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WHERE ARE THE HEALTH CARE ENTREPRENEURS? THE FAILURE OF ORGANIZATIONAL
INNOVATION IN HEALTH CARE

David M. Cutler

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ABSTRACT

Medical care is characterized by enormous inefficiency. Costs are higher and outcomes worse than almost all analyses of the industry suggest should occur. In other industries characterized by inefficiency, efficient firms expand to take over the market, or new firms enter to eliminate inefficiencies. This has not happened in medical care, however. This paper explores the reasons for this failure of innovation. I identify two factors as being particularly important in organizational stagnation: public insurance programs that are oriented to volume of care and not value, and inadequate information about quality of care. Recent reforms have aspects that bear on these problems.

David M. Cutler
Department of Economics
Harvard University
1875 Cambridge Street
Cambridge, MA 02138
and NBER
dcutler@harvard.edu

Designing policies to lower medical spending was central to the recent health care debate in the United States. Rising health care costs are the leading contributor to projected federal deficits over the next few decades (Congressional Budget Office, 2009) and make health insurance coverage expansions difficult to afford. In the private sector, high medical costs crowd out private coverage (Chernew, Cutler, and Keenan, 2005) and lead to reduced employment of low wage and secondary earners (Sood et al., 2009).

Of course, not all medical spending increases are problematic. A good share of rising costs is attributable to the development and diffusion of new technologies (Newhouse, 1992), which bring significant value (Cutler and McClellan, 2001; Cutler, 2004).¹ In an efficient industry, spending more on a good is not a cause for concern.

But alongside valuable innovation is an enormous amount of inefficiency. Evidence based on cross-sectional comparisons – both across countries and within the United States – suggest that one-third or more of medical resources is not buying improved health (Institute of Medicine, 2001; Cutler, 2002; Fisher et al., 2003a,b). In a \$2.5 trillion medical care economy, this amounts to over \$700 billion of excess spending annually. Understanding the causes of this inefficiency, and why it has not been eliminated, is the central goal of this paper.

One explanation for inefficient spending, common in the economic literature, is ‘flat of the curve’ medicine (Fuchs, 1974). Low patient cost sharing combined with generous provider reimbursement means that neither patients nor providers have incentives to limit care. Thus, too much is done. Flat of the curve medicine is indeed common (see below). But it is not the whole story. There are two other explanations for excessive spending that are important as well.

¹ Costs might also increase because of Baumol’s ‘cost disease,’ which would also be appropriate. Medical care has a very high capital-labor ratio, though.

The second explanation is inadequate coordination of care. Many acute conditions that could be prevented are not, leading to poor health outcomes and higher spending. For example, about 20 percent of Medicare patients discharged from a hospital are rehospitalized within 30 days (Jencks et al., 2009), often without seeing a doctor or nurse in between; in the best systems, the rate is as low as 6 percent. Similarly, patients with chronic disease – hypertension, high cholesterol, diabetes, and depression, for example – are not helped adequately to control their condition. Rates of chronic disease control are no better than two in five on average. Inadequate care coordination costs lives, and likely dollars.

The third explanation for inefficiency is poorly designed production processes. Medical care providers are far less efficient than they should be. Doctors and nurses spend significant time on routine administrative tasks or clinical services that could be provided by less trained personnel. Hospitals are slow to adopt efficiency savings in surgical suites, despite evidence that they save money and improve outcomes. And mistakes are common and costly.

Medical care is complex, and it is natural that there will be inefficiencies in complex settings. Indeed, in any industry where human action is important, there are bound to be mistakes.

The failure of medical care is not so much that mistakes are made, but rather that the system has not evolved mechanisms to minimize those mistakes. For many years, Toyota was famous for its attention to error reduction; Wal-Mart is equally known for its supply-chain management. In health care, in contrast, doctors will often redo a test because the prior test results are not available or would require too much effort to obtain.

The problem in health care is not a lack of possible market organizers. Primary care physicians, for example, could coordinate care for patients with chronic disease. Similarly,

multi-speciality groups of physicians might combine into care organizations to make sure patients do not fall through the cracks. Alternatively, payers for medical care – insurers or the employers they contract with – could push for coordination. Even farther removed, a firm from outside medical care could enter health care and organize the care experience, as Amazon.com did with book sales and Expedia did with airline tickets. A few firms have tried in health care, but none has made more than a minor dent. The question is why.

I argue that there are two fundamental barriers to organizational innovation in health care. The first is the lack of good information on quality. Within a market, it is difficult to tell which providers are high quality and which are low quality. As a result, most consumers still rely on reputation to judge providers. Difficulty measuring quality also makes expansion of high-quality firms more difficult. The quality of a Wal-Mart store in Kansas is virtually identical to that of a Wal-Mart in Oklahoma. Thus, a firm with a general reputation for high quality can expand nationally with relative ease. Knowing that an insurer has high quality in California, however, tells consumers very little about its quality in other markets. Thus, the gains from economies of scale are limited.

The second barrier is the stagnant compensation system of public insurance plans. In most industries, higher quality is associated with higher prices. That is not true in medical care, however, largely because of the public sector. Medicare accounts for 25 percent of physician and hospital services, and Medicaid accounts for another 13 percent. Since the 1960s, Medicare has paid providers on a fee-for-service basis, without reference to the quality of care delivered. Medicaid reimbursements are more flexible, but they are so low that many providers view Medicaid patients as effectively uninsured. As a result, about 40 percent of the market transmits incentives to provide more care but not more efficient care (Medicare) or to avoid patients who

are sick (Medicaid). With so much of compensation pegged to volume, not value, inefficient care is the natural outcome.

If inadequate information and misaligned compensation systems are the problems, one set of solutions is in that arena as well. I discuss the potential efficiency improvements from a significantly increased commitment to information collection and analysis, and changing the compensation arrangements in public insurance. I show that such efforts could lower medical spending by significant amounts. I discuss briefly how the recent reform legislation dealt with these issues. I also discuss how issues such as capital constraints or the uncertain role of the consumer factor into this analysis.

The paper is organized as follows. The first two sections provide evidence on the production inefficiencies in health care and the potential for improved outcomes. The third section lays out the puzzle of missing innovation. The fourth and fifth sections examine the barriers to innovation for providers and payers. The sixth section notes the features of the recent reform legislation that affects these areas, and the last section concludes.

I. Productivity in Health Care

Inefficient spending is an example of low productivity; more is spent than is needed to get the outcomes we get (or equivalently, less output is produced than is possible given the inputs employed). One way to gauge the relative efficiency of health care over time is thus to compare productivity growth in health care to other industries.

Productivity growth is notoriously difficult to measure in health care (Berndt et al., 2000). Accurate productivity assessment requires a good output measure. Health is difficult to measure and even harder to decompose into medical and non-medical factors. As a result, official data are

much better on productivity outside of health care than they are in health care.² Still, I start with the official data as they are.

Overall productivity growth in the United States as a whole was low from the mid-1970s to the mid-1990s (the ‘productivity slowdown’). Since the mid-1990s, however, productivity growth has increased rapidly. Productivity growth in private industry, for example, was 1.25 percent annually from 1987 to 1995 and 2.4 percent between 1995 and 2005 (Oliner et al., 2007). Oliner et al. attribute the resurgence of productivity growth largely to greater use of information technology. Industries that use information technology above average experienced productivity growth approximately 1.5 percentage points higher than industries that did not.

The relative performance of productivity in different industries in the post-1995 era is shown in Figure 1. The most productive industries were durable goods manufacturing (6.9 percent growth annually) and information technology (5.7 percent growth annually). These industries are fairly different from health care. There are some industries with high productivity growth that are more similar to health care, however. Retail trade, for example, used to be a cottage industry like health care. In the last decade and a half, however, productivity growth in retail trade averaged 4.3 percent annually. Professional and businesses services had productivity growth of 1.2 percent annually, another industry that is close in production to medical care.

Productivity growth in health care (along with education and social assistance) is estimated to be -0.2 percent annually in the official data. As noted above, this is almost surely an underestimate. But even still, the negative value is striking.

Other studies have looked more closely at health care costs and output, and can be used to assess the productivity of medical care over time. Figure 2 shows the cost per additional year

² Output assessment is difficult in other industries too, but the methodology to make quality adjustment is better developed. Hedonic analysis is used in most industries. In health care, however, the absence of good market signals makes hedonic analysis very difficult to employ.

of life attributable to medical care between 1960 and 2000, as estimated by Cutler et al. (2006). The lower line is for newborns, with higher lines reflecting people at older ages. The highest line is for people age 65.

