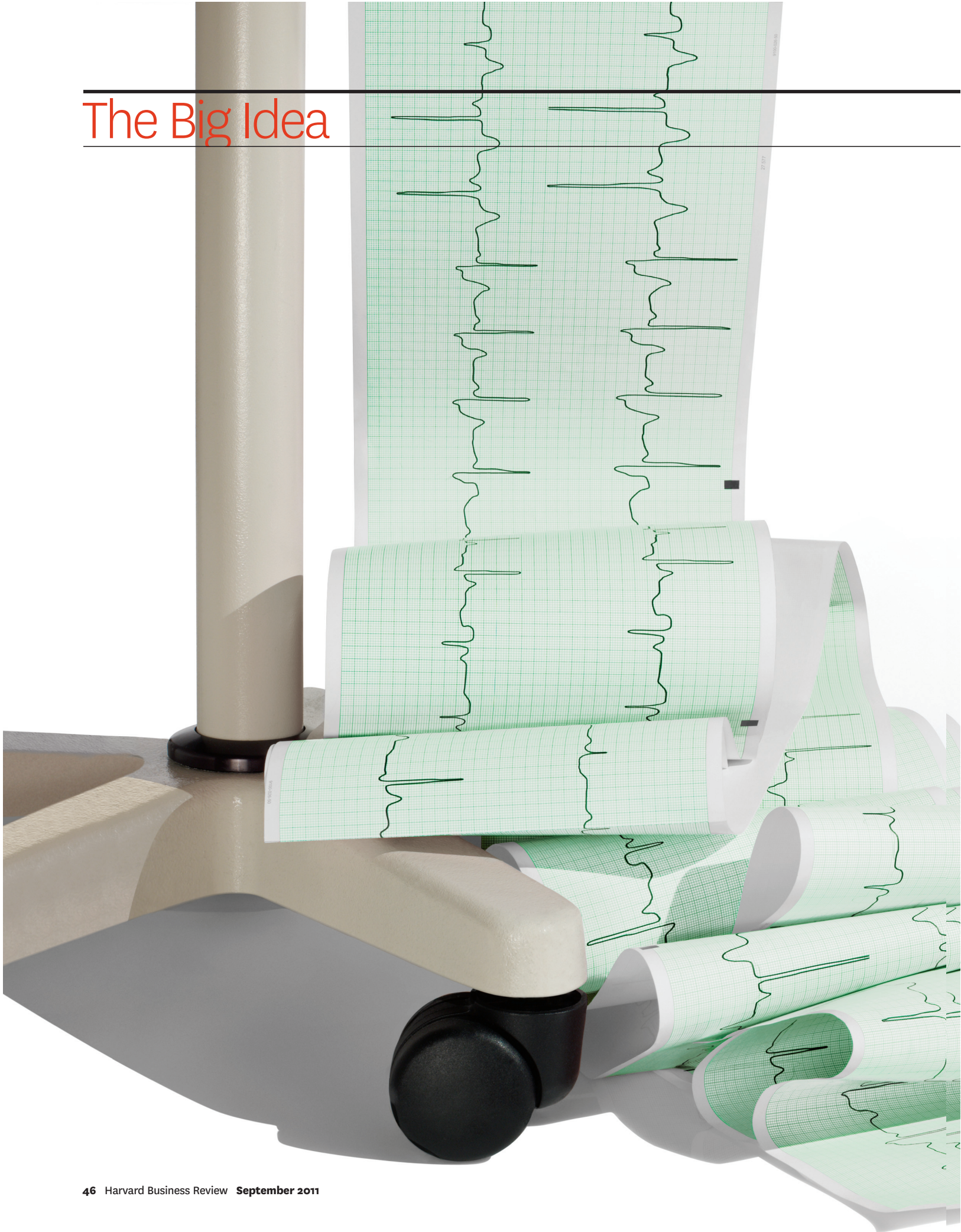


# The Big Idea





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# How to Solve The **Cost Crisis** In Health Care

The biggest problem with health care isn't with insurance or politics. It's that we're measuring the wrong things the wrong way.  
*by Robert S. Kaplan and Michael E. Porter*

PHOTOGRAPHY: MARK HOOPER

# U.S. health care costs currently exceed **17% of GDP** and continue to rise.

Other countries spend less of their GDP on health care but have the same increasing trend. Explanations are not hard to find. The aging of populations and the development of new treatments are behind some of the increase. Perverse incentives also contribute: Third-party payors (insurance companies and governments) reimburse for procedures performed rather than outcomes achieved, and patients bear little responsibility for the cost of the health care services they demand.

But few acknowledge a more fundamental source of escalating costs: the system by which those costs are measured. To put it bluntly, there is an almost complete lack of understanding of how much it costs to deliver patient care, much less how those costs compare with the outcomes achieved. Instead of focusing on the costs of treating individual patients with specific medical conditions over their full cycle of care, providers aggregate and analyze costs at the specialty or service department level.

Making matters worse, participants in the health care system do not even agree on what they mean by costs. When politicians and policy makers talk about cost reduction and “bending the cost curve,” they are typically referring to how much the government or insurers pay to providers—not to the costs incurred by providers to deliver health care services. Cutting payor reimbursement does reduce the bill paid by insurers and lowers providers’ revenues, but it does nothing to reduce the actual costs of delivering care. Providers share in this confusion. They often allocate their costs to procedures, departments, and services based not on the actual resources used to deliver care but on how much they are reimbursed. But reimbursement itself is based on arbitrary and inaccurate assumptions about the intensity of care.

Poor costing systems have disastrous consequences. It is a well-known management axiom that what is not measured cannot be managed or improved. Since providers misunderstand their costs,

they are unable to link cost to process improvements or outcomes, preventing them from making systemic and sustainable cost reductions. Instead, providers (and payors) turn to simplistic actions such as across-the-board cuts in expensive services, staff compensation, and head count. But imposing arbitrary spending limits on discrete components of care, or on specific line-item expense categories, achieves only marginal savings that often lead to higher total systems costs and poorer outcomes. For example, as payors introduce high copayments to limit the use of expensive drugs, costs may balloon elsewhere in the system should patients’ overall health deteriorate and they subsequently require more services.

Poor cost measurement has also led to huge cross-subsidies across services. Providers are generously reimbursed for some services and incur losses on others. These cross-subsidies introduce major distortions in the supply and efficiency of care. The inability to properly measure cost and compare cost with outcomes is at the root of the incentive problem in health care and has severely retarded the shift to more effective reimbursement approaches.

Finally, poor measurement of cost and outcomes also means that effective and efficient providers go unrewarded, while inefficient ones have little incentive to improve. Indeed, institutions may be penalized when the improvements they make in treatments and processes reduce the need for highly reimbursed services. Without proper measurement, the healthy dynamic of competition—in which the highest-value providers expand and prosper—breaks down. Instead we have zero-sum competition in which health care providers destroy value by focusing on highly reimbursed services, shifting costs to other entities, or pursuing piecemeal and ineffective line-item cost reductions. Current health care reform initiatives will exacerbate the situation by increasing access to an inefficient system without addressing the fundamental

## Idea in Brief

Much of the rapid escalation in health care costs can be attributed to the fact that providers have an almost complete lack of understanding of how much it costs to deliver patient care. Thus they lack the knowledge necessary to improve resource utilization, reduce delays, and eliminate activities that don't improve outcomes.

