Message from our President & CEO

HIMSS, a 51-year-old cause-based, non-profit organization focused on the best use of information technology (IT) and management systems to transform health and healthcare. The executive management teams of healthcare organizations play a powerful role in this transformation.

As a CEO, I understand first hand the challenges an executive team experiences in assessing and documenting IT return on investment. It’s a complex issue that impacts everyone across an organization, and there are many examples of disappointment, frustration and outright failure.

Our role is to equip you—a member of a healthcare executive management team—to realize ongoing financial viability through the best use of IT and management systems. As payment models begin to change, clinicians clamor for increased use of IT, and those paying for the care seek proof that care treatment plans are of greatest efficacy, executives must understand the strategic opportunities and pitfalls of IT. At the end of the day, without ongoing financial viability, a healthcare organization will fail.

To that end, this white paper focuses on what research teaches us about how to measure IT’s return on investment in the acute setting. Classic ROI methodologies are insufficient for a health setting. We provide research-based guidance on how to correctly assess ROI. We also outline the executive management’s strategic role and advice on how executives can improve the potential for success.

Over the next several months, HIMSS will publish ongoing ROI IT research—again, all focused on the needs of senior health executives. We will look at ROI in the ambulatory setting, and how executives can harness the power of IT to envision a successful future that—today—seems beyond imagining. Together, our generation will transform healthcare.

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Introduction

It is commonly believed that widespread U.S. provider adoption of health information technology (IT)—and, specifically, electronic health records (EHRs)—will lead to cost savings, an increase in patient safety and an increase in quality outcomes. Yet such outcomes are not automatic; providers may struggle to realize such results. And such outcomes have profound business implications, thus requiring strategic engagement of a provider’s executive management team.

Using established return on investment (ROI) methodologies, provider organizations have been trying to figure out how to demonstrate the value and financial benefits of investing in IT. In its classic definition, ROI is defined as a performance measure used to evaluate the efficiency of an investment or to compare the efficiency of a number of different investments. To calculate ROI, the benefit (return) of an investment is divided by the cost of the investment.

However, this traditional definition does not fit the scope of benefits that healthcare organizations can derive from effective implementation of IT systems. Indeed, a true measure of ROI must include the full spectrum of benefits that can result from a successful IT implementation: improved customer relationships, streamlined internal processes, innovation, patient safety and other qualitative factors. Such components may have a huge impact on a healthcare organization—all without the benefit of being quantified financially. Using the classic formula, an ROI calculation for a particular investment might be negative; however, benefits such as customer satisfaction and easy access to information may uncover ample justification.

Purchasing an electronic health record (EHR) is an expensive proposition. One estimate suggests that an EHR system costs $33,000 for each physician in a medical practice, with an additional cost of $1,500 per doctor per month for maintenance. According to the HIMSS Analytics™ Database, in 2010 U.S. hospitals spent a median of $16,448 per licensed bed on IT operating expenses and an average of $5,304 on IT capital expenses per licensed bed. For the average hospital with 164 licensed beds, that translates into $2.7 million in annual operating costs and $870,000 in capital expenses per year. However, costs will vary widely; organizations at the early stages of their journey will experience much higher “start-up” expenses than those cited here.

When maximized across all healthcare settings, the cost savings generated from the use of IT is substantial. One study estimates that, at 90 percent adoption, the healthcare industry could save $77 billion per year across in-patient and outpatient settings. The greatest savings would be generated by reductions in the following areas: length of stay (LOS) at hospitals, administrative time for nurses, drug usage in hospitals, and drug and radiology use in outpatient settings.
However, these cost savings can also be defined as “revenue reductions.” This is the crux of an executive management team’s challenge—how to harness the power of IT such that the business improves as the quality and cost-effectiveness of the service also improves.