The value of a year of life is generally taken to be about \$100,000 (Cutler, 2004). Thus, costs per year of life below this amount are generally considered to be good value, while costs above this amount are considered to be poor value. Most of the estimates of cost per year of life are below \$100,000. Thus, medical care on average is giving good value for the dollar. But the trend is adverse. Cost per year of additional life was lower in the 1960s and 1970s than in the 1980s and 1990s. For the elderly, recent estimates suggest that we are spending too much to extend life, though these estimates do not account for quality of life.

At one level, the pattern of increasing cost per year of life is not entirely surprising. It may be that the most beneficial treatments were developed first, and we are simply moving down the marginal product of innovation curve. Looked at a different way, however, the finding is quite surprising. In other industries, the common denominator has not been new goods but better ways of organizing production, distribution, and sales. This organizational change has led to expanded output per dollar. In health care, however, there has been very little innovation in the organization of the system.

II. Categories of Inefficiency in Medical Care

The inefficiency of medical care production can be understood in three dimensions: flat of the curve medicine; poor coordination; and inefficient production processes.

Flat of the Curve Medicine

Significant evidence shows that many people receive more medical care than is appropriate for their condition, especially in acute settings. Consider the treatment of localized prostate cancer (Perlroth et al., 2010). Almost all elderly men have cancer of the prostate. In many cases, however, the cancer grows slowly, and the person will die of something else before the cancer becomes fatal – or even clinically meaningful. Thus, ‘watchful waiting’ is a common strategy. In some cases, the cancer will grow rapidly and should be treated. However, it is not always clear whether a patient has a rapidly growing cancer or not.

There are a variety of different treatments for prostate cancer. In addition to watchful waiting, men may receive radical prostatectomy (removal of the prostate), brachytherapy (radioactive implants in the prostate), external beam radiation therapy, and intensity-modulation radiation therapy. Costs increase with the intensity of care. Costs in the two years after diagnosis average about \$50,000 for watchful waiting and radical prostatectomy,³ about \$68,000 for brachytherapy, about \$78,000 for external beam radiation therapy, and about \$96,000 for intensity-modulated radiation therapy.

Some clinical evidence has examined the effectiveness of these different strategies. The results suggest that the therapies are approximately equally efficacious in men aged 65 and older, the most common group diagnosed with localized prostate cancer.⁴ In particular, there is no evidence that the newer and very expensive radiation therapies have better outcomes. There is some evidence of adverse side effects with surgery – impotence and incontinence are common outcomes – making watchful waiting even more appropriate for many men.

Still, rates of invasive treatment remain high. Only 42 percent of elderly men with prostate cancer receive watchful waiting. One-third receive a radical prostatectomy, 15 percent

³ Watchful waiting is not lower cost because some men go on to receive active treatment in the two year window.

⁴ In younger patients, there is more time for the cancer to metastasize, and hence treatment is more beneficial.

receive brachytherapy, 1 percent receive external beam radiation therapy, and 5 percent receive intensity modulated radiation therapy. A final 4 percent of patients receive a combination of intensive treatment – which has not even been explored in the literature. Perlroth et al. (2010) conclude that savings of \$1.7 to \$3.0 billion annually would be realized by having all Medicare patients receive guideline-concordant care.

Patient preferences are not a major part of the variation in treatment. Sommers et al. (2008) show that patients differ in their preferences for side effects and risks of metastasis, but these preferences do not predict the therapy a patient receives. Rather, patients get referred to a particular type of specialist, and this specialist then recommends the therapy that they judge best. Thus, patients who see only a urologist most frequently undergo a radical prostatectomy, while patients seen by a radiation oncologist undergo some form of radiation.

The standard economic framework rationalizing this outcome is shown in Figure 3 (see Fuchs, 1974). Potential output is shown by the concave production possibility frontier. The marginal value of life is shown by the straight line, assumed constant over this interval. The optimal point for society is for patients to receive care until the marginal value of care is equal to the marginal cost, shown by point A.

Most patients are insured, however, and physicians are often paid above marginal cost. Each of these factors provides incentives for additional care above what is optimal. This is shown by point B in the figure. If the production function is sufficiently flat, outcome differences between points A and B would be difficult to detect, even at very different treatment rates. Point B is allocatively inefficient. The care that is provided is technically correct, but is not appropriate.

Other countries appear to have less overused care than does the US. Because of the tighter restrictions on overall supply, the number of procedures performed is lower elsewhere (Cutler, 2002). Thus, it is natural to think of lower spending countries as occupying a point like A in comparison to the U.S., perhaps at point B.

The overall amount of money spent on allocatively inefficient care has been a subject of some debate. Comparing different regions of the United States, Fisher et al. (2003 a,b) estimated that about 30 percent of medical care utilization in the Medicare population is associated with care that is not contributing to improved health. Other studies suggest the number may be smaller (Elmendorf, 2009) or larger (other countries spend about half the US amount). Table 1 shows the estimate of 30 percent possible savings.

The flat of the curve model is undoubtedly part of the explanation for high medical spending, but it is unlikely to be the only important factor. Around 1990, 22 percent of elderly patients with a heart attack who lived in the United States received either coronary bypass surgery or balloon angioplasty. In Canada, the equivalent number was 2 percent. Yet 30 day mortality after a heart attack was the same in the two countries (Tu et al., 1997). It is implausible that the production frontier is this flat over such a large range. There must be some other explanation for poor outcomes in the U.S.

Poor coordination

The second area of low productivity is poor coordination of care. For many medical conditions, people need to see generalist and specialist physicians, receive periodic lab tests, take medications, and modify their behaviors. This complex regimen is almost always left to the

patient to plan and coordinate. Many people are bad at this, however. Partly as a result, people receive too little chronic and preventive care.

If prostate cancer is the poster child for overused care, diabetes care is the equivalent for coordination. Diabetes is a chronic disease, requiring regular dietary and (often) pharmacological intervention, and testing for possible complications.⁵ There are consensus guidelines for how frequently these should occur.

Figure 4 shows adherence to these recommendations in the United States and seven other developed countries.⁶ Adherence to guideline recommendations is low. Only 43 percent of diabetics in the United States receive recommended therapy. The issue is not just lack of insurance. The other countries shown have universal coverage, and yet the average success rate (46 percent) is no better.

Diabetes is not unique. Only one-third of people with high blood pressure have their cholesterol under control (Cutler et al., 2008), and only one-quarter of those with high cholesterol are under control (Hyre et al., 2007). Outcomes for patients with conditions such as depression are even worse. Again, this appears similar in all countries. Unlike excessive use of care with low value, poor chronic disease care management is a feature of all developed country medical systems.

It is possible to do better. A number of integrated provider systems achieve outcomes on diabetes care that are far superior to the norm. Beaulieu et al. (2006) study the case of diabetes management in HealthPartners, a staff model HMO in Minneapolis, MN. In the mid-1990s, HealthPartners began a program to improve diabetic outcomes. The plan worked with its

⁵ These include heart disease, retinopathy, kidney failure, and poor circulation to the extremities.

⁶ The survey was conducted by the Commonwealth Fund in 2008 (Schoen et al., 2008) and sampled about 1,000 individuals in each country. The initial sample was people with chronic disease; the sample in figure 4 is the subset with diabetes.

physicians to identify diabetic patients that had not received recommended screening and provided nurse case managers to call the patients. Physicians were encouraged to start medication therapy in patients for whom diet and exercise were not sufficient. Patients, in turn, were reminded to take their medications and receive recommended screenings. Individual and group sessions developed mechanisms for people to manage their disease, and nurse case managers helped as needed. In the five years after this program was implemented, rates of high blood sugar fell in half and diabetes was brought under much better control. HealthPartners is not unique. Kaiser Permanente, an HMO with salaried doctors and (in many areas) fully owned hospitals, regularly ranks among the top insurers on the basis of quality, largely as a result of good chronic disease care.

The successful examples are similar in many ways. They all integrate care across different providers, by having providers in the same physical or virtual organization. They pay physicians on a salary or productivity basis, not just fee-for-service payment. Finally, they decentralize decision-making to encourage productivity.

The biggest problem for HealthPartners was that the economics did not work out well. The cost of the program was a few hundred dollars per diabetic patient. Better diabetes control translates into fewer adverse events, but that comes a few years down the road. The health plan feared that many patients would transfer to a new insurer before the benefits of prevention were noticeable. Beaulieu et al. estimate that the ROI was favorable over a decade, but not by anywhere near the social value of the program.