Pilot projects under way at hospital systems in the U.S. and Europe demonstrate the transformative effect of a new approach that accurately measures costs—at the level of the individual patient with a given medical condition over a full cycle of care—and compares those costs to outcomes.

As providers and payors better understand costs, they will be positioned to achieve a true “bending of the cost curve” from within the system, not based on top-down mandates.

The sheer size of the opportunity to reduce health care costs—with no sacrifice in outcomes—is astounding.

value problem: how to deliver improved outcomes at a lower total cost.

Fortunately, we can change this state of affairs. And the remedy does not require medical science breakthroughs or top-down governmental regulation. It simply requires a new way to accurately measure costs and compare them with outcomes. Our approach makes patients and their conditions—not departmental units, procedures, or services—the fundamental unit of analysis for measuring costs and outcomes. The experiences of several major institutions currently implementing the new approach—the Head and Neck Center at MD Anderson Cancer Center in Houston, the Cleft Lip and Palate Program at Children's Hospital in Boston, and units performing knee replacements at Schön Klinik in Germany and Brigham & Women's Hospital in Boston—confirm our belief that bringing accurate cost and value measurement practices into health care delivery can have a transformative impact.

### Understanding the Value of Health Care

The proper goal for any health care delivery system is to improve the value delivered to patients. Value in health care is measured in terms of the patient outcomes achieved per dollar expended. It is not the number of different services provided or the volume of services delivered that matters but the value. More care and more expensive care is not necessarily better care.

To properly manage value, both outcomes and cost must be measured at the patient level. Measured outcomes and cost must encompass the entire cycle of care for the patient's particular medical condition, which often involves a team with multiple specialties performing multiple interventions from diagnosis to treatment to ongoing management. A medical condition is an interrelated set of patient circumstances

**The remedy to the cost crisis does not require medical science breakthroughs or new governmental regulation. It simply requires a new way to accurately measure costs and compare them with outcomes.**

that are best addressed in a coordinated way and should be broadly defined to include common complications and comorbidities. The cost of treating a patient with diabetes, for example, must include not only the costs associated with endocrinological care but also the costs of managing and treating associated conditions such as vascular disease, retinal disease, and renal disease. For primary and preventive care, the unit of value measurement is a particular patient population—that is, a group with similar primary care needs, such as healthy children or the frail and elderly with multiple chronic conditions.

Let's explore the first component of the health care value equation: health outcomes. Outcomes for any medical condition or patient population should be measured along multiple dimensions, including survival, ability to function, duration of care, discomfort and complications, and the sustainability of recovery. Better measurement of outcomes will, by itself, lead to significant improvements in the value of health care delivered, as providers' incentives shift away from performing highly reimbursed services and toward improving the health status of patients. Approaches for measuring health care outcomes have been described previously, notably in Michael Porter's 2010 *New England Journal of Medicine* article, “What Is Value in Health Care?”

While measuring medical outcomes has received growing attention, measuring the costs required to deliver those outcomes, the second component of the value equation, has received far less attention. In the value framework, the relevant cost is the total cost of all resources—clinical and administrative personnel, drugs and other supplies, devices, space, and equipment—used during a patient's full cycle of care for a specific medical condition, including the treatment of associated complications and common comorbidities. We increase the value of health care delivered to patients by improving outcomes at similar costs or



by reducing the total costs involved in patients' care while maintaining the quality of outcomes.

A powerful driver of value in health care is that better outcomes often go hand in hand with lower total care cycle costs. Spending more on early detection and better diagnosis of disease, for example, spares patients suffering and often leads to less complex and less expensive care later. Reducing diagnostic and treatment delays limits deterioration of health and also lowers costs by reducing the resources required for care. Indeed, the potential to improve outcomes while driving down costs is greater in health care than in any other field we have encountered. The key to unlocking this potential is combining an accurate cost measurement system with the systematic measurement of outcomes. With these powerful

tools in place, health care providers can utilize medical staff, equipment, facilities, and administrative resources far more efficiently, streamline the path of patients through the system, and select treatment approaches that improve outcomes while eliminating services that do not.

### The Challenges of Health Care Costing

Accurate cost measurement in health care is challenging, first because of the complexity of health care delivery itself. A patient's treatment involves many different types of resources—personnel, equipment, space, and supplies—each with different capabilities and costs. These resources are used in processes that start with a patient's first contact with the organization and continue through a set of clinical consulta-

## Myth #1

# Charges are a good surrogate for provider costs.

The widespread confusion between what a provider charges, what it is actually reimbursed, and its costs is a major barrier to reducing the cost of health care. Providers have aggravated this problem by structuring important aspects of their costing systems around the way they are reimbursed. In the U.S., this is partly a historical artifact of the Medicare cost-plus reimbursement system, which requires hospital departments to prepare an annual Medicare Cost Report (MCR), detailing costs and charges by department. Rather than developing and maintaining accurate costing systems that are based on actual resource usage, separate from the regulatory standard required for reimbursement, hospitals defaulted to reimbursement-driven systems.

Unfortunately, that approach was flawed from the start because it was based on the use of highly aggregate data for estimating costs and the

deeply flawed assumption that every billable event in a department has the same profit margin. Reimbursement-based costing also buries the costs of valuable but nonbillable events, such as patient consultations, in large overhead pools that are allocated arbitrarily and inaccurately to billable events.

Although costing systems for physician services differ from those used by hospitals, they suffer from the same problems. As is the case for hospitals, U.S. physicians are reimbursed not on the basis of an individual patient's resource use but on average estimates of relative demands—relative value units, or RVUs—on physician labor, practice expenses, and malpractice expenses in performing billable activities. These resource estimates are derived from specialty panels and national surveys of physicians, who stand to gain from overestimating the time and complexity of their work. Despite the required sign-off by government payors, the RVU

estimates are not systematically measured or confirmed in practice settings. Reimbursing physicians on the basis of highly aggregate and likely inaccurate estimates of their costs introduces major incentive problems into the health care system. But the problems are compounded when the reimbursement rates are also used to allocate physician costs to patients, a purpose for which they were never intended.

We need to abandon the idea that charges billed or reimbursements paid in any way reflect costs. In reality, the cost of using a resource—a physician, nurse, case manager, piece of equipment, or square meter of space—is the same whether the resource is performing a poorly or a highly reimbursed service. Cost depends on how much of a resource's available capacity (time) is used in the care for a particular patient, not on the charge or reimbursement for the service, or whether it is reimbursed at all.


