By Kenneth Ross and Jeffrey Heyman

Navigating divergent interests in the timing of technology decisions

A major healthcare construction project offers an opportunity to dramatically change hospital operations and improve current workflow by acquiring new medical technologies. The challenge is getting timely consensus from the numerous stakeholders — those involved in planning, design and construction as well as the hospital's clinicians and administration — in order to make technology decisions effective.

On the surface, everyone involved wants a state-of-the-art building that best supports patient care with the latest medical technologies. But technology has a steep cost; one that sometimes pits the administration against the clinicians. This process can be daunting and is, in part, driven by the building timeline set forth by the architect and construction manager. Staying on schedule and keeping emotions in line — all while making very complex decisions related to technology — is no simple task; especially when the state-of-the-art in technology is a rapidly moving target.

The timelines for construction and for technology acquisition are radically different; the window for construction is typically one to three years prior to opening, whereas the technology acquisition occurs in the final nine to 12 months. That is, the shell and core is completed at least a year before the building opens. At this stage, the design requires specifications of major medical equipment, requiring clinical users to settle on some equipment needs during users meetings from the design development stage of the process. This early input works against the typical focus of technology acquisition on the latest and greatest. In fact, design decisions made more than one year before technology decisions can radically constrain the ability to acquire the newest, most desirable technologies as move-in approaches.

Project administrators face a major challenge of meeting both clinical needs and the timing set forth by the construction process. In fact, the needs of the technology and construction process do not actually align until the end user is ready to occupy the space. Skyrocketing construction costs are driving the need for increased efficiency in the technology planning process to minimize the demand for continually decreasing contingency funds. The challenge is to synthesize these divergent perspectives on technology decision timing and keep the project moving forward. Technology and the construction process can be aligned in the majority of instances, but when it cannot, the challenge becomes managing the misalignment.

The challenge is to synthesize these divergent perspectives on technology decision timing and keep the project moving forward. Technology and the construction process can be aligned in the majority of instances, but when it cannot, the challenge becomes managing the misalignment.

The roles of designers, planners and administrators

Architects have the challenge of balancing a variety of concerns, including schedule and budget concerns of the hospital administrators that hired him, as well as the downstream issues of clinical user satisfaction and the patient experience in the new building. They are possibly in the most challenging position related to technology decision-making because they are charged with meeting the continually evolving end-user technology demands while working within the constraints of the construction process. One such example of the conundrum faced by architects is if a certain space can accommodate an alternate technology choice or if doing so will require an expensive change order.

Equipment planners often find themselves in the middle of the technology debate with the architects. Pressure to keep the project on budget and to provide detailed specifications in a timely manner often conflicts with the pressures from the clinical users to provide technologies that meet their clinical needs and act in the best interest of the patient. Equipment planners — who often have the information necessary to help the architect and mechanical, electrical, plumbing engineers understand the potential impacts of future technology — may find it difficult to present technology solutions and options due to concerns for the architectural and budget impacts.

By the end of design development, the architects will need a model as the basis for design use in the construc-

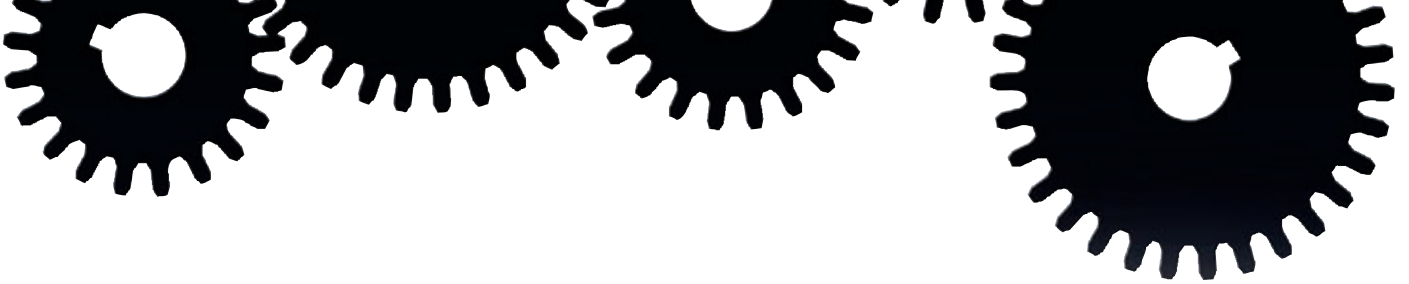
Illustrating impact of changing technology needs

Often more troublesome than choosing a model to design around is reaching consensus on the technology to design around. Consider the rapidly changing landscape of the healthcare information technology market. For a seemingly simple decision related to patient charting, there are choices that drastically affect design decisions.

