




NXT25

Voices and verdicts

At our inaugural NXT25 event, attendees discussed and debated key drivers of change in surgery to determine our collective readiness to shape this rapidly evolving landscape through meaningful action.

Johnson & Johnson
MedTech

What might the next 25 years in surgery look like?



That's what senior healthcare leaders, expert surgeons, and technologists from across the United States discussed and debated at the NXT25 event hosted by Johnson & Johnson MedTech.

Check out the insights from the event—including areas of broad agreement and diverging opinions about what surgery will look like in 2050—highlighting both opportunities for meaningful action and challenges ahead when it comes to advancing surgical care.

NXT25: Five highlights



1

A majority of attendees agreed that AI and automation will change who is in the operating room, signaling a potential long-term shift in workforce dynamics for surgical teams.

2

Surgical decisions will likely not rely entirely on AI, according to a majority of attendees, who emphasized the irreplaceable nature of human expertise and instinct and raised the question of whether AI can ever approximate human intuition.

3

Robotic surgery may shift from universal platforms to more specialized systems tailored for specific tasks, but attendees cautioned the economic feasibility of this shift for hospitals and the importance of interoperability in an OR with many specialized robots.

4

Automation of administrative and clinical tasks could significantly reduce surgeon burnout—with NXT25 attendees cautioning that automating tasks could also create all new stressors.

5

As more surgeries are done with minimally invasive techniques over the next 25 years, NXT25 attendees cautioned that surgeons should be trained to maintain the skills needed for open surgery, indefinitely.



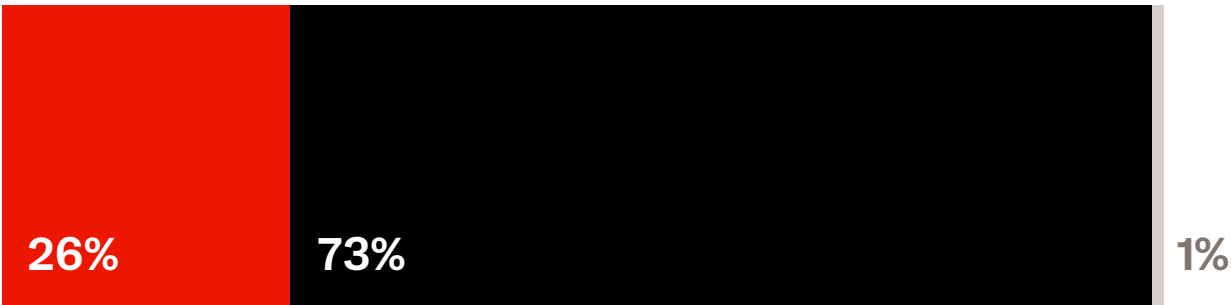
AI and Automation in the OR

The promise of technology in the OR lies in better patient outcomes, but how technology will enable those outcomes was up for debate at NXT25. With differing opinions on what the OR of 2050 will look like, one area of consensus was that integration of surgical AI will unfold in measured steps, not leaps. Trust in data and technology will guide the balance between human and AI roles, though questions remain about AI matching the intuition and judgement of seasoned surgeons.

AI and Automation in the OR

73%

of NXT25 attendees disagree that the majority of surgical decisions will not require a surgeon “in the loop”



“The best ideas and technology, if not adopted, will have very little impact. And all of that rests on trust. You aren’t going to let that robot operate on your patient unless you trust it. As digital and technology leaders, we need to provide enough assurance and information that allows us to build that trust to truly drive change.”

Lisa Stump
EVP and Chief Digital Information Officer, Dean of Information Technology at Mount Sinai Health System, Icahn School of Medicine

“We’re probably not going to wake up one day and get a Prometheus-style alien robot operating on us. It’s going to be a stepwise process. Initially we’ll probably get intraoperative navigation, and then we’ll start seeing some automatic steps in the surgery itself.”