**FURTHER READING  
FROM THE AUTHORS**
**MEASURING VALUE  
AND OUTCOMES**
**“What Is Value in  
Health Care?”**

 by M.E. Porter  
*New England Journal of  
Medicine*, 2010

**Redefining Health Care:  
Creating Value-Based  
Competition on Results**

 by M.E. Porter and  
 E.O. Teisberg  
 Harvard Business Review  
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**“A Strategy for Health  
Care Reform: Towards a  
Value-Based System”**

 by M.E. Porter  
*New England Journal of  
Medicine*, 2009

**TIME-DRIVEN  
ACTIVITY-BASED  
COSTING**
**Time-Driven Activity-  
Based Costing:**
**A Simpler and More  
Powerful Path to  
Higher Profits**

 by R.S. Kaplan and  
 S.R. Anderson  
 Harvard Business Review  
 Press, 2007

**Cost and Effect: Using  
Integrated Cost Systems  
To Drive Profitability and  
Performance**

 by R.S. Kaplan and  
 R. Cooper  
 Harvard Business Review  
 Press, 1998

tions, treatments, and administrative processes until the patient’s care is completed. The path that the patient takes through the system depends on his or her medical condition.

The already complex path of care is further complicated by the highly fragmented way in which health care is delivered today. Numerous distinct and largely independent organizational units are involved in treating a patient’s condition. Care is also idiosyncratic; patients with the same condition often take different paths through the system. The lack of standardization stems to some extent from the artisanal nature of medical practice—physicians in the same organizational unit performing the same medical process (for instance, total knee replacement) often use different procedures, drugs, devices, tests, and equipment. In operational terms, you might describe health care today as a highly customized job shop.

Existing costing systems, which measure the costs of individual departments, services, or support activities, often encourage the shifting of costs from one type of service or provider to another, or to the payor or consumer. The micromanagement of costs at the individual organizational unit level does little to reduce total cost or improve value—and may in fact destroy value by reducing the effectiveness of care and driving up administrative costs. (For more on the problems with current costing systems, see the three Myth sidebars.)

Any accurate costing system must, at a fundamental level, account for the total costs of all the resources used by a patient as she or he traverses the system. That means tracking the sequence and duration of clinical and administrative processes used by individual patients—something that most hospital information systems today are unable to do. This deficiency can be addressed; technology advances will soon greatly improve providers’ ability to track the type and amount of resources used by individual patients. In the meantime, it is possible to determine the predominant paths followed by patients with a particular medical condition, as our pilot sites have done.

With good estimates of the typical path an individual patient takes for a medical condition, providers can use the time-driven activity-based costing (TDABC) system to assign costs accurately and relatively easily to each process step along the path. This improved version of activity-based costing requires that providers estimate only two parameters at each process step: the cost of each of the resources used in the process and the quantity of time the patient

spends with each resource. (See Robert S. Kaplan and Steven R. Anderson’s “Time-Driven Activity-Based Costing,” HBR 2004.)

In its initial implementation, such a costing system may appear complex. But the complexity arises not from the methodology but from today’s idiosyncratic delivery system, with its poorly documented processes for treating patients with particular conditions and its inability to map asset and expense categories to patient processes. As health care providers begin to reorganize into units focused on conditions, standardize their protocols and treatment processes, and improve their information systems, using the TDABC system will become much simpler.

To see how TDABC works in the health care context, we first explore a simplified example.

**Costing the Patient: A Simple Example**

Consider Patient Jones, who makes an outpatient visit to a clinic. To estimate the total cost of Jones’s care, we first identify the processes he undergoes and the resources used in each process. Let’s assume that Jones uses an administrative process for check-in, registration, and obtaining documentation for third-party reimbursement; and a clinical process for treatment. Just three clinical resources are required: an administrator (Allen), a nurse (White), and a physician (Green).

We begin by estimating the first of the two parameters: the quantity of time (capacity) the patient uses of each resource at each process. From information supplied by the three staffers, we learn that Jones spent 18 minutes (0.3 hours) with Administrator Allen, 24 minutes (0.4 hours) with Nurse White for a preliminary examination, and nine minutes (0.15 hours) with Physician Green for the direct examination and consultation.

Next, we calculate the capacity cost rate for each resource—that is, how much it costs, per hour or per minute, for a resource to be available for patient-related work—using the following equation:

$$\text{Capacity Cost Rate for Resource}_i = \frac{\text{Expenses Attributable to Resource}_i}{\text{Available Capacity of Resource}_i}$$

The numerator aggregates all the costs associated with supplying a health care resource, such as Allen, White, or Green. It starts with the full compensation of each person, including salary, payroll taxes, and fringe benefits such as health insurance and pensions. To that we add the costs of all other associated resources that enable Allen, White, and Green to be

available for patient care. These typically include a pro rata share of costs related to employee supervision, space (the offices each staffer uses), and the equipment, information technology, and telecommunications each uses in the normal course of work. In this way, the cost of many of the organization's shared or support resources can be assigned to the resources that directly interact with the patient.

Supervision cost, for example, can be calculated on the basis of how many people a manager supervises. Space costs are a function of occupancy area and rental rates; IT costs are based on an individual's use of computers and communications products and services. Assume that we find Nurse White's total cost to be as follows:

<b>Annual compensation</b> (including fringe benefits)	<b>\$65,000</b>
<b>Supervision cost</b> (10% of nursing supervisor's full cost)	<b>\$9,000</b>
<b>Occupancy</b> (9 sq. meters of space @ \$1,200/sq. meter/year)	<b>\$10,800</b>
<b>Technology and support</b>	<b>\$2,560</b>
<b>Annual total cost of Nurse White</b>	<b>\$87,360</b>
<b>Monthly total cost of Nurse White</b>	<b>\$7,280</b>

We next calculate Nurse White's availability for patient care—the denominator of our capacity cost rate equation. This calculation starts with 365 days per year and subtracts all the time that the employee is not available for work. The calculation for Nurse White is as follows:

<b>Start with</b>	<b>365 days per year</b>
less weekend days	<b>104</b>
less vacation days	<b>20</b>
less holidays	<b>12</b>
less sick days	<b>5</b>
	<b>224 available days per year</b>
	<b>18.7 days per month</b>
<b>Start with</b>	<b>7.5 hours per available day</b>
less scheduled breaks (hours)	<b>0.5</b>
less meetings, training, education	<b>1.0</b>
<b>Available clinical hours</b>	<b>6 hours per day</b>

Nurse White is therefore available for patient work 112 hours per month (6 hours a day for 18.7 days). Dividing the monthly cost of the resource (\$7,280) by monthly capacity (112 hours) gives us Nurse White's capacity cost rate: \$65 per hour.

Let's assume that similar calculations yield capacity cost rates for Administrator Allen and Physician Green of \$45 per hour and \$300 per hour, respectively.

We calculate the total cost of Jones's visit to the facility by simply multiplying the capacity cost rate of each resource by the time (in hours) Jones spent using the resource, and then adding up the components:

(0.3 hours × \$45)
(0.4 hours × \$65)
+ (0.15 hours × \$300)
<b>Total cost of visit: \$84.50</b>

As this example demonstrates, accurately calculating the cost of delivering health care is quite straightforward under the TDABC system. Although the example is admittedly simplified, it captures almost all the fundamental concepts any health care provider needs to apply to estimate the cost of treating patients over their full cycles of care.

By capturing all the costs over the complete cycle of care for an individual patient's medical condition, we allow providers and payors to address virtually any costing question. Providers can aggregate and analyze patients' cost of care by age, gender, and comorbidity, or by treatment facility, physician, employer, and payor. They can calculate total and average costs for any category or subcategory of patients while still capturing the detailed data on individual patients needed to understand the sources of cost variation within each category.

