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THE ECONOMICS OF HEALTH SYSTEM PAYMENT*

BY

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Summary

Health care takes up 10 to 15 percent of GDP in most countries. In this lecture, I consider the efficiency of the medical system, focusing on the potential for payment reform to increase efficiency. Traditionally, medical care reimbursement has been based on the quantity and intensity of the services provided. While this system encouraged valuable innovation, it failed when high quality is not achieved by increased quantity. In theory, a more efficient system could be achieved by paying for medical care on the basis of quality of care provided, not just quantity. I discuss the design of such a payment system and review the literature on how pay-for-performance systems have worked in practice. Cautious optimism about the potential for efficiency gains from payment reform is warranted.

Key words: pay for performance, medical care, reimbursement

JEL Code(s): I11, D02

Health care is big business. In the United States, health care is the same size as the manufacturing sector, having tripled as a share of GDP in the past half century. Businesses go bankrupt – or so they claim – because of high health care costs. Federal spending on Medicare and Medicaid is nearly $450 annually, about as large as Social Security. Under current projections, Federal spending on health care will rise to over 10 percent of GDP by the middle of this century. Official estimates suggest that much of this differential growth in medical spending is because of more rapid price inflation in heath care.

Jan Tinbergen pioneered macroeconomic modeling of the economy a half century ago. At that time, health care was small and it was appropriate to ignore it. Today, no understanding of the macro economy is complete without systematic consideration of the health sector.

The emphasis on health care is particularly necessary given the concern that most populations have about their health systems. In virtually all countries, health care is a source of great frustration. People are upset that medical

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costs are high while quality is low. The hunt for health care reform is ongoing in the United States, the Netherlands, and most of the developed world.

In this paper, I take up the economic analysis and operation of the medical sector. I consider the efficiency with which health care is provided, and I discuss recent economic research on how payment reform might be used to increase efficiency. I suggest that payment-based reforms could have a big effect in improving the operation of the medical system. Traditionally, most of medical care reimbursement was based on the intensity of the services provided – doctors got paid for doing things, with more paid the more intensive was the provided. This type of system has many good features – rapid innovation in medicine is one consequence of it. But there are drawbacks as well. In situations where health could be improved by non-medical interventions, such as investment in information technology or the social aspects of caring for health, the medical sector has not been up to the task.

A recent branch of economic research has focused on an alternative system that rewards providers for the quality of the services they provide, not just the quantity and intensity. Providers that take measures resulting in improved health would be rewarded more than doctors that did not. In this way, medical care payments would reflect the economic good that people want – the ability to enjoy a longer and higher quality life. I discuss the economics behind this approach theoretically and present evidence on the likely impact of measures to pay for quality. In theory, performance-based payment could be either beneficial or harmful, depending on how difficult it is to measure quality and the consequences of using imperfect measures. To date, evidence suggests that the good features of such a system likely outweigh the drawbacks.

This paper is structured as follows. The first section considers the problems of medical care in the US to several other developed countries. The second section examines the economic incentives that lead to the equilibrium we observe in medical care. The third section presents evidence on the impact of reforms that reward quality in addition to quantity. The fourth section discusses possible limitations of such an approach, and the last section concludes.

1 THE HEALTH CARE DILEMMA

The most surprising, and disconcerting, aspect of health medical care systems is how unpopular they are. For close to 20 years, Robert Blendon of Harvard University and colleagues have been administering surveys to residents of a number of countries, asking their view of their medical system. In the Blendon surveys, people are given three responses and asked which one they most agree with: (a) On the whole, the health system works pretty well, and only minor changes are necessary to make it work better; (b) There are some good

things in our health system, but fundamental changes are needed to make it work better; or (c) Our health care system has so much wrong with it that we need to completely rebuild it.

Figure 1 shows the results of this question asked of five English speaking countries in 2004: Australia, Canada, New Zealand, the United Kingdom, and the United States. If one defines strong support as people expressing need for only minor changes, there is no country where support for the medical system is strong. The UK medical system draws the most support from its residents, but even there only 26 percent of people believe that the health system can do with only minor changes. Across the range of countries, about 80 percent of the population – roughly 4 in 5 – believe that the medical system needs fundamental change or complete rebuilding. The degree of displeasure is greatest in the United States, where a third of the population supports fundamental rebuilding, but happiness is not common anywhere.