Filippo Filicori, M.D., MIS, PD, FASMBS, FACS
System Chief, Surgical Innovation at Northwell Health and Program Director at MIS Fellowship

“

Technology in and of itself is fascinating, but that’s not the fundamental reason why we’re here. I hope that in the not-so-distant future, I’ll be talking to you about how quickly we are enabling the potential of technology to drive surgical complication rates down to zero.”

Neda Cvijetic, Ph.D.
SVP - Global Head of R&D, Robotics and Digital, MedTech at Johnson & Johnson

60%

of NXT25 attendees believe that surgical data and AI models will be treated as a public good.



“

There are going to be real advantages to having AI to help look at big data to see what algorithms for clinical care work and for which patient characterizations will drive outcomes. But the challenge is going to be, how do you recognize where there’s bias in that system? How do you pivot to care for that individual in front of you when certain data isn’t fed into the system, like social characteristics or family support?”

Gina Adrales, M.D., MPH, FACS
Chief, Ravitch Division of Minimally Invasive Surgery and Director, Minimally Invasive Surgical Training and Innovation Center at The Johns Hopkins University School of Medicine

“I’m excited to be able to harness what I call ‘actionable intelligence’ in surgery. It’s about taking the information that we get intraoperatively and utilizing it to help us with medical decision-making while we’re in the middle of taking care of a patient.”

Arnold Advincula, M.D.
Minimally invasive surgeon

92%

of NXT25 attendees believe adoption of AI and automation will change who is in the operating room.



“

There will always be some human element to surgery. There are always one or two decisions that are key judgement decisions. Can that be understood and interpreted and replicated with AI? I’m not sure. It’s possible...25 years is a long time.”

Isaac George, M.D
Thoracic surgeon



Future of Surgical Robotics

NXT25 attendees envision a future 25 years from now in which universal and specialized robotic systems will be used in hospitals and continue to progress democratized care. Robotic data is required for the next stage of AI and automation, but there's caution about idolizing data, underscoring the need for sophisticated analysis in surgical robotics. Most importantly, robotics should address needs—a genuine clinical pull, not just a tech push.

Future of Surgical Robotics

72%

of NXT25 attendees believe there will be a shift in 25 years from universal robotic surgical systems toward specialized systems for specific surgical tasks and/or procedures.



"What really determines outcomes in the operating room is judgment and skill. These are codependent such that great judgment and limited skill can have a poor outcome and vice versa. AI in robotics has the potential to impact both."

Peter Schulam, M.D., Ph.D.
Chief Scientific Officer, MedTech at Johnson & Johnson

"The ultimate value of advances in robotics is that we'll generate more datasets, and AI will allow more to be acquired. The hardware will become less relevant, and the software will make a big difference."

Isaac George, M.D.
Thoracic surgeon

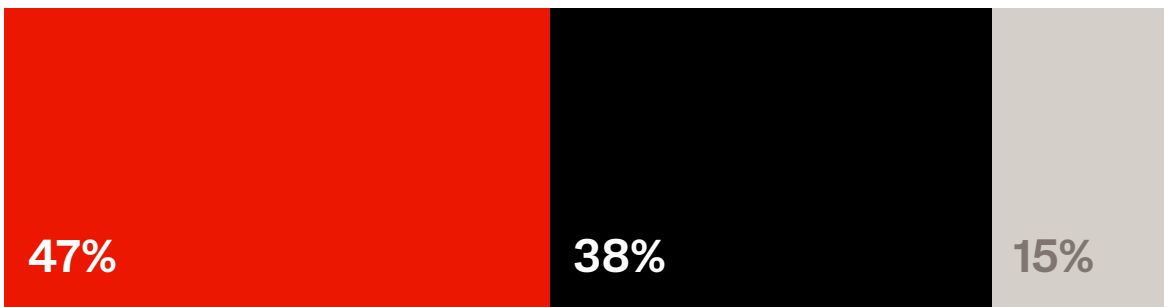
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If we say we want more and more data, we also have to be able to clean and analyze this data in very nuanced and complex ways ... there's a danger in bad data. There are some experiments that show that you can poison a robotics system by putting in 1 or 2 bad examples.”