The lack of coordination that is endemic to chronic disease care is noticed by consumers. Figure 5, also taken from the Commonwealth Fund survey, shows that 25 percent of Americans with chronic disease have had the experience of having records unavailable when needed, and 20

percent have had a doctor order a repeat test. Overall, 35 percent of Americans felt their time was wasted because of poor organization. Other countries do somewhat better, with 25 percent of people citing such barriers on average. But nowhere are people very happy.

Comparable data on perceptions of other industries are not available. That is not an accident; consumers are rarely as poorly served in other industries as in medical care. In making retirement savings decisions, for example, companies such as Fidelity and Vanguard automate the collection of money and its allocation. Flight information is kept and stored electronically, for easy access throughout one's trip. And specialty stores in retail bring together different products, so consumers do not have to physically compare products from different suppliers.

To be sure, the retail model of organization has imperfections. Electronics stores encourage people to choose more services than they need, and sell them overpriced insurance for what they buy (Cutler and Zeckhauser, 2004). The fees collected by mutual funds are far higher than a perfectly competitive market would suggest (Barber, Odean, and Zheng, 2005). But still, these market organizers have gained enormous market share because of their service quality and low price.

The low level of service quality in health care is ironic given the enormous investment in non-clinical personnel. There are 9 times more clerical workers in health care than there are physicians, and twice as many clerical workers as registered nurses. This investment has not paid off in superior outcomes or better customer service, however.

Better preventive care would improve outcomes, though whether it would save money is unclear. In the medium-term, managing diabetics better reduces rates of heart attack and kidney failure, lowering spending. However, everyone ultimately gets sick, and the lifetime costs of treating diabetics may be greater than if they were not treated. Thus, lifetime medical spending

may rise or fall, even as total productivity increases. In light of the uncertainty about cost savings from prevention, I do not assign a dollar amount of cost reduction to improvements in this area.

Inefficient production

The final aspect of low productivity is excessive costs of providing services. Like the problem of poor coordination, excessive input costs are a problem of productive efficiency. A country with inefficient production would be at point C in figure 3.

Every analysis of medical care that has been done highlights the significant waste of resources in providing care. Consider a few examples: one study found that physicians spent on average of 142 hours annually interacting with health plans, at an estimated cost to practices of \$68,274 per physician (Casalino et al., 2009). Another study found that 35 percent of nurses' time in medical/surgical units of hospitals was spent on documentation (Hendrich et al., 2008); patient care was far smaller.

Half or more of this spending could be easily reduced through current or likely future IT systems. For example, a segment of administrative costs are attributable to pharmacy and formulary-related interactions; these costs could be virtually eliminated through administrative simplification that can accompany ubiquitous use of IT (Gans, 2004). Another part of costs is associated with basic data entry: recording and transcribing notes, and inputting laboratory and physiological measures into systems. Advances in voice recognition and computerized ways of transmitting patient vital status into medical records would reduce these costs. As but one example, Kaiser Permanente found that use of IT combined with organizational changes led to a 35 minute reduction in nursing overlap time associated with shift changes.

Surgical care is also less efficient than need be. A variety of studies show that providing dedicated surgical suites for particular operations results in lower cost per surgery (Herzlinger, 1997). Yet, most full-service hospitals do not organize their operating suites in this fashion. As a result, surgery costs more than need be.

Many of the examples just presented are of excessive cost for the same clinical benefit. In some cases, inefficient production also leads to worse outcomes. This is most common in the case of medical errors – the poster child for inefficient care delivery. It is estimated four percent of hospitalized patients suffer an adverse event, of which one-third, or 1 percent of total hospital admissions, are a result of negligence (Brennan et al., 1991). The Institute of Medicine estimates that preventable medical errors lead to between 44,000 and 98,000 deaths annually, making such errors one of the top 10 leading causes of death (Institute of Medicine, 2000). Errors are also expensive; costing the system about \$30 billion annually (Scott, 2009).

There are many models for reducing medical errors. Adverse drug interactions can be virtually eliminated by computerized physician order entry systems, which cost roughly \$8 million each. Yet, only 4 percent of hospitals have fully adopted such a system (Cutler, Feldman, and Horwitz, 2005). Surgical complications can be reduced through organizational innovations such as surgical checklists (Haynes et al., 2009); use of checklists is relatively low, however.

A few organizations have become quality leaders. For example, Virginia Mason Medical Center in Seattle committed itself to lean manufacturing principles in 2002. Over the next several years, it focused on patient safety, care coordination, supply management, and nursing productivity. Among the returns have been greater patient volume, reduced capital expenditure, and less use of temporary and contract nurses (Kaplan and Patterson, 2008). Similarly,

The Medicare in Northeastern Wisconsin cut costs by 5 percent in three years and improved quality by using tools of lean manufacturing (Toussaint, 2009).

Perhaps the biggest transformation of all was the Veterans Administration. Between 1995 and 1999, the VA handled 24 percent more patients despite a budget increase of only 10 percent (compared to 30 percent in the health care system overall). The VA was able to do this through greater use of IT, greater local financial autonomy, and empowerment of regional managers (Oliver, 2007; Kizer and Adams, 2009).

Reducing inefficient operations would save significant amounts of money. The PROMETHEUS payment model initiative estimates that 14-70 percent of costs for common conditions in the elderly (such as joint replacements, heart attacks, congestive heart failure and diabetes care) are avoidable (Gosfield, 2008). Similarly, the VA and Virginia Mason examples suggest that a large share of total hospital costs are unnecessary. If costs could be reduced by one-quarter – well in line with estimates of waste – total system savings would be about 8 percent (see table 1).

III. Where are the Health Care Entrepreneurs?

The obvious question about health care is why the market has not evolved to become more efficient. For example, specialized firms might enter to help individuals navigate the health care system, just as financial services firms do with money management. Alternatively, new integrated insurance plans might develop, or existing ones could spread across the country. In still other cases, groups of providers could come together to enhance quality and lower costs, pocketing the savings as profits.

In many other industries, entry is a crucial feature of improved productivity. Wal-Mart, Southwest Airlines, and Amazon.com were all responses to inefficiencies in supply – in retail, airlines, and book sales respectively. What is different about health care?

The lack of organizational innovation is apparent in looking at the sources of health care wealth. Table 2 shows the Forbes 400 richest Americans in the health care, pharmaceutical, and retail industries. There are 11 health care entrepreneurs on the list, 4 from the pharmaceutical industry, and 21 from retail. Nine of the 11 health care entrepreneurs made their money by inventing drugs or devices. Only one person can plausibly claim to have made money by changing the organization of health care delivery -- Thomas Frist, Jr. who started HCA, a for-profit hospital company. The story is similar in pharmaceuticals. Three people on the list invented new drugs; only one figured out how to produce existing drugs cheaper (the generic market).

Contrast health care with retailing. Not a single individual on the retailing list made their money by inventing a product that consumers use. Instead, all of the people made their money by changing the way that consumers buy products. This includes Wal-Mart (five heirs to the Wal-Mart fortune are on the list) as well as consumer products retailers Gap, Home Depot, Urban Outfitters, and Hobby Lobby. Total wealth on the retail list is over \$100 billion.

The potential savings from improved organization in health care are enough to land many potential entrepreneurs on the Forbes 400 list. Suppose that a firm developed and sold a system to improve hospital productivity, and as a result could save half of the 8 percent of medical spending estimated to be accounted for by productive inefficiency. The money saved would total \$100 billion annually. Similarly, a firm that was able to reduce the overuse of care by even

a quarter would save the health system \$330 billion annually, again providing an enormous profit opportunity.

One irony of health care is that there have been attempts at organizational change over time, but they have not been successful. Since 1980, Kaiser Permanente has attempted to enter seven new markets (Ho, 2008). In four of those markets (Dallas, Kansas City, North Carolina, and the Northeast), Kaiser failed and withdrew. In the other three, Kaiser's market share averages 10 percent (10 percent in Atlanta, 3 percent in Baltimore, and 18 percent in Washington, D.C.), well below the 30 percent penetration in its base markets.

In another example, specialized firms have entered health care attempting to manage chronic disease – the 'disease management' industry. Disease management firms were popular for a while, but have had only limited success. External management of behavioral health care (mental health and substance abuse, primarily) has been very successful, but management of more common chronic conditions such as diabetes has been less successful (Congressional Budget Office, 2004). As a result, the disease management industry has remained relatively small.

In the next sections, I consider a number of possible explanations for why organizational innovation has not come to health care. I do this primarily using the three examples above: reducing use of care for patients with prostate cancer; coordinating care for diabetics; and eliminating mistakes in hospitals.