### The Cost Measurement Process

Moving beyond the simplified example, let's now look at the seven steps our pilot sites are using to estimate the total costs of treating their patient populations.

**1. Select the medical condition.** We begin by specifying the medical condition (or patient population) to be costed, including the associated complications and comorbidities that affect processes and resources used during the patient's care. For each condition, we define the beginning and end of the patient care cycle. For chronic conditions, we choose a care cycle for a period of time, such as a year.

**2. Define the care delivery value chain.** Next, we specify the care delivery value chain (CDVC), which charts the principal activities involved in a patient's care for a medical condition along with their locations. The CDVC focuses providers on the full care cycle rather than on individual processes, the typical unit of analysis for most process improvements and lean initiatives in health care.

## CREATING A COST MEASUREMENT SYSTEM

## 1

Select the medical condition and/or patient population to be examined

## 2

Define the care delivery value chain

## 3

Develop process maps of each activity in patient care delivery; identify the resources involved and any supplies used for the patient at each process

## 4

Obtain time estimates for each process step

## 5

Estimate the cost of supplying each patient care resource

## 6

Estimate the practical capacity of each resource provider, and calculate the capacity cost rate

## 7

Compute the total costs over each patient's cycle of care

(The exhibit “The Care Delivery Value Chain” shows the CDVC developed with the Brigham & Women’s pilot site for patients with severe knee osteoarthritis.) This overall view of the patient care cycle helps to identify the relevant dimensions along which to measure outcomes and is also the starting point for mapping the processes that make up each activity.

**3. Develop process maps of each activity in patient care delivery.** Next we prepare detailed process maps for each activity in the care delivery value chain. Process maps encompass the paths patients may follow as they move through their care cycle. They include all the capacity-supplying resources (personnel, facilities, and equipment) involved at each process along the path, both those directly used by the patient and those required to make the primary resources available. (The exhibit “New-Patient Process Map” shows a process map for one segment of the patient care cycle at the MD Anderson Head and Neck Center.) In addition to identifying the capacity-supplying resources used in each process, we identify the consumable supplies (such as medications, syringes, catheters, and bandages) used directly in the process. These do not have to be shown on the process maps.

Our pilot sites used several approaches for creating process maps. Some project teams interviewed clinicians individually to learn about patient flow, while others organized “power meetings” in which people from multiple disciplines and levels of management discussed the process together. Even at this early stage in the project, the sessions occasionally identified immediate opportunities for process and cost improvement.

**4. Obtain time estimates for each process.** We also estimate how much time each provider or other resource spends with a patient at each step in the process. When a process requires multiple resources, we estimate the time required by each one.

For short-duration, inexpensive processes that vary little across patients, we recommend using standard times (rather than investing resources to record actual ones). Actual duration should be calculated for time-consuming, less predictable processes, especially those that involve multiple physicians and nurses performing complex care activities such as major surgery or examination of patients with complicated medical circumstances.

TDABC is also well suited to capture the effect of process variation on cost. For example, a patient

who needs a laryngoscopy as part of her clinical visit requires an additional process step. The time estimate and associated incremental resources required can be easily added to the overall time equation for that patient. (See again the process map exhibit.)

To estimate standard times and time equations, our pilot sites have found it useful to bring together all the people involved in a set of processes for focused discussion. In the future, we expect providers will use electronic handheld, bar-code, and RFID devices to capture actual times, especially if TDABC becomes the generally accepted standard for measuring the cost of patient care.

**5. Estimate the cost of supplying patient care resources.** In this step, we estimate the direct costs of each resource involved in caring for patients. The direct costs include compensation for employees, depreciation or leasing of equipment, supplies, or other operating expenses. These data, gathered from the general ledger, the budgeting system, and other IT systems, become the numerator for calculating each resource’s capacity cost rate.

We must also account for the time that many physicians, particularly in academic medical centers, spend teaching and doing research in addition to their clinical responsibilities. We recommend estimating the percentage of time that a physician spends on clinical activities and then multiplying the physician’s compensation by this percentage to obtain the amount of pay accounted for by the physician’s clinical work. The remaining compensation should be assigned to teaching and research activities.

Next, we identify the support resources necessary to supply the primary resources providing patient care. For personnel resources, as illustrated in the Patient Jones example, these include supervising employees, space and furnishings (office and patient treatment areas), and corporate functions that support patient-facing employees. When calculating the cost of supplies, we include the cost of the resources used to acquire them and make them available for patient use during the treatment process (for instance, purchasing, receiving, storage, sterilization, and delivery).

Finally, we need to allocate the costs of departments and activities that support the patient-facing work. We map those processes as we did in step 3 and then calculate and assign costs to patient-facing resources on the basis of their demands for the services of these departments, using the process that will be described in step 6.



**CASE STUDY: THE CARE DELIVERY VALUE CHAIN**  
**Severe Knee Osteoarthritis Requiring Replacement**

The care delivery value chain is both a descriptive and prescriptive tool. By systematically mapping the full set of activities delivered over the cycle of care for a medical condition, spanning multiple providers and nonclinical care settings, the CDVC enables analysis of how the set of activities *together* generates patient value and offers providers a systematic approach to analyze, improve, and integrate the configuration of care delivery.

<b>INFORMING AND ENGAGING</b> What do patients need to be educated about?	<ul style="list-style-type: none"> <li>Importance of exercise, weight reduction, proper nutrition</li> </ul>	<ul style="list-style-type: none"> <li>Meaning of diagnosis</li> <li>Prognosis (short- and long-term outcomes)</li> <li>Drawbacks and benefits of surgery</li> </ul>	<ul style="list-style-type: none"> <li>Setting expectations</li> <li>Importance of nutrition, weight loss, vaccinations</li> <li>Home preparation</li> </ul>	<ul style="list-style-type: none"> <li>Expectations for recovery</li> <li>Importance of rehab</li> <li>Post-surgery risk factors</li> </ul>	<ul style="list-style-type: none"> <li>Importance of rehab adherence</li> <li>Longitudinal care plan</li> </ul>	<ul style="list-style-type: none"> <li>Importance of exercise, maintaining healthy weight</li> </ul>
<b>MEASURING</b> What measures need to be collected?	<ul style="list-style-type: none"> <li>Joint-specific symptoms and function (e.g., WOMAC scale)</li> <li>Overall health (e.g., SF-12 scale)</li> </ul>	<ul style="list-style-type: none"> <li>Loss of cartilage</li> <li>Change in subchondral bone</li> <li>Joint-specific symptoms and function</li> <li>Overall health</li> </ul>	<ul style="list-style-type: none"> <li>Baseline health status</li> <li>Fitness for surgery (e.g., ASA score)</li> </ul>	<ul style="list-style-type: none"> <li>Blood loss</li> <li>Operative time</li> <li>Complications</li> </ul>	<ul style="list-style-type: none"> <li>Infections</li> <li>Joint-specific symptoms and function</li> <li>Inpatient length of stay</li> <li>Ability to return to normal activities</li> </ul>	<ul style="list-style-type: none"> <li>Joint-specific symptoms and function</li> <li>Weight gain or loss</li> <li>Missed work</li> <li>Overall health</li> </ul>
<b>ACCESSING</b> Where do patient care activities take place?	<ul style="list-style-type: none"> <li>PCP office</li> <li>Health club</li> <li>Physical therapy clinic</li> </ul>	<ul style="list-style-type: none"> <li>Specialty office</li> <li>Imaging facility</li> </ul>	<ul style="list-style-type: none"> <li>Specialty office</li> <li>Pre-op evaluation center</li> </ul>	<ul style="list-style-type: none"> <li>Operating room</li> <li>Recovery room</li> <li>Orthopedic floor at hospital or specialty surgery center</li> </ul>	<ul style="list-style-type: none"> <li>Nursing facility</li> <li>Rehab facility</li> <li>Physical therapy clinic</li> <li>Home</li> </ul>	<ul style="list-style-type: none"> <li>Specialty office</li> <li>Primary care office</li> <li>Health club</li> </ul>

