FOCUS: Enterprise Information Systems

Making Sausage—Effective Management of Enterprise-wide Clinical IT Projects

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ABSTRACT

Unlike most other industries in which company employees are, well, company employees, U.S. hospitals are typically run by both employees (nurses, technicians, and administrative staff) and independent entrepreneurs (physicians and nurse practitioners). Therefore, major enterprise-wide clinical IT projects can never simply be implemented by mandate. Project management processes in these environments must rely on methods that influence adoption rather than presume adoption will occur. “Build it and they will come” does not work in a hospital setting. This paper outlines a large academic medical center’s experiences in managing an enterprise-wide project to replace its core clinical systems functionality. Best practices include developing a cogent optimal future-state vision, communications planning and execution, vendor validation against the optimal future-state vision, and benefits realization assessment.

KEYWORDS

• Enterprise HIT project management
• Optimal future-state vision
• HIT vendor validation
• Communications plan
• Benefits realization

Despite the fact that there is a wealth of reference literature articulating purportedly effective methods for managing large-scale IT projects, there are an even greater number of citations suggesting that the vast majority of IT projects end in failure.1 Much of this literature does not include the healthcare industry, instead describing organizations that actually formally employ all of their workers.

By contrast, U.S.-based hospitals typically do not formally employ a key driver of its revenue processes, the physician. This suggests that it is even more difficult to successfully implement an enterprise-wide clinical project in healthcare organizations, where projects move along almost exclusively by influence and consensus building vs. by edict.

Until recently, most hospitals have implemented departmental systems that support silo-like work, requiring the use of paper-based processes whenever information from these systems must flow outside of the department (for example, printing out lab results and putting them in the paper-based record). However, the Institute of Medicine study2–4 along with subsequent increased interest from employer groups,5 health plans6 and Congress7 in reducing medical errors, medication errors, and the overall cost of
healthcare have substantially increased pressure on hospitals to implement enterprise-wide, integrated clinical systems.

In light of this scenario, “cookie-cutter” project management techniques most likely will fail in hospital settings. Instead, facilities need project management approaches tailored to the healthcare services delivery industry that heavily focus on adoption through consensus-building. This paper outlines the approach being taken by a large academic medical center as it embarks on replacing and enhancing its enterprise-wide core clinical systems.

The University of Alabama at Birmingham Health System (UABHS) comprises University Hospital, a 908-bed academic tertiary medical center; the Kirlin Clinic, a 470-physician multispecialty group practice; the Callahan Eye Foundation Hospital; and Viva Health, UAB’s managed care health plan. To appreciate the scale and scope of the work accomplished at UABHS, some workload statistics are provided in Table 1 (UAB Health System 2002-2003 Facts and Figures). UABHS is a recognized pioneer in employing IT in its clinical environment. It has been named one of the 100 Most-Wired hospitals by Hospitals and Health Networks.
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Figure 2.

Developing a Future-State Vision

In March 2004, UABHS began an initiative to develop a vision to replace the current Patient Information Network system with a comprehensive core clinical system that could provide advanced and integrated functionality.

Initially, the scope of the vision development project was limited to the UAB Hospital, which includes all inpatient departments and hospital-based clinics. However, because UABHS recognizes that access to clinical data by both the clinics and the hospital is essential to the continuity of patient care, the scope of the vision development project was expanded to include the Kirklin Clinic, UABHS’s 470-physician group practice.

Project governance and planning were carefully structured. The major activities for each initiative were rolled into one integrated project plan with two distinct focus areas, acute care and ambulatory, and each focus area was staffed appropriately with subject matter experts. The project used a shared executive-level governance structure, and a health system-level executive steering team (see Figure 2) validated shared goals for both focus areas.

Before creating a vision for the future system, it was important to develop an accurate conceptualization of UABHS’s current state. Using basic business process modeling techniques, subject matter experts from both the acute care and ambulatory settings created the content for detailed current state workflow process maps.

To develop the “story” for the future-state vision, planners studied information on unresolved current state issues and opportunities desired by the organization. They examined research on the healthcare industry to understand
how other similar organizations were addressing issues and setting goals for the future. A review of available technology was also included, as shown in Figure 3.

Each component of the future-state vision then was validated to ensure that it addressed the issues and opportunities identified by the current state analysis focus groups, that it supported one or more organizational objectives, that it supported industry and UAB best or optimal practice standards, and that the technology was currently available within the industry. Any differences of opinion were usually resolved by referring to the objective data in these sources.

