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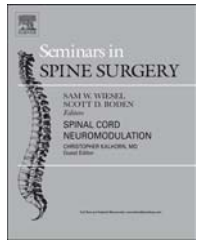

Defining, measuring, and improving value in spine care

Robert S. Kaplan, PhD[a,*], *and Derek Haas, MBA*[b]

[a]*Harvard Business School, Boston, MA*
[b]*Avant-garde Health, Boston, MA*

ABSTRACT

This chapter discusses how to measure and improve spine care outcomes and costs. Today's commonly used outcome metrics, such as readmission and complication rates, are actually process and quality metrics. They are not the outcomes, such as improvement in pain and mobility, that patients expect to enjoy from being treated for spine pain. Similarly, existing cost measurements of spine care, derived from ratios of cost-to-charges or relative value units, are inaccurate and do not track actual resources used to treat spine care patients over complete treatment cycles. We document how to improve the value of spine care by adopting patient reported outcomes measures that can be collected in a standardized way. Similarly, more accurate cost measurement can be achieved by implementing Time-Driven Activity-Based Costing, an approach that helps clinicians identify opportunities to reduce the cost of delivering spine care without adversely affecting, and often improving, patient outcomes.

Health care costs in the U.S. have increased from 7.2% of GDP in 1970 to nearly 18% in 2016.[1,2] As the population ages, spending on health care in general, and orthopedic and neurosurgical spine surgeries in particular, are forecast to continue to rise faster than GDP growth. But government payers, private insurers, and corporations are actively working to contain surgical costs and "bend" the cost curve. They are replacing fee-for-service reimbursement with value-based payments, such as global and bundled payments, in which hospitals and physicians bear more risk for the costs they incur to treat patients. The value of care is defined as the health outcomes achieved by the patient relative to the costs of delivering that care.[3] Value-based payments provide strong incentives for surgeons to lower the total cycle-of-care costs while still delivering excellent outcomes to their patients. This chapter will focus on how to define, measure, and improve value in spine care.

1. Measure and compare spine care outcomes

Today most providers track outcomes measures such as readmissions rates and complication rates. But such metrics have severe limitations. Providers may not be aware of readmissions and complications for their patients that end up being treated, post-discharge, by other providers. There are also no standard definitions of complications for different types of spine surgeries, which makes it difficult to accurately compare rates across providers. Most importantly, avoiding readmissions, infections, and complications are not the goals patients expect when they seek care for their back pain. They do not seek care to avoid bad events; they seek care to improve their pain, mobility, and functionality. Clinicians should definitely attempt to reduce the incidence of adverse events, which fortunately are experienced only by a small percent of spine surgery patients. But clinicians must become accountable for solving the patients' problem, not just feeling successful because they avoided adverse events.

Patients most often have spine care to reduce pain, and/or improve their functionality, as well as their physical and mental health. For many years patient reported outcomes measures (PROMs) have been collected for research studies; but collection and recording of PROMs in patient records is rare and their use for accountability and compensation of clinicians even rarer. Those spine providers who actually

* *Corresponding author.*
E-mail address: rkaplan@hbs.edu (R.S. Kaplan).

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collect PROMs on a regular basis use different measures from each other, and collect the data at different intervals (e.g., one provider may track PROMs 3 months post-operatively while another may collect PROM data every 6 months over a 3-year period, post-operatively). Some providers will collect PROMs for only surgical patients, while some will collect them for non-surgical spine patients as well. Patient completion rates for PROMs also vary widely across providers, and completion rates decline with the length of time since treatment.