III. Provider-Driven Reform

Many of the investments in clinical quality improvement need to occur at the provider level. Hospitals and physicians need to adopt computer systems so that patient outcomes can be tracked and shared among relevant individuals. Similarly, physicians need to counsel patients about treatment options. And doctors need to be involved in care coordination. Thus, it is natural to start with provider-level incentives.

To understand the economics of provider-driven reform, consider the standard profit equation. Profits are total revenue (price, P times quantity, Q) minus cost:

$$\text{Profit} = P*Q - \text{Cost} \tag{1}$$

For organizational innovation to be effective, it must positively affect the price or quantity of services sold, or reduce costs. I consider how improved quality would affect each of these areas.

Inefficient Production. Hospitals that invest in computer systems can reduce adverse drug interactions and thus lower treatment costs. Reconfiguring surgical suites can lower surgical costs. What is the economics of these investments?

Almost all of these interventions require up-front investment – either monetary or organizational. Computer systems run into the millions of dollars, and changing operating practices involves re-organizing care throughout the institution. Thus, provider groups need some return to make these investments.

Price changes are not a part of a favorable return. Hospitals are typically paid on a fixed fee basis, independent of quality. For example, Medicare reimburses hospitals a predetermined

amount per stay, depending on the diagnosis of the patient and whether surgery was performed.⁷ A less good job earns as much as a better job. Building off Medicare, private insurers generally use per-stay or per-diem payments: a single payment is made for all services provided in that stay or during that day, again independent of quality. As a result, improved quality merits no higher price.

Quantity responses to quality improvements are also limited. One might imagine that more patients would choose to be operated on in hospitals with safety systems or more regular surgical times. But information about such forms of quality is not systematically available. Until very recently, there were no validated measures of provider quality that accurately accounted for differences in patient severity. And even now, measures of clinical and service quality are extremely limited. As a result, hospital choice is based on reputation or recommendation more than actual data.

That leaves only the possibility of cost savings. Many productivity innovations will reduce costs. Fewer errors means shorter hospital stays, for example, which lower costs. A full analysis of investment in more efficient production has not been undertaken, and it may be that providers should be investing in efficiency improvements on this basis alone. To date, however, the vast bulk of hospitals have concluded that the financial and organizational costs of transforming their institution are not matched by sufficient cost savings.

An example is telling. In the 1990s, Cincinnati Children's Hospital decided it wanted to become a leader in quality of pediatric care (Edmonson and Tucker, 2009). The hospital CEO and Board of Directors were on board, but the finance team was not. They saw quality improvement as harming the finances of the institution, which were based on admitting more

⁷ The exception to the fixed payment is that very costly outliers are reimbursed an additional amount above the per-stay payment.

children and treating them in a high-tech way. No payer reimbursed them more for higher quality care; in fact, it was penalized.

In the end, the finance team was brought along, but only by pointing out an error in their thinking: having fewer medical errors meant more rapid discharges, which could be offset by admitting more patients from the queue. Thus, there would be no revenue loss from better care. After demonstrating that revenues would not be harmed, the staff at Cincinnati Children's Hospital went ahead with the quality improvement efforts, and Cincinnati Children's Hospital is now a model for other institutions. The example of Cincinnati Children's would apply at similar prestigious institutions, but not in all of American medicine. For most providers, quality improvement is unlikely to have a positive ROI.

Care Provision: Limiting and Managing Care. Limiting excessive care provision and better managing patients with chronic disease have many similarities. In each case, physicians or nurses expend effort – counseling the patient about treatment options in the case of prostate cancer and explaining the steps involved in good management in the case of diabetes. A successful intervention then lowers downstream costs. We can thus analyze these two examples together.

From the physicians' perspective, the pricing of medical care makes the switch from invasive medical procedures to advising and counseling problematic. Most physicians are paid on a fee-for-service basis. For example, Medicare uses fee-for-service payment for all physicians. The service units are independent activities that a physician performs when seeing a patient: a routine office visit, a procedure, or an interpretation of an image. Quality is not a part of the calculated fee. Rather, it is based on intensity: procedures are valued much higher than

counseling. Thus, primary care physicians earn about \$190,000 per year, while many specialists earn double that amount (Medical Group Management Association, 2009). Further, many of the simple services that are involved in good chronic care management are not reimbursed at all. There is no billing code for e-mail interaction, nor is there any payment for having a nurse place a reminder call to a patient. As a result, care management yields among the lowest returns.

Quantity changes are also not conducive to higher quality. Many providers have a waiting list of patients, so attracting more patients is not a major concern. Those providers that are not full compete on quality, but quality is again difficult to measure.

Coupled with this financial disincentive is the traditional norm that separates the practice of medicine in a medical setting from social interventions. Doctors are trained to diagnose and treat patients. They are not trained to counsel or reach out to patients. Physicians can be made to see their job differently, but the incentives to change need to be very strong. In the current system, these incentives are weak, if present at all. With a relatively inelastic quantity, and prices that are invariant to quality, the incentives for providers to invest in more efficient care provision are very substantially blunted.

IV. Payer-Driven Innovation

Given the poor incentives transmitted to medical care providers, the obvious question is why payers do not intervene. Payers for medical care could significantly affect the productivity of the system. For example, payers could ensure the flow of appropriate information by requiring providers to adopt and use interoperable electronic medical records. They could also move to quality-based payment systems to incentivize more efficient care.

The ‘payers’ here include insurers, the employers who contract with them, or third firms that purchase and manage the care from individual providers (for example, a multispecialty practice or an oncology care management company). Why do they not do so? Four explanations have been proposed.

Network externalities. The first explanation for lack of insurer change is network externalities – a single payer finds it difficult to have compensation arrangements that are substantially different from other payers. Medicare and Medicaid together account for about 40 percent of acute care payments, and private insurance is another 40 percent.⁸ Within the private insurance market, there might be three or four large insurers, for an average market share by each plan of about 10 percent. It is difficult for an insurer to fundamentally change the practice of medicine when it accounts for only 10 percent of the market. For example, even an insurer that put 20 percent of a physician’s revenue at risk for poor performance would affect only 2 percent of the typical provider’s income. Given the fixed cost associated with provider change, this incentive system is unlikely to do much good.

The economics are even worse for large firms. A large firm accounts for a smaller share of the total market, making it difficult for a self-insured firm to affect medical practice to any great extent. This is why most of the employer-led innovations have involved the combined effort of many large firms in an area – and usually only areas with a significant presence of employment in large firms.

Further, because of the fixed costs of providers changing their practice, even if the insurer were able to change provider behavior, the savings would be realized by all payers. A primary

⁸ The remaining 20 percent is from other payers, including worker’s compensation, the VA, public health agencies, and out-of-pocket payments. Out-of-pocket payments track public and private methodologies.

care physician that responds to insurer incentives by hiring a nurse case manager to work with diabetic patients will have that nurse case manager work with all patients, not just those of a particular insurer. Thus, the benefits of any insurer investing in better care extend well beyond that insurer.⁹

Two solutions are generally available for solving the network problem. First, integrated firms may arise that provide both insurance and medical care and thus internalize all externalities. Kaiser is an example of such a firm, and it provides among the highest quality chronic disease care. Like most high quality firms in health care – Geisinger Health Care, the Mayo Clinic, and the like – Kaiser has walled themselves off from the rest of the health system.

Alternatively, providers could decide to propose new contracts. For example, providers might suggest that cost savings that result from fewer hospital-based errors be shared between the innovating firm and the government. The major problem here is Medicare. Medicare reimbursement has been fixed by law, making that part of revenue unalterable.

Information. The second barrier to expansion of high quality care is lack of good information. Return to the example of Kaiser health plan, where expansion met with only haphazard success. Analyzing the Kaiser experience, Ho (2008) argues that lack of good information was a central barrier: outside of its traditional area, people did not have direct experience with Kaiser and so did not automatically associate it with high quality.

⁹ This situation is not unique to health care. In the automobile industry, there was a lengthy debate about the make-or-buy decision: should an automobile company make its own spark plugs (and tires, batteries, etc.), thus reaping all the benefits of innovation, or should it purchase components from external firms, with attendant spillovers to other purchasers? In the end, automobile firms chose to purchase, not produce, components. Separate firms made and innovated in automobile components. In the automobile case, prices were flexible enough that component suppliers continued to innovate.

Within a market, lack of good quality data means that consumers have a difficult time determining which providers are better and worse. And across markets, lack of good information means that firms with high quality in one geographic area will not necessarily be perceived to have high quality in other areas.

