Strategies for Success in Purchasing Medical Technology

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Emerging medical equipment and technologies (“medical technology”) offer the promise of improved patient outcomes, decreased labor costs, and increased operational efficiency and capabilities. Unfortunately, the allure of such benefits often lead well-intentioned healthcare leaders to make purchasing decisions without conducting a proper assessment of the resource demands, up-front costs (including integration costs), workflow impact, reimbursement potential, and other factors needed to fully understand the value added by new medical technology.

One of the prevailing tenets of healthcare economists is that the continued development and dissemination of new technologies is a primary driver of increased healthcare costs in the United States. A recent study from Rice University of Texas hospitals between 2000 and 2007 concluded that technology costs, rather than hospital market power or cost shifting to private payers to compensate for the uninsured, was the largest contributor to the growth in hospital pricing.1 If healthcare leaders fail to conduct thorough due diligence prior to the purchase of medical technology, organizations run the risk of adding unnecessary costs to an organization’s budget without adding significant clinical or operational value.

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Admittedly, it is a challenge to find the right formula to accurately calculate the projected return on investment (ROI) for medical technology, as well as to decide which technical features and capabilities are best suited to meet an organization’s strategic needs. The goal is to find an accurate measure of the medical technology investment and return in terms of patient care and safety and organizational efficiency. This article outlines practices for making financial and strategic decisions related to general medical technology purchases, and identifies factors that impede effective technology planning and decision making. This article does not discuss decisions related to electronic health records (EHRs) ROI.

Process for Selecting Medical Technology

Medical Technology Upfront costs

To help healthcare organizations understand the upfront costs required to implement medical technology, healthcare organization...
leaders need to engage different areas of expertise within the organization or possibly contract out in order to obtain the required skill set needed to perform a thorough analysis. Depending on the complexity of the medical technology being implemented or requested, assigning a project manager and system architecture design specialist can increase the potential of a successful implementation. Identifying key stakeholders and laying the groundwork architecturally can help identify upfront costs in both capital and operational costs giving healthcare organizations line of sight to true costs and lifecycle of the medical technology. Capital costs can include such things as integration points and network infrastructure in addition to the technology being purchased. Operational costs can include gaps in skill level to support the technology, contracts for service and parts, and training. If a gap in skill level to support the medical technology cannot be remedied with training, then the organization will have to consider outsourcing the clinical engineering tasks instead of providing them in-house.

### Life Cycle of Medical Technology

Healthcare systems are now dependent on medical technology to help deliver services across the continuum of care. Healthcare organizations should look at how the adoption of the proper medical technology contributes to the quality of healthcare delivered, cost containment, and the increase of services by the healthcare system. The appropriate deployment of medical technology should help contribute to the quality of healthcare delivered, improve access of information, and contain costs.²

In the United States, we seem to have a bias toward purchasing the latest medical technology just because it is available. Specific service lines, such as laboratory, imaging, cardiology, or interventional radiology, use more complicated technology to provide quality healthcare than support services such as environmental services or food services. However, even the support services departments are seeking new technologies to assist in providing more efficient, quality care. In evaluating any new medical technology, it is important to understand the life cycle or expected years of use of the technology. Life cycle information should be obtained from the manufacturer and also can be obtained from organizations such as ECRI Institute, MDBuyline, and the American Hospital Association. Once the technology is in place, the life cycle information is incorporated into a cost-accounting analysis “that includes a review of the impact equipment has on reimbursement methodologies such as cost-based or case based, and in conjunction with a market-based forecasting model...”² For example, organizational leaders can evaluate the overall ROI of purchasing a $200,000 piece of medical technology with a five-year life span that has projected net revenue impact of $50,000 per year versus a $200,000 piece of medical technology that may not generate revenue, but increases patient safety or decreases infections.

### Decision Making

After the medical technology evaluation is complete, a final decision on whether or not to purchase the latest medical technology must be made. With the potential of streamlined processes and savings advocated by the vendors during the evaluation period, it is sometimes difficult to make an independent, well-informed decision. In the United States, we seem to have a bias toward purchasing the latest medical technology just because it is available. Steven Schroeder, MD, a professor of health and healthcare in the Division of General Internal Medicine, Department of Medicine, at the University of California, San Francisco, touched on this bias in an article published in 2011. Dr. Schroeder explained

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that he took a sabbatical at a London teaching hospital in the early 1980s where the medical wards had similar patients to those in U.S. teaching hospitals. “But, when I visited the ICUs it was different: the proportion of special care beds was smaller and the patients were less sick.”

When Dr. Schroeder asked about the difference, a physician who had spent time in the U.S. explained that while the U.S. facilities were state-of-the-art and the teaching was superb, “you don’t know when to stop.”