One might hope that health reforms over time would have improved the operation of medical systems, so that the trend would be positive, but this too is not the case. Figure 2 shows trends in the share of people who believe that only minor changes in the health system are necessary. The most dramatic change is in Canada, where support for the medical system fell from 56 percent in 1988 to 20 percent a decade later. The reason for the reduction in support was a budget crisis that led to closure of hospitals, layoffs of medical personnel, and lower wages to health sector employees (Cutler (2002)). While

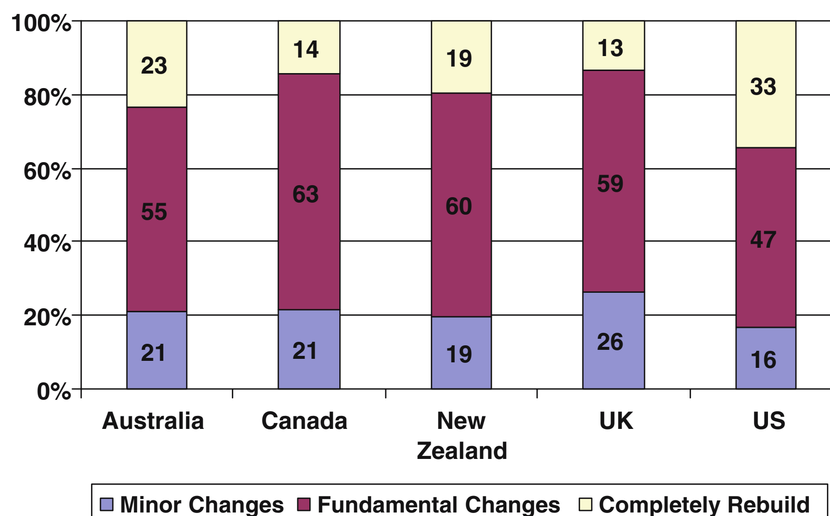

Figure 1 – Support for Health Care Systems in Five Countries, 2004. Source: Schoen et al. (2004)

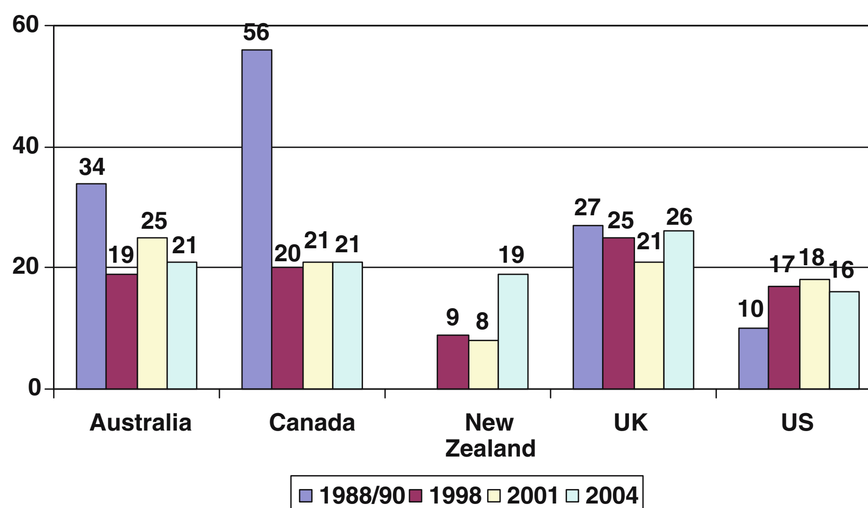

Figure 2 – Share of People Believing Only Minor Change are Needed, 1988-2004. Sources: Blendon and Taylor (1989); Blendon et al. (1990); Blendon et al. (2002); and Schoen et al. (2004)

the crisis in Canadian health care has largely passed, views of the health system have not recovered. Support for medical care has fallen in Australia as well, and had been falling in the UK until the Blair government announced plans to increase NHS spending. Support has increased mildly in New Zealand and the US, but not to particularly high levels. Low support for medical systems is a structural feature of health systems, not a temporary aspect of any single event.

1.1 *The Conflict Between Cost Containment and Access*

While everyone is disappointed in the operation of medical systems, the reason for the discontent differs across countries. As a rough characterization, Americans believe that their medical system is too expensive and exposes them to too much risk, while people outside of the US are upset that the system spends too little, and thus they cannot access services when they need to.

