Inside the intelligent OR: How AI is redefining surgical care

Problem: Brilliant devices, siloed systems

Today's operating rooms (ORs) are equipped with some of the most advanced medical technologies—tools that have significantly improved patient outcomes by enhancing safety and reducing recovery times. Despite these advancements, a critical challenge remains: many of these solutions, along with others deployed across the broader health system, are not interoperable.

As a result, healthcare organizations often rely on disparate, siloed solutions, leading to underutilized equipment and requiring staff to navigate multiple disconnected platforms. This fragmentation drives up administrative costs and burdens clinical staff significantly. If these integration challenges remain unaddressed, healthcare organizations risk leaving substantial operational and clinical value unrealized.

"I want a single dashboard that tells me how many ORs are running, who's staffing each one, whether the equipment is ready, whether our supplies have arrived, what cases are on the schedule, and where we're falling behind. Instead, we're jumping between five different systems, radios, phone calls, and in-person conversations to pull that together."

Dr. Jessica Feranec
Chief of Surgery, Orlando VA Medical Center

Opportunity: From standalone tools to integrated platforms

The next frontier of medical technology (MedTech) isn't about more devices—it's about interoperable ones. When systems enable bidirectional data flow, administrators can more effectively view and allocate resources, such as provider time, equipment availability, and OR utilization. Surgeons and other healthcare staff benefit as well: interoperable systems streamline workflows and enable real-time collaboration across surgical centers, ultimately improving patient outcomes. Health systems are also better positioned to respond to supply chain disruptions.

As organizations contend with critical levels of physician burnout, evolving federal regulations, increased focus on patient outcomes, and shrinking margins, the pressure to make this vision a reality is growing. At a recent DeviceTalks session in Boston, industry leaders from NVIDIA®, SoftAcuity, Infor™, and Barco® shared how they're helping healthcare providers with smarter, more connected solutions.

How to do this: What the operating room needs is intelligent solutions

What do smarter solutions and devices look like in practice? They're designed to integrate seamlessly into clinical environments, improving data accessibility and leveraging artificial intelligence (AI) to support faster, more informed decision-making. One example is NVIDIA Holoscan—an edge computing platform that enables MedTech developers to build and run real-time applications, such as computer vision, image enhancement, and procedural annotation, directly on the device during the procedure.

Another example is Barco's surgical display platform, which incorporates a voice-enabled interface known as Edge-Linked Surgical Assistant (ELSA). Surgeons can use voice commands to control video routing, display overlays, launch applications, and access real-time clinical data—all directly on the display. ELSA also integrates with platforms like NVIDIA Holoscan to present AI-generated insights during procedures. Using Infor Cloverleaf, it connects to the electronic medical record (EMR) system to surface patient-specific information when it's most relevant.

NVIDIA and Barco's platforms leverage Infor Cloverleaf to facilitate secure, bidirectional, standards-based data exchange between endpoints, including the EMR, radiology platforms, and various medical devices. Together, these technologies illustrate what's possible when real-time intelligence, connectivity, and usability converge in the OR—creating solutions that are not only innovative but also improve the lives of patients and those who deliver care.

> "Don't sell me another black box. Sell me a smart system that fits into my OR, talks to my other devices, and makes life easier for my team."
>
> **Dr. Jessica Feranec**

Benefits: Smarter technology improves the lives of patients and providers

- **Better patient outcomes**: Surgeons can overlay imaging onto live surgical views, highlight landmarks, and flag concerns in real time, improving precision and safety.
- **More collaborative care team**: Intelligent systems connect OR workflows with imaging, EMR data, and external collaborators to enhance decision-making, staffing, and real-time surgical support.
- **Simplified provider experiences**: AI doesn't replace clinical judgment—it augments it, reducing manual tasks and administrative burdens so doctors and nurses can focus on care.
- **Operational efficiency and device utilization**: Real-time data exchange between devices and systems enables smarter scheduling, faster room turnover, and proactive readiness checks.
- **Interoperability and scalability**: Smart systems integrate with existing infrastructure, meaning hospitals don't need to overhaul their tech stack to benefit.

The road ahead: Ecosystem-first thinking

Forward-thinking healthcare organizations are already planning for what's next—building connected ecosystems of devices and endpoints that support patients from pre-operation to recovery. The goal: to improve outcomes, enhance safety, and use resources more effectively. To thrive in the next era of MedTech, manufacturers must:

1. Build with others to succeed

David Niewolny from NVIDIA emphasized the importance of focusing on your organization's core competencies and understanding what your customers truly need. He advised companies to "look in the mirror" and honestly assess their core competencies and customer needs. Instead of trying to build everything in-house, organizations should identify strategic partners who excel in the capabilities they lack. This allows you to stay focused on what makes you an expert.

"Know what you're good at. And then find people who are great at the rest."

David Niewolny
Senior Director, Global Head of Business Development, NVIDIA

2. Pivot from hardware-defined to software-enabled strategies

Healthcare organizations are moving away from costly, time-consuming hardware refresh cycles. Instead of upgrading to the next "next-generation" device every few years, they are prioritizing software-based solutions that evolve continuously through updates. This shift reduces operational burden, allowing health systems to focus more energy on patient care.

3. Prioritize ease of use and workflow fit over isolated innovation

SoftAcuity's approach wasn't about redesigning the operating room, but improving the existing experience. They enhanced surgical displays by integrating an AI-powered virtual assistant that functions like a voice-enabled web browser. The assistant responds to spoken commands, enabling intuitive interaction. The takeaway: Complexity doesn't drive adoption—simplicity does.

"The best technology in the OR is the kind that disappears. It doesn't get in your way."

Bruce Kennedy
Founder and CEO, SoftAcuity

4. Look for natural ways to leverage generative AI

While considerable skepticism exists around AI in healthcare, manufacturers shouldn't shy away from it. There is a significant opportunity to use generative AI (GenAI) for manual tasks such as managing clinical documentation, automating workflows, and analyzing data, which carry relatively low regulatory risk and can drive efficiency.

5. Deliver personalized experiences

For Dr. Feranec, success means walking into an OR that knows her. The system anticipates the procedure, preloads imaging, confirms checklists, and assigns staff based on case complexity. If there's a new nurse or resident, the platform adjusts—flagging the change or tailoring teaching prompts. Equipment runs readiness checks, surfacing issues proactively. Patient-specific risks, such as a difficult airway or prior complications, are highlighted and actionable. Technology should enhance the physician experience.

Conclusion

The intelligent OR isn't just a vision; it's a strategic imperative. Healthcare organizations are no longer looking for the next standalone device. They are searching for interoperable platforms that integrate seamlessly into existing environments, reduce staff burden, and deliver real-time, actionable insights.

To succeed in the next era of MedTech, manufacturers must build connected, intuitive solutions as part of a larger ecosystem—tools that enhance collaboration, streamline workflows, and evolve alongside providers' needs. This isn't about more technology. It's about smarter, integrated technology that makes healthcare work.

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