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improving value with TDABC

Time-driven activity-based costing presents significant opportunities to enhance quality of care and outcomes while reducing costs—and provides a foundation for value-based payment.

Pilot projects conducted by more than two dozen leading healthcare organizations are demonstrating the power of time-driven activity-based costing (TDABC) to improve value.

Value-based healthcare delivery offers a transformational opportunity for the sector to deliver better patient outcomes at lower total costs.[a] By mapping processes and measuring the costs involved in treating specific medical conditions over complete cycles of care, healthcare organizations can better determine the true cost of providing care for the conditions. Combining TDABC data with outcomes measurement illuminates the value of care and service provided and enables clinicians, leaders, and staff to pinpoint opportunities to redesign processes to deliver the same or better outcomes at lower total cost.

TDABC also has significant implications for value-based business models. Measuring both the outcomes produced and the costs incurred in treating specific populations helps providers determine whether a bundled payment for a defined episode of care covers the true cost of that care—and helps purchasers understand the value of the care and service provided.

Taking a Closer Look

Existing cost-measurement systems in health care are inadequate. They typically use inaccurate and arbitrary cost allocations and provide little transparency to guide clinician- and staff-driven efforts to reduce costs and improve processes to enhance outcomes. They also fail to focus on the correct unit

a. Porter, M. E., "What Is Value in Health Care?" *New England Journal of Medicine*, Dec. 23, 2010, and Porter, M. E., and Lee, T.H., "The Strategy That Will Fix Health Care," *Harvard Business Review*, October 2013.

AT A GLANCE

Time-driven activity-based costing:

- Traces the path of a patient throughout the continuum of care for a specific medical condition
- Identifies the actual cost of each resource used, such as personnel, space, consumables, and equipment, in both inpatient and outpatient settings
- Documents the amount of time the patient spends with each resource
- Supports the ability to aggregate cost information across multiple organizations that deliver care to a patient throughout a defined episode of care

Learn more about using time-driven activity-based costing to improve patient outcomes while reducing costs at hfma.org/TDABC.

of analysis: patients being treated for specific medical conditions over complete cycles of care. Unless the sector can implement better cost measurement and management systems, the promise of value-based care will remain unfulfilled.

Using TDABC, healthcare organizations trace the path of a patient throughout the continuum of care for a specific medical condition; identify the actual cost of each resource used, such as personnel, space, consumables, and equipment, in both inpatient and outpatient settings; and document the amount of time the patient spends with each resource. TDABC also supports the ability to aggregate cost information across multiple organizations that deliver care to a patient throughout a defined episode of care (the activity portion of TDABC).

