

Next Social Contract Initiative and Economic Growth Program

PRODUCTIVITY AND THE HEALTH CARE WORKFORCE

Shannon Brownlee, Joseph Colucci, and Thom Walsh

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Executive Summary

Since World War II, health care spending in the United States has grown rapidly – faster than in the rest of the developed world, and much faster than the US gross domestic product. With less than 5% of the world’s population, the US now accounts for 40% of global health spending, almost twice as much per capita as the next highest-spending country. American health outcomes, however, have not kept pace with spending. The United States compares remarkably poorly to other developed countries on such measures as life expectancy at birth, infant mortality, and other indicators of population health. In other words, we are spending more and more on health care for lower and lower returns in the form of better health. Despite a steady stream of medical innovations, productivity growth in the health care sector has been slow.

There are several reasons for this poor productivity. Many tests and treatments (both new and old) are routinely put to use with little or no regard for whether they improve patient outcomes. Treating prostate cancer with proton beam therapy, for example, costs \$50,000 per patient – roughly twice the cost of standard radiation treatment. Yet there is no evidence that proton beam therapy is any better for the patient’s chances of surviving cancer or avoiding serious side effects.

There is also evidence that between one-tenth and one-third of tests and treatments are unnecessary or unwanted by patients. Such overuse consumes real resources and can cause real harm, and is largely the result of two main factors. One is the failure to measure whether treatments such as proton beam therapy are effective. The other is a phenomenon known as “supply-sensitive” care, the tendency of providers to deliver hospitalizations and other medical services simply because resources such as beds and technology are available.

There is one additional reason for health care's poor productivity: medical institutions are poorly organized. They waste time, money, labor, and other resources by operating inefficiently. The Dartmouth Atlas, which tracks Medicare data, shows that inputs (beds, physicians, equipment per capita) vary widely among hospitals, with little if any discernible difference in the outcomes of statistically similar patient populations.

Studies of provider performance, especially of hospitals, suggest that vast productivity gains are within reach of American medicine. Some institutions have made dramatic improvements in efficiency by improving their care delivery processes – improvements that have led, for example, to a 30% reduction in the use of MRIs for patients with back pain, and improvements in workflow patterns that take nurses from spending over 60% of their time *away* from patients to spending 90% of their time *with* patients. For example, if all hospitals achieved the same level of efficiency for inpatient care as Intermountain Healthcare, a multi-hospital chain based in Salt Lake City, total hospital spending in the US would fall by an estimated 43 percent.

Making better use of health care labor force is the key to improving productivity in the sector. This paper looks first at sources of low productivity in health care, and then examines the implications for future health care workforce needs.

Sources of Low Productivity

There are three principal reasons for poor productivity in health care: measurement challenges, supply-sensitive care, and poor organization.

Measurement challenges: Measuring productivity requires us to gauge the value of services provided, but this poses special challenges in health care. The consumption or utilization of health care services and the market price of those services (two easily-measured quantities) offer only limited information as to the value a patient receives from medical care. Many services don't have a clear relationship with improved health, and many expensive treatments are no more valuable than low-cost care. For example, medical (drug) treatment for stable angina (chest pain) is, for most patients, just as effective at relieving pain as medical treatment plus angioplasty, a surgical procedure – and the surgery is both invasive and expensive. Using the amount spent as a metric for value when comparing an angina patient who received medical management alone to one who had medical management plus angioplasty would incorrectly suggest that the patient who underwent angioplasty enjoyed better health. And even when we measure patients' actual health, it's difficult to attribute improvements to a particular treatment. The problems inherent in measuring the value of health care have prevented markets from providing effective signals to clinicians or patients about which treatments to use and which to avoid.

Supply-sensitive care: There is considerable geographic variation in utilization of medical services across the country, both in terms of dollars spent and the rate of utilization of specific tests and procedures. This variation cannot be explained entirely by differences in rates of illness, or the quality of care being delivered. Rather, it is explained in large part by differences in the concentration of such medical resources as hospital beds, CT scanners, and physicians. Los Angeles has more beds per capita than most other places in the U.S. – and not surprisingly, patients in Los Angeles spend more days in the hospital than most. This effect, known as supply-sensitive care, contributes to higher utilization in high-supply areas – but patients in those areas do not appear to benefit from much of the

additional utilization. This suggests that much of the care delivered in these high-supply areas is waste. The phenomenon of supply-sensitive care has significant implications for our discussion of the workforce.

Poor organization and productive inefficiency: Even when the care being provided is valuable, resources are routinely used ineffectively and wastefully in health care. Examples of this inefficiency abound. Highly-trained and highly-paid physicians fill out basic paperwork, patients wait hours for answers to simple questions, and nurses and technicians spend hours each day searching for commonly-needed medical supplies. A few hospital systems have reinvented their production processes using the waste-elimination philosophy of Lean management and have experienced significant improvements in efficiency and reductions in cost. Others have used different methods that have improved efficiency by reducing the delivery of unnecessary services.

Implications for the Workforce

Each of these factors – poor measurement, supply-sensitive care, and poor organization – has significant implications for health care workforce planning. Nearly 14 million people are involved in the direct delivery of medical services. Many of them, including 691,000 practicing physicians, 2.7 million nurses and nurse practitioners, and 83,000 physician assistants, spend years in training – much of which is federally subsidized. Thus, their numbers are influenced by federal and state policy. For example, the number of new physicians is determined in large part by the U.S. Department of Health and Human Services, which pays for the majority of graduate medical (residency) training and sets the number of residency slots. In the past, decisions about the number of physicians the nation needs has been determined largely on the basis of population growth and historical patterns of utilization of medical services. Most projections have assumed that as the population grows and ages, the nation will need more physicians and other health care workers to deliver needed services.

We argue that over-reliance on the workforce of the past as a model for the workforce of the future is likely to impede productivity growth in the health care sector. Supply and demand are not independent in health care. In assuming that the quantity of medical services delivered is independent of the size of workforce, policy experts who predict we need more physicians as the population expands and ages are making a crucial error, which is likely to exacerbate, not ameliorate, the poor productivity currently seen. Moreover, since increasing supply increases the provision of low-value services more than high-value services, an unwarranted expansion of the health care workforce is likely to reduce productivity even further.

This paper draws on a wide range of research, from the Dartmouth Atlas Project on geographic variation in utilization and efficiency, to the economics literature, and to case studies that have demonstrated it is possible to lower production costs and increase productive efficiency in hospitals and primary care settings. From this work, we draw three main conclusions about current workforce allocation and future workforce needs:

By improving primary care, it is possible to reduce the rate of hospitalization, and thus reduce the need for hospital-based labor for a given population of patients. Organized primary care practices, built around smaller panels (fewer patients per primary care doctor) and collaboration among clinicians, have successfully reduced utilization of emergency room and inpatient services while improving patient health, increasing patient and employee satisfaction, and reducing spending.

Improving productive efficiency within hospitals can also decrease the need for hospital-based labor. By improving skill-task alignment and reducing unnecessary processes and the delivery of unnecessary services, hospitals can free up high-priced specialists to serve a larger patient population. In some cases, reorganization of care processes has also boosted efficiency, allowing physical and staffing resources to serve more patients and decreasing the cost of providing care.

If all hospitals and ambulatory practices increase efficiency and improve care, the workforce of the future is likely to be very different from the workforce of today. The variation in the allocation of resources in different regions of the country coupled with case studies suggest that we now have more highly specialized clinicians than we need and too few primary care physicians to handle a larger patient population. Thus, the nation may not need more physicians, even after taking into account aging of the population and growth in rates of insurance, but we will surely need to address the ratio of primary care doctors to specialists. Moreover, many tasks that are currently performed by physicians could be done by other clinicians, such as nurse practitioners, or by trained non-clinicians such as health coaches and medical assistants.

Recommendations

Residency: In light of the deleterious effects a larger workforce is likely to have on productivity, the federal government should refrain from expanding funding for graduate medical education slots. If, after further study, an expanded workforce seems necessary to provide all beneficial medical care, this expansion should aim to encourage team-based care and strong primary care management, and to discourage a glut of specialists.

Regulation: Scope-of-practice and staffing ratio laws that interfere with skill-task alignment or with necessary reductions in the hospital workforce should be repealed or relaxed on providers with consistently good outcomes.

Research: Any projections of future utilization or workforce needs should account for supply-sensitive care, and adjust workforce recommendations to minimize overuse, or the provision of ineffective care. Research is also needed to determine how best to organize the delivery of health care services and reduce waste.