TYPICAL PATH OF PATIENT CARE						
	MONITORING/ PREVENTING	DIAGNOSING	PREPARING	INTERVENING	RECOVERING/ REHABBING	MONITORING/ MANAGING
<b>CARE DELIVERY</b> What activities are performed at each stage?	<b>MONITOR</b> <ul style="list-style-type: none"> <li>Conduct PCP exam</li> <li>Refer to specialists, if necessary</li> </ul> <b>PREVENT</b> <ul style="list-style-type: none"> <li>Prescribe anti-inflammatory medicines</li> <li>Recommend exercise regimen</li> <li>Set weight loss targets</li> </ul>	<b>IMAGING</b> <ul style="list-style-type: none"> <li>Perform and evaluate MRI and x-ray                             <ul style="list-style-type: none"> <li>Assess cartilage loss</li> <li>Assess bone alterations</li> </ul> </li> </ul> <b>CLINICAL EVALUATION</b> <ul style="list-style-type: none"> <li>Review history and imaging</li> <li>Perform physical exam</li> <li>Recommend treatment plan (surgery or other options)</li> </ul>	<b>Overall prep</b> <ul style="list-style-type: none"> <li>Conduct home assessment</li> <li>Monitor weight loss</li> </ul> <b>SURGICAL PREP</b> <ul style="list-style-type: none"> <li>Perform cardiology, pulmonary evaluations</li> <li>Run blood labs</li> <li>Conduct pre-op physical exam</li> </ul>	<b>ANESTHESIA</b> <ul style="list-style-type: none"> <li>Administer anesthesia (general, epidural, or regional)</li> </ul> <b>SURGICAL PROCEDURE</b> <ul style="list-style-type: none"> <li>Determine approach (e.g., minimally invasive)</li> <li>Insert device</li> <li>Cement joint</li> </ul> <b>PAIN MANAGEMENT</b> <ul style="list-style-type: none"> <li>Prescribe preemptive multimodal pain meds</li> </ul>	<b>SURGICAL</b> <ul style="list-style-type: none"> <li>Immediate return to OR for manipulation, if necessary</li> </ul> <b>MEDICAL</b> <ul style="list-style-type: none"> <li>Monitor coagulation</li> </ul> <b>LIVING</b> <ul style="list-style-type: none"> <li>Provide daily living support (showering, dressing)</li> <li>Track risk indicators (fever, swelling, other)</li> </ul> <b>PHYSICAL THERAPY</b> <ul style="list-style-type: none"> <li>Daily or twice daily PT sessions</li> </ul>	<b>MONITOR</b> <ul style="list-style-type: none"> <li>Consult regularly with patient</li> </ul> <b>MANAGE</b> <ul style="list-style-type: none"> <li>Prescribe prophylactic antibiotics when needed</li> <li>Set long-term exercise plan</li> <li>Revise joint, if necessary</li> </ul>
<b>ORTHOPEDIC SURGEON</b>						

For more on the CDVC, see *Redefining Health Care: Creating Value-Based Competition on Results*, by M.E. Porter and E.O. Teisberg (Harvard Business Review Press, 2006).

This approach to allocating support costs represents a major shift from current practice. To illustrate, let's compare the allocation of the resources required in a centralized department to sterilize two kinds of surgical tool kits, those used for total knee replacement and those used for cardiac bypass. Existing cost systems tend to allocate higher sterilization costs to cardiac bypass cases than to knee replacement cases because the charges (or direct costs) are higher for a cardiac bypass than for a knee replacement. Under TDABC, however, we have learned that more time and expense are required to sterilize the typically more complex knee surgery tools, so relatively higher sterilization costs should be assigned to knee replacements.

When costing support departments, a good guideline is the "rule of 1." Support functions that have only one employee can be treated as a fixed cost; they can be either not allocated at all or allocated using a simplistic method, as is currently done. But departments that have more than one person or more than one unit of any resource represent variable costs. The workload of these departments has expanded because of increased demand for the services and outputs they provide. Their costs should and can be assigned on the basis of the patient processes that create demand for their services.

Project teams tasked with estimating the cost to supply resources—the numerator of the capacity cost rate—should have expertise in finance, human

resources, and information systems. They can do this work in parallel with the process mapping and time estimation (steps 3 and 4) performed by clinicians and team members with expertise in quality management and process improvement.

**6. Estimate the capacity of each resource, and calculate the capacity cost rate.** Determining the practical capacity for employees—the denominator in the capacity cost rate equation—requires three time estimates, which are gathered from HR records and other sources:

- a. The total number of days that each employee actually works each year.
- b. The total number of hours per day that the employee is available for work.
- c. The average number of hours per workday used for nonpatient-related work, such as breaks, training, education, and administrative meetings.

$$\text{Monthly Practical Capacity of Resource} = \frac{a}{12} \times (b-c)$$

For physicians who divide their time among clinical, research, and education activities, we subtract time spent on research and education activities to obtain the number of hours per month that they are available for clinical work.

For equipment resources, we measure capacity by estimating the number of days per month and the number of hours per day that each piece of equipment can be used. This represents the upper limit on the capacity of the equipment. The actual capacity utilization of much health care equipment is sometimes lower because equipment capacity is supplied in large lumps. For instance, suppose a piece of equipment can do 10,000 blood tests a month. A hospital decides to buy the equipment knowing that it needs to process only 6,000 tests per month. In this case, we make an adjustment: The costing system should use the time required to perform 6,000 tests as the capacity of the resource. Otherwise, the tests actually performed on the equipment will, at best, cover only 60% of its cost. If the provider subsequently ends up using the equipment for a higher number of tests, it can adjust the capacity rate accordingly.

This treatment of capacity follows the rule of 1 and should be applied when the organization has only one unit of the equipment. Now suppose a provider has 12 facilities that each use equipment capable of performing 10,000 blood tests per month—but each facility performs only 6,000 tests per month. In that

## Myth #2

# Hospital overhead costs are too complex to allocate accurately.

Most health care leaders will eventually accept the idea that the direct costs of patient care, such as nurses, physicians, and consumable supplies (drugs, bandages, and syringes), ought to be assigned more accurately to individual patients. But many leaders believe that allocating the costs of indirect and support units cannot be done except with crude, arbitrary methods, often dressed up to look sophisticated. Typically, they use a “peanut butter” method, which spreads overhead and support costs across each department’s billable activities (see Myth #1) using metrics such as the size of direct costs, head count, length of stay, assigned physical space, number of patients, number of procedures, RVUs supplied, or costs-to-charge ratios (Myth #1 again).