Ken Goldberg, Ph.D.
William S. Floyd Jr. Distinguished Professor of Engineering, UC Berkeley and Chief Scientist, Ambi Robotics

47%

of NXT25 attendees believe robotic surgery's future value lies in data and software, not hardware. 38% disagree showing a split in where the value lies.



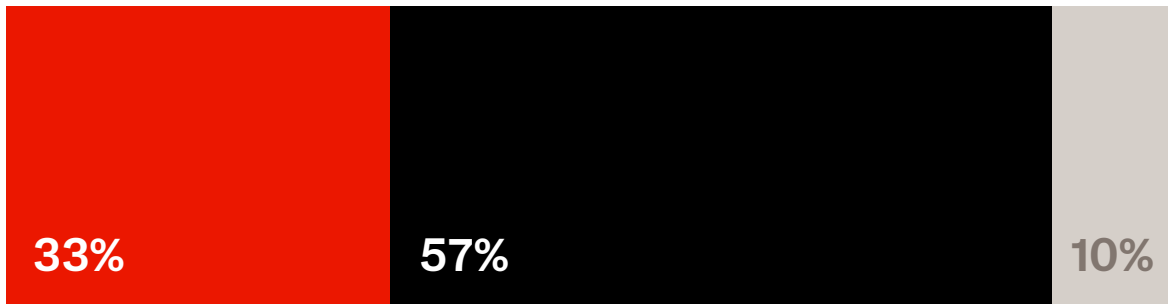
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Thus far, most innovators are trying to use robotics to emulate, and maybe amplify, what humans do. But when you think about designing truly autonomous procedures, that approach is probably a mistake. We don’t have to create technologies that emulate surgeons’ two hands. The visualization, actions and cognition for these new systems do not need to be referenced against the limitations of human operators. We now have the opportunity to create these technologies to do procedures in a completely new and different way.”

Josh Makower, M.D., MBA
Yock Family Professor of Medicine and Bioengineering,
Stanford University Schools of Medicine and Engineering

57%

of NXT25 attendees disagreed that the majority of surgical tasks will be automated in 25 years.



“When we do traditional operations using loops or headlights or laparoscopy, that greatly shortens a surgeon’s life. Whereas the robot, at least in my experience, has really enhanced ergonomics and increased longevity as a surgeon.”

Ranjan Sudan, M.D.
General surgeon

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We must solve clinical problems, not just pursue technological innovation for its own sake.”

Erik Wilson, M.D., FACS
Professor of Surgery at the University of Texas Medical School
and Director of Minimally Invasive Surgeons of Texas



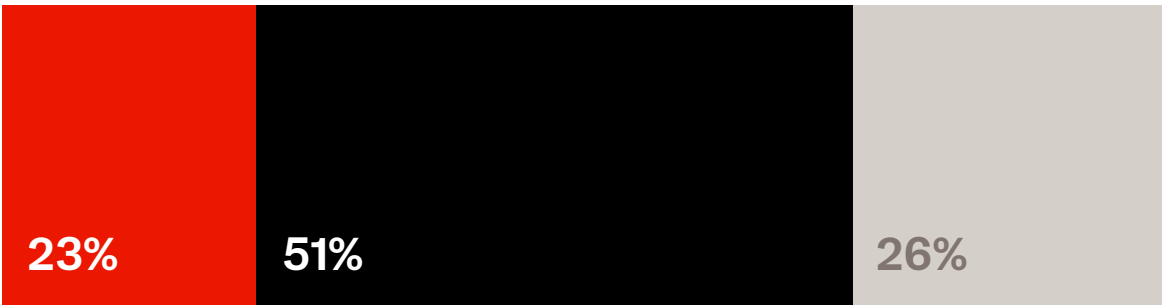
Education for the Future of Surgery

During a discussion about surgical education, NXT25 attendees called for education to balance training on new tools and tech with strengthening foundational human skills and healthy team dynamics. Surgeons also stressed the importance of core clinical skills in an AI-informed OR. In other words: it's critical to foster digital literacy while ensuring that empathy, communication, and patient management remain central to surgical practice.