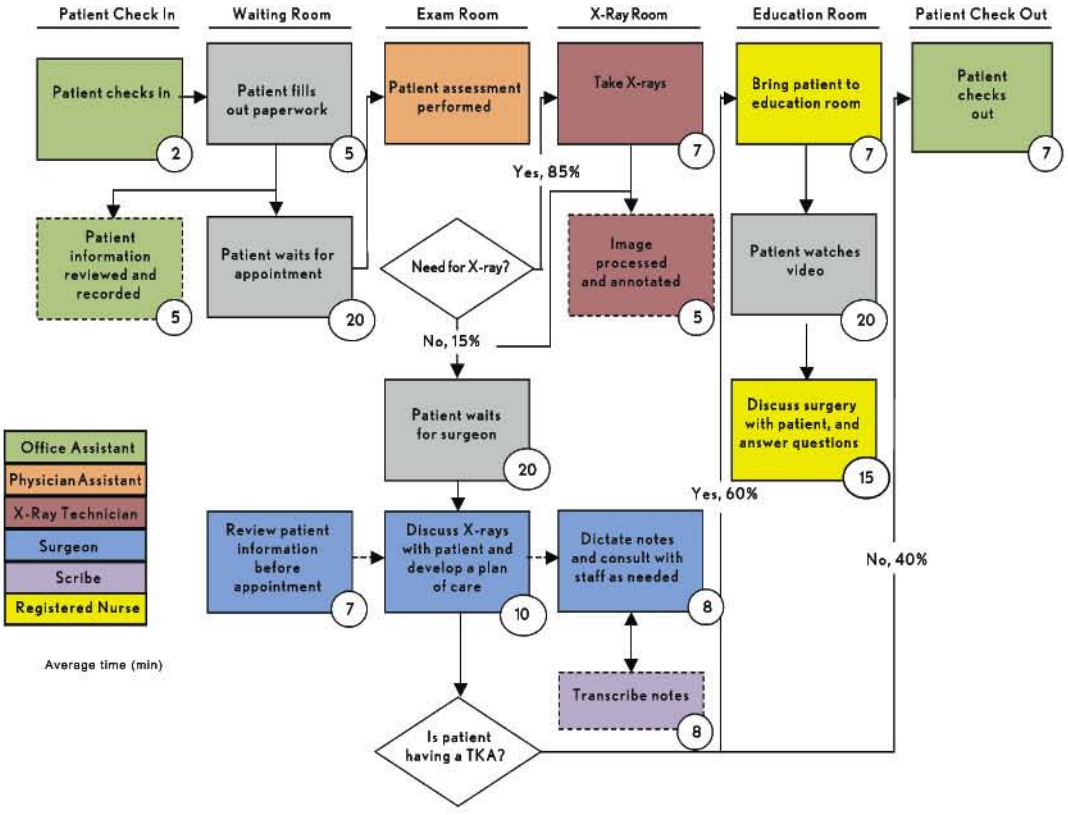
The theory underlying TDABC is simple. The fundamental cost-accounting equation for any resource is well known:

Resource cost (C) = Quantity of resource units (Q) × Price per unit of the resource (P)

The innovation of ABC—and especially its newer variant, TDABC—can be viewed as rediscovering this basic cost-accounting equation and applying it to all resources acquired and supplied by the organization, not just direct labor and direct materials. In this way, almost all personnel, equipment, facility, and indirect and support costs can be directly attributed—not allocated—to the organization's output of products, services, and, in the case of health care, patient care.

To estimate the *Q* component of the TDABC equation, a team of clinicians and business

PROCESS MAP FOR INITIAL OFFICE VISIT



analysts develops step-by-step process maps of all the clinical and administrative processes used along the patient's complete cycle of care for a specific medical condition (see the exhibit on page 78).

The process maps document the activities involved in treating patients, the resources (clinical and administrative personnel, equipment) used at each step, and the time used (the Q of this equation) of each resource at that step. In addition to identifying the quantity of capacity-supplying resources at each process step, the maps link to the quantities (and costs) of any consumable supplies (e.g., syringes, catheters, and bandages), devices, and medicines used during that step. The map incorporates risk adjustments and care variability by including decision nodes to represent alternative care paths that are followed based on particular circumstances and risk factors of individual patients.

Finance staff supply the price (the *P* component of the cost equation) using the following procedure to estimate the capacity cost rate (the amount per minute) of each person and piece of equipment involved in the care processes.

For the *numerator* in the capacity cost rate, the finance staff accumulate all the costs incurred to supply each person or piece of equipment for treating patients. Personnel costs include compensation and the costs of space, technology, training, supervision, and other indirect expenses incurred to support each person. Equipment costs include depreciation or rental expense, space occupied, utilities, consumable supplies, and maintenance and repair.

For the *denominator*, the finance staff estimate the available capacity, typically measured in minutes, of each resource that is actually available for productive work. For personnel, this process starts with a complete calendar year and then subtracts the time not available due to vacations, holidays, training, education, meetings, and breaks during the day.

Each resource's capacity cost rate (amount per minute) is then calculated by dividing the total costs of supplying the resource by its available capacity.

The exhibit below shows a typical capacity cost rate calculation for the resources identified in the process map on page 78.