The decision should be made using objective information such as: data evaluation, price quotes, potential savings, actual costs, service and repair requirements, strategic vision, funding sources, life expectancy, quality and efficiency of care and in conjunction with a number of other factors. In determining whether or not to make a medical technology purchase, it is important to remain objective and avoid impulse purchasing decisions driven by emotional or superficial motivations. For example, if the hospital has hand washing compliant employees, has demonstrated low infection rates and has not identified any concerning infection trends, then there is no need to make a capital investment in the latest hand washing monitoring technology.

In evaluating new medical technology, it is imperative to model excellent, efficient organization processes that align with the medical technology. Instead of trying to make the medical technology morph to fit inefficient organization processes, the processes must be changed to optimize the use of the medical technology. If organization leaders are not willing to evaluate and redesign processes to fully utilize the new medical technology, then they would be better off withholding the investment. Howard Kern, president and chief operating officer of Sentara, shared this insight, “If we didn’t do the baseline process redesign and really made sure we were harvesting the value (of new technology), two things happen. One, you don’t really redesign and…two you’re layering on a lot of cost…and you don’t have anything to show for it, other than depreciation, maintenance, and licensing fees.”

Redesigning organizational processes and workflows to optimize medical technology capabilities is fundamental to the success of the implementation and utilization of that medical technology.

**Strategic Plan and Funding**

Make sure that medical technology capital expenditures are included in the organization’s written strategic plan. At Maricopa Medical Center in Phoenix, AZ, the operations departments work closely with the clinical engineering, information technology, and finance departments to develop and implement three- to five-year equipment purchase plans. These plans are “living” documents that are updated at least annually before the capital budgeting process begins. It is imperative to develop, align, communicate, maintain, and drive the implementation of a strategic plan and directive and to include or reference the equipment plan in the overall strategy. The strategic and equipment plans must remain fluid so they can be adapted to meet the organization’s needs in this ever changing healthcare environment.

The strategic plan also should address funding options available to the organization as medical technology options can range from thousands to millions of dollars. Organizations should evaluate short- medium- and long-term financing options to pay for new medical technology. Leaders may also want to explore other options such as leases. Options can range from a line of credit from the bank for short-term capital to bond issues for long-term capital strategies. As previously noted, the strategic plan, funding options, and business justification should include an evaluation of the life expectancy of the medical technology, service and maintenance costs, and how long the organization anticipates using the medical technology.

**Business Justification/Budget/ROI**

Much like the equipment plan supports the organization’s the strategic plan and direction, so too should the business justification for purchasing or leasing the medical
The business justification should address the need for the medical technology, whether it is critical for patient care and safety, necessary to meet regulatory requirements or because the current medical technology is at the end of its life cycle. It is important to hold leaders accountable for business justifications and investments by evaluating actual performance of the medical technology against the projected performance one to two times a year and implementing appropriate adjustments (where possible) to save costs, build volume, redesign processes, or optimize the use of the medical technology. The business justification document should include: background information about the related department or service line; the goal of the department or service line after obtaining the medical technology; appropriation requested (both for capital and employees if additional staff is needed); provider and payer mix, volume and reimbursement; financial risks; a three to five year proforma (analyzing the capital expenditure, expected revenues, contribution margin and whether or not that includes or excludes overhead); average

<table>
<thead>
<tr>
<th>Medical Technology</th>
<th>Benefits</th>
<th>Implementation Plan</th>
<th>Strategic Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe medical technology. Include vendor name, estimated total cost and years until ROI.</td>
<td>List financial benefits</td>
<td>Evaluate and flow any process changes that must occur</td>
<td>Demonstrate how the new equipment/technology meets the organizational strategic objective(s)</td>
</tr>
<tr>
<td></td>
<td>List quality benefits</td>
<td>Outline the implementation plan including target due dates</td>
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</tr>
<tr>
<td></td>
<td>List safety or other benefits</td>
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<td></td>
<td>List regulatory benefits</td>
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Table 2. Strategic Plan Matrix

<table>
<thead>
<tr>
<th>BUSINESS JUSTIFICATION TABLE</th>
<th>The new medical technology will benefit the organization by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits</td>
<td>New</td>
</tr>
<tr>
<td>Strategic Benefits</td>
<td>Describe how the medical technology will provide a new strategic benefit to the organization AND/OR</td>
</tr>
<tr>
<td>Financial Benefits</td>
<td>Describe any financial benefits from the medical technology (for example the creation of a new line of business) AND/OR</td>
</tr>
<tr>
<td>Quality Benefits</td>
<td>Describe how the medical technology will provide new patient quality of care benefits AND/OR</td>
</tr>
<tr>
<td>Safety Benefits</td>
<td>Describe how the medical technology will provide new patient or staff safety benefits AND/OR</td>
</tr>
<tr>
<td>Regulatory Benefits</td>
<td>Describe how the medical technology will meet new regulatory requirements AND/OR</td>
</tr>
</tbody>
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Table 1. Evaluation Matrix
return on investment; payback period and; any specific recommendations.