Remuneration: Payment reform will be a part of any effective strategy for improving productivity. It's crucial that reform efforts diminish or eliminate rewards for delivering large volumes of care that offer little or no benefit to patients. Clinicians may be salary-based (as they are at many high-quality health care organizations), with hospitals receiving global budgets to take care of a specified population of patients, or payment may take another form, but the nation should shift away from the current fee-for-service model toward a system that rewards the delivery of valuable care, not just more care.

Introduction

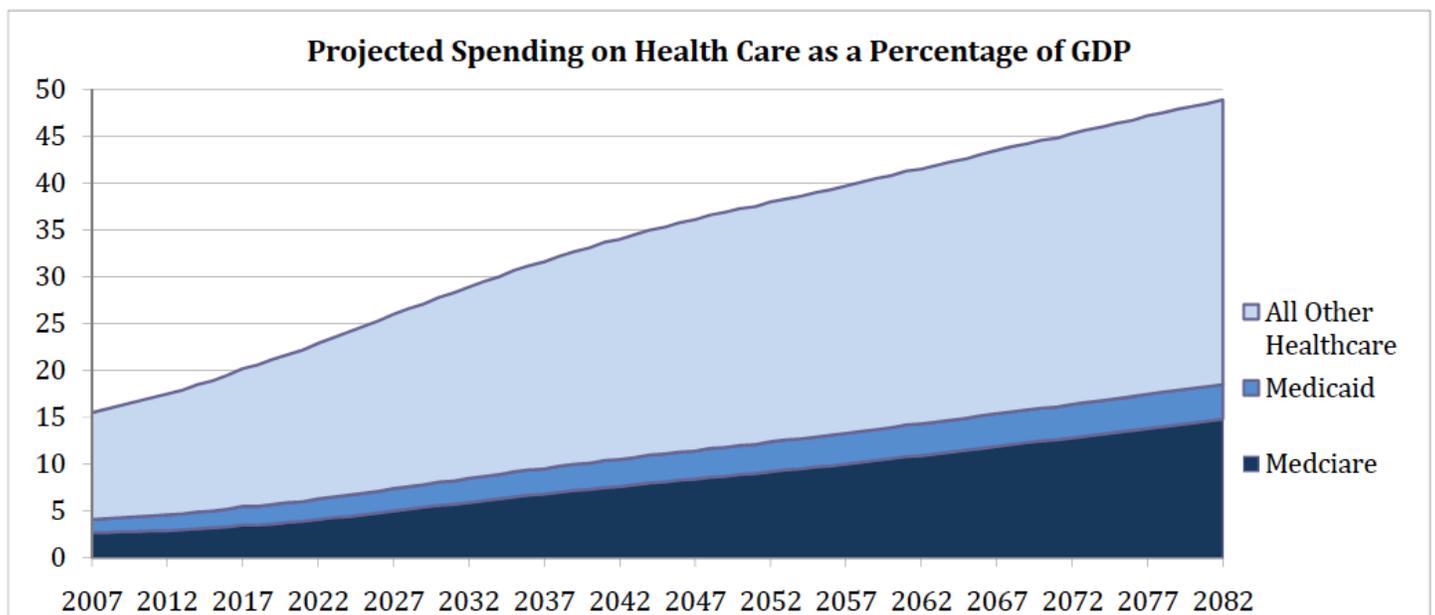
American health care spending as a percentage of GDP has been rising for more than 40 years. The US accounts for 40% of global health care spending, and spends around one and a half times as much per capita on health care as the next highest-spending country, Norway.^{1, 2} Although the rate of growth in health care spending slowed during the 2007-09 recession, it remains higher than the rate of growth in the economy as a whole (Figure 1).

In isolation, rising health care spending might not be cause for concern. As incomes go up, it makes sense that people want to allocate more resources to longer lives and better health. However, the reality of escalating health spending should give us pause because it does not appear to be purchasing better health. In 2008, U.S. per capita spending was 103% higher than the average per capita spending of Canada, Japan, Australia, and 16 Western European countries. Yet many U.S. health statistics, such as life expectancy at birth, infant mortality, and maternal mortality, ranked at or near the bottom of that group.³

Rising health spending is also crowding out other goods we might wish to purchase. For many of the roughly 170 million Americans with employer-provided health insurance, coverage accounts for a growing percentage of total worker compensation. As a result, living standards for middle- and lower-income Americans have stagnated or fallen, even as median total compensation has risen.⁴ Finally, escalating spending on health care at both the federal and state levels is squeezing out other public goods such as education, defense, and infrastructure maintenance, leaving the federal government and the states either to raise taxes or to accept unprecedented levels of public debt (Figure 2). We are spending more and more public and private money on health care, while getting less and less for it.

At the same time, rising health care spending has been accompanied by remarkably low productivity growth in the sector. In car manufacturing and computers, for example, rising productivity has meant that fewer workers are

Figure 1:



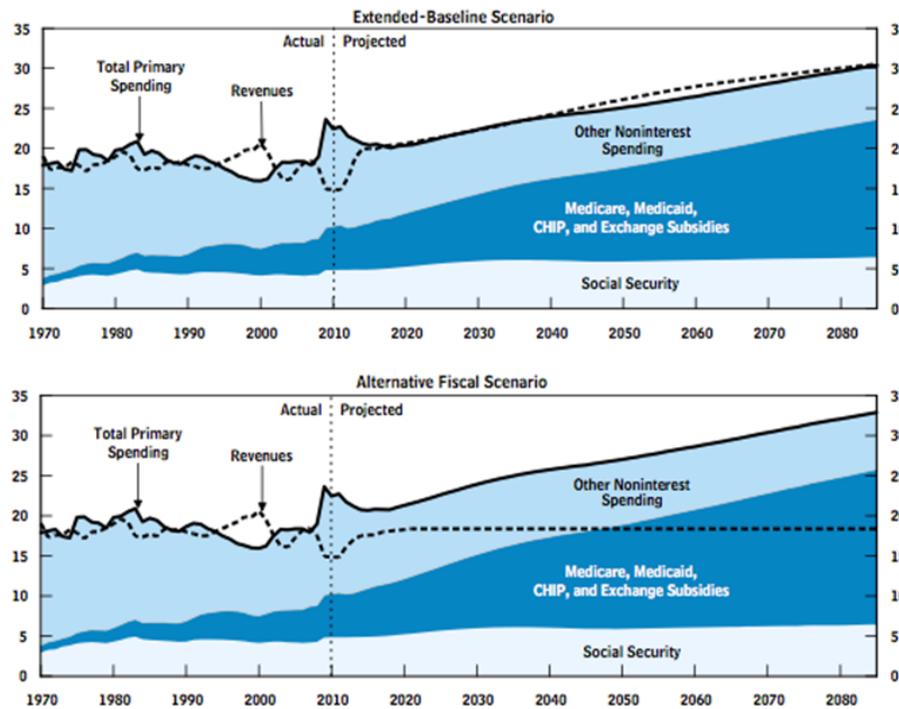
Source: Congressional Budget Office, 2011

needed to produce a vehicle, and that each new microchip offers more processing power for the same price. Those are just two examples of the sorts of productivity gains that have helped enrich the U.S. and the world over the last fifty years. Yet even as health care's share of GDP grows ever larger, productivity gains in the sector lag far behind the rest of the economy.⁵ While labor-intensive service sector industries in general have lower productivity growth than manufacturing or agriculture, health care does have room to be more productive. Health care resources, including the health care workforce, are not being put to the most efficient possible use.⁶

Figure 2:

Primary Spending and Revenues, by Category, Under CBO's Long-Term Budget Scenarios Through 2085

(Percentage of gross domestic product)



Source: Congressional Budget Office, 2011

efficient hospitals and primary care groups to determine what contributes to their greater efficiency.

The key ingredient to efficiently-delivered health care, it turns out, is human organization. Different hospitals allocate resources, including labor, very differently, depending in part upon the degree to which they have organized their processes for delivering care. Hallmarks of more efficient hospitals include formal methods for examining their own production processes and efforts to ensure that physicians and other clinicians work together as teams in caring for patients.⁷ More efficient health care providers also tend to emphasize community-based primary care over (expensive) hospital-based specialty services, and may be better at using clinicians as effectively as possible by harnessing their most advanced skills and ensuring that highly-trained workers are not performing low-value tasks. Studies of exemplary hospitals and physician practices, those that are more efficient than most, suggest that vast productivity gains are being left on the table.