The difficulty of measuring quality is a fundamental difference between health care and most other retail products. Retail stores can be virtually identical across the country, allowing firms can earn a national reputation for high (or low) quality relatively easily. In health care, national reputations are uncommon.

The information problem in health care is very much a public good. All insurers would like to have good data on physician quality, but no single insurer has an incentive to create such data, since quality information will rapidly disseminate across the market. Thus, some governmental involvement in information is needed.

Plan Turnover. Suppose that an insurer decides to coordinate care on its own. It might hire nurse case managers, work directly with patients, and reconcile different physician recommendations. What is to stop it from realizing the benefits of this strategy?

High plan turnover is one often-cited barrier (Cebul et al., 2010). Investing in better care has up-front costs, but many of the savings occur only over time. For example, better diabetes care may lead to fewer complications, but only after five to ten years. Since as many as 20 percent of people change plans annually, the insurer undertaking the original investment may not realize the savings.

That said, this explanation is not entirely convincing. The high turnover in health insurance is partly endogenous – customers feel little allegiance to a plan whose perceived

quality is low and whose services are comparable to those of every other insurer. In plans with a reputation for good quality – Kaiser Permanente in California, for example – turnover is much lower. Thus, I suspect this explanation for lack of investment in organizational change is less important than it might seem.

The Wrong Customer. The issue of turnover raises a general question about who is the appropriate customer when payers consider care management. In retail trade, the customer is the individual shopper. If Wal-Mart finds a way to save money, it can pass that along to consumers directly. In health care, in contrast, the situation is more complex, since patients do not pay much of the bill out-of-pocket. Rather, costs are passed from providers to insurers to employers (generally) and on to workers as a whole.

If this process is efficient, the system will act as if the individual is the real customer, since they are ultimately paying the bill. It may be, however, that the incentives get lost in the process, and efforts to innovate are not sufficiently rewarded.

What difference does selling to an employer or selling to an individual make? Even if insurers wrongly think their customer is the employer purchasing insurance, that employer may still value improved quality. Many firms, for example, invest in wellness programs, which often involve attempts to coordinate care. If cost savings or productivity benefits of improved health are sufficiently high, this is a natural step for employers. The impact of group versus individual purchase is thus a matter of some debate.

V. The Impact of Recent Legislation

This analysis has highlighted two fundamental factors leading to low health care productivity: lack of good information on quality of care, and public sector payment systems that are insufficiently responsive to the value of care provided. It follows that making health care more efficient will require changes in each of these areas.

There has recently been a push to gather relevant information and measure the quality of different providers. For example, many states now profile cardiovascular surgeons, based on criteria developed by the surgeons themselves; the Federal government has produced data on hospital quality from Medicare records; and non-profit groups are standardizing measures of good care for different specialties. The report card movement has generated some successes, but also controversy. Providers with low ratings seem to improve when the low quality of their care is identified publicly (Cutler, Huckman, and Landrum, 2003), but part of this may be because they avoid sicker patients (Dranove et al., 2004). It is not clear how extensive this practice is, or whether better risk adjustment would improve the situation.

The key barrier to more widespread quality assessment is access to appropriate data. Having high-quality measures of performance requires detailed information from medical records, but these data are generally not computerized or centrally stored.

Recent legislation may change this. As part of the American Recovery and Reinvestment Act of 2009, the federal government is committing \$30 billion over the next five years to finance a national system of electronic medical records. In addition, the Patient Protection and Affordable Care Act of 2010 (a.k.a. the health reform legislation) mandates that Medicare data be made available to private parties, including insurers and employers, for purposes of forming

quality measures. Thus, we may be on the verge of significantly reducing the information problems in medical care.

The healthcare IT investment was generally applauded. Debate was much fiercer about payment reform, however. Broadly speaking there are three approaches to payment reform. The first is a single payer system, where physicians are salaried or paid on a fee-for-service basis within an overall budget target. Such a system is common in many countries, and can be successful in reducing unnecessary care.¹⁰ The second approach is to turn health care into a market like other markets, where individuals are more in charge of their spending and service use. This would take the form of much higher deductibles in Medicare, and incentives to purchase less generous policies outside of Medicare. The idea behind this model is that providers forced to compete for individuals would invest in higher quality, the same way that retail firms do.

The third approach is to keep cost sharing as it is, but to reform the way that Medicare payments operate, to stress value more than volume. The theory underlying this is that changes in Medicare, integrated with changes in private reimbursement, will provide incentives for more efficient care delivery.

Following this third path, changes in Medicare reimbursement are a significant part of the recent reform legislation. The Patient Protection and Affordable Care Act introduced several types of payment alternatives to fee-for-service Medicare. *Bundled payments* are payments made to a group of providers who jointly agree to care for a patient with a particular condition and split the overall amount. *Accountable care organizations* go a step further – groups of providers agree to accept a capitation payment in exchange for providing all services needed during a year. *Pay-for-performance*, or value-based purchasing, is a method of adjusting fee-for-service payments to reflect the quality of the care provided. Finally, *care coordination and*

¹⁰ Like any rationed system, the efficiency of a single payer system depends on how well the rationing is done.

transition payments are introduced to provide support to nurses or primary care physicians that seek to manage care better.

Each of these payment systems have been the subject of experimentation, with some success in each case. Payment bundles are the best developed. Medicare's Heart Bypass Center Demonstration Project in the 1990s bundled all care for coronary artery bypass graft (CABG) surgeries; it achieved savings of more than 15 percent per episode (Cromwell et al., 1997). Similarly, Geisinger health system has a bundled system in place for cardiac care and has among the lowest rate of readmissions in the country (Casale et al., 2007).

The idea of global payments for a patient as a whole has been tested in the Medicare Physician Group Practice Demonstration (PGP). The experiment has so far shown savings of \$17 million, and 4 of the 10 sites exceeded the 2 percent savings threshold in the second year of the program, making them eligible for bonus payments (Tisolini et al., 2008; McCarthy, Mueller, and Klein, 2009; Praxel, 2008).

Many care coordination efforts are also promising. In addition to the Group Practice Demonstration described above, Geisinger's medical homes initiative saw 7 percent total medical cost savings and a significant reduction in hospital admissions in the first year (Paulus et al., 2008). Similarly, a number of sites in the Medicare Coordinated Care Demonstration successfully contained costs by avoiding initial hospitalizations and rehospitalizations. Overall coordination efforts appear to be able to save about 15 percent of inpatient costs when they target populations with chronic illnesses (Brown et al., 2009; Pekis et al., 2009).

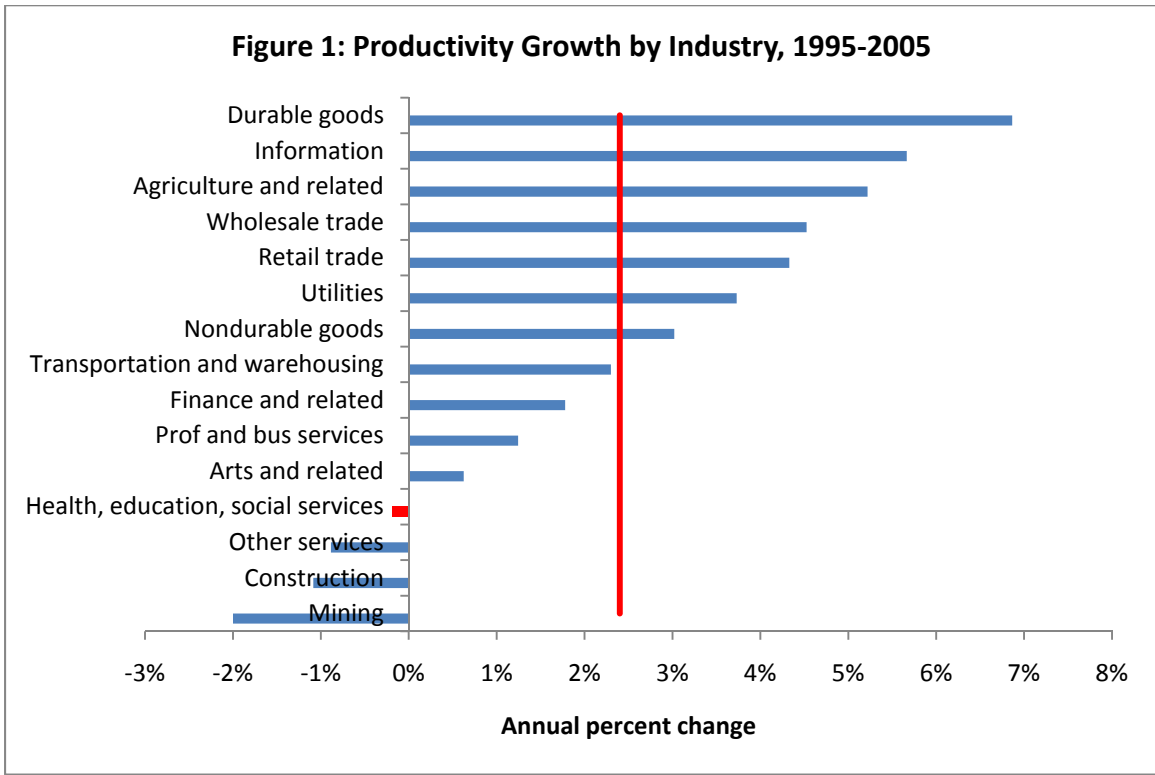
Evidence on the impact of pay-for-performance is mixed, reflecting the paucity of large experiments using these methods and the focus of most programs on quality improvement, not cost efficiency (Peterson et al., 2006). The documented improvement in quality that some

programs achieve suggests that cost saving are feasible, however. Overall, payment reform shows a good deal of promise as a complement to improved information.

