

OUR INNOVATION IMPACT

Transforming Patient Care With Robotics and Digital Solutions

Johnson & Johnson

MEDTECH



Johnson & Johnson (J&J) MedTech is building a digital surgery ecosystem to provide deep insights to surgeons and healthcare systems, with the goal of making medical intervention smarter, safer, and more personalized. This end-to-end digital ecosystem will bring together the power of next-generation robotics, world-class instrumentation, advanced imaging and visualization, data and analytics, and artificial intelligence (AI) and machine learning (ML). We believe that this will lead to better patient outcomes at a more affordable cost.

We made a number of significant advances in 2021 to make this vision a reality, including:

- Achieving a significant milestone with our **MONARCH® Platform** by impacting the lives of more than 7,000 patients in 2021 alone.¹ MONARCH is a first-of-its-kind robotic technology that enables physicians to access and navigate to lung nodules with greater precision than ever before. Given its minimally invasive nature, physicians can reach distal parts of the lungs that were previously inaccessible, enabling physicians to diagnose and intervene earlier.^{2,3} We've expanded MONARCH for use in urology, and continue to explore the potential of MONARCH to expand beyond diagnosis into treatment for lung disease.

“We want to shape a future where medical intervention is smarter, less invasive, and more personalized for patients so they can have more confidence in their procedures and recovery. We believe that through our connected, digital ecosystem, we will be able to meet surgeons where they are in their workflow and offer them novel capabilities and insights to help them provide the best possible outcomes for their patients.”

Hani Abouhalka, Company Group
Chairman, Robotics and Digital Solutions,
Johnson & Johnson MedTech

- Launching our **VELYS™ Robotic-Assisted Solution**, a table mounted system that helps to reduce the complexities of previous robotics and simplifies knee replacement surgery, representing the next chapter in how surgeons plan, execute and perform total knee replacement surgery.⁴ This expansion is part of our **VELYS™ Digital Surgery Platform** that provides tools and technologies for a more personalized orthopaedic patient care experience, greater insights for real-time decision making for surgeons, and greater precision during surgery. We are continuing to build upon our digital solutions in orthopaedics, including the potential for additional robotic solutions, smart sensing technology, and the expansion of patient- and customer-facing tools to assist with surgery effectiveness and efficiency.
- Advancing development of **OTTAVA™**, our general surgery robotics offering which we believe has the potential to revolutionize surgery.
- Expanding our **Surgical Process Institute (SPI)** to the U.S. SPI leverages our deep clinical expertise to create digital technologies designed to transform the surgical experience and enable surgeons to choreograph their operating room (OR), guiding the entire care team through each surgery. By supporting care teams to operate in a more synchronized way, we aim to help surgeons and hospitals deliver consistent, high quality of care and efficiency in their OR.
- Creating an internal **Office of Digital Innovation (ODI)** to help J&J MedTech become a more integrated and digitally powered company. ODI is focused on enabling a digital surgery ecosystem with a unified platform to drive innovation and cross-enterprise digital partnership; offering standardized solutions and operations to increase organizational efficiency and reduce outcome variability; and engaging in strategic partnerships to enable and empower our digital architecture. In 2021, we stood up this organization and built a foundation of leadership, governance, and process to promote greater alignment across our business, with the ultimate goal of better enabling advancements in technologies such as robotics, digital solutions, advanced imaging, supply chain solutions, market access solutions, and 3D printing.

Improving the orthopaedic care continuum

With our **VELYS™ Digital Surgery** system, we are building a platform of connected technologies, powered by data insights and designed to elevate the orthopaedic experience for patients, surgeons, and their care teams—before, during, and after surgery.

- **Preoperatively**, the **VELYS™ Patient Path** mobile app helps connect patients and their care teams to prepare for surgery, with education and action plans.
- **For surgical planning**, and through partnerships with innovative digital companies, we are developing cost effective imaging technologies designed to avoid expensive computed tomography scans, while providing an automated pre-op surgical plan.
- **Intraoperatively**, we have robotics and advanced navigation solutions that enable surgeons to improve precision and reproducibility of the procedure. In the future, we envision a fully connected OR that will enable seamless information sharing and communication.
- **Postoperatively**, with **VELYS™ Patient Path**, we are working on integrating solutions such as sensors for post-operative patient monitoring and rehabilitation.