This paper focuses on just one of the inputs needed to deliver health care: the physicians, physician assistants, nurse practitioners, nurses, and allied health professionals who make up the health care workforce. It draws on a broad range of literature, including studies of labor productivity, organizational improvements in health care, and regional variation in medical spending and practice. Our goal is to understand the role that the health care workforce plays in the sector's low productivity and to make specific recommendations for improving productivity through workforce policy. We first examine the evidence for poor productivity and some of the factors that contribute to it. We then look at the role of excess supply in driving overuse of medical services, and at the particular habits and techniques used by the most

If the nation could harness the best practices of these relatively efficient organizations and apply them to all health care providers in all states, the savings would be substantial – not just for Medicare and the federal government, but for state governments and private payers as well. To take a single example, if productivity in the hospital sector rose and all hospitals achieved the same level of efficiency for inpatient care as Intermountain Healthcare, a multi-hospital chain based in Salt Lake City, total hospital spending in the US would fall by 43 percent.⁸

The final aim of this paper is to examine current workforce policy in light of what we have learned about the causes of low efficiency and productivity, and about the ingredients necessary to improve them. From this critique, we offer several workforce policy recommendations.

Part I: Waste and Productivity

How do we measure productivity in health care? Economists and health services researchers often measure it in the same way they measure productivity in other industries. A systematic review of 265 productivity measures in 172 papers conducted by Hussey, et al. of the RAND Corporation found that the majority of health care productivity research tracked utilization, or the provision of medical services, either per dollar (of total cost or labor cost) or per worker (or worker-hour, etc.).⁹ Over 97 percent of productivity studies looked at the utilization of health care services as the only output. (Not surprisingly, most of those metrics were created by or for hospital managers, physician practices, and others interested in improving revenue generation.)

The other common method for measuring health care productivity is to look at the role of health care in the national economy. For example, in a recent paper published in the *New England Journal of Medicine*, Robert Kocher and Nikhil Sahni estimate health care labor productivity by measuring the growth rate of total health care spending (health care's contribution to GDP), minus the growth rate of the health care labor force.¹⁰ In their calculation, workers are the input; health care spending is the output.¹¹ In Kocher and Sahni's analysis, health care labor has become less productive over the last two decades, because wages in the sector have risen faster than the sector's contribution to GDP.¹²

These are reasonably useful ways to measure productivity in most industries, but they fail to measure the real *value* of health care. Writing in the *New England Journal of Medicine* in 2010, Michael Porter defined value as “the health outcomes achieved per dollar spent. This is what matters to patients and unites all actors in the system.”¹³ Individuals don't purchase medical services because they like to go to the doctor or be admitted to the hospital; they seek care because they want longer, healthier lives and relief from suffering.¹⁴ Employers and governments invest in health care for employees and citizens for the same reasons. This means, in the view of four health care economists interviewed for this paper,¹⁵ that we need a different set of output measures if we want to develop a productivity metric that incorporates the notion of value. (See the paper by Chernew, McKellar, and Colucci accompanying this report for more detail on how productivity has been measured.)

Health Care (In)efficiency

Measuring efficiency in health care is also uniquely difficult because purchasers, providers and patients each have their own idea of what constitutes value, quality, and the right price for care.¹⁶ Prices are often equated with value in

other industries, but in health care prices for identical services vary widely even within the same hospital. Spending per patient, similarly, is a poor measure of efficiency because health care providers are generally paid by the unit of service – for each CT scan, physician visit, day in the hospital, surgical procedure – without regard for the actual improvement the service caused in the patient’s health. If we used spending to measure value, it would appear more valuable to let a patient get diabetes and then treat the disease than to prevent its occurrence altogether – but no patient would choose that outcome. Thus, neither the price per unit of service nor the amount spent per patient is a sound measure of output or value.

Even without being able to measure efficiency with much precision, we know that some hospitals are more efficient than others. For example, some hospitals (often in more competitive markets) cannot negotiate favorable rates with private insurers, so they manage to make a profit on Medicare’s comparatively low reimbursement rates,¹⁷ while others claim to lose money on their Medicare patients. A more useful metric for the efficiency of different hospitals has been produced by the Dartmouth Atlas Project, which attempts to quantify variation in rates at which medical services are delivered to similarly ill patients in different hospitals. Dartmouth researchers studied chronically-ill Medicare recipients during the last two years or six months of their lives to produce a “relative efficiency” metric, which reflects the amount of resources used at a hospital to treat similar patients with similar outcomes.¹⁸

The Differences Between Spending, Price, and Cost

Terminology frequently becomes a problem in discussions of health care productivity, because people use the phrases “health care costs,” “health care spending,” and “the price of health care” interchangeably, without clarifying which quantity they are referencing. For clarity’s sake, we suggest the following definitions:

Cost refers to a provider’s total financial outlay for each unit of service. Costs can be measured per patient, per procedure, per hospital day, or something similar.

Price refers to the dollar amount paid to a provider for a specific service or bundle of services. For instance, we might refer to the price of an office visit or an MRI, or the price of cardiac bypass surgery, which includes multiple services.

Spending is the total amount spent to reimburse providers of health care services and equipment. Spending is affected by both the price of services, and by utilization, or the quantity of services provided. Thus, a payer might spend less per patient in a hospital with high costs and prices, but where utilization is low. The payer could also end up paying more per patient at another hospital where utilization is high, even if prices are lower.

Note that spending is the true variable of interest for most policymakers, and reduced spending can come as a result of lower costs (allowing lower prices), price controls or competition between providers (again leading to lower prices), or lower utilization.

The Dartmouth Atlas methodology takes advantage of the similarity among such patients to eliminate most explainable variation in how much care patients need. Within the study population, after appropriate adjustments for differences in rates of different chronic illnesses, age, sex, and race, the patients are substantially identical. Because patients are comparable in terms of initial and final health status (death), any benefit they gained from treatment in terms of longevity is essentially the same.¹⁹ This methodology also allows the researchers to measure resource inputs at different hospitals for the same output.

Different Production Functions

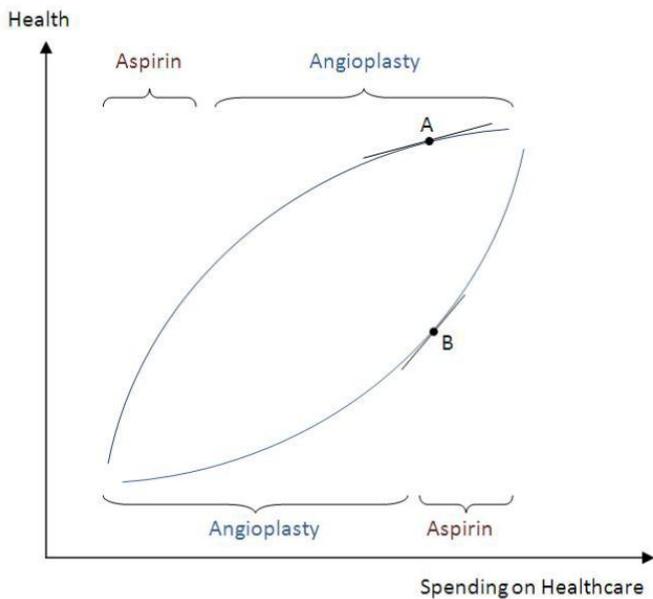
One common interpretation of the Dartmouth findings (of wide variation in health spending and levels of utilization) is that the marginal benefit of additional tests and treatments in most American hospitals is small or nonexistent. That interpretation suggests that many hospitals are delivering low-value or even totally unnecessary care. However, Amitabh Chandra and Jon Skinner have proposed an alternate interpretation. They contend that different hospitals operate on different production functions, because they have chosen to specialize in different kinds of treatments which are of varying degrees of cost-effectiveness.^{20, 21} Chandra and Skinner offer a typology for different kinds of services.

"[Category I treatments are] highly cost-effective "home run" innovations with little chance of overuse, such as anti-retroviral therapy for HIV, [Category II] treatments [are] highly effective for some but not for all (e.g. cardiac stents), and [Category III] "gray area" treatments [are those] with uncertain clinical value such as ICU days among chronically ill patients."^{22, 23, 24}

Hospitals that invest in delivering more or less of each category of care will have different production functions (see Figure 3). Empirical data suggest this is the case. For example, there is a negative correlation between the use of relatively high-value, low-tech treatments, such as aspirin and beta-blockers for secondary prevention in heart attack patients (which would fall under Chandra and Skinner's Category I) and expensive high-tech treatments of dubious value, such as angioplasty for asymptomatic patients (Category III).^{25, 26} The spending differences among hospitals that lie on different production function curves can be substantial. Skinner, Staiger, and Fisher found that risk adjusted one-year survival for a first heart attack was 69.7 per 100 patients in Knoxville, Tennessee, with one-year spending of \$20,720. By contrast, in Manhattan risk-adjusted survival was 65.6 per 100 patients, and one-year spending was \$47,133.²⁷ These studies and others support the argument that there is considerable room for increasing productive efficiency through shifting investment in how inefficient practices deliver care.