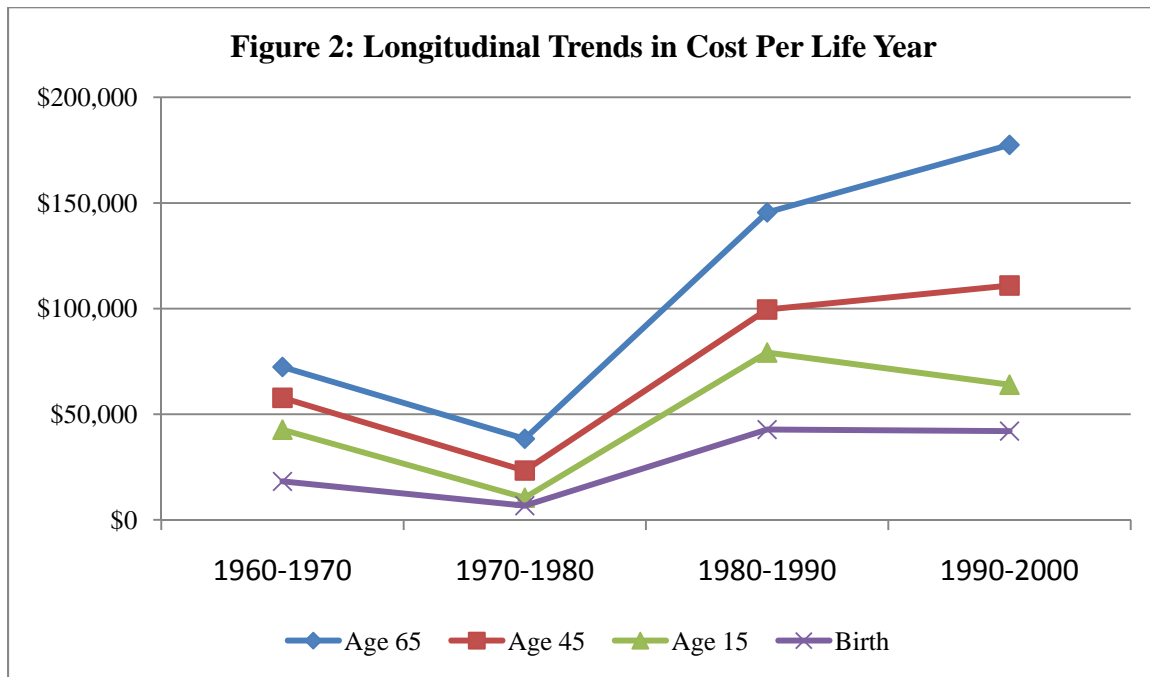
VI. Conclusion

Health care is notorious for market imperfections. For a number of reasons, medical care markets do not always work well. Within the plethora of health care problems, though, one problem sticks out: the mismatch between the medical care that people should get, and the care that they do get. About one-third of medical spending is not associated with improved outcomes, significantly cutting the efficiency of the medical system and leading to enormous adverse effects.

To reduce this waste, organizational innovation will be required. To date, however, such innovation has been very rare in health care. This paper argues that lack of information and poor incentives are the key barriers to new organizational models, and accordingly that public action to address these issues is needed. Recent reform legislation has made changes in each of these areas. Whether the legislation addresses these problems sufficiently is something that only time will tell.

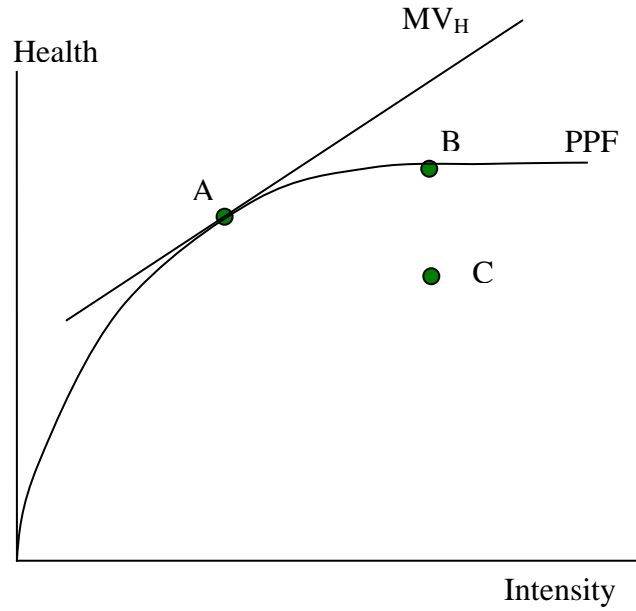


Source: Oliner et al., 2007.

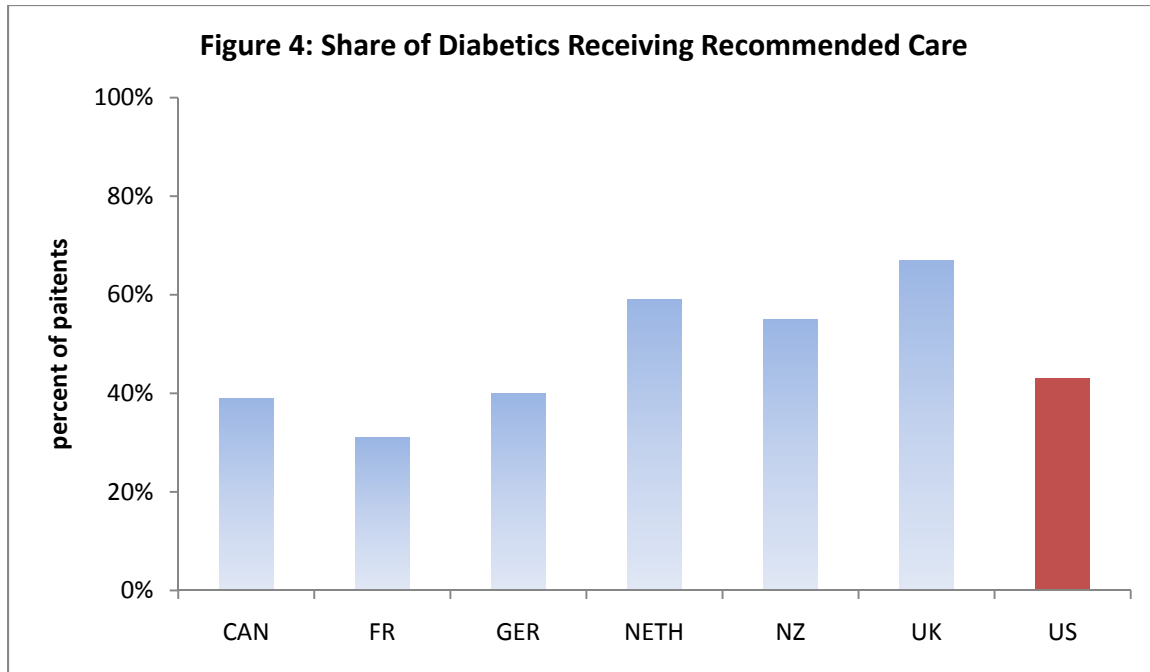


Source: Cutler, Rosen, and Vijan (2006).

