Next Social Contract Initiative and Economic Growth Program

Productivity Measurement in the United States Health System

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Improving productivity in health care is, unquestionably, among the most important challenges facing policy makers and health care systems. Advances in medicine have greatly improved lives over the last century and ideally will continue to do so in the future. However, medical care also consumes a rapidly increasing proportion of society's time and resources. That trend has continued to the point that growth in health care spending is considered a drag on the remainder of the economy.[2] By improving productivity, we can continue improving our health while not sacrificing too much of our material well-being in the process.

Current measurements of health care productivity are standing in the way of that improvement by presenting a false image of how the health care system creates value. Existing measurements tend to reflect the needs and incentives of health care providers in a fee-for-service world – not the interests of a broad population of patients, most of whom would prefer to stay out of the doctor's office and away from the hospital as much as possible. Improving measurements of productivity will be a challenge, but it's an important step toward a better health care system.

Defining Productivity

Productivity is a measure of the output (e.g. widgets or cars) that can be produced given a certain combination of inputs (e.g. number of employee hours and machines). Typically productivity is measured for a specific input, such as labor. It's also possible to consider "system productivity" – the productivity of spending in a hospital, physician practice, or health system – by looking at the output achieved for any given amount of resources devoted to health care.

In order to evaluate how policy tools or interventions affect productivity, we need to distinguish between average and marginal productivity. Average productivity relates total output to the total amount of any given input (or, when measuring system productivity, aggregated resources). For example, a manufacturing plant might produce three cars

per worker per day. Marginal productivity refers to the incremental output achieved for an incremental investment in additional resources – in the same plant, adding one *more* worker might mean the plant produces only one more car per day. It's clear that the two measures are useful in different circumstances. Total productivity is important when deciding which of two hospitals is more efficient: a hospital that produces very healthy patients for $100,000 per year is more efficient than one that also produces very healthy patients, but needs $200,000 per year to do so. Marginal productivity is important when we consider whether we should spend more money on health care as a country. Both marginal and total productivity can vary with the level of output.[3]

The productivity of any one input also depends on the availability and quantity of other resources utilized. For example, physician productivity could theoretically be improved by increasing investment in information technology or nurses. The optimal input mix will depend on the prices of inputs and will minimize costs of production. Thus, the productivity of particular resources may vary even among highly effective firms or systems because they may produce different levels of output, and so require different mixes of inputs. Similarly, the size and composition of the health care workforce play an important role in the productivity of the health care system, and the productivity of each type of health care worker depends on the availability of other workers and of non-labor inputs.

Existing Productivity Measurements

The vast majority of metrics that have been used to gauge health care productivity do not look at the right output. A systematic review conducted by Hussey, et al. of the RAND Corporation found that nearly every health care productivity metric tracks the provision of medical services, either per dollar (of total cost or labor cost) or per worker (or worker-hour, etc.).[4] Their study found that over *97 percent* of productivity measures tracked only the utilization of health care services as the output from hospitals and other medical institutions. Those measures include cost per hospital discharge, cost per outpatient visit, relative value units (RVUs) per physician per month, patient visits per physician per month, average length of stay per discharge, and similar metrics.[5] (See Table 1.) The vast majority of measures use some form of risk-adjustment to ensure that patients are comparable.

Throughput-based metrics, such as patient visits per physician per month, make sense in most industries. A car factory is intended to make cars, and the more cars workers can turn out in a day, the greater the productivity. But while medical institutions are intended to provide medical services, productivity measurements that only consider throughput are fundamentally flawed. There are two primary problems: medical services do not, in themselves, constitute valuable medical care, and not all medical services are created equal.

There's a clear difference between health care and most other goods that people buy. When someone buys a cheesecake or a pair of pants, they make that purchase because they want to eat the cheesecake or wear the pants. By contrast, nobody gets an MRI just because they want an MRI – rather, people consume medical care because it's supposed to make them healthy. In economic terms, that means health care is not a consumption good: it doesn't directly contribute to making anyone better off, but only contributes by increasing another output, in this case by improving health.