Note the enormous variation (more than 10:1) from the most-expensive to the least-expensive clinical resource in the process map. Virtually no other industry, other than professional sports, has this much variation in cost among employees performing front-line work. This high variation provides many opportunities to redesign

CALCULATE CAPACITY COST RATES (CCR) FOR CLINICAL AND STAFF PERSONNEL

	Surgeon	Registered Nurse	X-Ray Technician	Physician Assistant	Office Assistant	Scribe
Total Clinical Costs ($)	$546,400	$120,000	$100,000	$64,000	$51,000	$61,000
Personnel Capacity (minutes)	91,086	89,086	89,086	89,086	89,086	89,086
Personnel Capacity Cost Rate ($/min.)	$6.00	$1.35	$1.12	$0.72	$0.57	$0.68

administrative and clinical processes so that skilled clinicians and surgeons perform work that only they are qualified to perform (referred to as working at the "top of their license") while reassigning many routine tasks to lower-paid personnel. The reassignments can be done without having any adverse effects on patient outcomes. In many cases, the reassignments improve outcomes by having mid- and lower-level clinical providers and social service workers spend more time educating and counseling patients. Even with more total hours spent by employees with patients, overall costs decrease when clinicians work at the top of their license, performing work that best leverages their education, training, and experience.

In a final step, the total cost of caring for a patient over a complete cycle of care is obtained through the following calculation: For each process step during the care cycle, multiply the time spent by each resource at the process step by its capacity cost rate; add in the cost of supplies, devices, and drugs used at the process step; and sum up across all the process steps (see the exhibit on page 81).

The table below summarizes the principal differences between TDABC and typical relative value unit costing approaches.

Using Outcome and Cost Measurements to Improve Value

Through TDABC, clinicians and staff are able to see—often for the first time—a valid outcome and cost measurement for their clinical and administrative processes and are able to use this information to immediately begin to redesign and improve their processes. The changes enable them to deliver the same or better outcomes at lower total cost—opportunities that just became visible with the new

COMPARISON OF TDABC AND TYPICAL RVU COSTING SYSTEMS

	TDABC	Typical RVU Systems
Direct Costs	Bottom-up, based on actual processes and resources used to treat patients	Top-down allocations based on derived (relative value unit [RVU]) metrics
Scope	Includes hospital and physician costs in an integrated calculation	Hospital costs only
Type of Costing System	Standard costs based on estimates of resource's capacity cost rates	Actual costs; general ledger expenses allocated to procedures; easy reconciliation
Clinical Input	Performed by teams of clinicians, administrators, and finance staff; highly actionable	Led and updated by finance; clinicians do not understand how costs are assigned
Care Cycle	Assigns costs to all processes used during a patient's complete cycle of care	Costs assigned only to reimbursable processes; all other costs in allocated "overhead"
Pricing	Supports transparent and defensible pricing	Pricing unrelated to actual costs
Process Improvement	Links naturally to Lean and performance improvement initiatives	No connection to Lean and process improvements
Benchmarking	Compares efficiency and resource costs across different units by clinical condition	Not used for benchmarking (no visibility into underlying processes and personnel)
Unused Capacity	Measures cost of unused capacity	All costs allocated to billable volume; no visibility into used versus unused capacity
Updating	Requires clinical teams to keep up-to-date maps of their processes	Requires finance to update RVU complexity metrics