Figure 3: Productivity of Care

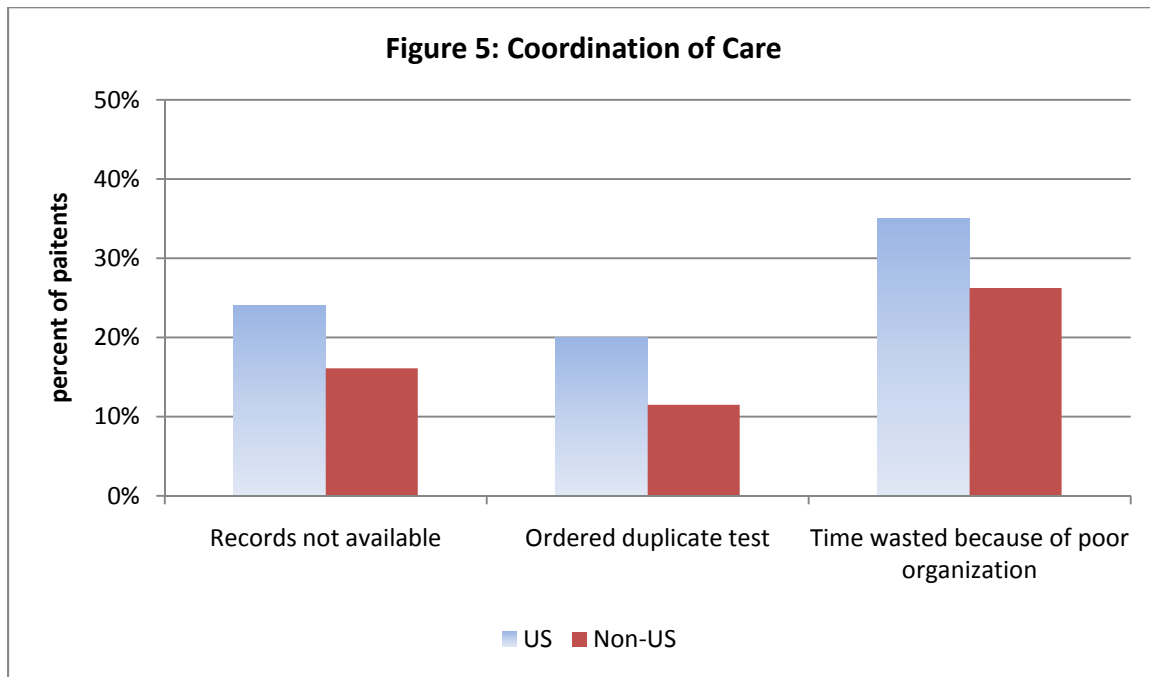


Note: PPF is the production possibility frontier and MV_H is the marginal value of health. Point A, where the two intersect, is the efficient equilibrium. Point B is allocatively inefficient; the care is technically correct, but too many people are treated. Point C is productively inefficient; health improvement is less than is possible given the amount spent.



Note: The specific types of care asked about are: hemoglobin A1c checked in past six months; feet examined for sores or irritations in past year; eye exam for diabetes in past year; and cholesterol checked in past year.

Source: Commonwealth Fund 2008 International Health Policy Survey in Eight Countries. See Schoen et al., (2008).



Note: The specific question is: “In the past 2 years, when getting care for a medical problem, was there ever a time when...?”

Source: Commonwealth Fund 2008 International Health Policy Survey in Eight Countries. See Schoen et al., (2008).

Table 1: Estimates of Inefficient Health Care Spending

Category	Share of medical spending	Annual savings from 50% reduction
Flat of the curve medicine	30%	\$350 billion
Inadequate care coordination	??	---
Productive inefficiency	8%	\$100 billion

Note: See text for sources.

Table 2: The Richest Americans in Health Care and Retailing

Number	Name	Net Worth (\$billion)	Source
<i>Health Care</i>			
68	William Cook	\$5.0	Cook Group (catheters, stents, etc.)
123	Barbara Piasecka Johnson	\$3.3	Johnson & Johnson
134	Ronda Stryker	\$3.0	Stryker (joints, surgical tools, etc.)
215	Jon Stryker	\$2.1	Stryker
246	Thomas Frist Jr.	\$1.9	HCA
262	Alfred Mann	\$1.8	Minimed (insulin pumps)
262	Pat Stryker	\$1.8	Stryker
301	Patrick Ryan	\$1.6	Re-insurance broker
321	John Abele	\$1.5	Boston Scientific
321	Gary Michelson	\$1.5	Karlin technology (spinal implants)
355	John Brown	\$1.4	Stryker
<i>Pharmaceuticals</i>			
65	Patrick Soon-Shiong	\$4.0	Generic drugs
158	Philip Frost	\$2.0	Kay Pharmaceuticals (OTC products)
190	Michael Jaharis	\$1.9	Kay Pharmaceuticals (OTC products)
230	Randal J. Kirk	\$1.6	New River Pharmaceuticals (Vyvanse)
<i>Retailing</i>			
---	5 heirs of Sam Walton	\$81.9*	Wal-Mart
44	Frederik Meijer & family	\$5.0	Supermarkets
44	John Menard	\$5.0	Menard's
---	3 heirs of Fishers	\$3.3*	Gap
97	Richard Schulze	\$3.0	Best Buy
117	E. Stanley Kroenke	\$2.7	Real estate
118	Victor Fung & Family	\$2.6	Li & Fung (global outsourcing)
123	David Green	\$2.5	Hobby Lobby
158	Roger Wang	\$2.0	Retail in China
272	Bernard Marcus	\$1.5	Home Depot
272	Drayton McLane Jr.	\$1.5	Wal-Mart (logistics)
317	Arthur Blank	\$1.3	Home Depot
317	Richard Hayne	\$1.3	Urban Outfitters
366	Margaret Magerko	\$1.1	84 Lumber
371	William Kellogg	\$1.0	Kohl's

* Combined net worth

Source: Forbes Magazine

References

- Barber, Brad, Terrance Odean, and Lu Zheng, "Out of sight, out of mind: The effects of expenses on mutual fund flows," *Journal of Business* 78, 2005, 2095-2119.
- Beaulieu, Nancy, et al., "The Business Case for Diabetes Disease Management at Two Managed Care Organizations," *Forum for Health Economics and Policy*, 2006.
- Berndt, Ernst, et al., "Medical Care Prices and Output," in Anthony Culyer and Joseph Newhouse, *Handbook of Health Economics, Volume IA*, 2000, 119-180.
- Bodenheimer, Thomas, Mina Matin, and Brian Yoshio Laing, "The Specialist–Generalist Income Gap: Can We Narrow It?" *Journal of General Internal Medicine* 23(9):1539–41
- Brennan, Troy, et al., "Incidence of adverse events and negligence in hospitalized patients. Results of the Harvard Medical Practice Study I," *New England Journal of Medicine*, 1991, 324(6), 370-376.
- Brown, Randall, "The Promise of Care Coordination: Models that Decrease Hospitalizations and Improve Outcomes for Medicare Beneficiaries with Chronic Illness," The National Coalition on Care Coordination. March 2009.
- Casale Alfred S., et al. "ProvenCareSM': a provider-driven pay-for-performance program for acute episodic cardiac surgical care," *Annals of Surgery*, 2007;246:613-623.
- Casalino, Lawrence P., Sean Nicholson, D. N. Gans et al., "What Does It Cost Physician Practices to Interact with Health Insurance Plans?" *Health Affairs* Web Exclusive, May 14, 2009, w533–w543.
- Cebul, Randall D., James B. Rebitzer, Lowell J. Taylor, and Mark E. Votruba, "Unhealthy Insurance Markets: Search Frictions and the Cost and Quality of Health Insurance," mimeo, 2010.
- Chernew, Michael, David M. Cutler, and Patricia S. Keenan, "Increasing Health Insurance Costs and the Decline in Health Insurance Coverage," *Health Services Research*, 40(4), 2005, 1021-1039.
- Congressional Budget Office, *An Analysis of the Disease Management Industry*, Washington, D.C.: Congressional Budget Office, 2004.
- Congressional Budget Office, *The Long-Term Budget Outlook*, Washington, D.C.: Congressional Budget Office, 2009.
- Cromwell Jerry L., Debra A. Dayhoff, and Armen H. Thoumaian, "Cost Savings and Physician Responses to Global Bundled Payments for Medicare Heart Bypass Surgery," *Health Care Financing Review*, 19(1), 1997, 41–57.

Cutler, David M., *Your Money or Your Life: Strong Medicine for America's Health Care System*, New York, Oxford University Press, 2004.

Cutler, David M., "Equality, Efficiency, and Market Fundamentals: The Dynamics of International Medical Care Reform," *Journal of Economic Literature*, September 2002, 881-906.