It turns out there are large differences among hospitals in terms of the amount Medicare spends per patient to treat the chronically ill in their last few months of life, and thus in the relative efficiency of each hospital. According to the Dartmouth metric, the Mayo Clinic's St. Mary's Hospital, in Rochester, Minnesota, and the Cleveland Clinic, in Ohio, are among the most efficient academic medical centers. (They are also widely considered to be exemplary in terms of the technical quality of their care.) At both hospitals, Medicare Part A spent roughly \$34,000 on inpatient services per decedent over the last two years of life. Contrast that to the \$90,000 spent per patient at Hahnemann

Figure 3: Different hospitals can have different production functions depending on the kinds of treatment to which they allocate resources.



In the figure, “Aspirin” represents high-value, low-cost care that falls into Chandra and Skinner’s Category I; “Angioplasty” represents Category II care that has value for some patients but not for others. Hospitals that over-invest in Category II care, because of reputational or other incentives, may neglect high-value, low-tech care and achieve lower health at a given level of spending. If a hospital is on the lower production function, reducing spending will not improve outcomes – indeed, patients will be harmed. Improving outcomes will require a concerted effort to improve organization, reallocate resources, and move to the higher production function.

Source: Baicker and Chandra, 2011

Hospital, in Philadelphia, and nearly \$72,000 at Cedars Sinai Medical Center, in Los Angeles. There was some variation in what Medicare paid each institution in terms of *price* per unit of service, but most of the difference was in utilization – days in the hospital per patient, days in the intensive care unit, and physician visits for hospitalized patients. Over the last two years of life, the average patient had 155.8 physician visits at Cedars Sinai, more than double the 62.8 visits at the Cleveland Clinic.²⁸

These findings should not be surprising, given the myriad sources of waste and disorganization in health care. A recent study by PricewaterhouseCoopers estimated that as much as half of health care spending is waste, about one-third of which can be attributed to the delivery of health services that are either unnecessary or provided incorrectly.²⁹ The report estimates that unnecessary or unwanted tests, treatments, hospitalizations, and physician visits account for \$210 billion of that waste. Preventable complications from diabetes lead to \$22 billion in waste; overprescribing of antibiotics creates another \$1 billion.

Some other common examples of inefficiency in health care:

- Highly skilled providers regularly perform tasks that require a lower level of skill and fewer formal qualifications than they possess. For example, registered nurses escort patients to examination rooms, schedule follow-up visits, and discuss whether the patient has had the recommended screenings – basic clinical and administrative tasks that could be performed by a medical assistant, nurse’s aide, or a case manager.³⁰
- Every industry requires a certain amount of paperwork and administration to function, but the American health care sector stands out in the amount of time, money, and effort it wastes on administrative work that

provides no value for patients or payers. (For a list of some of the tasks undertaken by health care administrators, see Cutler & Ly 2011).³¹ Estimates of the cost of administrative waste (not total administrative spending – just *waste*) range from \$100 billion to almost \$400 billion per year.³² The US spends about three times as much on paperwork and other administrative activities as does Canada.^{33, 34} Administrative tasks also waste the time of highly trained providers: primary care physicians, physician’s assistants, and hospital nurses spend multiple hours a day doing paperwork instead of caring for patients.

- Moving hospitalized patients around is another source of waste: it congests hallways, exposes patients to injuries in transit and while moving in and out of bed, and requires hospitals have enough staff to do the moving. A patient who needs an X-ray will be transferred from the bed to the gurney in order to be taken to the machine’s location, rather than moving the machine to the patient. Each aspect of patient movement creates several forms of waste: overstaffing, defects (injuries to both patients and workers), and forcing patients to spend extra time in the hospital.³⁵
- Physicians often care for similar patients in different ways, even when the doctors work in the same hospital. Nurses have talked about carrying notecards to remind themselves of the settings on equipment, which tests to perform, and the drugs and other treatments each patient should get, based not on evidence but on the preferences of the different surgeons they work for – meaning some patients are not getting optimal care, and the nurses have to waste time and effort keeping track of the differences.

The Role of Health Care Labor

Labor is the single most expensive input in health care (and the most important one for the quality of patient care), and as the examples above suggest, it is not being deployed efficiently. That means we could achieve equal (or better) health outcomes in the U.S. while spending less on health care labor if the processes used to deliver care were more efficient. A handful of hospitals and ambulatory care practices have made significant gains in efficiency by extracting waste from their processes and focusing attention on managing the care of chronically ill patients. Whether driven by a sense of professional responsibility for improving care or by financial pressure to reduce input costs, their methods are similar and instructive.

Three examples illustrate the vast room for improvement in health care efficiency and productivity, and suggest some specific changes in the composition of the future workforce.

- In 2002, ThedaCare, a four-hospital system in northeastern Wisconsin, implemented a version of “Lean,” a production improvement system pioneered by American efficiency expert W. Edwards Deming and first put into practice in Japan by Toyota.³⁶ At the time, ThedaCare’s hospital-wide mortality rate for coronary bypass surgery was nearly 4 percent. After several iterations of implementing Lean management methods, mortality dropped to 1.4 percent in 2008 and was 0 percent through six months of 2009. ThedaCare’s efforts to streamline its cardiac bypass processes, including elimination of steps that did not contribute to patient outcomes, led to the average time a bypass patient spent in the hospital to fall 22%, from 6.3 days to 4.9 days.^{37, 38}

- Virginia Mason Medical Center in Seattle, Washington, found that patients suffering from acute (recently developed) low back pain followed different treatment paths depending on how they entered the hospital. If the patient came through the emergency room, they often underwent an MRI, regardless of whether or not it was likely to improve diagnosis. If the patient came through a referral from primary care, by contrast, they were likely to be seen by a neurologist. In the end, most patients were treated with painkillers and physical therapy regardless of how they came into the system. That treatment could as easily have been prescribed without taking up so much specialist time and without unnecessary imaging.

Using the Toyota method, the hospital defined a single pathway for all back pain patients. This pathway sent the vast majority of patients directly to a nurse practitioner (NP), who screened each patient for warning signs of serious complications (such as a tumor), and then to physical therapy. The NP reduced the number of patients who unnecessarily saw a neurologist, and restricted MRIs to patients with specific, evidence-based justifications – slashing the number of patients getting an MRI for back pain by 31 percent.³⁹

- Another way to increase productivity is by keeping patients healthier, so they have less need for costly hospitalizations and surgeries. Many chronically-ill patients find themselves going in and out of the hospital because their conditions are poorly controlled. Some of these conditions, such as heart failure and diabetes, are called “ambulatory care-sensitive conditions,” because hospitalization can often be avoided with good primary care.^{40, 41, 42, 43, 44} Several pilot programs and demonstration projects aimed at intensively managing chronically ill patients in the primary care setting have shown reductions in rates of unnecessary hospitalization.

For example, Group Health Cooperative of Puget Sound's “patient-centered medical home” test clinic made significant progress in keeping patients out of the hospital by reducing the number of patients each primary care physician was responsible for and matching physicians with inexpensive, relatively low-skilled medical assistants who could greet patients, escort them to exam rooms, check whether they were up to date on standard tests, and schedule future tests using evidence-based protocols. Chronically-ill patients were intensively managed, often with home visits and longer office visits. Compared with patients at other Group Health clinics, those in the medical home had fewer complications from chronic illness, 29 percent fewer emergency visits, and 6 percent fewer hospitalizations. The higher initial spending on improved primary care was offset by lower hospital spending and led to lower total spending per patient.^{45, 46}

When taken together, the results of these programs and others like them, as well as the Dartmouth Atlas findings on relative efficiency, show the profound implications the structure of the health care workforce has for improving productivity in the sector.⁴⁷ We can say with some certainty that health care is not as productive as it could be, because we know it is not operationally efficient. And we can say that health care labor could be used more efficiently, perhaps dramatically so, to produce the same or better population outcomes with lower spending. The following section looks at implications of improving efficiency for the size and composition of the health care workforce. It examines current workforce projections, most of which predict (we think incorrectly) that the healthcare system will need significantly more physicians and other clinicians in the future. We make some predictions about the effect on health outcomes and productivity of the health care sector of carrying out current

workforce estimates and expanding the supply of clinicians. The final section of the paper makes specific policy recommendations.

Part II: Implications for the Workforce

Seeing the evidence of low productivity in the health care workforce should be a radicalizing moment – and for many policy experts, it has been. There is now widespread recognition that among the many changes that need to come to pass if we are to improve health care efficiency and productivity are distinct shifts in how we train, allocate, and use the health care workforce.

The U.S. needs to make these shifts very deliberately. In most industries, competitive pressures force companies to make an efficient use of labor. In the steel industry, for example, increasing automation allowed fewer, higher-skilled workers to replace larger numbers of lower-skilled workers; companies that failed to adjust were driven out of the market. However, because health care providers (such as hospitals) are generally paid for the volume of services they deliver regardless of the value of those services, health care providers have not had much incentive to shrink their workforce and to allocate labor in a way that would maximize efficiency. Health care delivery is also complicated by the effect that the supply of clinicians (particularly physicians) has on the rate at which medical services are delivered (see box on supply-sensitive care, next page.) Simply put, the more doctors there are in a geographic region, the more services they will deliver, regardless of whether those services make the population better off.

There is clearly a role for government in arresting the maldistribution and disorganization of the medical labor force. Indeed, the federal government is already heavily involved in the training of physicians because the Centers for Medicare and Medicaid Services (CMS) fund the majority of post-graduate medical education (residencies). By changing how CMS funds residency and the other qualification requirements for physicians and medical schools, it is possible create significant savings and improve productivity.

With that in mind, here are four conclusions about the health care workforce that can be drawn.

Existing projections of future workforce needs are probably overestimates.

Existing projections for health care workforce needs assume that the current health care system is efficient, and ignore the possibility that hospitals can move to higher production functions. Such projections may grossly overestimate the need for additional physician capacity in a more organized health care system.

There is a large body of literature in medical journals and policy publications laying out what kinds of medical services and providers Americans will want and need in the future. The most cited (and credible) projections come from the Center for Workforce Studies of the Association of American Medical Colleges (AAMC), a trade group representing medical schools and teaching hospitals across the U.S. and Canada. The Center's most recent study, published in 2008, argued that the U.S. faces a shortage of around 124,000 physicians by 2025.⁴⁸ As the population ages and more citizens are covered under the Patient Protection and Affordable Care Act of 2010, the Center predicts we will need more than 72,000 additional physicians⁴⁹ and 581,000 more nurses by 2020.⁵⁰

Their projections are based on current levels and trends of the number of working physicians, how much service those doctors can provide, and the general level of demand for medical services. Their projection of the number of available physicians is relatively uncontroversial (especially given the restrictions on physicians entering the workforce imposed by residency requirements). But the authors of the AAMC study admit that predicting physician behavior and patients' future desires and needs for physician services is difficult, and requires making some strong assumptions. Their headline prediction assumes, for example, that doctors won't retire later or work more hours in response to any emerging shortage of physicians, and that as the patient population expands and ages, the need for medical services per capita will grow. In the scenario the authors consider most likely, their assumptions lead to an estimate of a significant physician shortage. But if those assumptions aren't borne out, the prediction loses validity.

Supply-Sensitive Care

Supply-sensitive care is one of the most important explanations for why health care spending and treatment patterns vary across the country.⁵¹ Essentially, the hypothesis is that physicians use the availability of medical resources (like hospital beds and consulting specialists) as a heuristic when making decisions about how to treat patients. Thus, the larger the supply of hospital beds in a market, the more likely a patient with a given set of symptoms will be admitted, and the more days patients in the area will spend in the hospital. Similarly, the greater the supply of primary care physicians, the more primary care visits patients will have. Researchers at the Dartmouth Atlas Project and elsewhere have documented this phenomenon for the amount of end-of-life care dying patients receive, days infants spend in Neonatal Intensive Care Unit (NICU) beds, the rate of neonatologist consultations, and a variety of other treatment patterns. Patients in resource-dense areas (areas with numerous doctors and hospital beds available, compared to the predicted needs of the population) receive more care than those in areas with lower supply.^{52, 53, 54}

Not all clinical decisions are subject to influence by supply. A patient with a hip fracture, for instance, will nearly always be hospitalized, regardless of the supply of orthopedic surgeons or hospital beds. Rather, the supply factor appears to have the greatest influence on physician's decisions when good scientific evidence is lacking about which treatment is most likely to be effective, or when consensus about the best course of treatment is lacking. This category of care includes a wide range of decisions, such as whether to admit a patient with chest pain to the hospital, or place an elderly patient in a regular hospital bed or the Intensive Care Unit.^{55, 56, 57, 58}

For example, an otherwise healthy low-birth weight infant can be taken care of in the regular nursery, or they can be placed in the neonatal intensive care unit (NICU). This decision appears to be influenced by a combination of bed availability and the habitual pattern of care at the hospital. Likewise, the decision to call in a neonatologist for a consultation about a newborn who is having a little difficulty breathing is influenced by the availability of such specialists. The same is true of office-based specialists. Imagine two similarly-sized cities with similar populations of people with heart disease. Because there are no clear, evidence-based clinical guidelines that determine how often cardiology patients should have follow-up appointments, doctors use their available time as a heuristic. If city A has twice as many cardiologists as City B, the time between follow-up appointments for patients with heart disease will be roughly half as

long as in city B.

It's important to recognize the distinction between the terms "supplier-induced demand" and "supply-sensitive care." Both are attempts to explain the provision of excess services that don't benefit the patient. However, the term "supplier" refers to an individual – typically a clinician – and "supplier-induced demand" refers to individual behavior. "Supply" is a feature of a city, a market, or a region. The proposed causal mechanism is the most important difference between the two. In supplier-induced demand, clinicians are motivated by the fee-for-service payment system to prescribe more care than their patients need or is actually beneficial. While there is evidence that physicians respond to financial incentives, the claim that they systematically recommend services that they know to be unnecessary is controversial and not well-established by research.⁵⁹ The mechanism behind supply-sensitive care, by contrast, involves the fact that clinicians face many decisions which are not clearly informed by research, because the relevant clinical trials don't exist. In those cases, physicians often lean on their training, and a number of human cognitive biases and heuristics come into play – including the availability of resources. The existence of supply-sensitive care has been well-documented by observational studies.⁶⁰

There are a couple of other important points regarding supply-sensitive care. One, the per capita supply of such resources as NICU beds and neonatologists to staff them does not correlate with the prevalence of illness in the population.⁶¹ Indeed, physician supply tends to be lower in communities with high rates of minority and low-income patients, the very people who need more care.⁶² (This is sometimes called the "inverse care law.") Two, more is not always better when it comes to improving patient outcomes, and a greater supply of many resources does not necessarily lead to better health.⁶³ Those both reinforce the fact that an excess supply of resources can lead to harmful overuse and reduced efficiency.

The authors do offer a variety of projections under alternate assumptions, including the possibility that physicians will be able to serve more patients, work longer careers, or work more hours. The authors even suggest in their text that some of the medical care that patients currently receive is not worth providing. However, all of their quantitative projections assume that the medical workforce will continue to deliver those services. In so doing, they both accept that overuse will continue unabated, and assume that the level of unnecessary utilization is unrelated to the workforce available to provide it.

While the AAMC study focuses on the physician workforce, it makes some predictions based on a larger primary care role for NPs and PAs. If more NPs and PAs enter the workforce, they may alleviate some of the burden on primary care doctors and may increase access for patients who have trouble getting a primary care appointment. There is some evidence to support the notion that NPs can free up time for higher-level providers – as noted above, Virginia Mason successfully used them to reduce the unnecessary workload on neurologists. However, primary care studies haven't looked at long time horizons to see if there's a difference over a lifetime between patients who get primary care from a physician and those who get it from an NP or PA. Studies have focused instead on measuring the marginal productivity of different types of provider (usually by measuring patient throughput), in order to determine whether hospitals could save money by replacing higher-skilled workers.^{64, 65, 66, 67, 68} The lack of such

long-time-horizon studies is not a reason to avoid reassigning primary care to NPs and PAs, but it is an area for future research.

Expanding the health care workforce is likely to worsen current inefficiencies.

If the U.S. increases the physician workforce to fill AAMC projections, we will continue providing unnecessary care and further entrench inefficient production patterns. Continued overuse is antithetical to the goal of improving productivity, and will remain a problem even if we succeed in reducing the waste in production processes.