Table 1 reports survey results for the same five countries on problems with the health care system. The first blocks show the most frequently cited problem in the country. A plurality of Americans, 48 percent, believe that the high cost of care is the major problem with medical care. Second in importance is inadequate coverage of services, generally attributed to a concern about losing insurance or facing high out-of-pocket costs. Together, these factors are raised by 75 percent of people.

TABLE 1 – PROBLEMS AND SOLUTIONS IN HEALTH CARE

Question	Australia	Canada	New Zealand	UK	US
Most frequently cited problem					
High cost of care	19%	13%	21%	6%	48%
Inadequate coverage of services	9	8	6	4	25
Shortages	31	54	20	33	5
Waiting times	31	27	41	39	3
Not enough government funding	20	16	23	24	1
Most important thing government can do to improve health					
Spend more money	30	32	34	30	4
Increase number of health professionals	14	19	5	15	2
Reduce costs	5	1	5	3	16
Improve coverage	4	2	5	1	21
Reports of medical system interactions					
Had problems paying medical Bills in past year	11	7	12	3	21
Access restrictions due to cost*	29	17	34	9	40
Waited 4 months or more for elective surgery **	23	27	26	38	5

Note: The most frequently cited problem and the most important thing government can do to improve health are from a 2002 survey reported in Blendon et al. (2003) and sample adults with health problems. The reports on medical system interactions are from a 2004 survey reported in Schoen et al. (2004) which sampled all adults.
* This includes people who report any of not receive medical care because of the cost of a medical visit; skipping a medical test, treatment, or follow-up because of cost; or not filling a prescription drug or skipping doses because of cost.
** Among people who had elective surgery.

Outside of the United States, the major concern is that people cannot get care when they need it. Shortages or waiting times are cited as the major issue by 60–80 percent of the population. Inadequate government funding, the underlying cause of service shortages, is cited by another 20 percent. The share of people concerned about the high cost of care or inadequate coverage of services is no higher than 28 percent.

When asked what government should do to improve health care, the answers are similar. Reducing costs and improving coverage are the major issues in the US. A third of Americans support one of these two measures. Spending more money or increasing the number of health professionals are widely viewed as the key issue outside of the United States.

Survey evidence on the use of particular medical services confirms these impressions. Twenty-one percent of Americans report having problems paying medical bills because of cost; outside of the United States the share is only half as high. Similarly, many more Americans than residents of other countries report not using care because of costs. In contrast, long waits for elective surgery are common outside of the US – between 23 and 38 percent of the

time – while waits of such lengths in the US are extremely rare. The international data are very clear: spending more buys greater access to immediate services, but involves more trouble financing the care.

The key question is which system is right – the US system, that spends more but leaves people at greater risk; or systems outside the US, which protect financial risk better but have more rationing. In short, what is the productivity of additional medical spending? The answer to this question depends on the value of the marginal services received. If the value of medical care is high, spending restraints will deny people care that they would like to afford. If the marginal value is low, spending less is preferred.

A number of authors have considered this question (Cutler (2002, 2004), Fisher et al. (2003a,b), OECD (2002). I shall not go into that literature here. Instead, I shall focus on areas of common weakness across countries.

1.2 *Care for Chronic Disease*

Most of medical spending is for acute situations, and many of the access and funding issues are addressed to such situations. But acute disease is often the byproduct of chronic disease. Much of severe heart disease, for example, is the consequence of failure to manage risk factors such as hypertension, high cholesterol, and diabetes. Cancer survival can similarly be improved if regular screening is performed. For cost and health reasons, understanding the treatment of chronic disease is at least as important as understanding the acute medical sector.

In many measures of the quality of chronic disease care, the US performs similarly to the rest of the world, and no country is good. Table 2 compares the quality of chronic disease treatment in the same five countries as noted earlier. In all countries, about two-thirds of elderly people receive a flu shot annually. The common recommendation is that all elderly receive a flu shot, so the record is ok, but not great. Similarly, the share of age-appropriate women who receive a PAP smear ranges from 65 percent to a high of 87 percent in the US. The upper end is certainly reasonable; appropriateness rates of two-thirds are below what most people believe is possible.

The process of receiving care is even worse than these outcomes. The vast bulk of doctors do not send reminder notices to patients about needed appointments or health issues, despite clear evidence that such notices are successful (Beaulieu et al. (2006)). In no country can even one-quarter of people e-mail their doctor, even though electronic communication is ubiquitous outside the medical sector. And between one-quarter and one-third of people report common coordination problems such as tests not being available at the appropriate time, tests being reordered because the prior results were not available, or conflicting information from different doctors about what is needed.