Cutler, David M., Naomi Feldman, and Jill R. Horwitz, "US Adoption of Computerized Physician Order Entry Systems," *Health Affairs*, 24(6), November/December 2005, 1654-1663

Cutler, David, Robert S. Huckman, and Mary Beth Landrum, "The Role of Information in Medical Markets: An Analysis of Publicly Reported Outcomes in Cardiac Surgery," *American Economic Review*, 2004, 94(2), 342-346.

Cutler, David M., and Mark McClellan, "Is Technological Change in Medicine Worth It?" *Health Affairs*, 20(5), September/October 2001, 11-29.

Cutler, David M., Allison B. Rosen, and Sandeep Vijan, "Value of Medical Innovation in the United States: 1960-2000," *New England Journal of Medicine*, 2006; 355(9), 920-927.

Cutler, David M. and Richard J. Zeckhauser, "Extending the Theory to Meet the Practice of Insurance," in Robert Litan and Richard Herring, eds., *Brookings-Wharton Papers on Financial Services, 2004*, Washington, D.C.: Brookings Institution, 2004

Cutler, Jeffrey A., Paul D. Sorlie, Michael Wolz, et al., "Trends in Hypertension Prevalence, Awareness, Treatment, and Control Rates in United States Adults Between 1988-1994 and 1999-2004," *Hypertension* 2008;52:818-827.

Dranove, David, Dan Kessler, Mark McClellan, and Mark Satterthwaite, "Is More Information Better? The Effects of 'Report Cards' On Health Care Providers," *Journal of Political Economy*, 2003, 111(3), 555-88.

Edmonson, Amy, and Anita Tucker, "Cincinnati Children's Hospital Medical Center," Harvard Business Review Press, 2009.

Elmendorf, Douglas, Letter to the Honorable Kent Conrad, June 16, 2009.

Fisher, Elliott S. et al., "The implications of regional variations in Medicare spending. Part 1: the content, quality, and accessibility of care," *Annals of Internal Medicine*, 2003a, 138(4), 273-287.

Fisher, Elliott S. et al., "The implications of regional variations in Medicare spending. Part 2: health outcomes and satisfaction with care," *Annals of Internal Medicine*, 2003b, 138(4), 288-298.

Foot, Sandra M. "Next Steps: How Can Medicare Accelerate The Pace Of Improving Chronic Care?" *Health Affairs*, 28(1), 2009, 99-102.

Fuchs, Victor, *Who Shall Live?* New York: Basic, 1974.

Gans, David, "The cost of healthcare complexity," Medical Group Management Association, Center for Research, November 2004.

Ginsburg, Paul B., and Jerry M. Grossman, "When The Price Isn't Right: How Inadvertent Payment Incentives Drive Medical Care," *Health Affairs*, 10.1377/hlthaff.w5.376

Ginsburg, Paul B., "Efficiency and Quality: The Role of Controlling Health Care Cost Growth in Health Care Reform," Center for American Progress, May 2009.

Gosfield, Alice G., *Making Prometheus Payment Rates Real: Ya' Gotta Start Somewhere*, 2008, Available at: <http://www.prometheuspayers.org/publications/index.htm>.

Haynes, Alex B., et al., "A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population," *New England Journal of Medicine*, 360(5), 2009, 491-499.

Hendrich, Ann, Marilyn Chow, Boguslaw A Skierczynski, and Zhenqiang Lu, "A 36-Hospital Time and Motion Study: How Do Medical-Surgical Nurses Spend Their Time?" *The Permanente Journal*, 12(3), Summer 2008, 25-34.

Herzlinger, Regina, *Market-driven health care: who wins, who loses in the transformation of America's largest service industry*. Reading, MA: Addison-Wesley; 1997.

Ho, Katherine, "Barriers to Entry of a Vertically Integrated Health Insurer: An Analysis of Welfare and Entry Costs," Columbia University mimeo, 2008.

Hyre, Amanda, Paul Muntner, Andy Menke, et al., "Trends in ATP-III-Defined High Blood Cholesterol Prevalence, Awareness, Treatment and Control Among U.S. Adults," *Annals of Epidemiology*, 17(7), 2007, 548-555.

Institute of Medicine, *To Err is Human*, Washington, D.C.: National Academy Press, 2000.

Institute of Medicine, *Crossing the Quality Chasm: A New Health System for the 21st Century*, Washington, D.C.: National Academy Press, 2001.

Jencks Stephen F., Mark V. Williams, and Eric Coleman, "Rehospitalizations among Patients in the Medicare Fee-for-Service Program," *New England Journal of Medicine*. 360(14), 2009, 1418-28.

Kaplan, Gary H. and Sarah H. Patterson, "Seeking Perfection in Health Care," *Healthcare Executive*, 23(3), May/June 2008, 17-21.

Kizer, Kenneth W. and R. Dudley Adams. "Extreme Makeover: Transformation of the Veterans Health Care System," *The Annual Review of Public Health* 30, 2009, 313-339.

McCarthy, Douglas, Kimberly Mueller, and Sarah Klein, “Marshfield Clinic: Health Information Technology Paves the Way for Population Health Management”, *Commonwealth Fund*, 2009.

Medical Group Management Association, *Physician Compensation and Production Survey: 2009 Report Based on 2008 Data*, Washington, D.C.: Medical Group Management Association, 2009.

Newhouse, Joseph P., “Medical Care Costs: How Much Welfare Loss?” *Journal of Economic Perspectives*, 1992, 6(3), 13-29.

Oliver, Adam, “The Veterans Health Administration: An American Success Story?” *The Milbank Quarterly* 85(1), 2007, 5-35;

Paulus, Ronald A., Karen Davis, and Glenn Steele, “Continuous Innovation In Health Care: Implications of The Geisinger Experience,” *Health Affairs*, 2008, 27(5), 1235-1245.

Peikes, Deborah, Arnold Chen, Jennifer Schore, and Randall Brown, “Effects of Care Coordination on Hospitalization, Quality of Care, and Health Care Expenditures Among Medicare Beneficiaries: 15 Randomized Trials,” *JAMA*. February 11, 2009 2009;301(6):603-618.

Perloth, Daniella J., Dana P. Goldman, Alan M. Garber, “The Potential Impact of Comparative Effectiveness Research on U.S. Health Care Expenditures,” *Demography* 2010 (in press).

Petersen Laura A., et al., “Does Pay-for-Performance Improve the Quality of Health Care?” *Annals of Internal Medicine*, 2006;145(4): 265-272.

Praxel, Ted, “Participation in the Centers for Medicare and Medicaid Services Physician Group Practice Demonstration Project –Lessons Learned,” 2008, available at <http://www.amga.org/Education/IQL/Presentations/2008/participatingInTheCMSPhysicianGroupPracticeDemonstrationLessonsLearned.ppt>

Schoen, Cathy, Robin Osborn, Sabrina K. H. How, Michelle M. Doty, and Jordon Peugh, “In Chronic Condition: Experiences of Patients with Complex Health Care Needs, in Eight Countries,” 2008, *Health Affairs* Web Exclusive, Nov. 13, 2008, w1–w16.

Scott, R. Douglas, II, “The Direct Medical Costs of Healthcare-Associated Infections in U.S. Hospitals and the Benefits of Prevention,” Washington, D.C.: Centers for Disease Control and Prevention, 2009.

Sommers, Benjamin D., Clair Beard, Anthony V. D'Amico, et al., “Predictors of patient preferences and treatment choices for localized prostate cancer,” *Cancer*. 113(8), 2008, 2058-2067.

Sood, Neeraj, Arkadipta Ghosh, and José Escarce, “Employer-Sponsored Insurance, Health Care Cost Growth, and the Economic Performance of U.S. Industries”, *Health Services Research*, 44(5), October 2009, 1449 -1464.

State of North Carolina, Office of the Governor. Governor Easley Announces Community Care Saves Taxpayers \$231 Million. Press Release, September 25 (2007)

Toussaint, John, "Writing The New Playbook For U.S. Health Care: Lessons From Wisconsin," *Health Affairs*, 28(5), 2009, 1343-1350.

Trisolini, Michael, Jyoti Aggarwal, Musetta Leung, Gregory Pope, and John Kautter, "The Medicare Physician Group Practice Demonstration: Lessons Learned on Improving Quality and Efficiency in Health Care," 2008.

Tu, Jack, Chris L. Pashos, C. David Naylor, et al., "Use of cardiac procedures and outcomes in elderly patients with myocardial infarction in the United States and Canada," *New England Journal of Medicine*, 336(21), 1997, 1500-1505.