Given the flaws in projections of workforce need, we must be careful not to over-expand physician capacity. If we overestimate the effects of aging and rising rates of obesity on future medical need, we may be left with a workforce that provides even *more* unnecessary care than it does now, and further reduces productivity. By contrast, the problems associated with underestimating growth in health care needs seem less worrisome – our existing workforce has large amounts of excess capacity that could, if a shortage became apparent, be used more effectively to care for more and sicker patients.

Increasing the size of the workforce also makes it harder to exert political control over health care spending, because it creates an ever-larger constituency with a vested economic interest in keeping health care spending high. The interests of medical workers are concentrated, giving them a strong incentive to participate in political discussions where their incomes are at risk, while the harm from unnecessary medical treatment and spending is broadly distributed across the population, and therefore not as powerful a motivator for political action.⁶⁹ The same patterns exist within institutions. The internal resistance of administrative workers to change (especially change that would put them out of work) may explain why administrative waste is so prevalent in health care, while companies like Amazon have been able to drastically reduce the administrative waste in industries like retail.

Better primary care can decrease utilization of expensive emergency department and hospital services, and thereby reduce the need for hospital-based specialist labor.

More intensive primary care for chronically ill patients appears to lead to fewer emergency room visits and lower hospital-based utilization. While we may need a larger primary care workforce with more nursing and allied health professionals such as case managers, better primary care will probably mean we need fewer hospital-based specialists.

The Group Health primary care medical home and other similar efforts to reduce utilization of hospital and emergency room services have several implications for workforce projections.⁷⁰ First, the results suggest that expanding the medical home model across the country could significantly reduce the workforce needed in hospitals for the current patient population. Increasing the number of primary care physicians is a recommendation that has reached near-consensus in the policy arena.⁷¹ It's possible that we may need to expand the primary care workforce in order to serve more people while simultaneously reducing panel sizes to match the levels in Group Health's medical

home and other demonstrations. But simply adding primary care physicians to the system will not improve productivity without changes in the way primary care is delivered.

There is also widespread agreement that the ratio of primary care physicians to specialists needs to increase.⁷² Most other developed countries have much higher ratios of primary care to specialists than we do in the U.S. In most developed nations, less than half of physicians are specialists;⁷³ in the U.S., specialists make up more than 60 percent of the physician workforce. Rebalancing that ratio poses a significant challenge, since the number of young physicians going into primary care (family practice, general internal medicine, and pediatrics) has been dropping steadily for more than a decade.⁷⁴ Boosting the ratio of primary care physicians to specialists, and deploying primary care resources to regions of the country where they are needed most, will require targeted policies by the Centers for Medicare and Medicaid Services.

Projections based on the experiences of efficient hospitals suggest a need for fewer hospital-based specialists.

Along with the reduced utilization of hospital services resulting from implementing primary care medical homes, improving the productive efficiency at hospitals should lead to adjustments in their workforce size and mix. As some tasks are shifted to lower-skill clinicians or to less expensive specialties, more expensive specialists in individual hospitals will be able to use their extra time to serve a larger population of patients. Improving hospital efficiency across markets, however, will lead to a surplus of specialists.

Implementing efficiency improvements such as those seen at Virginia Mason, ThedaCare, and other hospitals across all hospitals in a region or market would have significant implications for the local health care workforce size and mix.⁷⁵ These efficiency demonstration projects have often shifted tasks down the skill ladder, while still providing care that is as effective or better with lower immediate labor costs.⁷⁶ Implemented across a market, these efforts would lead to a reduced need for at least some hospital-based specialists. This possibility is supported by the Dartmouth Atlas, which shows lower specialist inputs at the most efficient hospitals (many of which are also considered some of the nation's highest quality medical centers).

Interestingly, while case studies of primary care medical homes and Toyota efficiency methods often produced reduced hospital utilization, none made explicit projections for reductions in workforce as a result of greater productive efficiency. Many hospitals that have used Toyota and other efficiency-improvement methods have had no-layoff policies as a way to gain cooperation from employees and avoid the aforementioned political resistance to improved efficiency.⁷⁷ They have relied instead on workforce attrition, and on recruiting new patients from competing hospitals, to ensure that physician labor is fully used. If all hospitals in a region or market improve efficiency, however, they will run out of patients to recruit and could find themselves with more physicians than they need given the current patient population. What their needs will be as the U.S. population grows and ages, and as 30 million newly insured Americans begin to access health care under the provisions of the 2010 Patient Protection and Affordable Care Act, is simply uncertain.

Many policymakers have suggested that money will be saved by shifting care to less-skilled, less-expensive clinicians like nurse practitioners and licensed practical nurses, rather than physicians and registered nurses, respectively.⁷⁸

However, immediate labor costs are only part of the spending equation. Caring for the chronically ill makes up nearly half of spending, and that proportion will likely increase as the population gets older and more obese, so short-term spending measurements are increasingly insufficient. The best way to measure the effect of cost-cutting interventions like better primary care and making better use of lower-level clinicians in hospitals would be to examine lifetime inpatient utilization, particularly the number of lifetime hospital admissions and readmissions. As we mentioned, there are no studies looking at long-term utilization of medical services based on whether patients see a physician or nurse practitioner for primary care. That lack of research leaves open the possibility that one provider or the other tends to miss important indicators of future health problems, and fails to prevent an expensive medical condition later in life. A case manager who focuses on diabetic care may produce equivalent diabetes outcomes to a physician, but it's possible they will miss early signs of preventable heart disease. Conversely, one sort of provider may tend to use more unnecessary or low-value tests, leading to higher spending down the road with no discernible benefit.⁷⁹

In general, the evidence does not support the idea that we can reach sustainable levels of health care spending, or greatly increase productivity, by simply task-shifting or relying on other small, discrete interventions. The most impressive results in reducing spending, improving outcomes, and boosting efficiency and productivity have come from concerted efforts to organize care, eliminate waste in production processes, and communicate with patients – in short, to develop coherent systems that provide only the tests and treatments that patients value.⁸⁰

Conclusion

Some policy makers have looked to the health care sector as a way out of our current unemployment problem, and indeed health care is one of the few sectors that continued hiring throughout the 2007-09 recession.⁸¹ Looking to the future, the Bureau of Labor Statistics predicts that health care will add 3,600,000 jobs by the end of the decade.⁸² But simply adding jobs to an already inefficient sector will have the perverse effect of further driving up spending, decreasing sector productivity, and depressing job growth in the rest of the economy – while worsening the federal government's prospects of resolving our long-term fiscal imbalance.

Policy analysts have long been pointing to human organization as the key to providing better health care. It is also the hallmark of greater efficiency. Indeed, most of the hospitals in the top 10 percent of Dartmouth's relative efficiency metric are organized, salaried, multi-specialty group practices.^{83, 84} This suggests that one of the secrets to improving efficiency across the health care sector, and thus increasing productivity, is finding incentives for hospitals and physicians to emulate the habits of organized, salaried group practices. This is not a new idea: it is implicit in several aspects of the 2010 Patient Protection and Affordable Care Act, particularly in the provisions for Accountable Care Organizations.^{85, 86} Also needed are ways of disseminating usable information to patients about the value of seeking more organized, efficient care.

Improving productive efficiency in health care will also have profound implications for the workforce of the future. Adopted broadly, medical homes similar to the Group Health experience, Lean improvement programs for eliminating waste in hospitals, and lower levels of supply-sensitive care will likely lead to reduced demand for hospital-based specialists and other hospital-based workers such as nurses and administrative personnel. At the

same time, we may need more clinicians in primary care, including more primary care physicians, physician assistants, physical therapists, nurses and nurse's aides, nutritionists, pharmacists, and case managers.^{87, 88}

Finally, we note these conclusions are based on observations of relatively few highly efficient systems. We believe the findings from these case studies have a degree of generalizability, but there are undoubtedly site-specific attributes that do not generalize. For this reason, a rigorous assessment of health care delivery and efficiency is badly needed. The science of health care delivery is a burgeoning field that seeks to determine the best ways to deliver care. The most effective use of the health care workforce should be included in this research.

