CASE STUDY

Kermit Randa

using IT to drive operational efficiency in the OR

Implementing an anesthesiology information system and redesigning work flow processes helped one hospital improve its operational efficiencies and the bottom line.

AT A GLANCE

- Automating the anesthesia record in the operating room (OR) can help hospitals reduce coding staff needed and days in accounts receivable.
- Employing analytics allows OR managers to refine and streamline processes.
- Using technology to manage surgeon preference cards can help hospitals reduce costs, capture charges, and better manage surgical supplies.

Today's hospital perioperative services, which encompass all pre-, intra-, and postoperative care, constitute the economic epicenter of many hospitals, accounting for some 60 to 70 percent of the revenue of many hospitals and 35 to 40 percent of their costs. Complex and fast moving, the operating room (OR)/perioperative service area has long been rife with operational and clinician work flow inefficiencies and particular patient safety challenges. As a result, the efficiencies brought about by the use of new perioperative IT, coupled with changes in work flow, when driven by strong clinician leadership, can have a positive impact on a hospital's bottom line.

At the University of California-Irvine Medical Center (UCI), a 449-bed tertiary care hospital serving Orange County, California, clinicians analyzed levels of operational efficiency and clinician effectiveness, with an eye toward improvement. IT quickly became a driver in discussions of how to improve operations in the OR and perioperative areas.

Clinicians at UCI have implemented comprehensive IT, in phases, to improve administrative efficiencies and the quality of patient care. That implementation, combined with extensive work flow process redesign, has resulted in measurable improvements in the performance of the perioperative and anesthesiology department and has laid the groundwork to benchmark clinician work flow improvement and help to refine best practices for the department. Zeev Kain, MD, UCI's new department chairman of anesthesiology and perioperative care, and his clinical team, managed the implementation of a new perioperative and anesthesiology information system over six months. The contract was signed in April 2008, and the perioperative part of the system went live that September.

Kain, who had worked for years in paper-based care delivery environments, demanded—and obtained—a guarantee that his new hospital would implement a perioperative information system, as a condition of his accepting the anesthesia department chairmanship when he came to UCI in 2008.

Looking back at that demand, Kain says, "Overall, the way the operating room has worked has changed dramatically over the past several decades. The one thing that hasn't changed is the anesthesia record. That is still completely manual in most organizations, just as it was back in the 1950s. And that's an area of great opportunity. But automation is here to stay, and you can either use it now or use it later, but if you use it later, you'll lose money, efficiency, and opportunity along the way." Instead, he says, "I felt my best opportunity to get it was when I started at a new organization."

And that's what has happened at UCI, which went live with the anesthesia component of a broader perioperative information system in November 2008. The system implemented at UCI includes numerous other modules that have since been implemented. These include preadmission scheduling, surgery scheduling, clinical documentation for anesthesia, preoperative care, interoperative care, postoperative care, nursing documentation, an analytics module, a surgeon preference card module, a web-based scheduling and schedule-viewing application, and a resource and tracking system. Clinicians have also introduced business analytics to the overall system.

The primary challenge facing Kain and his team was to transform the perioperative and anesthesiology department to provide measurable improvements in operational efficiencies and quality-of-care improvement through the use of work flow process redesign supported by IT. The focus was to be not solely on cost reduction, but to implement an automated system that could quickly analyze perioperative processes and outcomes to guide the department in process improvement and establishing best practices.

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Although this process is still in its early stages, initial results of the effort indicate that improvements are occurring in several areas. Among the highlights:

- Use of the anesthesia module has reduced the coding staff devoted to anesthesia billing by 50 percent.
- Days in accounts receivable have been declining and are expected to be reduced by up to 50 percent.
- The number of late starts for surgery, measured in minutes, has decreased 42 percent from two years ago, while on-time surgery starts have increased from 80 to 86 percent.
- The average inpatient OR turnover time of 38 minutes for the current fiscal year is down from 52 minutes two years ago—a 30 percent improvement.
- Postsurgical time to submit a bill has gone from approximately two weeks on average to an average of under 24 hours in most cases.
- Use of the system has significantly aided UCI's anesthesia department in more effectively adhering to Medicare compliance rules for the required reporting of key clinical care elements.

Clinicians and managers at UCI have also begun to delve into the process of applying data analytics software to analyze outcomes of work flow processes and improve them.

And although it might be a stretch to say that the implementation of the anesthesia module, along

with the rest of the hospital's perioperative information system, contributed to the department's moving higher up in the National Institutes of Health's rankings of research funding for anesthesia departments nationwide (it is now ranked 26th, up from 44th previously), the department's information system implementation has certainly been a facilitator of generally improved care delivery.

All these results are significant, both clinically and operationally, say Kain and his colleagues, and clearly, the results have strong financial implications, which will become clearer as the process improvement and analysis work that the new information system has made possible move forward.

Combining Process Change and IT Facilitation

Clinician leaders at UCI say the importance of intelligently applying IT to the operational challenges of the OR cannot be overstated. Indeed, the key to understanding all these improvements, says Laura Bruzzone, RN, UCI's perioperative director, is that, "With this system, your data are readily available so you can start drilling down and understanding your operations and practices."

David Keymel, RN, manager of perioperative information systems, says, "Implementation of these systems has streamlined our ability to look at current operations, and to determine where operational efficiencies can be gained. It's relatively easy to find the low-hanging fruit that you can knock off pretty quickly when you have the data. One area we looked at is on-time surgery starts. This is an area that hospitals struggle with. We were at 80 percent of starts being on-time starts before implementation, which is good, but we have made further progress since."

What's more, Bruzzone notes, analytics can be used to determine what has happened with regard to any particular operational question, so it is possible to continually improve processes with the aim of developing more refined best practices.

In a related process, UCI's clinician leaders have been analyzing turnover time—i.e., the amount of time it takes to wrap up one surgical procedure and hand off an OR for the next scheduled procedure. As anyone who has worked in the surgical setting knows, optimizing the efficiency of the turnover process is key to the efficiency and productivity of a hospital's surgical suites. Hospitals that can make the turnover process more efficient can add to the throughput of surgical procedures on a daily and weekly basis. Conversely, of course, those with less efficient turnover processes find their throughput diminished.

"Operating rooms continually look at turnover time," says Lorrie Stone, RN, OR assistant director. "Through our analysis and work in this area, we've started to edge it down. We still have a ways to go."

With regard to the broader issue of improving OR turnover time, Stone says part of the core challenge is improving communication among the surgeons, anesthesiologists, and staff. "Because we are a teaching institution," she explains, "our cases tend to be complex and not straightforward, and residents and medical students get involved. So we spend a lot of time on education, which adds to the complexity. Automating documentation and communications cleans up the whole data flow process and improves the management of surgical equipment." Stone also says that with an automated perioperative system, nurses require less time to complete their post-surgical documentation, which improves efficiency, clinician effectiveness, and job satisfaction.

That leads to yet another aspect of changes in work flow facilitated by the IT solution implemented at UCI. Clinicians and managers there have chosen to automate surgeon preference cards, the documents that list individual surgeons' instrument and supply preferences. In many hospitals today, the preference card system remains largely manual and a major source of operational inefficiency resulting from the typical lack of standardization of surgeons' supply preferences and the time required to update the raft of preference cards to cover every procedure each surgeon performs. By going live on their

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automatic surgeon preference cards, UCI's clinicians and managers should further help to bring down average turnover time.

The Importance of Analytics

Following the implementation of each of the numerous modules within the broader perioperative information system, UCI professionals have been taking data from the system's modules and leveraging those data to improve operations by using the analytics software to perform strong data analysis.

As mentioned above, clinicians and managers have been working to improve operational efficiencies by streamlining surgical start times, surgical turnover times, and surgeon preference card system. Overlapping with the preference card system analysis is the initiation of overall purchasing analysis. Indeed, says Keymel, "When you integrate the materials management aspect into the overall process, you can start looking at finding cost savings and driving down costs from the purchasing side. That's starting to look like a benefit. And with our preference card system and rules-based analytics going live, we'll be able to look at purchasing costs and charge capture levels on a daily basis."

"We're just learning what all these data can do for us," says Bruzzone. "But there is so much in it. We can look at performance of individual surgeons and OR nurses along different dimensions, for example, or at any number of other data points. The data are extremely rich. It's just a matter of figuring out what you want to use."

Future Directions

Leaders in the surgical area at UCI are exploring the possibility of incorporating even more detailed analytic capabilities into their system, especially in the area of anesthesiology. In addition, they will be working with other departments in the medical center to integrate their data into a larger hospitalwide information system. The clinicians and managers at UCI agree that although much remains to be done, the use of a comprehensive perioperative information system, coupled with work flow redesign, can produce measurable improvements in a relatively short time frame.

For Zeev Kain, all this is to the good, and to be expected. "From my perspective," he says, "the perioperative system is far more than just a communications tool. It's about the flow of cases, billing, compliance, and instruction. It's about the entire way you run the operating room. This information has transformed not just the way the department of anesthesiology does its business, but how work is done across UCI's entire perioperative services area as well." ●

About the author

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