**HIMSS Research Return on Investment**

HIMSS, a 51-year-old non-profit, cause-based organization, has been addressing ROI for many years. For example, since the mid-1990s, the Davies Award of Excellence has recognized healthcare organizations that could document tangible and intangible ROI from IT investments. In 2003, HIMSS dedicated an edition of the *Journal of Health Information Management* (JHIM) to a dialogue about ROI. HIMSS also released Return on Investment, a basic primer on completing an ROI analysis for a single project in 2003. In the mid-2000s, HIMSS launched its Stage 7 Award, which recognizes when paper charts are no longer used to deliver patient care. And in 2007, HIMSS released *Beyond Return on Investment: Expanding the Value of Healthcare Information Technology*, which expands on the benefits of ROI to address a comprehensive program of value-based information management for health systems today.

**HIMSS Davies Award of Excellence**

Since 1994, the HIMSS Nicholas E. Davies Award of Excellence has recognized outstanding achievement in the implementation and value from health IT, specifically EHRs. This award program promotes EHR adoption by sharing information and lessons learned on implementation strategies, financial ROI and quantitative ROI from EHRs that improve patient care and outcomes. Past winners of the award have demonstrated improvements across a wide variety of metrics including reductions in transcription errors, a decrease in medication errors, reduction in duplicate testing, efficiency savings in physicians’ schedules, revenue enhancements and cost savings associated with staffing reductions and enhanced billing practices.⁴

**HIMSS Analytics Stage 7 Award**

In 2006, HIMSS Analytics introduced the EMR Adoption Model (EMRAM) to track the progress of EMR adoption in the United States. The EMRAM scores all hospitals in the HIMSS Analytics™ Database on their progress in completing the eight stages to creating a paperless patient record environment. To date, 60 hospitals have achieved Stage 7 and 243 have achieved Stage 6.

While demonstrating ROI is not a requirement of achieving advanced stages on the EMRAM model, a review of case studies on those organizations that have achieved Stage 7 suggests that these organizations have been able to document ROI across a wide range of metrics, including cost savings, efficiency savings and improved patient care.⁵
Limitations to Existing Studies/Research

A plethora of research around quantifying ROI in healthcare is available. This rich body of literature includes publications in trade journals, peer-reviewed journals and lay literature. In addition, case studies published by vendors, trade associations and other organizations abound. This body of literature provides example after example of the ways in which healthcare organizations have achieved ROI. However, a number of limitations to the literature presently exist.

First, many articles, studies and case studies extol the virtues of a limited number of organizations. While these studies may document valuable insights into the ways in which organizations are documenting ROI, ultimately they need to be replicated to validate that the benefit is not simply a consequence of something unique to that organization. Second, articles often have a narrow focus. These articles will often address a scope of benefits that is limited to one type of benefit or to the benefits of a single type of technology. For instance, a study may focus on quality or safety outcomes. It is a rare case in which the use of technology is more holistically approached.

Third (and particularly common among studies that use a more comprehensive sample), a number of studies in the field use the presence of an application type, such as computerized practitioner order entry (CPOE), as their unit of analysis, failing to take into consideration the extent to which this technology is used by physicians, nurses and other care providers.

Types of ROI

Return on investment has three phases: (1) greater efficiency—cut costs; (2) greater productivity—do more with same input; and (3) do things you cannot imagine today. For example, the iPad. This paper addresses the first two phases.

In order to determine the ROI benefits that can result from IT implementation, it is necessary to establish baseline metrics that can be used as a guideline for measuring success after the implementation. Existing literature suggests that ROI can best be differentiated into two broad categories—“hard costs” and “soft costs.” Prior to implementation, healthcare organizations need to establish baseline metrics so they are prepared to evaluate both types of ROI in order to understand the full scope of potential benefits resulting from an IT implementation.
“Hard Costs” ROI
This is the traditional hallmark of ROI, measured by using concrete figures and yielding a benefit in dollars. Using this type of metric, organizations are able to demonstrate quantifiable returns in terms of cost savings or enhanced revenues. Metrics reviewed in this category might include billing improvements, savings realized from staffing/materials reductions and patient flow metrics such as length of stay or number of patient encounters.

