



Editor's Spotlight/Take 5

Editor's Spotlight/Take 5: Time-driven Activity-based Costing More Accurately Reflects Costs in Arthroplasty Surgery

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Margaret Thatcher famously once said, “The problem with socialism is that you eventually run out of other people’s money.” Were she an economist today, she might say the same thing about healthcare.

Note from the Editor-In-Chief: In “Editor’s Spotlight,” one of our editors provides brief commentary on a paper we believe is especially important and worthy of general interest. Following the explanation of our choice, we present “Take Five,” in which the editor goes behind the discovery with a one-on-one interview with an author of the article featured in “Editor’s Spotlight.”

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The lack of information regarding hospital costs can range from the infuriating, where a patient receives a “facility fee” of USD 600 for routine radiographs performed in a hospital-owned clinic, to the inscrutable, as in Rosenthal’s recent study [4], in which fewer than 20% of hospitals contacted in a telephone survey were able to provide a price quote for a routine THA. A common response to this complaint is that the costs of a complex procedure are impossible to estimate. However, Bernstein and Bernstein [1] performed a similar survey asking hospitals for prices for an electrocardiogram and for parking: 19 of 20 hospitals could quote a price for parking, while only three could do so for the electrocardiogram.

A major factor in this lack of transparency is a reliance on outmoded methods of cost analysis. Traditionally, healthcare systems have used a ratio of cost to charge as a baseline. The inaccuracies associated with cost to charge

ratios are old news. In 1995, Shwartz and colleagues [5] compared the ratio of cost to charges to a cost system based on relative-value units, which was the most accurate measure then available. They found that for more than one-third of patients, the two cost estimates differed by more than 15%. They also found that when hospital-based ratio of cost to charges were used, a 15% or greater error occurred 45% of the time. Therefore, a major impediment to controlling expenses in the hospital setting is that in many cases, we simply do not know how much care actually costs.

In this month’s Spotlight study, Akhavan and colleagues use time-driven activity-based costing (TDABC) to look at every work action associated with performing a total hip or total knee in their institution. Briefly, activity-based costing began as a business and manufacturing tool in the 1990s, in which a department might survey employees to estimate the percentage of time and effort they spent (or expected to spend) on various activities, and then assign the department’s resource expenses according to these percentages. This approach worked well for small groups, but became extremely

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unwieldy with larger or more complicated activities.

The developers, therefore, modified their approach to emphasize the time needed for a given activity [3]. TDABC requires estimates of only two parameters: The cost per time unit of supplying resource capacity and the unit times of consumption of resource capacity by products, services, and customers. For example, the TDABC of an employee making USD 25 an hour who spends 20 minutes talking to a customer is 50 cents a minute. With TDABC, cost estimates are now based on actual process characteristics and direct observations of processing times, not on subjective estimates of where and how people spend their time.

Let's talk with Kevin Bozic MD, MBA, the senior author, on what TDABC means for the costs of arthroplasty surgery.

Take Five Interview with Kevin Bozic MD, MBA, senior author of "Time-driven Activity-based Costing More Accurately Reflects Costs in Arthroplasty Surgery"

Paul A. Manner MD: *Congratulations on a thought-provoking and timely publication. In this article, you bring in a set of tools that are unfamiliar to most clinicians. A number of*

studies have shown that the cost-to-charge ratio is not terribly accurate for a given patient. It seems like this would be particularly true for a good portion of orthopaedics—much of the cost is related to the implant, which in reality has low fixed costs associated with its use—the implant is opened in the room, the manufacturer is responsible for inventory, and typically rents space within the hospital. Is this a possible reason for the discrepancy you are seeing? What about the other cost centers?

Kevin J. Bozic MD, MBA: As the interest in health economics and health policy-oriented research has grown during the past decade, particularly in orthopaedic surgery, strategies to accurately measure costs have remained elusive for a variety of

reasons. First, most healthcare institutions consider their costs to be trade secrets, and therefore keep that information confidential. Second, how we assign and attribute costs has traditionally been based on either charges (such as cost-to-charge ratios) or reimbursement, as opposed to the actual costs of delivering healthcare services. For example, we charge or get paid X amount of dollars for an intervention, therefore we will attribute Y amount of costs to these activities. Obviously, neither of those strategies accurately account for actual resource utilization associated with delivering a healthcare service.

Traditionally, orthopaedics is a service line that has been well reimbursed, so we can attribute many costs (including a large amount of



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indirect costs) to orthopaedics because we can afford to absorb those costs, since it is a profitable service line. That may be fine for the purposes of estimating the profit margins associated with a service line, but if the goal is to understand how much a specific service costs, you have to measure the actual costs associated with delivering that service.

One of the primary problems with our current healthcare cost accounting systems relates to the way we attribute indirect costs. We measure the direct costs of those products and services that are the easiest to define (such as operating room time, nursing, and implants), and then we apply an indirect cost rate to the direct costs. We do this to account for the costs of those services which are more nebulous and difficult to measure and attribute to specific services like utilities, amortization of buildings, and housekeeping. At our hospital, the indirect cost rate was 60%. So if an implant costs USD 10,000, there was assumed to be USD 6000 worth of indirect costs associated with supplying that implant to the patient. However, if you have an implant that costs USD 2000, and you assign the same 60% indirect cost ratio, you assume that only USD 1200 worth of indirect costs are associated with supplying that implant. We end up attributing a five-fold difference in

indirect costs, even though the “fixed” resources utilized in delivering the two different implants are the same. Anytime you are using an indirect cost formula or ratio you are going to end up with skewed costs. That is the primary reason why there is a discrepancy.

