The purpose of this paper is to compare and contrast the EHR implementation and optimization methods of health systems that do and do not achieve measurable strategic benefits and show how any organization can get value from their EHR investment.

Over the past two decades the healthcare industry has invested heavily in information technology (IT). Just since 2011, the U.S. government has paid hospitals and physician offices $38 billion\(^1\) in EHR implementation incentives. Worldwide EHR spending, which has lagged U.S. spending, boomed in the last three years, and new excitement over digital health promises to spur major investments in information technologies such as artificial intelligence, mobile applications, analytics, and virtual healthcare, among others.

While past EHR adoption was strongly motivated by government incentives and penalties, in the U.S. those incentives paid only a fraction of total EHR implementation cost, not to mention the growing costs of EHR optimization to improve functionality, usability and value. The rest of the bill was supposed to have been covered by benefits from EHR use, including improvements in clinical quality, safety, efficiency and patient outcomes, and increased revenue and cost savings.

But in the five years since most U.S. hospitals reached Stage 4 on the HIMSS EMR Adoption Model (EMRAM) scale – the stage at which clinical decision support capabilities begin to make substantial benefits possible – most hospitals have not realized these benefits. And the increased costs of operating more sophisticated EHRs leave some further behind financially\(^2\), leading critics to claim that EHRs have been a huge waste of time and money.

Based on the experience of hundreds of health systems, we have identified the practices that allow providers to realize strategic benefits from their EHR initiatives; they are surprisingly simple, yet few organizations fully use them.
The full story isn’t that simple. A growing number of organizations have realized and measured impressive benefits, which not only paid for their EHR investments but substantially improved patient outcomes. Texas Health Resources (THR) saved an estimated $10 million from a greater than 60% reduction in adverse drug events at three hospitals one year after EHR go-live. Sentara realized $57 million in annual EHR-driven savings, net of expenses, and a 50% reduction in hospital mortality ratio. And Memorial Hermann saved over $2 million annually from increased use of just six standardized electronic order sets.3

A review of the “success literature” identifies the most commonly-reported hospital EHR benefits shown in Figure 1, below.

**FIGURE 1**
**MOST COMMONLY-REPORTED EHR BENEFITS**

- Reduced adverse drug events (ADE)
- Fewer incidences and harm from infections
- Reduced transcription costs
- Reduced hospital lengths of stay
- Improved nursing efficiency
- Improved preventive care
- Reduced utilization and cost of lab testing
- Reduced utilization and cost of drugs
- Increased billings related to charge capture and coding
- Reduced costs to collect
- Accelerated cash collections
- Reduced denials

*What is the explanation* for the growing divide between the relatively few organizations that get large strategic benefits from their EHR investments and the average organization that can’t measure any value? *The primary answer* is how these organizations plan, design, build, implement and optimize their EHRs, beginning with the premise behind their purchase.
Why Don’t More Health Systems Realize EHR Benefits?

Most health systems preface their EHR investment with a business case outlining expected benefits, but unsuccessful providers are derailed by the challenges to actually realizing those benefits, including:

- Helping business leaders understand that EHR benefits and return on investment (ROI) will not be achieved without a sustained, organized approach
- Gaining a firm commitment from business leaders to benefits realization
- Identifying benefits that are realistic to expect from an EHR
- Estimating the amount of benefit that can be expected, given the organization’s unique strengths and weaknesses, IT changes, culture and other characteristics
- Understanding how IT and process changes combine to produce desired outcomes
- Obtaining commitments from clinical or business “owners” to drive specific benefits
- Changing clinician and staff behavior
- Sustaining the focus on benefits realization amid the distractions of the design, build and implementation process, and later, when the next big change initiative comes along

Practices of Successful Organizations

After reviewing the cases of hundreds of hospitals in scores of health systems and from our own direct experience in working with several hundred other hospitals, we have identified the practices that allow successful providers to realize strategic benefits from their EHR initiatives.