“Soft Costs” ROI
In this category of ROI, benefits are intangible, but no less important than the concrete dollar figures demonstrated through the metrics that are used to compute “hard costs” return on investment. Many “soft costs” items are transformative and are often at the heart of the mission of healthcare organizations. For instance, Kaiser Permanente, Oakland, CA, a HIMSS Analytics Stage 7 Award Winner and HIMSS Enterprise Davies Award Winner for 2011, identifies its mission as “to provide quality care for our members and their families, and to contribute to the well-being of our communities.” As such, in addition to the financial benefits they saw from their EHR implementation, they were also able to affect quality of care by reducing patients’ wait time for test results and reducing medication errors at one facility by linking barcode scanning to the CPOE and electronic medication administration record (eMAR) systems.

Areas in Which ROI Can Be Evaluated
There are multitudes of metrics by which ROI can be measured. Many of these metrics can be categorized into five broad categories. When determining if an IT purchase is a good investment, healthcare organizations should consider evaluating each of the following five broad categories as they put together a more formal ROI analysis. This paper gives examples of the different areas of ROI on which healthcare organizations might focus, but it by no means intends to provide an exhaustive list.

Efficiency Savings
This savings category can be defined as those savings that result in direct cost reductions. These may take place across a wide variety of areas, including a reduction in redundant staff compensation, decreases in transcription, reduced supply costs and other similar decreases. Efficiency savings are widespread and easily documented.

Many of the HIMSS Davies and Stage 7 Award winners have documented benefits in this area. For instance, Sentara Healthcare, Norfolk, VA, documented more than $1 million in savings from reductions in medical records and coding staff. The Children’s Hospital of Pittsburgh of UPMC, Pittsburgh, PA, documented nearly $43,000 in savings for transcription costs. Children’s Hospital Boston, Boston, MA, documented $40,000 in annual savings by eliminating paper chart folders and supplies.
Efficiency Financial Gains/Revenue Implications
This category can be characterized by additional revenue that is generated as the result of an IT implementation. Studies suggest that IT adoption is associated with improved financial outcomes at healthcare organizations. There are a number of revenue implications in this area, including increased visits due to reduced provider time per visit or increased outreach encouraging patients to seek needed care, increased revenue due to better clinical documentation and accurate claims submissions. In addition, payer organizations can expect to save money through the effective use of IT to reduce unintended consequences or re-admissions. For instance, Citizens Memorial Healthcare, Bolivar, MO, reported that enhanced availability of records has led to a 35 percent reduction in the re-admission rate for home care patients. NorthShore University HealthSystem, Evanston, IL, reported that improved documentation has not only resulted in more accurate billing and reimbursements, but also reduced the accounts receivable (AR) days in the Medical Group.

Efficiency Non-financial Gains
This area is the true “soft costs” ROI. Improvements in this area typically are characterized by items that don’t yield concrete financial gains or savings.

Examples in this area include decreased provider time at work, increased employee satisfaction and increased patient satisfaction with encounters. Davies Award-winner University of Illinois Chicago Medical Center, Chicago, IL, documented that radiologists were able to spend approximately five fewer hours per week reviewing medical records.

Additionally, many healthcare organizations have been able to document enhanced availability of medical records at the time they are needed to provide care, enhancing both the patient and clinician experience. For instance, at Davies Award-winner Queens Health Network, Queens, NY, 100 percent of patients have electronic records; prior to the implementation of the EMR, paper charts could be located for only 70 percent of patients.

Increased Strategic Knowledge of the Patient Population
Accurate medical records are required not only to provide quality of care at the time of the patient encounter, but also to create a dataset that can be mined to ensure that specific at-risk patient populations, such as individuals with chronic conditions like diabetes, can be given appropriate preventative care.

For instance, a regional study suggests that diabetic patients seen at a practice in which information from the EHR is readily available were more likely to receive care that met the four standards of diabetic care. Insurance and pharmaceutical companies will also benefit from leveraging this type of information.
Process and Quality Improvements

Finally, the utilization of IT can have a positive impact on the quality of care by enabling more efficient provision of healthcare. This is the area in which healthcare organizations can recognize achievements that are directly tied to improved care for their patients. Examples of this type of benefit are varied and well documented, including improved throughput in specific departments, increased patient encounter efficiency, reductions in medical errors, elimination of duplicate testing and more timely provision of healthcare. For instance, Sentara Healthcare has documented a reduction in the time that it takes to admit an ED patient to the hospital. The Children’s Hospital of Pittsburgh at UPMC has decreased the time from ordering an antibiotic to administering the drug from more than an hour to 10 to 15 minutes.

