

# ADVANCE FOR NURSES

## The OR of the Future

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By Rich Magda

One of the central components of Kaiser Permanente's Sidney R. Garfield Health Care Innovation Center is its Digital Operating Room of the Future - a universal room of standardized layout and size, designed to expand with future technologies, instrumentation and procedures.

### **Shaping the Future**

According to James Lewis, MD, who began researching the cutting-edge OR about 2 years ago, the big-picture plan was the same then as it is today: to create the safest and most efficient operating space, given current technologies and best practices. On the technology side, Lewis identified two basic drivers: technology assessment and interoperability, meaning how systems integrate and share data with each other. He then added the human factor - testing whether so-called advancements actually improve the OR experience for patients and clinicians alike.

"After a period of intense research, we set out to build a truly simulated environment would allow us to mimic the real workflows and processes of an actual OR," Lewis said. "We've created what we call an augmented virtual reality laboratory. We're now testing how people react to human-machine interfaces. Does it impede or improve workflows? Does it create safety issues or is it improving safety? We can actually start to understand how technology is going to be adopted or not adopted and what the learning curve will be, as well as how we can shorten the learning curve everyone involved."

While the digital OR is used for some direct staff training, it primarily serves as a place where clinicians, technologists, IT staff, engineers, architects, designers, and sometimes even patients, can come together and test the concepts and systems that are likely to shape the future of healthcare.

### **Looking Ahead**

The Garfield Innovation Center contains 37,000 square feet of simulated healthcare environments. An inpatient unit is mocked up as well as an outpatient clinic and a home environment. The inpatient space includes a med/surg unit, a critical care patient room, a labor and delivery room, a staff unit core area with nurse workstations, an emergency department treatment room, a family waiting room and the digital OR.

So what does the future look like?

Innovations in the OR range from a dedicated area for the circulating nurse, including OR



**THE PICTURE OF HEALTH:** The imaging technology in the digital operating room at Kaiser Permanente's Sidney R. Garfield Health Care Innovation Center not only facilitates more accurate patient information but also extends the OR to specialists virtually anywhere. *courtesy Kaiser Permanente*

communications and control systems, to an in-room status camera that improves communication between the OR patient room and the OR control desk to reduce turnover time. "I always like to paraphrase William Gibson, the sci-fi writer, who said, 'The future is already here; it's just not evenly distributed,'" Lewis said. "The OR already looks futuristic in a lot of places. Over the past 20 years, there has been a strong movement to less-invasive procedures, which improve recovery and reduce morbidity. Similarly, interventional radiology is being done without incisions. A lot of what you're going to see is much more image-dependent and image-guided, whether it is CT scans, MRIs, fluoroscopy or visible-light imaging. "Then there is the fact that ORs are becoming much more information-rich environments, particularly when you look at biomedical devices," Lewis continued. "In the past, you'd buy a ventilator, for example, and then you'd plug it into the wall and use it. Now these devices are generating data streams that can have important implications in terms of documentation and potentially even communicating data between devices so they can detect and correct problems in an automated way. There's also more information available through electronic medical records. The question is, how can we abstract that information and provide clinicians with just what they need at the point of care in a format that is useful? And, on top of that, how do you display this information so visibility is optimal for everyone in the room?"

### **Ideas in Action**

One of the most intensive projects under way to address these issues involves image management. In the first round of the project, Lewis conducted interviews with various members of the multidisciplinary team. One of the technologists commented that he never realized how complicated an OR case can be. The technologist then expressed further surprise that every time he asked, "Who does this?" referring to some aspect of the OR operation, the answer was always, "a nurse."

"We recognized right there that as we start using more complicated systems, generating more data and having more equipment in the room, we also need to engineer these systems so they can run at autopilot," Lewis said. "It was a reminder that we're there not to serve the equipment - we're there to serve the patient."

Another high-priority project is the development of a digital checklist that can be built into the electronic medical record. The digital OR team has created custom checklists for each possible procedure, providing a series of prompts and questions that are checked off from red to green as they are completed.

"One question might be whether there is blood ready in the blood bank," Lewis said. "We can click on that question and another window will pop up showing actual results from the lab showing whether blood is available. The checklist is a dashboard that brings real-time data from a variety of sources to the periop team at the point of care when they need it."

It doubles as a documentation tool, as well, and effectively flattens the clinician hierarchy, allowing all members of the periop team to see what has been done, what is being done and what needs to be done.

Lewis and the innovation team are also exploring the use of real-time location systems to track equipment, surgical assets, patients, staff and potential retained foreign objects such as sponges.

"This is all in the interest of patient safety and operational efficiency," Lewis said. "When you bring it all together, you can talk about predictive analytics, where you're using data to predict demand and workflow, therefore allowing you to model facilities, staffing models and so forth to better serve the periop environment."

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