The most frequently occurring problem was that team members would resort to current state thinking, reflected in statements like, “We don’t do that now” or “We don’t have the tools, skills, knowledge, space, equipment, leadership, or whatever to do that.” This type of thinking was refocused by advising participants to “think about the world as it could be,” “think about how you would want it if all was possible,” “put yourself five to 10 years in the future,” or “think about what could be done if that barrier was removed.”

Efforts of the optimal future-state design teams were articulated in story-like fashion in the context of a fictitious patient, “Ralph,” as he engages UABHS (see Table 2 for sample excerpts from UABHS’s ambulatory optimal future-state story).

An incredibly important formal step in the project management approach advocated by Healthlink is the use of executive level “Decision Days,” in which all key decisions are presented to the executive steering team and officially vetted and resolved. The vision design teams presented
their optimal future-state vision for this project to the UABHS executive steering team, which validated it. As a result, this vision will be used throughout UABHS’s journey through the project management steps in Figure 1.

In particular, the vision will serve as the basis for planning and executing the communications associated with the project, including marketing efforts; validating vendors’ proposed solutions and developing contract requirements statements; fighting “scope creep” by constantly reinforcing the agreed-upon, validated requirements; and serving as the basis for focusing benefits-realization efforts.

**Project Communications Planning**

It is virtually impossible to overcommunicate the IT agenda in a healthcare environment. Therefore, for IT projects of any scope, and particularly for enterprise-wide IT projects, CIOs should ensure that they are proactively using internal resources to regularly provide relevant news about IT projects that are coming, status reports on current projects, and retrospective news to celebrate successes and how they positively affected operations.

The best way to do this is by explicitly creating a project communications plan. This plan should cover topics such as developing the future-state vision or the “formal messages” about the project and what its envisioned positive impact will be, identifying potential media to communicate news about the project, identifying individuals who can write news articles, developing a timeline or schedule for news releases, and so on. See Table 3 for a sample IT project communication plan.

CIOs should use all available media, such as organizational staff newsletters, patient-focused newsletters and Web sites, the healthcare organization’s main Web site, and the IT organization’s Web site. The message about the project should be written in such a way so that it is relevant and understandable to the intended audience.

**Validating Vendors vs. the Vision**

The executive steering team’s validated optimal future-state vision is vitally important because it is used at multiple junctures in the project. It is particularly useful when the time comes for validating which vendors have solutions that match an organization’s requirements.

When many organizations consider buying clinical automation, vendors make presentations without a real framework and pretty much focus on the strengths of their products, irrespective of a particular organization’s specific needs. By orchestrating vendor presentations to the clinicians and administrators in an organization, a CIO can ensure that a common...
Table 3. Sample IT Project Communications Plan