TABLE 2 – THE TREATMENT OF CHRONIC DISEASE

Measure	Australia	Canada	New Zealand	UK	US
Share of elderly receiving flu shot	77%	66%	67%	74%	72%
Share of age-appropriate women receiving PAP smear	65	74	77	79	87
Can e-mail doctor	16	10	22	13	20
Doctor sends reminder notices	38	39	45	50	51
Can get same day appointment	54	27	60	41	33
Coordination problems*	28	26	25	30	34

Source: Schoen (2004).
* This includes test results or medical records that were not available at the time of a scheduled appointment; doctors ordering a test that was already done; or patients receiving conflicting information from different doctors.

The failure to provide high quality chronic disease care is particularly troubling because these interventions are typically much more cost-effective than are intensive treatments of disease after it occurs (US Preventive Services Task Force (2003). Medical systems in the United States and elsewhere are clearly operating far inside the production possibility frontier.

High expense is not the reason that chronic disease care is poor. Giving a flu shot costs no more than a few dollars, and coordinating care would often save money (after the initial expense to implement the computer systems necessary for coordination). Rather, the issue is the organization of medical care system. Physicians are not paid for getting patients to come in for screening or preventive care; they are only paid for providing care when patients do come in. Similarly, e-mail is not a billable service, and time spent coordinating records or advice from different doctors is not reimbursed. It is this failure of reimbursement to capture important areas of patient care that I turn to next.

2 AN ECONOMIC MODEL OF MEDICAL CARE REIMBURSEMENT

The fundamental issue I explore in this section is how reimbursement for medical services affects what is provided, and the resulting operation of the system. To understand the analysis, consider medical care as varying in two dimensions: the intensity of the service provided, and the effectiveness of the service in improving health. The least intensive services are as much social as medical – reminding patients about appointments and the value of taking medications; working with patients on lifestyle changes; and similar factors. Somewhat more intensive are medical services associated with chronic disease care, including diagnosis of diseases such as hypertension and diabetes, performing adequate testing at regular intervals, and prescribing medications or

lifestyle changes. The most intensive care is associated with episodic acute interventions: surgery or other intensive care for people whose health has deteriorated or is in danger of doing so.

Traditionally, medical care reimbursement was related to the intensity of services provided. Intensive care was reimbursed more than less intensive care because it was more difficult to do, because it was done by doctors who had undergone more training, and because it was literally lifesaving. That set of incentives fueled the development of modern medicine, with its rapid expansion of high tech care. But it left behind much of the less intensive services that are also important in good health. As a result, the system does not provide those services, and innovation in better ways to treat patients is limited.

To understand these points, consider a simple model of medical treatments. Think of the setting as an outpatient clinic, not an emergency department where only one course of therapy may be the difference between life and death. There are a range of possible treatments provided, indexed by i, where i ranges from 1, ..., M. The different services can be either complements or substitutes; the analysis is similar in each case. There are also a number of different service providers, indexed by k and ranging from 1, ..., K. Higher numbered physicians perform on average more intensive services than lowered numbered physicians.

The cost of providing a service has two parts. The first part is the fixed cost of investing in the necessary training, purchasing the requisite equipment, and hiring associated staff. Basic medical interactions require at least four years of medical school, with an internship and residency after that. More intensive interventions can involve much longer residencies and many more years of on-the-job training. In addition, physician offices require space and staff, and surgical operations require specialized equipment. Denote the fixed cost of provider k as cf_k. For simplicity, the marginal cost of providing service i is assumed to be the same for all providers, c_i. The cost to a provider of providing n_i units of service i is therefore $cf_k + n_i{*}c_i$. For convenience, array the services i by the cost of production. Service 1 has the smallest $cf_k + c_i$, and service M has the largest.

Health of the patient is a function of the set of medical services provided, denoted **m**, an array of 0's and 1's reflecting whether each service is provided or not; the severity of the disease, denoted s; and steps that the patient takes to improve his health, denoted B (for behaviors): $H = H(\mathbf{m}; s; B)$. I normalize H in units of quality-adjusted years of life.

Optimal medical care provision depends on the severity of the disease as well as the individual's behaviors. A patient with a good compliance record might receive medical management for cardiac pain, while a patient who has a hard time complying might receive surgical care. Without observing the patient, the insurer does not know the patient's true severity. Nor can the

insurer readily observe behaviors. As a result, the insurer cannot write an optimal state-contingent contract with providers.[1]

Historically, the response of insurers to this uncertainty was to pay providers based (loosely) on the cost of services provided. I denote the payment for service i as p_i. The easiest services to consider are those provided by doctors. A typical insurance payment for these services was $p_i = cf_k + c_i$. For services not provided in a face-to-face setting with a physician, insurers often did not provide reimbursement at all. E-mailing a patient instead of seeing the patient in person is not a medical service, for example, and thus is not reimbursed.

For the care manager to be indifferent between providing different services, payment should be made at marginal cost, c_i for service i. The problem with such payment is that it did not cover fixed costs. The time and money the physician invested in training is a sunk cost, but the facilities and staffing are not. Insurers needed to pay for part of those as well. Thus, payment systems paid for the average cost for medical care. In the United States, this was at one time enshrined in "usual, customary, and reasonable" fees, although it persists even into relative value scales. For concreteness, suppose that the average doctor performs n_i units of service i in a year. The payment would then equal the average cost of providing that care, or $p_i = cf_k / n_i + c_i$. At that price, the marginal profit for performing an additional service is the fixed cost per unit of care provided, or $\pi_i = p_i - c_i = cf_k / n_i$.

For a given provider or group of providers, aggregate profitability is the sum of profits for each procedure: $\pi_k = \Sigma_i n_{ik} * \pi_i = cf_k \Sigma_i (n_{ik}/n_i)$. For the average doctor, marginal profits are the fixed costs of providing care.

Doctors consider payment as one aspect of their work, but there are other aspects as well. Following much of the health economics literature (see Ellis and McGuire (1986)), I assume that the doctor has a utility function defined over the health improvement of the patient and the amount of money the physician makes: $U = U(H, \pi_k)$.

For a given patient, a physician will choose to provide service i if the combination of health benefits and profits makes it worthwhile:

$$\text{Provide } i \text{ if} \qquad U_H H_{mi} + U_\pi (p_i - c_i) > 0 \tag{1}$$

The first term in equation (1) is the health improvement to the patient. The second term is the impact of providing the service on profits, weighted by the utility value of those profits. It is easiest to express equation (1) in dollar terms, by dividing through by the marginal utility of income:

$$\text{Provide } i \text{ if} \qquad (U_H / U_\pi) H_{mi} + (p_i - c_i) > 0 \tag{2}$$

1 Indeed, for many medical services, the insurer might not be able to even observe the input. For example, the physician might report that he counseled the patient to stop smoking, but how effectively was this done? Note that the insurer can be either public or private; the issues are the same.

It is valuable to contrast this equilibrium with the optimal system. Assuming no distortions in raising revenue,[2] social welfare from providing the service is the value of health to the patient less the marginal cost of providing the care. Letting V denote the value of a year of quality-adjusted life, social welfare is $W = VH - \Sigma_i c_i * m_i$. A service should be provided if

$$\text{Optimally provide } i \text{ if:} \qquad VH_{mi} - c_i > 0 \tag{3}$$

Equation (3) differs from equation (2) in two ways. First, the social value of health may differ from the value that physicians put on health. In a situation without externalities, the social value of health will be the individual marginal rate of substitution between health and all other goods: $V = V_H / V_x$, where V is the utility function defined over health and non-medical consumption, and x is non-medical consumption (Cutler et al. (1998)).

The value of health to physicians (U_H / U_π) may exceed or fall short of the value to society. The shortfall is relatively straightforward: providers who care about profits and not about patients will underweight the social gain that comes from healthier patients in making their treatment decisions. But it could go the other way as well. The provider may factor into his decision-making the decisions of the sick patient in counting the benefits, while society may care about the decisions the *ex ante* patient would have made, before he knew if he would be healthy or sick. Because the *ex ante* patient recognizes the cost of the medical care as it flows through insurance, society might prefer less care be provided than physicians feel is best for their particular patient. For both of these reasons, it is only by happenstance will the social marginal rate of substitution between health and all other goods equal the rate at which physicians make the tradeoff.