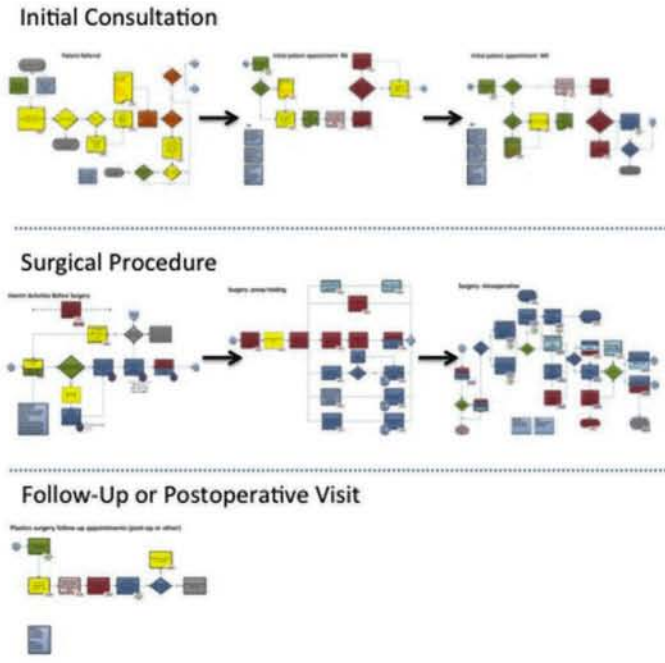
outcome and cost information. Among the value-enhancing opportunities are the following.

Improve resource efficiency. Process maps give visibility to opportunities to eliminate administrative and clinical processes and process variations that don't improve the value of care delivered. Benefits also arise from learning how to reduce the times required for major process steps. Often, the process improvement opportunities become visible from benchmarking the existing set of processes used to treat a clinical condition with similar units that treat the same medical condition. Benchmarking enables clinical teams to adopt the best practices from those that achieve comparable or better outcomes with fewer and more standardized processes or shorter cycle times for processes.

In addition, direct clinical utilization can be reviewed and shared with the clinical teams with the goal of developing optimal care path protocols or budgets that can be used to more effectively manage cost while improving outcomes. These protocols can be standardized and shared across the enterprise to allow for sharing and rapid adoption of care innovation and improvements. This Lean approach to developing standard work and improvement will be key to a provider's ability to manage costs successfully in a bundled-payment environment.

Optimize care over the complete care cycle. Process maps and associated cost information for the patient's complete cycle of care also enable clinical leaders to see how they can improve outcomes and lower costs by spending earlier in the cycle (e.g., diagnostics, physician meetings and consultations, monitoring, and patient education and compliance) to avoid much higher costs, complications, and lack of patient compliance

ACCUMULATE COSTS ACROSS A PATIENT'S COMPLETE CARE CYCLE



	Minutes	Cost/ minute	Total
Initial Consultation			
Physician	X_1	Y_1	$136.13
RN*	X_2	Y_2	$68.04
CA*	X_3	Y_3	$6.17
ASR*	X_4	Y_4	$15.74
			$266.08
Surgical Procedure			
Physician	X_1	Y_1	$584.99
Anesthesiologist	X_2	Y_2	$603.89
RN*	X_3	Y_3	$136.29
Technician	X_4	Y_4	$97.82
Operating Room	X_5	Y_5	$329.16
			$1752.15
Follow-Up or Postoperative Visit			
Physician	X_1	Y_1	$55.19
RN*	X_2	Y_2	$13.61
CA*	X_3	Y_3	$3.09
ASR*	X_4	Y_4	$1.77
			$73.66

*RN = Registered Nurse; CA = Clinical Assistant; ASR = Ambulatory Service Representative
Source: Meg Abbott, MD, and John Meara, MD, Boston Children's Hospital.

Sustainable cost reductions must start with clinician-led, bottom-up re-engineering that enables providers to maintain and improve their healthcare outcomes while reducing the costs of delivering that care.

later in the cycle. They can make informed decisions about introducing innovations in devices, drugs, equipment, and monitoring and compliance procedures that deliver better outcomes and lower total costs of care.

Implement resource substitution. Identifying which resources are performing each step in a patient's cycle of care helps clinicians in efforts to substitute lower-cost resources for higher-cost ones when medically appropriate. The high variation in capacity cost rates exists also for equipment and facilities. Cost rates within imaging modalities alone (magnetic resonance imaging, computed tomography, ultrasound, and X-ray) or among assorted types of laboratory equipment show variations of the same scale as for clinical personnel.