Table 1: Characteristics of Productivity and Efficiency Measures			
Perspective		**Number of Measures**	**Percentage of All Measures**
	Hospital	162	61.1
	Physician	54	20.4
	Health Plan	13	4.9
	Integrated delivery system	5	1.9
	Nurse	6	2.3
	Geographic region	4	1.5
	Medicare program	3	1.1
	Other	18	6.8
Inputs			
	Physical	123	46.4
	Financial	82	30.9
	Physical and financial	60	22.6
Outputs			
	Health services	258	97.4
	Health outcomes	5	1.9
	Other	3	1.1
Source: Hussey et al.			

If all health care were useful and effective at creating health, measuring throughput would be the right way to measure productivity. However, there's substantial evidence that a great deal of the medical care we provide doesn't make patients any healthier.[6] Studies have found, for example, that high-intensity end-of-life care may not keep patients alive any longer than hospice care.[7] There is a large body of data showing that many treatments offer little or minimal value to patients (e.g. prostate specific antigen (PSA) screening for prostate cancer, which was recently found by the U.S. Preventive Services Task Force to offer no benefit but which poses significant risk from false positives and subsequent testing), and many others are given to the wrong patients.[8] When measuring productivity, therefore, any meaningful metric has to account for whether the services provided actually did anything to improve health, either of individuals or of populations.

For tests and treatments to offer any benefit, they must have three characteristics: they must be effective, high-quality, and well matched to the patient. Effective treatments increase length or quality of life, even after accounting for the side effects of treatment – that is, for a defined patient population, they offer a net benefit. Not all common treatments are effective (especially when they're used outside of the originally-studied patient population), and clearly ineffective treatments that don't lengthen or improve life don't create any value. High-quality services are those provided with no errors and in accordance with all relevant guidelines and best practices. Low-quality treatments include, for example, surgery without appropriate prophylactic antibiotics. They put patients at risk of harm, and don't provide the medical benefits they should. Low-quality treatments are clearly not as valuable as high-quality treatments.[9]

Finally, well-matched treatments are treatments that patients would have chosen to have if they were well informed. Even an effective, high-quality knee replacement surgery provides no benefit if the patient, given complete information about the recovery from surgery and the effectiveness of her non-surgical treatment options, would have chosen to avoid surgery. If the patient would rather have avoided a surgery altogether, it's not reasonable to count that treatment as providing a benefit to the patient – or providing any value for the money spent on it.

Useful measures of health care value must therefore account for the effectiveness, quality, and match of the treatments provided to patients. But throughput measures, such as the number of bypass surgeries that can be performed over a given period of time, fail to capture whether services are provided in a manner that is high or low quality, well matched, or even effective. A metric that only captures the number of patients seen per day could easily portray a physician who does shoddy work quickly as being very productive (even if another physician has to go back and repair the damage later), while a slower but safer and more effective physician would appear relatively unproductive.

The medical community is hardly unaware of the concerns about measuring throughput, and measuring quality of care has been increasingly important in medicine over the last few years. However, only *six* metrics in the papers Hussey and his coauthors reviewed made any effort to judge productivity on what actually matters for patients: five included the health outcomes achieved through medical care (although they tended to use relatively narrow measures of health),[10] and one other measure accounted for the quality of services provided. When only six measures of 265 have even a weak connection to patient welfare (and none account for match quality), we are falling far short of even beginning to gauge the true value of health care.

Why These Metrics?

Why do throughput metrics exist at all, since they're so inappropriate for measuring the value of health care? The RAND group pointed out a useful pattern in their review of efficiency measures: most measures of productivity are designed by delivery systems and purchasers, meaning they're not designed for the needs of policy makers or patients. Specifically, over 80 percent of the throughput metrics currently used for studying efficiency provide information to hospitals or physicians. The design perspective matters because, as Hussey et al. write, "different entities have different objectives for considering efficiency, have control over a particular set of resources or inputs, and may seek to deliver or purchase a different set of services."[11, 12] Put more explicitly, physicians and hospitals operate in a largely fee-for-service context, so their incentives are to increase utilization of services, and so to increase throughput. Given that, it's not surprising to see what they choose to measure.