Education for the Future of Surgery

51%

of NXT25 attendees disagree that surgical education will emphasize clinical decision making over technical skills



“Surgical teams are evolving beyond the operating room. We’re building networks that include data scientists, engineers, and patient advocates.”

Africa Wallace, M.D.
Global Vice President of Medical Affairs, Surgery, MedTech at Johnson & Johnson

“From when I trained decades ago to now, my medical school has already changed. We’re not just teaching techniques anymore; we’re preparing teams to think critically, with technology as a partner. We can’t be totally reliant on AI.”

Gina Adrales, M.D., MPH, FACS
Chief, Ravitch Division of Minimally Invasive Surgery and Director, Minimally Invasive Surgical Training and Innovation Center at The Johns Hopkins University School of Medicine

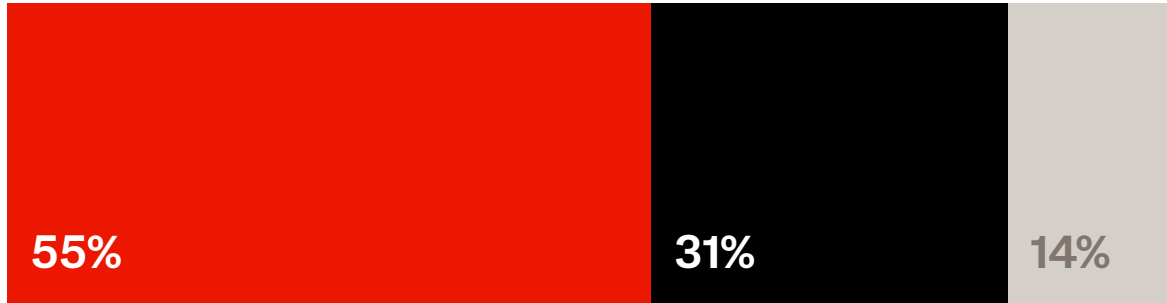
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AI is not going to replace the surgeon. The surgeon with AI is going to replace the surgeon without AI. And I think that's the reality of how we need to embrace the idea of AI as one of the key members of that team. And if we embrace that reality, then we're actually going to move somewhere.”

Rasu B. Shrestha, M.D., MBA
Enterprise EVP and Chief Innovation and Commercialization Officer for Advocate Health

55%

of NXT25 attendees believe that surgical education will maintain the skills needed for open surgery, indefinitely.



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Clinical decision-making will always remain important. But there’s potential for clinical decision-making support. For example, what may look in the textbook as the right procedure for a certain patient may actually be a terrible procedure for them, based on what their social support is, where they live and their access to care. Those are things that computers and AI could help solve for in the future.”

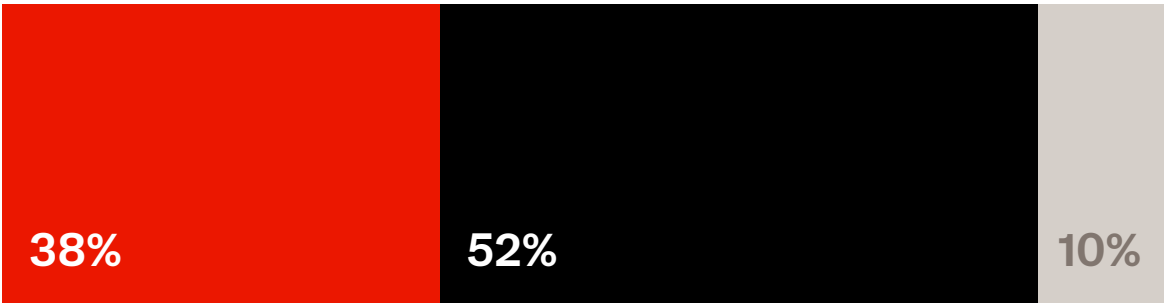
Bruce Gelb, M.D.
Transplant surgeon

“Clearly, you’ll always need open surgery. Absolutely. But does everyone need to know how to do highly technical, advanced open surgery? The answer is no. Complex cases should go to someone who’s an expert in open surgery, not someone who does mainly robotics and occasional open surgery.”