The second difference between the social and private optima is in the consideration of costs. In a fee-for-service system, physicians generally make a profit for more services provided. When prices are set equal to average costs, for example, the profit per service is cf_k / n_i. Physicians will tend to overprovide services with higher fixed costs, since the marginal profit of providing the care is greater. When services are not covered by insurance, in contrast, the loss is c_i per service, and such services will be provided less frequently. Relative to the first best, there will be overprovision of more intensive services and underprovision of less intensive services, and particularly of services not reimbursed.

There is an alternate way to think about these issues that is helpful. Payment policy has two challenges. The first is to set the relative price of different services so that the decision about which service to provide is based on medical concerns, and not profitability issues. If the reimbursement for surgery

2 If there were such distortions, they would be need to be included in the costs of providing the service.

and medical management of patients with a particular disease is set optimally, providers will be indifferent between using one or the other, choosing them only based on medical criteria.

The second goal is to subsidize (or punish) physicians for providing any care, so that providers care about health in the same way that society does. One can think of this as a general incentive to provide all types of medical care, rather than affecting the relative price of different services. The optimal value of such a subsidy – positive or negative – depends on the parameters of individual and physician utility functions. Without firm data on these, I do not pursue this issue in great detail. Instead, I consider the issue of the relative prices for different medical services.

As we have seen, average cost is not a good guide to setting relative prices for different services. If the fixed cost of performing procedures differs, setting payment at average cost will reward more intensive services above less intensive services. To set payments optimally, the insurer would need a two-part reimbursement system. Physicians would be paid a fixed payment for providing any services at all, and then receive marginal compensation proportional to the marginal cost of each service. This is feasible when there is only one insurer, but it is more difficult to coordinate in a setting with multiple insurers – as in the US and other countries. In such a situation, divvying up the fixed costs is not easy, nor it is not in the interests of insurance companies to cooperate in this.

An alternative to fee-for-service payment is to pay for the health outcome that results from care, rather than the inputs involved. Imagine that the insurer has a payment structure $p = \alpha \Delta H$, where α is a constant and ΔH is the change in health from before the medical interaction to after, adjusted for the change that would have occurred in the absence of treatment. In such a system, the profit for performing service i is $\alpha H_{mi} - c_i$. The physician will then provide service i if:

$$\text{Provide } i \text{ if} \qquad U_H H_{mi} + U_\pi \alpha H_{mi} - c_i > 0 \tag{4}$$

Dividing through by the marginal utility of income yields:

$$\text{Provide } i \text{ if} \qquad (U_H / U_\pi + \alpha) H_{mi} - c_i \quad > 0 \tag{5}$$

Comparing equations (5) and (3) shows the potential for a pay-for-performance system to achieve the first best. If α is used to offset the discrepancy between the physician's and society's tradeoff of health for money (i.e., to equalize U_H / U_π and V_H / V_π), physicians will provide the socially efficient level of care. But even if α cannot be set that finely, paying for outcomes instead of inputs leaves the relative price to the physician of providing different types of care undistorted. Thus, physicians will have strong incentives to

provide care even when it is less intensive, and they will not face financial incentives to provide the most generous care.

Pay-for-performance systems can be implemented perfectly when information is easy to observe. The system becomes harder to design as information becomes more difficult to obtain. There are two components to the information problem. The first is the difficulty of measuring outcomes – whether the H function can actually be observed. . Some components of health are readily observable, such as mortality. Other components of health are more difficult to observe. Has mental health really improved, or not? Is lower back pain severe or only moderate? Outcomes that cannot be well measured will inevitably play a smaller role in pay-for-performance systems, and there will be bias against making progress in such dimensions.

Even if outcomes can be measured, the payer needs to determine why they changed, and in particular how important medical intervention was to better health. Did the patient recover because of services the physician provided (including counseling), or would the disease have resolved itself? If the role of medical care cannot be differentiated from disease severity and exogenous patient behaviors, physicians will have incentives to game the system, by selecting less healthy patients to treat, or treating patients whose behavioral patterns are more likely to yield good health outcomes. In practice, this selection argument is likely to bias in favor of physicians wanting to treat richer patients from more stable environments.

If disease severity and behaviors can be observed, one can think about adjusting the payment for the background characteristics of the patient and the disease. This idea is termed 'risk adjustment' in the literature (van de Ven and Ellis (2000)). A major debate is over how good such adjustment can be. Because risk adjustment is relatively rare, and performance-based payment rarer still, we do not know how well this type of system can be implemented.

As a result, the comparison between cost-based payment and performance-based payments is not clear theoretically. In the next section, I evaluate what is known about performance-based payment empirically.