**PRACTICES OF SUCCESSFUL ORGANIZATIONS**

1. Commit to a “Short List” of Strategic Benefits
2. Clearly Define Benefit Mechanisms
3. Establish Formal Organization and Governance
4. Implement An “Operational” Measurement System
Commit to a “Short List” of Strategic Benefits

KEY INSIGHT #1:
Organizations that get measurable value from their IT investments are those that purchase technology to achieve specific strategic outcomes and manage the implementation and subsequent optimization to deliver those outcomes. We call this a “benefits-driven approach”, and it differs substantially from the typical technically-focused approach.

Key stakeholders, including the senior executive team, clinical leaders and functional/departmental leaders must all agree upon and commit to achieving a short list of 6-12 strategic benefits as the primary purpose of the EHR purchase, implementation or optimization effort. Every organization’s list is unique because of differences in their strategic goals, strengths and weaknesses, culture, current and future IT capabilities, relationships with clinicians, etc. However, there are many well-established EHR benefits that most health systems will have in common (see the graphic above).

Once key stakeholders are in agreement, benefit targets are shared and discussed with the entire organization, gaining buy-in, collaboration and additional feedback to guide the benefits realization effort.

FOR EXAMPLE
Before beginning EHR implementation, Sentara reviewed all major clinical and business processes, looking for areas where EHR-related innovation could improve performance. They identified 11 key benefits, including nursing efficiency, lower adverse drug event incidence, reduced transcription workload and reduced lengths of stay, and estimated clinical and financial impacts. These estimates were adopted as implementation targets, and when achieved, resulted in a return on Sentara’s EHR investment one year earlier than budgeted – an almost unheard-of achievement.
KEY INSIGHT #2:
The most significant EHR benefits are not the result of merely implementing and operating the system (automation); instead, they result from using new EHR capabilities to change the way work is done (innovation).

Each strategic benefit must be clearly described, including the functionality and process changes that drive benefit realization, the expected amount of benefit and the expected timing of benefit realization. In some cases, more detailed and specific “benefit requirements” (both system and process) are identified to guide the EHR design and build.

FOR EXAMPLE
Baylor Scott and White Health defined the functionality of an Emergency Department information system (EDIS) that could support improved throughput and bed utilization, increased revenue, and a reduction in patients leaving without being seen. These benefit requirements included descriptions of the system functionality and process changes necessary to achieve the desired outcomes (e.g., “patient tracking data collection is automated from documentation time stamps, not a separate data entry step” and “graphical status display looks like a map of the ED instead of a table of numbers.”) This detailed understanding of benefit mechanisms and requirements allowed them to make a well-informed choice between their standalone EDIS and the ED module of their new integrated EHR.
KEY INSIGHT #3:
Without a formal structure, benefits realization is left to chance – and benefits don’t happen by accident. Dedicated resources, well-defined roles and robust governance are required to maximize EHR benefits.

An organizational structure focused on benefits realization must be created and sustained for one to three years after EHR go-live to achieve the desired outcomes. It is important that senior-level “benefit owners” are identified, who take personal responsibility for realization of the benefit they own. Ideally, benefit owners meet regularly before and after go-live to coordinate a benefit planning and realization effort. Benefit owners may be members of a benefits committee, supported by experts in change management, process change, statistical analysis, measurement, etc. This group may be led by a dedicated Benefits Realization Director. In some cases, an existing committee can play this coordinating role; however, the committee must be able to focus on benefits realization on at least a monthly basis.

The work of the benefit owners, benefits committee and outcome/process metrics for each benefit area should be regularly reviewed by a senior-level steering committee that supports and assists with benefits realization efforts.