Even providers who use the same metrics, the same instruments, and the same frequency of data collection do not agree about how to compare performance across providers. One could use (1) the absolute improvement in patients' scores, (2) the percentage improvement in patients' scores, (3) the percent improvement between the patient's initial score and a perfect score, or (4) the percentage of patients who achieve a minimum clinically important difference in performance. Our view is that the third and fourth approaches are better than the first or second. Using the first approach, the absolute improvement in patients' scores, does not control for the greater opportunity for improvement of patients who start with very low PROM scores. The second comparison, percentage improvement, is better than the first, but still produces better scores for patients with more opportunity for improvement. The third approach solves the problem with the first two approaches by controlling for the quantity of a patient's improvement available from the initial PROM score. The fourth approach measures the percentage of patients who achieve a meaningful improvement, regardless of their starting point. While this would not provide an incentive for maximizing the potential benefit above and beyond the minimum threshold, one could have a weighted statistic, e.g., if a patient improves by twice the minimum clinically important difference, that patient would be weighted twice in the calculation.

Spine care clinicians need to achieve consensus around the outcomes measures that will be used, their timeframe, and the methodology for collecting and comparing. These efforts would likely have the greatest acceptance among clinicians if undertaken by a professional society. For instance, for joint replacements, the American Association of Hip and Knee Surgeons has defined a set of standard measures for knee and hip arthroplasty, which is leading to standardization around using the HOOS and KOOS Jr. measures. Other organizations, such as the International Consortium for Health Outcomes Measurement are also working to achieve alignment and acceptance around a common set of outcomes measures in a growing range of clinical areas.

2. Measure and improve spine care costs

Spine care clinicians must also improve how they measure the costs of their care. Traditional top-down health care costing systems, such as ratios of costs to charges (RCC) and allocations based on Relative Value Units (RVU),[4] are inaccurate and offer little insight to surgeons and clinical staff on how and where to optimally reduce costs.

RCC is a simple, inexpensive, and inaccurate method, which allocates costs in direct proportion to charges for individual services. Its assumption that the cost of performing a service is proportional to its charges is obviously incorrect, especially for surgical departments that perform heterogeneous procedures whose charges are, at best, weakly correlated with the costs of resources they actually use. RVU-based costing involves dividing total spending by total RVUs billed to generate a cost per RVU. The cost per RVU is then multiplied by RVUs billed for a given service to estimate its costs. This method allocates costs only to reimbursed services, and not to unreimbursed ones. Its reliance on Medicare's resource-based relative value scale (RBRVS) unrealistically assumes that service complexity is a valid surrogate for the cost and mix of resources actually used.

Time-driven activity-based costing (TDABC) has emerged as an innovative, more accurate costing alternative.[5,6] TDABC, in contrast with RCC and RVU costing, uses a bottom-up costing approach that starts by documenting the actual clinical and administrative activities performed during an entire cycle of care. The map identifies which personnel and equipment resources are used at each activity and the number of minutes used of each resource for the activity. Hospital finance staff participates by estimating the per-minute costs for each resource. A nurse's cost-per-minute, for example, is calculated by dividing total annual compensation by the total number of minutes per year (typically between 90,000 and 100,000) the nurse is available for clinical care. Equipment costs are calculated by dividing annual depreciation, maintenance, and operating expenses by the annual number of minutes the equipment is available for clinical use during the business hours of the unit it is in. Total cycle-of-care costs are obtained by multiplying total minutes used of each resource by each of their per-minute costs and then summing across all resources used during the care cycle. Then the cost of all of the supplies, drugs, tests, images, and implants and devices used during the care cycle are added in. The TDABC costs provide an accurate and transparent picture of all the expenses associated with surgical procedures and recovery (Fig. 1). Surgeons and administrators can use the costs obtained from TDABC analysis to identify multiple opportunities to lower total costs while delivering the same or better patient outcomes.[7] As with outcomes measurement, standardizing cost measurement methodologies across providers will be important for ensuring comparability of the data.

3. Measure and improve spine care value

Outcomes and costs must be measured over complete care cycles. Ideally, measurement starts from the time of diagnosis of the medical condition through treatment and recovery. Since multiple different providers from potentially different organizations may be involved over the care episode, it will often not be possible to use TDABC to measure costs across the entire cycle of care. In these cases one can use TDABC to measure the internal costs of care for the provider, and then use paid claims to represent the costs over the remainder of the care cycle. For instance, a hospital that performs a spine surgery could use TDABC to measure its costs for the inpatient stay, and use paid claims expenses to