Audience member

52%

of NXT25 attendees do not believe surgeons will be educated and trained as proceduralists.



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The future belongs to those who keep learning and support each other’s growth.”

David Wyatt, Ph.D., RN, NEA-BC, CNOR, FAORN, FAAN
Chief Executive Officer and Executive Director at AORN



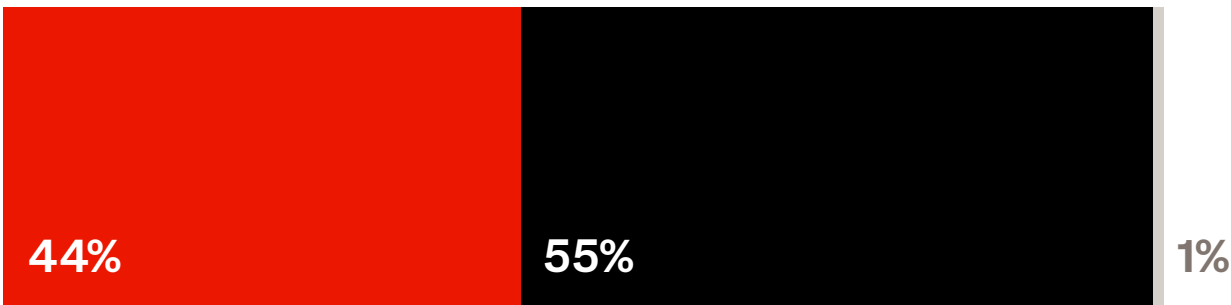
The Human Experience

Surgery is a deeply human endeavor shaped by the experiences, challenges and instincts of the people who practice it. Of particular concern is surgeon burnout, a common experience leading some in surgery to consider leaving the field and raising questions of how healthcare continues to attract surgical talent in the face of projected physician shortages. As ORs evolve over the next 25 years, leaders in the field are asking: “How can we better support the well-being of those who heal, and ensure that patient care remains at the center of everything we do?”

The Human Experience

55%

of NXT25 attendees disagree that fewer people will enter the field of surgery as a result of ongoing burnout.



“I’m a doctor, but I’m also a patient, and from both of those perspectives I want this problem to be solved. Psychological safety is a really important part of having teams function properly. Being able to raise these topics is extremely important, especially for those of us who mentor young medical students who are considering becoming surgeons.”

Sonia Ramamoorthy, M.D., MBA, FACS, FASCRS
Chief of the Division of Colon and Rectal Surgery at UCSD Health's Moore's Cancer Center

“

Burnout is an experience defect—not a weakness of people. It’s a design problem. We need to be intentional, stay focused, design around humans, and think at the system level. We must protect our field and critically important specialties, and push for change now.”

Matthew Higham
Global Partner, IDEO

76%

of NXT25 attendees believe that automation of administrative and clinical tasks will significantly reduce surgeon burnout.



The Human Experience

“

When we think about burnout, we're really thinking about how are we be able to care for our patients to the best of our ability? And how can we do that when we aren't taking care of ourselves? The more vocal we are as doctors, and we are starting to become more vocal about these issues, the more we allow people to help us, and we bring awareness to the issue.”

Angela Chaudhari, M.D.

Professor & Vice Chair of Faculty Affairs in the Department of Obstetrics and Gynecology at Northwestern Medicine

“I think we as physicians never say we can't handle something. And, frankly, I think that gets taken advantage of. How do you help someone admit they can't handle something? Well, at my institution, we recently started a peer support program for exactly this reason”

Zane Hammoud, M.D.

Thoracic surgeon

“

I don't have burnout from doing surgery. Taking care of patients is why I do what I do. I have fatigue from everything surrounding surgery that doesn't allow me to do my job.”

John Tann, M.D.

Bariatric surgeon



Look out soon for deeper insights into each topic area and the discussions that happened at NXT25.