FOR EXAMPLE
Texas Health Resources (THR) created a governance structure for their EHR benefits realization effort, including a system-wide executive steering committee and advisory teams representing doctors, nurses and many individual departments and functions. Once these groups had agreed upon a list of 11 strategic outcomes to pursue, THR hired a Benefits Director who led the system-wide benefits realization effort and created a clinical benefits team to support the effort. THR reported the following outcome improvements one year after EHR go-live: improvement from 67 percent to over 90 percent in the proportion of patients receiving appropriate care on all CMS core measures, greater than 50 percent reduction in adverse drug event rates in most hospitals, savings of more than 45 minutes of nursing time per nurse per shift and a two-hour reduction in order turnaround time.
Implement An “Operational” Measurement System

KEY INSIGHT #4:
Benefit measurement is important to guide the ongoing improvement efforts that produce EHR benefits. If you don’t measure it, you won’t achieve it!

Measurement begins with “benefit modeling” prior to go-live, in which local patient volumes and performance metrics, including baseline outcomes, are combined with a deep understanding of local culture, structure, strengths and weaknesses, and what is known from the literature, to credibly estimate an expected amount of benefit. This is a more rigorous process than is typically done for a business case; the primary purpose is to understand at a detailed level how benefits will be achieved to guide and focus the benefits realization effort.

After EHR go-live, an “operational” benefit measurement system supports action and not just insight. Such a system includes monthly reporting at both a dashboard and detailed level for each strategic benefit. It reports desired outcomes and key process and system use metrics, which give insight into the root causes of performance issues and are used by the benefit owners and/or benefits committee to support actions to resolve those issues. These metrics are also reported to the steering committee, whose members lend their influence and advice to the benefits realization effort.

In other words, benefit metrics support iterative performance measurement, review and data-based plans for improvement in system functionality, processes and culture/behavior that eventually lead to achievement of strategic value.

FOR EXAMPLE
An integrated delivery network (IDN) in the Southwestern U.S. implemented evidence-based electronic order sets to reduce unnecessary practice variation and cut costs. They modeled the impact of reducing variation in six high-volume, high-cost conditions and estimated savings they felt could be achieved. Direct variable costs for the six conditions were reported monthly, along with the percentage of time these order sets were used by physicians as well as the difference in cost between cases using the order sets and those where they were not used. Over three years, these data were reviewed monthly by the benefit owner of the order set initiative and the COO of the IDN. Plans were updated to improve physician training, availability of the order sets, and ease of use as well as create incentives for physicians to use the order sets, when appropriate. By 2017 order sets for these six conditions were used 90 percent of the time, clinical outcomes had improved, and annual cost savings exceeded $3 million for the six conditions. Order sets were subsequently implemented for many other conditions.
A Benefits-Driven Methodology for EHR Implementation and Optimization

The key practices described above are embedded in a decidedly different approach to EHR implementation and optimization, illustrated in Figure 2 below. This approach surrounds successful practices (the “what”) with supportive principles (the “how”) including change management, communication, consensus and engagement, which help individuals throughout the organization understand, agree upon and support the changes required to achieve lasting benefits.

FIGURE 2
A Benefits-Driven EHR Implementation & Optimization Approach

A benefits-driven EHR approach is one that uses the leading practices described above to drive substantial improvements in clinical quality, patient safety and/or operational and clinical efficiency. This is distinguished from a technically-focused or process-focused approach which has as its goals on-time and within-budget delivery of technical capabilities and/or changes in clinical and operational processes including technology adoption.
A step-by-step methodology to deliver a benefits-driven EHR approach is illustrated in Figure 3 below.

FIGURE 3
Benefits-Driven EHR Implementation & Optimization Methodology

In our companion paper, A Methodology for Benefits-Driven EHR Implementation & Optimization, we describe the timing, activities and outcomes of these work steps and highlight sample change management tactics for each step.

Health system leaders should be satisfied with nothing less than achievement of the strategic clinical and business objectives of their technology investments. While the majority of health system EHRs have not delivered on that promise, there is ample evidence that with clear goals, careful planning, good governance, and ongoing measurement and commitment, any organization can expect real, substantial benefits from EHR use. Organizations that have already implemented or upgraded their EHRs can use the principles and methods described above to optimize their EHRs to deliver measurable benefits.
Sources

3. Various published sources and personal communications with the authors.
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