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Objective</th>
<th>PIN Replacement</th>
<th>Communication Plan</th>
<th>Content</th>
<th>Timing</th>
<th>Responsible Person &amp; Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership - Executive Management</td>
<td>Inform on cost/benefits, service, quality, milestone completion</td>
<td></td>
<td>Meeting/medium</td>
<td>Brief status update</td>
<td>Operations</td>
<td>Mike Waldrum / ITAG 9/26 / Mgmt Forum (email) 9/22 / OOT</td>
</tr>
<tr>
<td>Leadership - Project Steering Team</td>
<td>To keep informed, resolve issues, make decisions as needed</td>
<td></td>
<td>Schedule time PRN at weekly AED meeting</td>
<td>Inform on methodology</td>
<td>Prior to milestones</td>
<td>PMT / Decision Day 1 with &quot;retreat&quot; 10/13, 1-5pm / Decision Day 2</td>
</tr>
<tr>
<td>Leadership - Office of the CIO</td>
<td>To keep informed, resolve issues, make decisions as needed</td>
<td>Weekly Status Report</td>
<td>Accomplishments</td>
<td></td>
<td></td>
<td>Weekly / Rhonda Callander</td>
</tr>
<tr>
<td>Nursing</td>
<td>Increase awareness, engage in Design Sessions, keep informed</td>
<td></td>
<td>UAB Synopsys</td>
<td>Initial introduction to method and project</td>
<td>Ongoing during project</td>
<td>Melanie Turner / Gretchen Kemmerer / Articles delivered to SME’s 9/7</td>
</tr>
<tr>
<td>Medical Staff</td>
<td>Increase awareness, engage in Design Sessions, keep informed</td>
<td></td>
<td>UAB Synopsys</td>
<td>Initial introduction to method and project</td>
<td>SNLC - 2nd &amp; 4th Tues</td>
<td>Melanie Turner / Gretchen Kemmerer / NURSING Leadership 9/21</td>
</tr>
<tr>
<td>All employees (UAB)</td>
<td>Increase awareness, keep informed</td>
<td>Grapvine</td>
<td>Grapevine (Ambulatory)</td>
<td>Initial introduction to method and project</td>
<td></td>
<td>Melanie Turner / Gretchen Kemmerer / Mike Waldrum - Clinical Council 9/2</td>
</tr>
<tr>
<td>All employees (TKC)</td>
<td>Increase awareness, keep informed</td>
<td>Monday Mailings</td>
<td>Monday Mailings</td>
<td>Initial introduction to method and project</td>
<td></td>
<td>Melanie Turner / Gretchen Kemmerer / Nancy Donlay - Clinic Chairs 9/14</td>
</tr>
<tr>
<td>Managers</td>
<td>Increase awareness, keep informed</td>
<td></td>
<td>Senior Managers Meeting - Management Forum - Dept Directors and Nursing Managers</td>
<td>Initial introduction to method and project</td>
<td></td>
<td>Melanie Turner / Gretchen Kemmerer / Mike Waldrum - Clinical Council 9/2</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>Increase awareness, keep informed</td>
<td></td>
<td>Dept meetings</td>
<td>Initial introduction to method and project</td>
<td></td>
<td>Melanie Turner / Gretchen Kemmerer / Mike Waldrum - Clinical Council 9/2</td>
</tr>
<tr>
<td>Residents</td>
<td>Increase awareness, keep informed</td>
<td></td>
<td>House Staff Council Surgery Grand Rounds</td>
<td>Initial introduction to method and project</td>
<td></td>
<td>Melanie Turner / Gretchen Kemmerer / Mike Waldrum - Clinical Council 9/2</td>
</tr>
<tr>
<td>ALL</td>
<td>Increase awareness, keep informed</td>
<td></td>
<td><a href="https://serhs.uab.edu/horizon">https://serhs.uab.edu/horizon</a></td>
<td>Session Schedule</td>
<td>9/23 Go live / Monthly Progress updates</td>
<td>Rhonda Callander / Mike Waldrum - Clinical Council 9/2</td>
</tr>
</tbody>
</table>

For instance, UABHS provided the optimal future-state vision in Table 4 to vendors, who were instructed to follow the optimal future-state vision story as they made presentations to the UABHS clinical staff. Clinicians who participated in the vendor demonstrations had score sheets detailing each area of the optimal future-state story and were asked to grade the vendor on each item. Table 4 shows a sample score sheet for one of the optimal future-state requirements.

Vendors find this approach somewhat constraining, so it is equally important to provide time for vendors to show additional functionality that they believe complements the optimal future-state vision. This is best done by jointly planning the vendor demonstration and going through a “dress rehearsal” of sorts; vendors then can articulate on which points of the optimal future-state story they would...
like to elaborate. This helps plan enough time for the
demonstrations and also prepares the clinical audience for
these diversions into exploring complementary functionality.

Finally, a clinical audience may also find the optimal
future-state script constraining, so while it is important to
stick close to the executive steering team’s validated
requirements in the optimal future-state vision, many clini-
cians will want to see how products match up with their
particular areas of interest. Because an organization needs
their buy-in to gain adoption, it is also important to allow
time during vendor demonstrations for these diversions.

A skilled facilitator can be invaluable during vendor
validation sessions. They can allow diversions but keep
them centered on the general focus area and bring things
back “on story” when the demonstration begins to drift too
far away from the optimal future state. Ultimately, however,
having an optimal future state vision that has been validated
by the executive steering team provides a crystallizing
framework for conducting highly focused vendor validations
and demonstrations.

The limitations of this article preclude full coverage of
each step in the project management process detailed in
Figure 1. This article primarily has examined how to get
things right at the beginning of the project to prevent
failures in conceptualization. An entire book can be written
about execution and implementation of major enterprise IT
projects. As this project is implemented at UABHS over the
course of the next year or two, the authors plan to write
another article on the execution phase of the project.

### Measuring and Realizing Benefits

One additional front-end activity involves planning
activities associated with the last step of project
management, which is measuring benefits. A consistent
theme that has guided the project management team at
UABHS throughout this project is to “begin with the end
in mind.” Ultimately, enterprise IT initiatives should create
benefits that are measurable.