The potential to cut waste from health care is vast, and the key to tapping that potential lies in organizing systems of care. The health care workforce of the future cannot simply expand the current mix of specialties and types of workers. As providers become more organized, they will begin to rationalize their workforces, so that the supply of clinicians and other workers matches the needs of the patient population they serve. Organized systems of care will likely use fewer physicians in specialties and more in primary care, along with fewer nurses in hospitals and more in primary care. This shift will offer a more equitable distribution of health care incomes, as the need for highly paid specialists declines and demand for mid-level clinicians and allied health professionals increases. The transition towards organized care and this new workforce represents a challenge in the short term, because it is difficult to predict how quickly we will achieve greater efficiency and thus whom to train. But failing to improve productive efficiency in health care is not an option. The system we have is a drag on the rest of the economy. Barring a major overhaul in the health care workforce and how it is organized, the effects of an overbuilt, oversupplied health care industry will be felt by future generations.

Shannon Brownlee is a senior fellow in the Health Policy Program at the New America Foundation and a senior vice president at the Lown Institute. She can be reached at brownlee@newamerica.org.

Joseph Colucci is the assistant director of communications at the Lown Institute and former program associate at the New America Foundation. He can be reached at jcolucci@lowninstitute.org.

Thom Walsh is a post-doctoral research fellow at The Dartmouth Center for Health Care Delivery Science. He can be reached at thom.walsh@dartmouth.edu.

Summary of Policy Recommendations

The findings of this paper suggest key policy recommendations in four areas: the training of medical residents; regulation of health care, particularly with regard to scope of practice and health information technology; research; and payment.

Residency

For the moment, CMS should not expand the number of residency slots that it supports. The physician shortages projected by the AAMC ignore the effects of supply-sensitive care and the possibility of improved efficiency. These shortages may not appear, and expanding the physician workforce will likely exacerbate low productivity seen at many health care institutions.

At the same time, CMS should establish clear standards to increase the proportion of residents trained in delivering primary care, including chronic disease management and communicating with patients.

CMS should shift its allocation of residency funds to encourage/reward teaching hospitals and academic medical centers with strong group practice norms, organized systems of care, protocols that encourage shared decision making, and other hallmarks of low-cost, high-value care.⁸⁹ That inducement might take the form of higher resident salaries at efficient institutions, or simply moving slots from relatively inefficient hospitals, such as New York University Medical Center in Manhattan, to outpatient training for primary care in more efficient systems, such as Intermountain Healthcare in Salt Lake City.

Regulation

Congress and state legislatures should create exemptions from scope-of-practice and staff ratio regulations, and provide legal liability protection, for provider groups that a) are actively experimenting and collecting data on the most cost-effective provider mixes or b) have consistently excellent quality and patient outcomes.

Private insurance, with each company's individual requirements, fees schedules and restrictions on coverage, contribute to the extraordinary degree of administrative waste at the provider level. States should examine their insurance regulations and find ways to harmonize administrative requirements for providers.

Research

New projections of workforce shortages/surpluses and recommendations for workforce policy must either account for the effects of supply-sensitive care, or provide a compelling alternative explanation for the huge variation seen among providers in the use of medical resources without commensurate variation in outcomes.

Federal funds should be directed towards developing a science of health care delivery. The bulk of federal research money now goes toward seeking new treatments and comparing existing ones. The next frontier is determining the best ways to deliver care as efficiently as possible, and the most effective use of the health care workforce should be included in this research agenda.

Remuneration

Payers must begin implementing methods of paying hospitals and physician practices that offer incentives to become more organized and efficient. There is growing recognition among policymakers that fee-for-service should be mostly phased out. The majority of providers that rank high in Dartmouth's metric for relative efficiency are salaried practices, which suggests that a salary, as opposed to fee for service, offers incentives for physicians to avoid waste. (At the same time, salaried group practices often provide incentives to maintain quality of care and throughput.) However, salaries alone will not create human organization. Fee-for-service as a means of paying hospitals should also be scaled back in favor of bundled payments and global budgets, which would push hospitals to extract waste from their processes and rationalize their investment in labor and capital.

Appendix I: Overview of Today's Health Care Workforce

There are approximately 691,000 physicians working in the U.S. right now – about one for every 450 people.⁹⁰ In addition to physicians, there are about 275,000 pharmacists dispensing medications in drugstores and hospitals nationwide, as well as 156,000 dentists and oral surgeons.

Only around thirty percent of physicians in the US practice in primary care specialties (general internal medicine, general and family medicine, and general pediatrics). The remaining physicians are specialists, including surgeons, OB/GYNs, psychiatrists, cardiologists, pulmonologists, and many others. In most other developed countries, there are about two primary care physicians for each specialist. In the US that ratio is much lower, and the number of specialists compared to primary care physicians has been increasing over the last two decades. The change has not been the result simply of growth in the number of specialists while primary care stayed constant, but instead has represented an exchange of primary care for specialists.

Of the doctors working at any given time, over 100,000 are residents – recent graduates of medical school, participating in their post-graduate medical training.⁹¹ They work in teaching hospitals across the country, under the supervision of attending physicians, for between three and eight years depending on their specialty. Residencies have traditionally involved working long hours. Residents are permitted to work up to 80-hour weeks, and may be responsible for more medical labor than their numbers indicate.

The Centers for Medicare and Medicaid Services (CMS) pay teaching hospitals to run residencies through their graduate medical education (GME) programs. The number of slots Medicare funds has been set at around 25,000 for several years,^{92, 93} meaning that regardless of the number of physicians matriculating in U.S. medical schools, the number of new doctors produced each year is capped. Although physicians make up only a small portion of the clinical workforce, their importance and the long lead-time involved in training them has led most workforce planning discussions to focus on physician supply when projecting future health care needs.

Physicians (including residents) supervise a variety of skilled providers, including physician assistants (PAs), physical therapists, nurse practitioners (NPs), and registered nurses (RNs). There are approximately 2,737,000 RNs and advanced practice nurses working in the US, making it the fifth largest occupation in the country (after retail sales, cashiers, office clerks, and food prep/service).⁹⁴ Other mid-level providers are significantly less common – there are about 83,000 PAs and 198,000 physical therapists nationwide.

Lower-level clinical workers include medical assistants, licensed practical and vocational nurses, home health aides, emergency medical technicians (EMTs) and paramedics, and others who work directly with patients under the direction and supervision of nurses, physicians, and other medical personnel. The precise number of low-level clinical workers is difficult to establish, but it's well over four million, including about 750,000 lower-level nurses, 226,000 EMTs and paramedics, 528,000 medical assistants, 219,000 radiology technicians, 330,000 laboratory techs, 334,000 pharmacy techs, 94,000 surgical techs, and 1,879,000 home health and personal care aides.

In addition to clinical workers, the health care industry employs a vast army of administrative and management personnel. Many of those workers spend their time communicating with payers, including private insurers, the federal Centers for Medicare and Medicaid Services (CMS), and state Medicaid programs. These administrators make sure hospitals and physician practices get paid and determine how much patients are responsible for paying

out of pocket. (We have chosen to exclude payers, both private insurance and public, from our discussion of productivity; while the insurance industry has an important role to play in shaping the future of the medical system by reforming payment systems, we do not see the composition of the insurance workforce as a particularly important driver of productivity.) Just as it is for low-level clinical workers, establishing a complete picture of the administrative workforce is difficult because of the wide range of job titles. However, at a minimum this workforce includes 508,000 medical secretaries, 179,000 medical records & health IT workers, and 95,000 medical transcriptionists, led by 303,000 medical and health services managers. The work performed by those million administrators is supplemented by the significant paperwork and other clerical duties performed by clinicians, including highly trained (and expensive) physicians and nurses.

While we have not enumerated all of them here, the health care industry as a whole employs over 14 million people – 11 percent of the US civilian workforce. That proportion will increase over the next decade: several of the occupations projected to grow the fastest over the current decade (both in percentage terms, and in the absolute number of new workers) are health-related. They include RNs (711,900 new jobs), home health and personal care aides (1,313,200 new jobs), physician assistants (24,700 new jobs),⁹⁵ medical assistants (162,900 new jobs), and nursing aides and orderlies (302,000 new jobs).⁹⁶

Appendix II: Challenges to the Dartmouth Atlas Findings

The Dartmouth Atlas researchers' claim that more treatment at the end of life doesn't help patients is not universally accepted. There are two central counterarguments: that hospitals which deliver more care are treating sicker patients, or that patients who receive more care live longer.⁹⁷ Both arguments rest on the claim that the Dartmouth analysis improperly accounts for how sick patients are. In the Dartmouth analysis, adjustments are made for the age, sex, and racial characteristics of different hospitals' patient populations. Those adjustments flatten out most of the differences between regions (since age, sex, and race are strongly predictive of how sick someone is and how much medical care they'll need), so regions with older populations don't look less effective because their patients are more likely to die.