Even when providers are pre-paid, as is the case for integrated provider-payer systems such as Kaiser Permanente, or are paid a bundled fee for a set of services, like they are with Medicare's diagnosis-related group (DRG) payment for hospitals, increasing throughput can allow providers to increase the number of patients served, and thus increase both revenue and measured productivity. Few payment schemes take into account the quality of care provided (although that's beginning to change, for example with Medicare's penalties for frequent readmissions).[13] Given the conflict between the need for health care to provide value to the patient and the drive for doctors and hospitals to get paid, it makes sense that physicians and hospitals measure (and try to increase) throughput of services. Tellingly,

none of the measures that accounted for health or quality was developed by a medical provider; rather, they were created by researchers studying efficiency at a payer or health care system level.

Conclusion

As spending on health continues to grow at an unsustainable rate, all stakeholders are faced with finding ways to increase productivity. Putting those efforts to good use demands that we measure productivity in a meaningful way. The conundrum of measuring productivity in health care is that the ultimate measure of interest – health created per dollar spent – is difficult to capture, and is often supplanted by intermediate measures such as the volume of services produced. Improving the productivity of the health care system will require delivering those services that produce health (and eliminating services that are ineffective, low-quality, and poorly-matched to patients), and then producing those effective services using as few resources as possible.

A number of initiatives in the 2010 Patient Protection and Affordable Care Act support this goal. These include more research on the clinical effects of different services, an effort that is supported by the Patient Centered Outcomes Research Institute (PCORI), and by experiments with payment reform that move the system away from fee-for-service toward bundled payment or global budgets. Bundled and global payments remove many incentives for providers to produce more services and thus may reduce their current obsession with volume.

However, bundled and global payments provide incentives for providers to stint on care. Here, proper metrics for quality will be key. These are needed to help guide patient and purchaser decisions and to promote accountability. Until we identify meaningful productivity measures that include quality and reflect societal interests, we will be shackled in our efforts to design a better health care system.

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Notes

[1] This is a companion paper to "Productivity and the Healthcare Workforce," by Shannon Brownlee, Joseph Colucci, and Thom Walsh, published by the Next Social Contract Initiative and Economic Growth Program at the New America Foundation, October 2013.

[2] Steven Nyce and Sylvester Schieber, "Treating Our Ills and Killing Our Prospects," 2011.

[3] Edwin Mansfield, "Micro-Economics: Theory and Applications," 1982.

[4] Peter Hussey, Han de Vries, John Romley, Margaret Wang, Susan Chen, Paul Shekelle, and Elizabeth McGlynn, "A Systematic Review of Health Care Efficiency Measures," 2009.

[5] These metrics are not consistently presented as "output/input" in the classic sense of productivity – some are input/output (for instance, total spending per discharge). Those metrics are sometimes more intuitive, especially when inputs are financial – it can be confusing to think about "discharges per dollar," for example. When comparing changes in two measures, therefore, it's important to consider the ratio one is describing: when cost per discharge goes up, the hospital has probably become less efficient; when patients per month goes up, it has in one sense become more efficient.

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

[7] Bruce Pyenson, Stephen Connor, Kathryn Fitch, Barry Kinzbrunner, "Medicare Cost in Matched Hospice and Non-Hospice Cohorts," *Journal of Pain and Symptom Management*, 2004.

[8] Joseph Colucci and Shannon Brownlee, "The Cost of Assuming Doctors Know Best," 2012.

[9] Interview with Amitabh Chandra, PhD, Professor of Public Policy at the Harvard Kennedy School, 2011.

[10] Common health-related measures include mortality, life expectancy, quality of life, and functional status (such as the ability to perform daily tasks). Specific measures related to the specific disease can also be relevant, such as disease-free survival rates for cancer. All of these are flawed, because they only capture a narrow piece of information about a patient's health, but they are better than using productivity measures with no adjustment for health status at all.

[11] For a more extensive discussion of the importance of perspective in assessing productivity metrics, see: Romley, et al., 2009.

[12] John Romley, Peter Hussey, Han de Vries, Margaret Wang, Paul Shekelle, and Elizabeth McGlynn, " Efficiency and Its Measurement: What Practitioners Need to Know," The American Journal of Managed Care, 2009.

See also: Hussey et al., 2009.

[13] Arnold Epstein, "Revisiting Readmissions--Changing the Incentives for Shared Accountability," *New England Journal of Medicine,* 2009.

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About the Project

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

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