3 PAY FOR PERFORMANCE

Empirically, we know a good deal about the way that physicians respond to fee-for-service payment. There is a vast literature on such responses, surveyed in several chapters in the *Handbooks of Health Economics*. The general result of this literature is that medical care provision is very responsive to payment incentives. When more is paid, more is done. This is seen in the case of hospital payments – most famously the movement from retrospective payment-for-service to prospective payment-for-admission (Cutler and Zeckhauser (2000)). It is also seen in physician fee changes (McGuire (2000)), and

for providers such as nursing homes (Norton (2000)) and pharmaceuticals (Scherer (2000)).

No medical systems use performance-based payment extensively, and thus experience with this type of reimbursement is limited. Still, there are some experiments that can be analyzed. In this section, I survey some of the literature that is available.

Two measures of performance are commonly used in pay-for-performance systems. Some systems measure actual health outcomes. Mortality is the most common outcome, although quality of life is occasionally a benchmark. In other cases, insurers determine whether physicians followed appropriate treatment guidelines and provide additional payments for meeting such guidelines. These types of systems are not true performance-based payment systems, but they do focus on more than just the intensity of services provided.

3.1 *Outcome Grading for Particular Services*

The quality of some services can be judged because there are well established measures of disease severity and reliable outcome measures. The most famous quality measurement initiatives are programs run by state governments that rate the quality of bypass surgery performed in their state. Bypass surgery report cards were pioneered in New York state in the late 1980s and have spread to other states since, including New Jersey, Pennsylvania, and Massachusetts.

In each case, the strategy is similar. Hospitals are required to submit to the state government information about the clinical risk factors of all patients receiving bypass surgery, and to indicate whether the patient died in the hospital or not. The state then estimates a regression model to adjust death for the severity of condition.[3] Based on these regression models, hospital or physician residuals are calculated and reported. Note that no payment is based explicitly on these report cards. Thus, this is not a pay-for-performance system in its truest sense. The goal of state governments, though, was that patients would respond to the report cards in their choice of hospital and physician, and that this would influence profits of the hospitals and doctors.

A moderately-sized literature has debated the impact of these hospital report cards on the quality of bypass surgery, including two recent papers of mine (Cutler et al. (2004), Landrum et al. (2005)), see those papers for other references). The literature is not totally definitive on several of the important issues, but there are some general conclusions. In my work on the impact of the program, my co-authors and I found significant improvements in quality for institutions that were reported publicly as being subpar. Relative to a pre-reporting mortality rate of about 4 percent, institutions identified as below

3 Because in-hospital mortality is the outcome, patient behavior is not a big factor to control for.

average improved mortality by about 0.8 percentage points. This change is reasonably large.

Interestingly, the effect does not appear to be a result of patients switching providers in response to the information. Most patients do not know which providers are graded high and low (Schneider and Epstein (1998)), and volume of operations is not particularly affected by the report cards. Rather, internal processes seem to be at work. Some hospitals reported to be low quality search for reasons for that ranking, and undertake internal changes to improve quality. Enough hospitals do this so that overall outcomes improve.

The New York State evidence is not without debate. While there is a severity adjustment in the New York rating system, if that adjustment is not accurate, or is not believed to be accurate, physicians might find it in their interest to avoid very sick patients. There has been a lively debate about the importance of 'dumping' and changes in operating thresholds in New York State. New York State officials do not believe that dumping is a significant problem (Hannon et al. (1994)), but some studies have suggested it is (Dranove et al. (2003)). This issue will need to be evaluated in more areas as programs like that in New York expand.

3.2 *Process Assessment for Health Plans*

Performance assessments have been made for health plans as well. For about a decade, the National Center for Quality Assurance (NCQA) has been rating the quality of managed care plans across the country. The NCQA currently measures 22 dimensions of care, although there were fewer measures in earlier years. The quality measures are generally for chronic disease: they pick up whether appropriate screening tests are provided, and whether patients are given medications that the literature suggests are valuable.

Very little payment is explicitly tied to the NCQA results, but these assessments are still important. Plans with high ratings advertise that to potential enrollees, and many businesses consider them in deciding which insurers to contract with. Thus, plans care a good deal about their quality assessments.