Ironically, there are few documented benefits realization
studies of major healthcare IT initiatives. Recently, Mike
Waldrum, UABHS’ chief operating officer, committed
dedicated resources so that healthcare IT benefits assess-
ment capabilities would be woven into the fabric of every
IT initiative.

For this project, as with the other project management
steps, the optimal future-state vision formed the basis of the
benefits realization assessment. A framework was developed
in which each major capability envisioned in the future-
state vision is presented and metrics associated with that
capability are mapped for financial outcomes, clinical
outcomes, and process outcomes. For each cell in the
matrix, the overall effect that the new envisioned capability
is expected to have is listed, along with the metric, means
of calculating the metric, and an identification of the source

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**Table 4. Sample Vendor Validation Scoresheet of Optimal Future State Functionality**

**Ambulatory Scenario—Pre Office Visit**

Ralph obtains an appointment with his UABHS physician. Ralph takes advantage of the health
information patient web portal link to successfully update his past family, medical, social history and
recent symptoms. From here he can also access patient education topics, view online account information
and post a confidential message to his physician.

<table>
<thead>
<tr>
<th>Functionality Demonstrated</th>
<th>Demo’d Y/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient ability to enter/update demographics via web portal (i.e. history, insurance,</td>
<td></td>
</tr>
<tr>
<td>medications, allergies)</td>
<td></td>
</tr>
<tr>
<td>Patient Security—user authenticated at logon</td>
<td></td>
</tr>
<tr>
<td>Patient audit trails are easy to search and review</td>
<td></td>
</tr>
<tr>
<td>Patient access to UABHS defined information and tests results</td>
<td></td>
</tr>
<tr>
<td>Patient Email capability demonstrated</td>
<td></td>
</tr>
<tr>
<td>Patient supplied data is validated, date and time stamped</td>
<td></td>
</tr>
<tr>
<td>Patient education available</td>
<td></td>
</tr>
<tr>
<td>Patient education material is customizable by UABHS</td>
<td></td>
</tr>
<tr>
<td>System allows for patient access to online account information</td>
<td></td>
</tr>
<tr>
<td>System allows the patient to request medication refills</td>
<td></td>
</tr>
<tr>
<td>System generates automatic patient health reminders</td>
<td></td>
</tr>
</tbody>
</table>
of the data used to calculate the metric.

UABHS currently is populating this benefits assessment framework to determine gaps in current data and what additional action is needed to establish a solid baseline with which to judge future benefits. For instance, an anticipated benefit might be that automated nursing documentation capabilities will save nurses time in certain steps of the nursing care process. This may require a time-motion study to establish this baseline data because this kind of data typically does not exist in current databases or reports.

Ultimately, a full “before” baseline study will be done against each optimal future-state vision or capability. Then, approximately six to nine months after the new capabilities are implemented, a full “after” assessment will be completed to compare the “before” data with the “after” data.

Because of resource constraints, few CIOs can invest in the human resources or consultant resources to accomplish post-implementation benefits realization studies or audits. As a result, stakeholders’ perceptions dominate subsequent discussions about the value of the investments in IT.

Consistently conducting benefits realization studies for each major IT initiative that a health system undertakes is an incredibly powerful tool that objectively demonstrates the value of IT initiatives to all key stakeholders, including boards of directors or trustees, CFOs, department chairs, and others.

Conclusion

While enterprise-wide IT projects are difficult in any industry, they are particularly difficult in the healthcare industry because of an operating environment in which only some of the members of the revenue-producing stream are actually employees of the organization. Standard project management processes are not likely to be as effective as project management processes that expressly focus on “getting it right” at the start of the enterprise-wide IT project, where failures in conceptualization are most likely to occur. This is best done by engaging clinical staff to build a cogent optimal future-state vision that will serve as a high-level requirements document guiding the enterprise through each step in the project. Furthermore, this vision, as validated by the executive steering team, can serve as a consistent guiding theme for all communications regarding the project, in validating vendor offerings and in performing post-implementation benefits realization studies.

About the Authors

Detlev H. Smaltz, PhD, FHMSS, CHE, is currently associate professor of health informatics at UAB and the chief technology officer at UAB Health System.

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Alan Bowen, MSHI, RN, CPHIMS, is a healthcare technology consultant with Houston-based Healthlink Inc.

Mike R. Waldrum, MD, MS is the chief operating officer and former chief information officer at UAB Health System.

References