The effect of such arbitrary support-department allocations on the measured cost of services can be profound. In the past, Schön Klinik, like other hospitals in Germany, had reduced the capacity of its total knee replacement rehabilitation units in part because the existing cost system portrayed them as less profitable than acute-care units. During Schön Klinik’s cost pilot, the project team discovered that the existing cost system allocated support-department costs largely on the basis of length of patient stay, not on the patient’s use of support resources. Since Schön total knee replacement patients spent 75% of their stay in the rehab facility, rehab had been allocated about 75% of support department costs.

The TDABC analysis showed, however, that the demand for many support-unit services, such as medical billing, is far higher during the days a patient spends in the acute-care facility than during rehab days. With support costs properly assigned, the rehab facility showed improved profitability. Schön Klinik began to contemplate the expansion of its rehabilitation capacity—a complete reversal of its previous decision—and shifted its focus more intensively on reducing support costs incurred during the acute-care stay.

Once indirect costs have been accurately assigned, managers and physicians can look for ways to reduce demand for support-department services and improve the efficiency with which they are delivered. That, in turn, will enable organizations to lower their spending on these resources.

case, the capacity of each resource unit should be set at the full 10,000 tests per month, not its expected number. We want the system to signal the cost of unused capacity when a provider chooses to supply capacity at multiple locations or facilities rather than consolidating its use of expensive equipment.

In addition to the lumpiness with which capacity gets acquired, factors such as peak load demands, surge capacity, and capacity acquired for future growth should be accounted for. This applies to both equipment and personnel. (Those factors can be incorporated, but the treatment is beyond the scope of this article.)

In practice, we have found that underutilization of expensive equipment capacity is often not a conscious decision but a failure of the costing system to provide visibility into resource utilization. That problem is corrected by the TDABC approach. We describe opportunities to improve resource capacity utilization later in the article.

To calculate the resource capacity cost rate, we simply divide the resource's total cost (step 5) by its practical capacity (step 6) to obtain a rate, measured in dollars or euros per unit of time, typically an hour or a minute.

#### 7. Calculate the total cost of patient care.

Steps 3 through 6 establish the structure and data components of the TDABC system. In the final step, the project team estimates the total cost of treating a patient by simply multiplying the capacity cost rates (including associated support costs) for each resource used in each patient process by the amounts of time the patient spent with the resource (step 4). Sum up all the costs across all the processes used during the patient's complete cycle of care to produce the total cost of care for the patient.

### Opportunities to Improve Value

Our new approach actively engages physicians, clinical teams, administrative staff, and finance professionals in creating the process maps and estimating the resource costs involved in treating patients over their care cycle. This bridges the historical divide between managers and clinical teams that has often led to tensions and stalemates over cost-cutting steps. TDABC builds a common information platform that will unleash innovation based on a shared understanding of the actual processes of care. Even at our pilot site Schön Klinik, which already had an excellent departmental cost-control system, introducing TDABC revealed powerful new ways to improve its

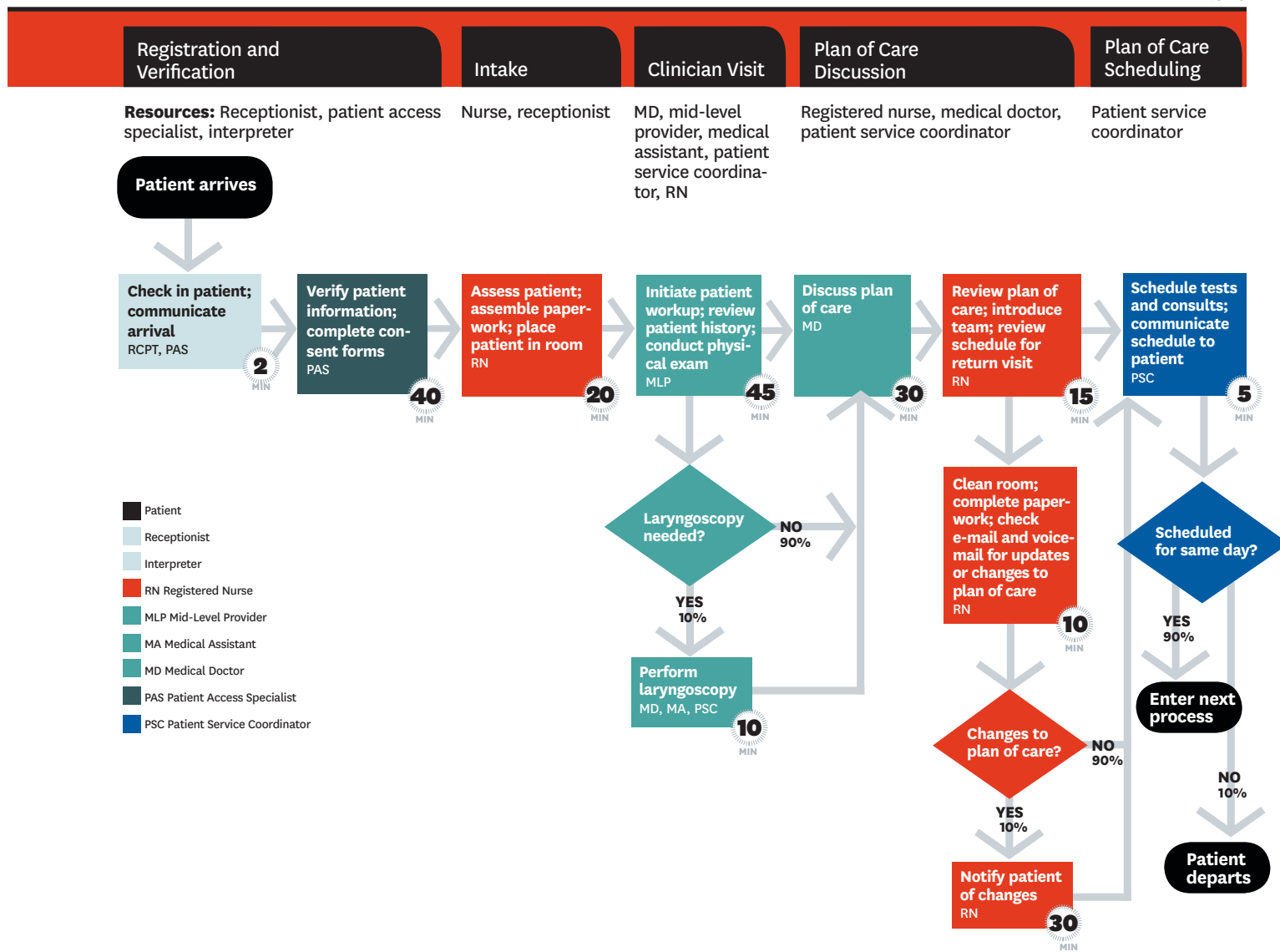
processes and restructure care delivery. Capitalizing on these value-creating opportunities—previously hidden by inadequate and siloed costing systems—is the key to solving the health care cost problem. Let's examine some of the most promising opportunities that proper costing reveals.