It also is imperative to engage physician partners and receive their input in evaluating the medical technology in relation to current medical technology, patient conditions treated, and proposed new services. If an objective, unbiased business justification is completed, it may not always demonstrate the need for the new medical technology; healthcare leaders need to recognize when it is reasonable to stop the process, even if there are internal pressures to continue.

ROI, while important to estimate, is often difficult to quantify. For example, sometimes the ROI does not come back to the organization that makes the investment, but rather is diffuse in nature. Blackford Middleton, MD, chief informatics officer at Vanderbilt University Health System, explained that a hospital’s investment in computerized physician order entry that screens for drug interactions can prevent costly drug events. However, those savings under current fee-for-service payment models are ultimately realized by the payor or insurer and not the hospital that paid for the investment.

It is important to balance the ROI and other financial data in conjunction with the added benefit of decreased employee errors and increased patient safety.

**Document Resources/Tools**
The Institute of Medicine (IOM) published a discussion paper proposing a model to assess institutional return on electronic health records which could be adapted to assess other medical technologies and can be accessed from the website referenced on page 98. Likewise, the Robert Wood Johnson Foundation website has ROI templates in an Excel-based format with a back-end tool designed to capture data on the costs of implementing quality improvement initiatives, as well as the savings associated with changes in patient utilization that result from these initiatives.

Another tool to support the business justification document is an evaluation matrix (Table 1). Quantifiable and measurable benefits are listed in the evaluation matrix to ensure an objective, analysis has been completed.

To assist in dovetailing the strategic plan into the business justification document, a strategic plan evaluation table may also be completed and attached. Just like the evaluation matrix table, objective information on the benefits and implementation process are a must.

**Barriers to Effective Technology Planning**
Despite the implementation of sound internal processes and tools for assessing potential medical technologies, there are a myriad of external factors (Table 2) that impinge on purchasing decisions that hospital leaders must recognize for optimal technology planning. Coverage and reimbursement decisions by the Centers of Medicare & Medicaid Service (CMS) and its downstream impact on commercial payors can play a dramatic role in shaping the adoption and utilization curve of new technologies. For example, CMS initially covered positron emission tomography (PET) for lung cancer staging, but quickly this was expanded to evaluate treatment response or recurrence monitoring, expanding utilization beyond its original intent. There may be little or no
scientific evidence to support such expensive treatments, but hospitals are incentivized to continue utilization based on a fee-for-service reimbursement model, particularly if the capital investment cost was significant.9

The influence of competitor buying decisions in a hospital's market cannot be overlooked as either an overt or implicit factor in the adoption of technologies. This medical “arms race” creates an environment for hospitals in which equipment purchasing is driven not by the promise of better patient outcomes or cost reductions, but to create market differentiation or undermine a competitive threat.

Finally, technology planning and decision making is often conducted without a sufficient framework of evidence-based research and comparative analysis. There is no central repository of information from which a hospital can properly weigh the pros and cons of a technological purchase. Often the information available comes from the vendor alone. If supported by reimbursement from health plans, it can be difficult to fend off the temptation to adopt a technology, particularly if admitting physicians are creating pressures on hospital administration to make the purchase.

These factors can have a pernicious effect on technology purchasing decisions, creating advocacy for acquiring new equipment that might otherwise be avoided if a hospital is using appropriate assessment tools and processes. Care should be taken to ensure a new medical technology purchases—whether the underlying aim is to improve patient safety or outcomes, to reduce waste, to offer a competitive strategic advantage—is clearly supported by reliable, objective evidence. A framework for better decisions by healthcare leaders must also include an evaluation of the stakeholders and how their influence affects the perception of value added to the organization. It requires leaders to test the underlying assumptions behind any purchase and challenge advocates to acknowledge the potential pitfalls and opportunity costs if such technologies are implemented.

Conclusion
Selecting new medical technology for your organization can be a daunting task. It is important to implement a systematic approach in evaluating the new medical technology starting with clearly articulated need for the medical technology. A systematic approach to acquiring medical technology should include: what individual or team has responsibility for vetting and presenting the project; documenting upfront costs as well as ongoing costs (such as licensing and maintenance and repair fees); evaluating the life cycle of the equipment; assessing if it is better to lease or to purchase (including the lease or purchase of refurbished technology); identifying and addressing any barriers; and overseeing the implementation of the new medical technology.

References: