

OR design & construction

Bits and bytes of planning new ORs

OR nurse managers make it their business to stay on top of new technology, but even they are challenged when faced with building or remodeling a suite of ORs. Wired or wireless phones? How much imaging equipment? Can I afford a supply tracking system? There are just a few of the questions to be answered.

It's more important than ever for OR managers to make sound decisions when selecting technology. Integration of technology, including systems that manage information, should be a top priority.

"The OR has not taken advantage of automation and information systems the way it needs to," says Richard Satava, MD, FACS, a professor in the department of surgery at University of Washington, Seattle. "It's no longer blood and guts, it's bits and bytes."

Integrate with hospital systems

An easy, yet often forgotten step of integration is considering how the OR suite can tap into existing systems.

"A lot of people haven't thought through how to integrate their perioperative information system with their hospital information system," says Dr Satava.

Wireless communication is ubiquitous at the University of Washington Medical Center, says Mary Claire Cook, RN, BSN, MSW, nurse manager of perioperative services.

The hospitalwide system means her OR staff and support staff can carry wireless phones to keep in touch easily. Staff welcomed the change.

"They were begging for them [the phones] and find them quite effective," says Cook, whose facility added 11 new operating rooms in recent years.

Track your assets

Tracking assets, including disposable supplies, equipment, and even patients, is moving rapidly into the electronic age. Experts recommend investing in tracking systems such as bar coding or radio-frequency identification (RFID) technology.

Tod Moore, RCDD, principal, technology consulting for Sparling, Inc, in Seattle, Washington, describes the "context-aware" OR, which combines RFID technology with sophisticated software packages. In such an OR, instruments, medications, disposable supplies, staff, and equipment such as drills and lasers would have RFID tags. The RFID system would automatically record when each item is used or a person enters or exits the OR, making documentation easier and automating detection of potential errors. Integration with the hospital's inventory management system can allow for automatic reordering. Automation promotes just in time inventory, cutting costs.

Dr Satava applauds these efforts, saying, "We have to get nurses out of the job of ordering supplies. They have better things to do. Supplies and equipment should track themselves."

Dr Satava noted the new technology available with radio-frequency tags and bar coding to aid the counting of surgical sponges. With the RF technology, he says, "We wave a wand over the abdomen. We'll know if a sponge is there," which takes less time than reconciling a manual count. Implementing such a system takes detailed planning with staff, physicians, supply processing, and IT, but the improved patient safety and reduction in turnover time can make the investment worth the time.



Staff and patients can be tracked too. Many ORs now use electronic tracking—a system with a flat panel screen that replaces markers and white boards. These systems update when the patient changes location, for example, from the OR to the PACU.

The imaging question

“As we become more and more minimally invasive, we can see less and less,” says Dr Satava of the trend fueling the growth in image-guided surgery. This type of surgery is costly and requires extensive training and equipment maintenance. That’s why OR managers need to determine what types and number of procedures are anticipated.

“You need to have integrative systems, especially for endoscopy equipment,” Cook says. The trick is to decide how much you need and where to put it. Placing ORs near the radiology unit helps facilitate procedures involving imaging.

Increasingly, the systems needed to run imaging devices and large pieces of equipment in general are moving outside the OR into a centralized area, where technicians can access it.

“If something goes down during a procedure, the technician can work on it without entering the OR, which helps with infection control,” says Moore, who adds, “As we consolidate equipment, we need more power and more cooling.” Connectivity pathways in these rooms need to be designed to provide proper space for the systems infrastructure.

Robotic staff for the future?

Dr Satava advises OR managers to decide if they want to invest in robotic systems, such as the da Vinci system, and if so, at what level.

“It’s going, but it’s going slowly,” he says of the overall trend in this technology. He notes a robotic system is a high-ticket item, so you need “one or two champions who will use it enough to be cost-effective.”

In the future, robots may take over one job in the OR: passing instruments to surgeons. Penelope is a “pick and place” robotic device currently in clinical trials. Here’s how it works. When the surgeon calls for an instrument such as a scalpel, his or her voice activates Penelope to use its camera to locate the scalpel and pass it to the surgeon. Penelope also keeps track of what is used and “talks” to the hospital information system so supplies used can be replaced in inventory. Dr Satava envisions that these machines will help free nurses so they can focus more on patient care.

Making choices

Dr Satava emphasizes a fundamental principle for deciding on technology—the need to consider what objects or processes can be replaced with information or energy. For example, someday a plasma ion discharge may replace povidone-iodine as a skin prep, eliminating a product.

“If you don’t have to store it, you don’t need inventory,” he says. “You improve what you’re doing and get rid of a logistical challenge.”

Plasma ions may be in the future, but for now, OR managers must consider the impact of decisions on the entire OR space. Cook notes that mounting microscopes in the ceiling may save floor space but limits the use of the room. On the other hand, a section of the OR at her institution has the capability to image pathology specimens in the OR, significantly reducing the number of trips surgeons must make to the pathology department.

Another major choice is whether to go wireless. Moore says reasons to use wireless systems in health care include mobility, convenience, productivity, and added safety, but adds, “If you don’t need them, don’t buy them.” Currently, the return on investment is still often higher with a wired instead of wireless system.

“That may change as wireless becomes more common,” he says, “but in the near future wireless won’t replace wired networks, but will supplement them.”

Moore urges caution when vendors claim the OR’s existing wireless LAN can support the new software modules needed.

“It might be true, but it might not, depending on the applications and the wire-

less LAN design and performance," he says. "Consult with the appropriate IT professional before making the decision."

As a consultant himself, Moore understands that managers may be skeptical of his advice for consulting services, but says, "You need an unbiased ally. Bring people to the table to decide what you want to accomplish and have consultants help you understand what will be your best return on investment."

He also offers this advice: "Don't deploy technology for technology's sake. Analyze the business need and determine the best method or technology to achieve the result before moving forward. That will save you the most money." ♦

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On the horizon

These technological developments are in limited use or a vision of the future.

Acoustic coagulation system

The use of noninvasive, high-intensity sound waves for coagulation.

Light emitting diodes (LEDs)

OR lights are shifting to use of LEDs, which produce light that is just as intense as halogen but which are longer lasting and cooler.

Femtosecond laser

This laser, which delivers precise, ultrashort pulses, is being used in corneal surgery.

High intensity focused ultrasound (HIFU)

Focused beams allow for a small focus deep in tissues. The heat generated destroys cancerous tissue. It is being used in clinical trials for prostate cancer and may be used for breast cancer in the future.

Holomer (holographic medical electronic representation)

A three-dimensional holographic digital image of a person, obtained from a CT scan or MRI. The surgeon will be able to use the image to plan surgery and then program the image into a computer for implementation of the procedure.

Portable CT scans

These are being used in some facilities to obtain diagnostic information without having to transport the patient.

Natural orifice transluminal endoscopic surgery (NOTES)

Surgery is done across the peritoneum. Several issues remain, including the need for better instrumentation; the need to go through the colon or stomach (the vagina in women), raising the risk of infection; and data on whether the procedure is better than using a few small abdominal incisions.

Sources: Satava R M. How the future of surgery is changing. Paper and Power-Point available at <http://depts.washington.edu/biointel/>