Some evidence suggests that care quality has improved along dimensions that are graded by NCQA. Perhaps the most widely publicized NCQA measure is the share of patients who receive a beta-blocker after a heart attack. Beta blockers are drugs that reduce the workload of the heart. After a heart attack, this is (almost always) a good idea, and beta-blockers have been shown to increase survival by up to 40 percent (Gottlieb et al. (1998)). Since they are off patent, the cost of these drugs is minimal, perhaps $.20 per day. Despite this clear evidence, data published by NCQA in the mid-1990s showed that only half of people with a heart attack received a beta-blocker (Figure 3).

Since NCQA started publishing these data, use of beta-blockers has soared. Figure 3 shows that today, over 95 percent of eligible heart attack patients receive beta-blockers. NCQA publication was not the only factor that was important; professional societies and medical journals stressed the same issues. But public reporting of good and bad health plans almost certainly contributed to an atmosphere in which quality improvement was seen as desirable.

The beta-blocker evidence is positive; other studies have been more mixed. The only formal evaluation of a true pay-for-performance system was an examination of payment changes made by a large insurance company in California (Rosenthal et al. (2005)). The insurer in question paid physicians in California bonuses for meeting a variety of quality targets. Physicians in neighboring states did not receive such bonuses, even though the insurer was the same, and so make a natural control group. Rosenthal et al. (2005) examine the impact of the quality payments made in three dimensions: cervical cancer screening for women; mammography for women; and treatment of diabetes.

Cervical cancer screening rose markedly with the implementation of the quality payments. Among doctors paid more, screening rates rose by 5.3 percentage points, compared to 1.7 percentage points for the control physicians in other states, a statistically significant difference. There were also differences in mammography rates (an increase of 1.9 percentage points vs. 0.2 percentage points), but this difference was not statistically significant. Blood sugar testing for diabetics rose the same amount for the physicians paid a bonus

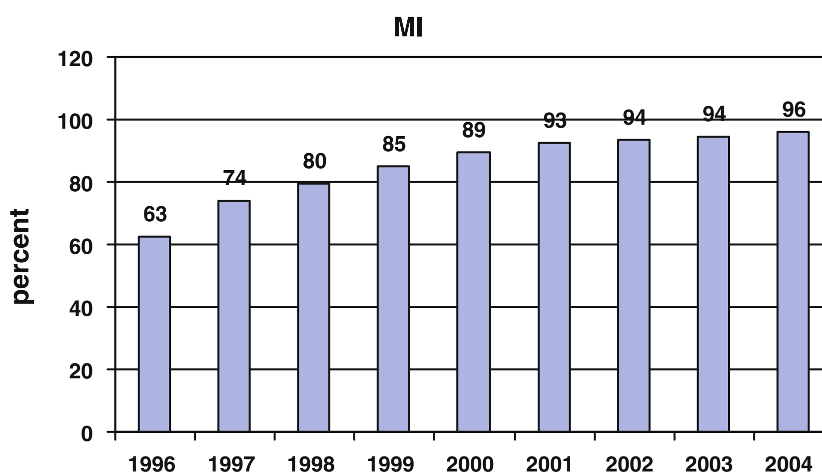

Figure 3 – Use of Beta-Blockers After an MI. Source: National Center for Quality Assurance, *The State of Health Care Quality*, 2005

and those not (2.1 percentage points in each case). Payment incentives thus had some felicitous impact on the quality of care, but the effects are not all in the same direction.

4 CONCLUSIONS

Enhancing medical care productivity is an enormous microeconomic and macroeconomic issue. With health care accounting for 10 percent of GDP or more in most countries, any policy that can improve efficiency in that sector will result in thousands of dollars gained for the typical citizen.

In this paper, I have discussed the problems of medical care productivity and low quality. Some of the problems are standard: the more that is paid, the more services people receive, and the less constrained individuals are. As a result, there is a classic tradeoff between cost and quality that countries must choose between.

But more important, I suggest, is the fact that medical systems across the world are producing inefficiently. Some money is wasted on care that does not need to be provided, and other interventions are not provided even when they would be valuable. Payment incentives are the key to these inefficiencies. Physicians paid for providing intensive services provide such services in great quantity, but less intensive services are underprovided. As a result, overall quality is haphazard. An economically attractive idea is to move away from paying for services provided, and pay instead on the degree of health improvement. Information problems make this solution potentially problematic, although the evidence to date is more positive than negative. If preliminary findings can be generalized and expanded, there is a possibility for significant improvement in the productivity of medical systems around the world.

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