Evaluating ROI in Diverse Provider Settings

The costs for purchasing electronic records vary widely by organization type, as do the priority and level of funding that will be dedicated to IT purchases. Potential reimbursement from the American Recovery and Reinvestment Act of 2009 (ARRA) is structured differently for hospitals and eligible professionals. Organizations have different payer mixes, patient populations and corporate objectives. All of these issues, which need to be considered for evaluating ROI, differ widely based on the type of facility that is evaluating the software purchase.

ROI in Hospital Settings

When a hospital chooses to invest in EHRs and other IT applications that capture health and financial information, it is paid for from the healthcare organization’s corporate capital budget. Ongoing maintenance costs are covered in the organization’s annual operating budgets. Therefore, if a project does not deliver on the expected ROI, the financial repercussions are experienced across the healthcare organization; no single individual bears the economic brunt of the failed performance.

ROI in Ambulatory Settings

The scenario is quite different for smaller ambulatory organizations in which the investment is made on a very personal level. In many small ambulatory practices, clinicians are writing personal checks to buy EHRs. In addition, providers at these practices are faced with issues related to the reduced number of patients that they can see while the implementation takes place.

Therefore, not only have they made an initial outlay in the technology, but they also have to accommodate reduced revenues while the technology is being implemented and optimized, or else put in additional hours to mitigate the impact of reduced patient volume. One estimate suggests that it takes an average of 2.5 years to recoup the costs of EHR acquisition and implementation in the ambulatory setting.
**ROI in Home Health/Sub-acute Settings**

Long-term care and home health agencies face IT implementation challenges that are similar to those faced by other healthcare organizations. Larger corporate-based systems may be in a better position to purchase and implement IT systems tailored to their patient populations, while smaller facilities—challenged by reimbursement levels and competing priorities—continue to document patient encounters using paper charts.\(^{21}\)

**Items That Can Routinely Influence IT ROI**

There are many factors that can impact the success of IT implementation. Below is a list of several key areas that executive teams must pay attention to in order to maximize ROI.

**Leadership Must Set Expectations and Support Initiatives**

One of the hallmarks for a successful IT implementation is executive-level support, which can ensure a sense of corporate mission and values. Support from leadership is also critical for garnering support from all of the organization’s employees. Furthermore, it is essential that there is harmony between an organization’s strategic plan and the organization’s IT goals. Ideally, an organization’s strategic IT plan should be a component of the organization’s broader strategic plan. For example, getting executive buy-in for the system’s implementation was a consistent theme identified by hospitals that have demonstrated success in EMR implementation, as noted by the designation of being a HIMSS Stage 7 Award-winning hospital.

**Budgets Must Be Adequate to Achieve Strategic Intent**

According to 2011 data from the HIMSS Analytics Database, the average IT budget in U.S. hospitals represented 2.63 percent of the operating budget. This ratio is the amount of the organizations’ expense attributed to IT operations. Historically, the healthcare industry has under-invested in IT compared to other industries. Indeed, senior IT executives have for years identified lack of adequate financial support/lack of budget as the top barrier to implementing IT.\(^{22}\) Healthcare organizations desiring to enhance their IT portfolio sufficiently to improve the quality of patient care must be prepared to fund their IT environment adequately. To ensure that the executive team is informed about the full impact of ownership, it must look beyond software and hardware acquisition costs. The team also must understand the associated infrastructure and staffing costs of implementation, and what it will take to provide ongoing maintenance and optimization.

**Project Management Is Essential for IT Success**

IT projects have varying degrees of complexity, from upgrading a web page, to installing new hardware or software systems, to integrating technologies both internally across an organization and with external organizations.\(^{23}\)
Projects of any scope can be successful only if they have been well thought out. Organizations need to determine anticipated project costs and schedules at the outset. This will help to establish a sense of the investment an organization needs to make in the technology, and allow the organization to apply realistic project milestones to help ensure that the project remains within scope, on time and on budget. Regular meetings with key stakeholders will help ensure that project milestones are met and that potential barriers are identified early in the process. Key factors to have in place when establishing a project plan include:

- Ensuring that the project is in alignment with the organization’s strategic goals
- Identifying an executive sponsor for the project, in addition to a project manager.
- Taking into account the disruption that will take place to employee regular duties and routines.
- Ensuring that the organization’s IT staff has the appropriate skill set.