However, after those basic risk adjustments, there are still some variations across regions in how sick patients appear, based on their medical records. Using the Medical Services Hierarchical Condition Category (HCC) to adjust for illness, some researchers have found a small but statistically significant benefit to patients in higher-spending hospitals. If the HCC offers the most accurate picture of a population's health, then there are some benefits to the very intense treatment offered at hospitals like Cedars-Sinai and Hahneman Hospital.

However, there is reason to doubt the accuracy of the HCC, which relies on counting diagnoses and assuming that patients with more diagnoses are at a higher risk of death.⁹⁸ The number of diagnoses is not a perfect measurement tool, though, and it has an important source of bias: the same factors that lead patients to get more intense treatment can also lead doctors to record more diagnoses for a patient (see the box on supply-sensitive care). Seeing more specialists can lead to a patient receiving extra diagnoses – and therefore appearing sicker in the HCC.^{99, 100}

In technical language, a patient's HCC score is an endogenous outcome of the supply of resources in a hospital or region, as is the intensity of treatment. Using one endogenous variable to predict another is a major source of potential bias. In this case, risk-adjusting based on the HCC makes patients in resource-dense areas look sicker than they are, and thus provides an erroneous justification for the extra medical care they receive.

We do not have data showing the size of the bias created by using the HCC, so we cannot prove that there are no benefits to high-intensity treatment. However, even the studies that have shown benefit have demonstrated only minimal improvements in mortality.¹⁰¹ Therefore, the question of whether extra high-intensity medical treatment offers patients any substantial benefit or is cost-effective is still open for debate.

Finally, other evidence weighs against the idea that more intense care results in greater longevity for chronically ill patients and those who are approaching the end of life. Several randomized controlled trials suggest that aggressive care for frail, elderly patients may be of limited value.¹⁰² A study published in the *New England Journal of Medicine* in 2011 found that terminal lung cancer patients who received palliative care lived on average two months *longer* than lung cancer patients who received usual – and more aggressive – care.¹⁰³

Notes

¹ US Centers for Medicare and Medicaid Services, "National Health Expenditures 2011 Highlights."

See also: "WHO Global Health Expenditure Atlas," World Health Organization, 2012.

² Organisation for Economic Co-Operation and Development, "Health Data 2013."

³ Aaron Carroll, "How Do We Rate the Quality of the US Health Care System -- Population Statistics," *The Incidental Economist*, 2010.

⁴ Steven Nyce and Sylvester Schieber, "How Rising Health Costs Slow Wage Growth," Progressive Policy Institute, March 2012.

⁵ Katherine Baicker and Amitabh Chandra, "Aspirin, Angioplasty, and Proton Beam Therapy: The Economics of Smarter Health Care Spending," *Jackson Hole Economic Policy Symposium*, 2011.

⁶ Donald Berwick and Andrew Hackbarth, "Eliminating Waste in US Health Care," *JAMA*, 2012.

⁷ Randall Cebul, James Rebitzer, Lowell Taylor, and Mark Votruba, "Organizational Fragmentation and Care Quality in the U.S Healthcare System," *Journal of Economic Perspectives*, 2008.

⁸ John Wennberg, Shannon Brownlee, Elliott Fisher, Jonathan Skinner, and James Weinstein, "An Agenda for Change: Improving Quality and Curbing Health Care Spending: Opportunities for the Congress and the Obama Administration," *Dartmouth Atlas White Paper*, 2008.

⁹ Peter S Hussey, Han de Vries, John Romley, Margaret Wang, Susan Chen, Paul Shekelle, and Elizabeth McGlynn, "A Systematic Review of Health Care Efficiency Measures," *Health Services Research*, 2009.

¹⁰ Robert Kocher and Nikhil Sahni, "Rethinking Health Care Labor," *The New England Journal of Medicine*, 2011.

¹¹ It is worth pointing out that the units of "productivity" are essentially ignored, or at least left implicit, in their analysis – especially since they discuss productivity *growth*, rather than the absolute value of productivity. For the record, their units are GDP dollars per health care worker.

¹² Their analysis is somewhat confused by the Bureau of Economic Analysis's (BEA) categorization scheme: Kocher and Sahni use BEA-generated data on "Health care and social assistance," a category which includes activities like emergency relief services, childcare, and other social services. The growth rate and level of labor productivity of those services may be markedly different than those of the medical services included in the category – nursing homes, ambulatory care, hospitals, etc. Even including that sector does not entirely explain their numbers, but the example of productivity measurement stands.

¹³ Michael Porter, "What Is Value in Health Care?" *The New England Journal of Medicine*, 2010.

¹⁴ Michael Chernew, Michael McKellar, Joseph Colucci, "The Nature and Challenges of Health Care Productivity Measurement," New America Foundation, 2013.

¹⁵ Economists interviewed were: Katherine Baicker, PhD, Professor of Health Economics, Department of Health Policy and Management, Harvard School of Public Health; Amitabh Chandra, PhD, Professor and Director of Health Policy Research, Harvard University, Kennedy School of Government; Michael Chernew, PhD, Professor, Department of Health Care Policy, Harvard Medical School; and David Cutler, PhD, Otto Eckstein Professor of Applied Economics, Department of Economics and Kennedy School of Government, Harvard University. Interviews took place June 29-30, 2011 and were conducted by Vanessa Hurley, MPH and Sam Wainwright.

¹⁶ Liza Greenberg, "Efficiency in Health Care: What Does It Mean? How Is It Measured? How Can It Be Used for Value-Based Purchasing?" 2006.

¹⁷ Jeffrey Stensland, Zachary Gaumer, and Mark Miller, "Private-Payer Profits Can Induce Negative Medicare Margins," *Health Affairs*, 2010.

¹⁸ John Wennberg, Elliott Fisher, David Goodman, Jonathan Skinner, "Tracking the Care of Patients with Severe Chronic Illness: The Dartmouth Atlas of Health Care 2008."

¹⁹ There is conflicting evidence regarding the quality of care delivered at the hospitals examined by the Dartmouth Atlas. For more, see: Wennberg, Fisher, Goodman, and Skinner, "Tracking the Care of Patients with Severe Chronic Illness: The Dartmouth Atlas of Health Care 2008"; and Peter Bach, "A Map to Bad Policy--Hospital Efficiency Measures in the Dartmouth Atlas," *The New England Journal of Medicine*, 2010.

In terms of mortality, the evidence is also conflicting, with some studies showing more care is associated with slightly lower mortality and other studies showing the opposite. For studies showing lower mortality, see:

Joshua Fenton, Anthony Jerant, Klea Bertakis, Peter Franks, "The Cost of Satisfaction: A National Study of Patient Satisfaction, Health Care Utilization, Expenditures, and Mortality," *Archives of Internal Medicine*, 2012;

Elliott Fisher, John Wennberg, Therese Stukel, and Daniel Gottlieb, "Variations in the Longitudinal Efficiency of Academic Medical Centers," *Health Affairs*, 2004;

Elliott Fisher, John Wennberg, Therese Stukel, and Daniel Gottlieb, F.L. Lucas, and Etoile Pinder, "The Implications of Regional Variations in Medicare Spending. Part 2: Health Outcomes and Satisfaction with Care," *Annals of Internal Medicine*, 2003;

and Elliott Fisher, John Wennberg, Therese Stukel, and Daniel Gottlieb, F.L. Lucas, and Etoile Pinder, "The Implications of Regional Variations in Medicare Spending. Part 1: The Content, Quality, and Accessibility of Care," *Annals of Internal Medicine*, 2003.

For studies showing higher mortality, see:

Dierdre McCaughey and Anthony Stanowski, "Efficiency Drives Value: The Relationship between Hcahps and Expense Control," 2012;

Michael Ong, Carol Mangione, Patrick Romano, Qiong Zhou, Andrew Auerbach, Alein Chun, Bruce Davidson, Theodore Ganiats, Sheldon Greenfield, Michael Gropper, Shaista Malik, Thomas Rosenthal, and Jose Escarce, " Looking Forward, Looking Back: Assessing Variations in Hospital Resource Use and Outcomes for Elderly Patients with Heart Failure," *Cardiovascular Quality and Outcomes*, 2009;

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The Next Social Contract Initiative aims to rethink our inherited social contract, the system of institutions and policies designed to empower and support citizens from childhood through work and retirement. Inspired by the premise that economic security and opportunity are mutually reinforcing, a new social contract should foster innovation and openness, encourage long-term growth and broadly shared prosperity, and engage individuals and families not only as participants in the economy but also as citizens.

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1899 L Street, NW
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