**Eliminate unnecessary process variations and processes that don't add value.** In our pilots, we have documented significant variation in the processes, tools, equipment, and materials used by physicians performing the same service within the same unit in the same facility. For example, in total knee replacement, surgeons use different implants, surgical kits, surgeons' hoods, and supplies, thereby introducing substantial cost variation in treating patients with the same condition at the same site. The surgical unit now measures the costs and outcomes that each surgeon produces. As a result, clinical practice leaders are able to have more constructive and better informed discussions about how best to standardize care and treatment processes to reduce the costs of variability and limit the use of expensive approaches and materials that do not demonstrably lead to improved outcomes.

In addition to reducing process variations, our pilot sites have eliminated steps or entire processes that did not improve outcomes. Schön Klinik, for example, lowered costs by reducing the breadth of tests included in its common laboratory panel after learning that many of the tests did not provide new information that would lead to improvement in outcomes.

Comparing practices across different countries for the same condition also reveals major opportunities for improvement. The reimbursement for a total joint replacement care cycle in Germany and Sweden is approximately \$8,500, including all physician and technical services and excluding only outpatient rehabilitation. The comparable figure in U.S. medical centers is \$30,000 or more. Since providers in all three countries report, in aggregate, similar margins on joint replacement care, U.S. providers' costs are likely two to three times as high as those of their European counterparts. By comparing process maps and resource costs for the same medical condition across multiple sites, we can determine how much of the cost difference is attributable to variations in processes, protocols, and productivity and how much is attributable to differences in resource or supply costs such as wages and implant prices. Our initial research suggests that although inputs are more expensive in

This process map describes a segment of the patient care cycle at MD Anderson Head and Neck Center. Process maps show the resources required for each activity and often reveal immediate opportunities for process improvement and cost reduction.



the United States, the higher cost in U.S. facilities is mainly due to lower resource productivity.

**Improve resource capacity utilization.** The TDABC approach identifies how much of each resource’s capacity is actually used to perform processes and treat patients versus how much is unused and idle. Managers can clearly see the quantity and cost of unused resource capacity at the level of individual physicians, nurses, technicians, pieces of equipment, administrators, or organizational units. Resource utilization data also reveal where increasing the supply of certain resources to ease bottlenecked processes would enable more timely care and serve more patients with only modestly higher expenditures.

When managers have greater visibility into areas where substantial and expensive unused capacity exists, they can identify the root causes. For example, some underutilization of expensive space, equipment, and personnel is caused by poor coordi-

nation and delays when a patient is handed off from one specialty or service to the next. Another cause of low resource utilization is having specialized equipment available just in case the need arises. Some facilities that serve patients with unpredictable and rare medical needs make a deliberate decision to carry extra capacity. In such cases, an understanding of the actual cost of excess capacity should trigger a discussion on how best to consolidate the treatment of such patients. Much excess resource capacity, however, is due not to rare conditions or poor hand-offs but to the prevailing tendency of many hospitals and clinics to provide care for almost every type of medical problem. Such fragmentation of service lines introduces costly redundancy throughout the health care system. It can also lead to inferior outcomes when providers handle a low volume of cases of each type. Accurate costing gives managers a valuable tool for consolidating patient care for low-volume procedures in fewer institutions, which

would both reduce the high costs of unused capacity and improve outcomes.

**Deliver the right processes at the right locations.** Many services today are delivered in over-resourced facilities or facilities designed for the most complex patient rather than the typical patient. By accurately measuring the cost of delivering the same services at different facilities, rather than using figures based on averaged direct costs and inaccurate overhead allocations, providers are able to see opportunities to perform particular services at properly resourced and lower-cost locations. Such realignment of care delivery, already under way at Children's Hospital Boston, improves the value and convenience of more routine services for both patients and caregivers while allowing tertiary facilities to concentrate their specialized resources on truly complex care.

**Match clinical skills to the process.** Resource utilization can also be improved by examining whether all the processes currently performed by

physicians and other skilled staff members require their level of expertise and training. The process maps developed for TDABC often reveal opportunities for appropriately skilled but lower-cost health care professionals to perform some of the processes currently performed by physicians without adversely affecting outcomes. Such substitutions would free up physicians and nurses to focus on their highest-value-added roles. (For an example from one of our pilot sites, see the sidebar "A Cancer Center Puts the New Approach to Work.")

**Speed up cycle time.** Health care providers have multiple opportunities to reduce cycle times for treating patients, which in turn will reduce demand for resource capacity. For example, reducing the time that patients have to wait will reduce demand for patient supervision and space. Speeding up cycle time also improves outcomes, both by minimizing the duration of patient uncertainty and discomfort and by reducing the risk of complications and minimizing disease progression. As providers improve

### Myth #3

## Most health care costs are fixed.

Many health care system participants, including economists and accountants, believe that most costs in health care are fixed because so much care is delivered using shared staff, space, and equipment. The result of this misguided thinking is that cost reduction efforts tend to focus on only the small fraction of costs seen as variable, such as drugs and supplies, which are sometimes referred to as marginal or incremental costs. This myth also motivates some health care organizations to expand through mergers, acquisitions, and organic growth in order to reap economies of scale by spreading their fixed costs over an increased volume of business.

But if most health care costs were truly fixed, we would not have the health care cost problem we do today.

If most costs were fixed, growth in demand for health care would increase only that small fraction of costs that are variable, leading to lower average costs in the system, not the dramatically higher share of GDP now being devoted to health care.

To understand why most health care costs are not fixed, start with personnel costs, which are generally at least 50% of the total costs of health care providers, according to American Hospital Association statistics. Hint: Personnel costs are not fixed. Hospital executives can set the quantity, mix, and compensation of their personnel each year, or even more frequently. Personnel costs are fixed only when executives allow them to be. The claim that personnel costs are fixed is a reflection of manage-

ment inattention, not of the nature of those costs.

Space costs are also not fixed. Space is perhaps an organization's most fungible resource. If demand for space is reduced, units can be consolidated into smaller space, and excess space can be repurposed, sold, or subleased. Similarly, equipment costs can be avoided if changes in processes, treatment protocols, or patient mix eliminate the demand for the resources. Equipment no longer needed can be retired or sold to other health care institutions that are expanding their capacity.

All told, we estimate that upwards of 95% of what health care managers think of as fixed costs are actually under their control and therefore not really fixed.

their process flows and reduce redundancy, their patients will no longer have to be so “patient” as they receive a complete cycle of care.

**Optimize over the full cycle of care.** Health care providers today are typically organized around specialties and services, which complicates coordination, interrupts the seamless, integrated flow of patients from one process to the next, and leads to the duplication of many processes. In the typical care delivery process, for example, patients see multiple providers in multiple locations and undergo a separate scheduling interaction, check-in, medical consultation, and diagnostic workup for each one. This wastes resources and creates delays. The TDABC model makes visible the high costs of these redundant administrative and clinical processes, motivating professionals from different departments to work together to integrate care across departments and specialties. Eliminating unnecessary administrative and clinical processes represents one of the biggest opportunities for lowering costs.