**End Users Must Be Involved in IT Adoption**

While an IT implementation cannot succeed without the support of the executive team, it also can’t succeed without the support and buy-in from the individuals who will have to use the systems on a daily basis. Evaluation of new technology cannot take place from only the organizational point of view—the needs and preferences of the end user must be considered. One of the key issues identified in the failed 2002 implementation of CPOE at Cedars-Sinai Medical Center, Los Angeles, CA, was a lack of physician involvement in the development of a system that would dramatically change the way they practiced medicine. This was a very valuable lesson and appears to be one that was well-heeded.

Nearly all respondents in a recent study (98 percent) noted that clinicians at their organization play some role in the IT process. Furthermore, clinician support was greatest in the key areas of IT system evaluation/selection and engaging clinicians as project champions to educate and lead their clinical colleagues.

**Conclusion**

Numerous healthcare organizations have demonstrated that they recouped IT investment costs through a combination of increased revenue and reduced expenses. Using classic ROI calculation methodologies for a particular investment computed on increased revenue and reduced expenses may suggest that an organization won’t recoup its investment. However, such methodologies need to be expanded to include intangible benefits such as customer satisfaction, easy access to information and enhanced patient quality. It is critical that healthcare organizations make every effort to consider both the “hard ROI” and “soft ROI” resulting from their IT implementations.
The literature broadly suggests that healthcare organizations may be able to recognize hard dollar benefits by eliminating costs associated with reduction of paper files, transcription costs and staffing. The literature also suggests that many healthcare organizations will also be able to yield greater revenues from enhanced billing practices that generate more accurate billing and increased payments.

However, as healthcare organizations also see a reduction in duplicate testing and a more efficient use of clinical time, they may ultimately see a decrease in revenue. In the current healthcare climate, organizations are reimbursed based on the services provided. Demonstration projects are underway and new regulations are pending in which this payment model is evolving to take outcomes into consideration.

As a result of providing better care through the best use of IT, and changing payment models, healthcare organizations may experience a reduction in revenue. Indeed, insurance companies may ultimately see the greatest financial impact from the implementation of EHRs and other computer systems, because as healthcare providers become more efficient in their care, insurance companies will no longer have to foot the bill for inefficiencies, such as duplicate tests.

The strategic challenge facing executive teams and their Boards of Trustees is to realize these changing realities and position their healthcare organizations for future financial viability. IT is a key component of that strategic conversation; executives must first understand how IT can be harnessed to jointly improve outcomes, reduce costs and generate new revenue. Then executives must articulate the plan and keep staff relentlessly focused.
Appendix—HIMSS Resources

The HIMSS organization makes a wide variety of tools, resources and archived education available. Some of these resources are available to all HIT professionals; some are restricted to HIMSS members. Listed below are some key resources that HIMSS has produced regarding ROI.

_Beyond Return on Investment: Expanding the Value of Healthcare Information Technology_
Authors: Pam Arlotto, MBA, FHIMSS; Patricia C. Birch, MBA; Susan P. Irby, MS
_http://marketplace.himss.org/_

_Journal of Health Information Management (JHIM)_
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Nicholas E. Davis Award of Excellence Home Page
_http://www.himss.org/davies/index.asp_

HIMSS Analytics EMRAM Model (Stage 7 Award)
http://www.himssanalytics.org/hc_providers/stage7Award.asp

Leaders & Innovators Program Website
http://www.himss.org/innovators/index.html
End Notes


2. HIMSS Analytics Database; www.himssanalytics.org.


9. Readers desiring more information on specific types of ROI that can be addressed in each of the areas outlined in this paper should read the case studies and other papers cited here.


15. HIMSS Analytics Stage 7 Award Case Study—NorthShore University HealthSystem; http://www.himssanalytics.org/hc_providers/stage7casestudies_NorthShoreUniv.asp. Accessed October 4, 2011.