The situation. Early in a project, clinical users plan to access their clinical documentation application from fixed computer alcoves in the hallways. Appropriately, the architect designs workstation alcoves throughout the care unit, with appropriate electrical and data drops. Sometime later, after construction is well underway, a hospital-wide decision is made to move charting to the point of care to allow nurses to spend more time at the bedside.

The problem. No data drops in the patient rooms. In fact, no computers or computer mounts budgeted for the rooms, and no space allotted either.

The dilemma. Pay-up to retrofit the rooms as necessary, or find an alternate solution that may not be clinically optimal. Either way, either the administrators managing the budget or the clinicians wanting the optimal clinical and operational solution aren't going to be entirely happy with the chosen solution.



tion documents. If possible, the mechanical, electrical and plumbing engineers should design spaces with maximum flexibility since technological innovations are likely to shift before the facility opens. This flexibility will come at a cost, which should be less than the cost of the change order to modify the building closer to occupancy.

The construction manager is responsible for delivering the building on-budget and on-time. The construction manager operates based upon the construction documentation, which is often issued one to three years in advance of the move-in date. As discussed above, the construction manager's need for substantial lead time is in direct contrast to the clinical users need to select specific models closer to occupancy which is driven only by manufacturing lead times. The typical lead time for a CT scanner, for example, is nine months.

The construction manager bases fees and schedules on the construction documents, which are in turn based upon particular equipment models used during design. Changes to architecturally significant models may result in changes to the building, placing the construction manager in the tough position of having to negotiate the additional funding for the change order.

Administrators — which can run the gamut from hospital administrators, hospital project managers or project executives — are typically responsible for managing the budget and timeline. Specifically related to technology decision making, this translates into the daunting task of resolving those difficult impasses that arise. Some of the toughest decisions include defining when clinical requirements outweigh the negative effect on the budget.

The clinical user's role and the impact on patients

From the perspective of the clinical user, their utmost interest in technology decisions surrounding a construction project is optimization of clinical and operational capabilities. After all, a new project represents somewhat of a clean slate — an opportunity perhaps to correct some inadequacies or inefficiencies in their current situation.

For many clinical users this will be the only opportunity to directly contribute to the design of a facility. They will be directly impacted by the technology decisions for many years. Their primary challenge is to provide enough information on their technology needs to satisfy the construction manager without sacrificing their ability to obtain the latest and greatest technologies upon move in.

The impact of technology on the project budget has never been greater than it is today. The alignment of the divergent interests will continue to be a major challenge for administrators, architects, and the clinical users. Developing a process with all of the stakeholders to manage the technology decision making process is crucial to delivering a project on budget and on schedule. In some cases, it will be known that a model can't be selected until the months just prior to occupancy. In this case, the stakeholders must design a facility with the flexibility to accommodate the selected model.

In many other cases, the impact of a model change is not architecturally significant and impacts only the equipment budget. A clearly communicated process and strong leadership from project management will help ensure that the design team, construction manager, and clinical users can remain focused on the needs of the patient and open a facility that satisfies everyone. ■

Kenneth B. Ross, senior associate with Applied Solutions Group at ECRI Institute, has more than 14 years of healthcare experience. He currently works in ECRI's consulting group and provides strategic technology and equipment planning services to hospitals nationwide. Prior to consulting, Ross ran a hospital biomedical engineering program and served as an ECRI health devices engineer. He can be reached at kross@ecri.org.

Jeffrey Heyman is a senior associate in the Applied Solutions Group of ECRI Institute. His responsibilities include assisting hospitals and health systems with strategic planning, equipment planning, technology assessment, and patient safety assessment for health technology, clinical practice, and hospital operations. Prior to consulting, he served as an ECRI Health Devices engineer. He can be reached at jheyman@ecri.org.

Administrative Maneuvers

Administrators can take a variety of postures towards managing the inevitably changing technology demands. The most common alternatives are:

- Only allow purchase of equipment that is selected during early design process.
- Allow changes so long as they have minimal or no impact on facility design by essentially treating the facility as 'existing site conditions.'
- Budget for and allow for changes in the major medical devices during the process by commissioning a building that is flexible and can accept a range of available models that includes a contingency budget for change orders due to changes in equipment selection.