And large cost variations occur across facilities. For example, an academic medical center (AMC) that is part of a multisite system may have the most expensive and complex equipment and the most skilled and highly paid personnel in that system. But many of the visits and procedures performed in the primary AMC complex could be performed equally well or even better—because of shorter wait times and better focus—in satellite clinics in suburban and rural locations. Reserving the AMC for the most complex cases and the most at-risk patients while performing more standard procedures and clinical visits in lower-cost satellite facilities reduces the total cost of treating a population of patients and reduces the pressure to expand capacity at the system's most expensive location. Performing each process with the right personnel, in the right place, and with the right equipment creates massive cost-saving opportunities without compromising outcomes.

Enhance resource utilization. The TDABC capacity cost rates are, by definition, based on the practical capacity of each resource (personnel and equipment). In this way, the cost of only the capacity actually used to treat patients is assigned to patients. If the demands for the resource's capacity from all the patients treated in a given period are less than the available capacity, then the cost of the unused capacity is identified and classified separately in the financial report for the period. Administrative and clinical leaders are thus able to see the cost, every period, of their organization's unused capacity, resource by resource and in aggregate. This treatment represents a distinctive improvement from providers' existing costing systems that bury the costs of unused capacity in overhead pools that are allocated arbitrarily to the existing volume of procedures.

As providers implement action plans to improve processes, even more unused capacity likely will be created in existing resources. Once visible, the leadership team can either apply its unused capacity to treat a higher volume of patients, without increasing its spending on new resources, or manage the excess capacity out of the system, enabling costs to be reduced without any detrimental effects on existing patient volume and outcomes. For the first time, hospital leaders will see the benefits from having all resources—personnel, equipment,

and facilities—operating at high utilization rates and will be able to capture the savings by redeploying resources no longer needed.

Resource capacity planning and budgeting. A revised budgeting process enables executives to identify surplus resources and to begin to manage them out of the enterprise. The activity-based budgeting process starts by predicting the volume and types of patients the provider expects to care for in future periods. Combining these forecasts with the process maps already developed for treating each patient condition allows providers to predict the quantity of resource hours required to perform each process and serve all the forecasted demands. The demanded resource capacity can then be divided by the estimated practical capacity of each resource type (previously calculated in developing the TDABC model) to obtain an accurate estimate of the quantity of each resource that must be supplied to meet the demands from the forecasted population of patients. Because the cost model already captures the cost of supplying each resource unit, the estimated spending budgets for future periods is easily obtained by multiplying the quantity of each resource category required by the cost of supplying that resource. Various scenarios of patient volumes and mix can be simulated to see the robustness of the updated resource capacity authorizations.

When using the TDABC model for resource capacity planning and financial budgeting, each parameter in the model should be updated to reflect expected efficiency improvements in each process (the benefits from the actions described earlier) as well as changes in compensation and other resource supply costs for the following year. By operating the TDABC model essentially in reverse, using forecasted patient demands to predict the resource capacity and costs required to meet that demand, managers can treat virtually all their costs as "variable." They can readily translate efficiency improvements and process innovations into reduced spending on resources that are no longer needed. They will have the information to see how process improvements enable them to redeploy freed-up resources. Using the TDABC model for resource capacity planning and budgeting enables providers to lower their costs while still delivering equal or better outcomes. The TDABC-based resource capacity and budgeting process is why we often say, "Ain't no fixed costs; only inattentive managers."

A Value-Driven Approach to Costing

Reducing the cost of delivering health care while improving outcomes must be the central focus for any provider. Attempting to reduce total spending by arbitrary, across-the-board budget cuts will adversely affect access and quality of care. Sustainable cost reductions must start with clinician-led, bottom-up re-engineering that enables providers to maintain and improve their healthcare outcomes while reducing the costs of delivering that care. Such reengineering must be based on valid outcome metrics and accurate calculations of the total cost of delivering care over patients' complete treatment cycles. ●

About the author

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