With a complete picture of the time and resources involved, providers can optimize across the entire care cycle, not just the parts. Physicians and staff may shift more of their time and resources to the front end of the care cycle—to activities such as patient education and clinical team consultations—to reduce the likelihood of patients experiencing far more costly complications and readmissions later in the cycle.

Additionally, this resource- and process-based approach gives providers visibility into valuable non-billed events in the cycle of care. These activities—such as nurse counseling time, physician phone calls to patients, and multidisciplinary care team meetings—can often make major contributions to efficiency and favorable outcomes. Because existing systems hide these costs in overhead (see Myth #1), such important elements of care are prone to be minimized or left unmanaged.

### Capturing the Payoffs

“Calculating the return on investment of performance improvement has been missing from most of the quality improvement discussions in health care,” Dr. Thomas Feeley at MD Anderson told us. “When measurement does occur, the assumptions are usually gross, inaccurate, and sometimes overstated,” he added. “TDABC gave us a powerful tool to actually model the effect an improvement will have on costs.” Accurate costing allows the impact of process

PILOT

# A Cancer Center Puts The New Approach To Work

by Heidi W. Albright, MHA, and Thomas W. Feeley, MD

**T**he University of Texas MD Anderson Cancer Center is a National Cancer Institute–designated Comprehensive Cancer Center, located in Houston, Texas. Seeing more than 30,000 new patients every year, MD Anderson accounts for approximately 20% of cancer care within the Houston region and 1% of cancer care nationally. MD Anderson is a medical condition–focused center that provides integrated, interdisciplinary care across the care cycle.

In collaboration with Michael Porter, we embarked on a major effort to expand clinical outcome measurement, beginning with a study of 2,468 patients in the Head and Neck Center, in 2008. We created the Institute for Cancer Care Excellence in December 2008 to support this effort. In 2010, with Robert Kaplan, we launched a pilot project, also within the Head and Neck Center, to assess the feasibility of applying modern cost accounting to health care delivery.

Traditionally, at MD Anderson, we used a charge-based cost accounting system. However, we realized that its cost allocations were problematic at several levels. For a start, the drivers of cost in health care had changed but the allocation methodology had not, with the result that our costing no

CONTINUED ON NEXT PAGE

improvements to be readily calculated, validated, and compared.

The big payoff occurs when providers use accurate costing to translate the various value-creating opportunities into actual spending reductions. A cruel fact of life is that total costs will not actually fall unless providers issue fewer and smaller paychecks, consume less (and less expensive) space, buy fewer supplies, and retire or dispose of excess equipment. Facing revenue pressure due to lower reimbursements—particularly from government programs such as Medicare and Medicaid—providers today use a hatchet approach to cost reduction by mandating arbitrary cuts across departments. That approach jeopardizes both the quality and the supply of care. With accurate costing, providers can target their cost reductions in areas where real improvements in

lead to reduced spending on resources that are no longer needed. Managers also have the information they need to redeploy resources freed up as a result of process improvements. Leaders gain a tool they never had before: a way to link decisions about patient needs and treatment processes directly to resource spending.

### Reinventing Reimbursement

If we are to stop the escalation of total health care costs, the level of reimbursement must be reduced. But how this is done will have profound implications for the quality and supply of health care. Across-the-board cuts in reimbursement will jeopardize the quality of care and likely lead to severe rationing. Reductions that enable the quality of care to be maintained or improved need to be informed by accurate

**When providers understand the total costs of treating patients over their complete cycle of care, they can contemplate innovative reimbursement approaches without fear of sacrificing their financial sustainability.**

resource utilization and process efficiencies enable providers to spend less without having to ration care or compromise its quality.

Health care organizations today, like all other firms, conduct arduous and time-consuming budgeting and capacity planning processes, often accompanied by heated arguments, power negotiations, and frustration. Such difficulties are symptomatic of inadequate costing systems and can be avoided.

A TDABC budgeting process starts by predicting the volume and types of patients the provider expects. Using these forecasts combined with the process maps for treating each patient condition, providers can predict the quantity of resource hours required. This can then be divided by the practical capacity of each resource type to obtain accurate estimates of the quantity of each resource needed to meet the forecasted demand. Estimated monthly expense budgets for future periods can be easily obtained by multiplying the quantity of each resource category required by the monthly cost of each resource.

In this way, managers can make virtually all their costs “variable.” They can readily see how efficiency improvements and process innovations

knowledge of the total costs required to achieve the desired outcomes when treating individual patients with a given medical condition.

The current system of reimbursement is disconnected from actual costs and outcomes and discourages providers and payors from introducing more cost-effective processes for treating patients. With today’s inadequate costing systems, reimbursement rates have often been based on historical charges. That approach has introduced massive cross subsidies that reimburse some services generously and pay far below costs for others, leading to excess supply for well-reimbursed services and inadequate delivery and innovation for poorly reimbursed ones.

Adjusting only the level of reimbursement, however, will not be enough. Any true health care reform will require abandoning the current complex fee-for-service payment schedule altogether. Instead, payors should introduce value-based reimbursement, such as bundled payments, that covers the full care cycle and includes care for complications and common comorbidities. Value-based reimbursement rewards providers who deliver the best overall care at the lowest cost and who minimize complications rather than create them. The lack of accurate cost

## Accurate costing allows the impact of process improvements to be readily calculated, validated, and compared.

data covering the full cycle of care for a patient has been the major barrier to adopting alternative reimbursement approaches, such as bundled reimbursement, that are more aligned with value.

We believe that our proposed improvements in cost measurement, coupled with better outcome measurement, will give third-party payors the confidence to introduce reimbursement methods that better reward value, reduce perverse incentives, and encourage provider innovation. As providers start to understand the total costs of treating patients over their complete cycle of care, they will also be able to contemplate innovative reimbursement approaches without fear of sacrificing their financial sustainability. Those that deliver desired health outcomes faster and more efficiently, without unnecessary services, and with proven, simpler treatment models will not be penalized by lower revenues.

**ACCURATELY MEASURING** costs and outcomes is the single most powerful lever we have today for transforming the economics of health care. As health care leaders obtain more accurate and appropriate costing

numbers, they can make bold and politically difficult decisions to lower costs while sustaining or improving outcomes. Dr. Jens Deerberg-Wittram, a senior executive at Schön Klinik, told us, “A good costing system tells you which areas are worth addressing and gives you confidence to have the difficult discussions with medical professionals.” As providers and payors better understand costs, they will see numerous opportunities to achieve a true “bending of the cost curve” from within the system, not in response to top-down mandates. Accurate costing also unlocks a whole cascade of opportunities, such as process improvement, better organization of care, and new reimbursement approaches that will accelerate the pace of innovation and value creation. We are struck by the sheer size of the opportunity to reduce the cost of health care delivery with no sacrifice in outcomes. Accurate measurement of costs and outcomes is the previously hidden secret for solving the health care cost crisis. ♡ **HBR Reprint R1109B**

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“Actually, I don’t know who these people are. They came with the frame.”

CARTOON: CHRIS WILDT



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