Dr. Manner: *Administrators and surgeons sometimes disagree regarding which service lines make or lose money; to what degree is this a function of different ways of how cost accounting is done, and to what degree is it the case that hospitals (and practices) simply do not know how much their services cost?*

Dr. Bozic: As discussed above, hospitals use a variety of different accounting approaches to attribute indirect costs to a particular service line, and the methodology used to assign indirect costs has a major impact on the profitability (or net margin) associated with those services. Because of that, clinicians often argue that we should really use direct contribution to margin (revenue minus direct cost) as a reflection of the profitability of a service line. Under traditional cost accounting methodologies, service lines that have resource intensive inputs such as implants will absorb higher indirect costs based on a fixed indirect cost ratio, which clouds the perception of the margin.

Our article discusses the use of Time Driven Activity Based Costing (TDABC) as a technique to more accurately measure the actual costs associated with delivering a healthcare service. When we use TDABC, we are not only measuring the cost of delivering a service, but there is unused capacity that we can also measure. We know that it exists, but we are not attributing it to any specific service. As a result, the attributed costs using traditional hospital cost accounting are much higher than those calculated using TDABC, due to the allocation of unused capacity to the “cost” of a service using traditional accounting techniques.

Some people have argued that these differences between traditional hospital cost accounting and TDABC is a good way to convince hospital administration that the margins associated with a particular service line such as orthopaedic surgery, are higher than they appear under traditional hospital cost accounting techniques. I would disagree. As a business, you need to make sure that you are allocating costs in such a way that you are accounting for all costs, including unused capacity. Therefore, I believe that TDABC is less helpful for financial accounting such as comparing margins across service lines because you are not attributing that unused capacity to any particular service lines.

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However, TDABC is an extremely effective tool for management accounting, to identify unused capacity, reduce nonvalue-added steps in care, and eliminate waste.

Dr. Manner: *Bundled care, where all costs are placed into one package, seems inevitable. For surgeons, what do your findings imply for a bundled care program? And what about for hospitals?*

Dr. Bozic: Bundled payment, which I happen to be a big proponent of, means that we are paying for an entire episode of care as opposed to buying that care piecemeal. Imagine going to a car dealer and asking for a price on the brakes, the shocks, the transmission, the interior, the exterior, and the body. That would be very frustrating. Instead, you ask for the price of the car. In healthcare right now, we price all of those services separately, and then we expect the consumer to build the car and the payer to pay for each individual part separately. It also means that there is no one accountable for the car. When the car fails, there is lots of finger-pointing; "It was the brakes, not the steering column."

A bundled or episode-of-care payment incentivizes a team of providers to achieve the best outcome for the patient at the lowest cost. In order to do that effectively, in addition to all the cultural aspects of this (like having a team of people who are committed to

developing an integrated program for delivering care that optimizes outcomes and minimizes costs) we need a detailed understanding of the processes that are used to deliver that care, the outcomes that are achieved, and the costs of achieving those outcomes. There are many hospitals that have gone to market with a bundled payment without a thorough understanding of their outcomes and costs. What other industry can you think of that would go to market with a product or service without an understanding of the cost of delivering that service? It is just a basic building block to be able to deliver episodic care.

Dr. Manner: *You cite a recent study from the Cleveland Clinic that looked at their cardiac program that used TDABC and also found that costs appeared lower with this methodology [2]. The authors of that study noted a few limitations: "It intentionally does not allocate the cost of unused capacity or waste, nor does it account for the cost of related activity, such as research or education. TDABC therefore cannot be used to calculate all of an organization's costs." If that is the case, do we run the risk of implying that the cost of care is lower than it truly is, and how do we guard against that?*

Dr. Bozic: TDABC measures the actual resources used in delivering that

service. Contained in that is how much time is attributable to each of those resources, including the nurse, surgeons, radiology technicians, and others. But what does it actually cost to deliver that care? For example, a nurse may spend 5 hours of an 8-hour shift actually delivering care and documenting his or her work. The remaining 3 hours are unused capacity. We want to measure that unused capacity, but it is not actually part of the cost of delivering care. Because we are not attributing those to a certain service, it cannot be used for financial accounting or for measuring profitability of a service line. I disagree, however, that it cannot be used to measure all the costs in an organization. In fact, research and education costs can be built into TDABC like anything else, and then you have to figure out how much time is being spent on research and education for the cost of those. If I am a surgeon making USD 500,000 a year, we know how much my time is worth per minute and if I am spending 40 extra minutes a case to educate residents, we know what we are spending on education for that case.

Dr. Manner: *Your new role may allow you some opportunities in terms of how orthopaedic groups and hospitals evaluate both quality and cost. How will this study's findings influence the way*

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you do this at the new program in Austin, and how might some of the things you are doing in that program influence surgeons' and hospitals' approaches to cost accounting elsewhere?

Dr. Bozic: At the University of Texas (UT) in Austin, we are building a brand-new medical school and health-care system from the ground up. We are the first medical school to be built on a nationally competitive research university (also known as a Tier 1) campus in the United States in more than 40 years. That affords us the unique opportunity to work with clinicians, hospitals, and researchers throughout the UT Austin community and central Texas. Our team includes people with a diverse set of skills, such as design engineers, health-informatics experts, and authorities on population health management, that go well

beyond the traditional faculty who are included in a medical school.

One of our primary goals is to improve the health of the population by developing interdisciplinary teams that are organized around diseases and conditions, rather than around departments. The goal of these teams is to improve the health of the population by optimizing health outcomes while controlling the costs of care. In order to do that effectively, we need to have a detailed understanding of our processes of care, the costs associated with delivering care, and the health outcomes achieved by those processes. The TDABC approach used in this study is an important building block for understanding our costs, and an important tool to teach the next generation of physician leaders as they strive to improve the value of care we provide to our patients.

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