“We believe the transformative promise of digital surgery lies in capturing the learnings surgeons have gained from performing countless procedures and transferring that knowledge through data analytics and insights into technologies. Those technologies can be used across the continuum of care for more informed decision making and better connectivity with the patient pre- and post-operatively.”

Sharrolyn Josse, Worldwide President, VELYS™ Digital Surgery & Capital, DePuy Synthes

Along each step of this journey, our goal is to use the robust and secure connectivity between our products, hospitals, and the cloud. By aggregating and analyzing data, we can help each system learn, predict, and inform clinical actions, allowing for insight-driven decisions that reduce variability and produce better outcomes, advance skills, improve workflow, and enhance surgical decision making for a better overall experience. For patients, it represents an exciting step towards creating a connected patient journey before, during, and after a procedure, with the potential to improve both patient and economic outcomes.

Bringing AI and ML into the OR



The greatest asset within any clinical setting is the expertise of the HCPs providing patient care. The ability to glean collective experience and insight from ORs throughout the world would make a powerful addition to any surgical teams' arsenal of knowledge and expertise. That's why we're designing and developing digital solutions to improve OR efficiency, enhance surgical skills and decision making, and help patients navigate their healthcare journey.

In 2021, we:

- **Continued to scale our C-SATS® platform**, a cloud-based ecosystem of knowledge for surgeons that connects the operating room to the cloud where best practices and surgical techniques are gathered and analyzed. The platform represents insights from a network of more than 375 board-certified surgical experts and more than 18,000 videos to date.⁵
- **Launched AI-powered software for use with our TruDi™ Navigation System** that is designed for ear, nose and throat (ENT) surgeons to deliver real-time 3D guidance, anatomical mapping, and surgical insights throughout ENT procedures. The AI-powered software simplifies surgical planning and provides real-time feedback during ENT navigation procedures. More than 30 million adults in the U.S. are diagnosed with sinusitis each year,⁶ and at least 20% require sinus surgery.⁷ For those who do require surgery, this first-of-its-kind technology represents a major leap forward by helping surgeons avoid unintended consequences and expanding access to safe, minimally invasive, long-term solutions.
- **Launched our AITA™ Suture Management Kiosk**, designed to be a smart, fully automated product storage and staging system that can deliver actionable insights to inform more efficient hospital decisions and minimize waste and redundancy.

Collaborating to power the Internet-of-Things in the OR

Our innovative medical technology exists across an ecosystem that includes next generation robotics, world-class instrumentation, advanced imaging and visualization, data and analytics, AI, ML, and digital solutions. To mobilize the potential of these assets and make a clinical difference for patients, it is imperative to establish robust connectivity with, and between, all elements of the ecosystem with a seamless, interconnected network that meets surgeons where they are in their workflow and patients where they are in their healthcare journey.

In early 2022, we announced a strategic partnership with Microsoft to further enable and expand our secure and compliant digital surgery ecosystem, with the aim to deliver synchronized digital offerings across the healthcare continuum. By harnessing the power of the Microsoft Cloud, we aspire to deliver a best-in-class, unified platform across our innovative surgical technologies and increase the pace of digital innovation and transformation as we continue to build out our Internet of Things connectivity.

For surgeons, this platform promises to advance skills, improve workflow, and enhance surgical decision making for a better overall experience. For patients, it represents an exciting step towards creating a connected patient journey before, during, and after a procedure, with the potential to improve both patient and economic outcomes.

“Collaborating with Microsoft will help take our digital approach to the next level as we create a best-in-class, unified platform across our innovative surgical technologies. It brings together our collective expertise and is an exciting step towards creating a connected patient journey across the entire care continuum, before, during, and after a procedure.”

Larry Jones, Group CIO and Global Vice President, Johnson & Johnson MedTech



The Lung Cancer Initiative at Johnson & Johnson

Lung cancer is the leading cause of cancer deaths globally and often detected too late, with more than half of cases metastasizing by the time they are first diagnosed.^{8,9}

With patients at the heart of everything we do, the [Lung Cancer Initiative \(LCI\) at Johnson & Johnson](#) (J&J) was formed in 2018. The LCI takes a multidisciplinary approach in bringing together the unparalleled expertise, technology, scale and reach across J&J's Pharmaceutical, MedTech, and Consumer Health sectors, and collaborates with other companies and academic institutions with the aim to prevent, intercept, and treat the deadliest form of cancer.

Key accomplishments in 2021 include:

- Advanced MONARCH[®] as a leading robotic endoluminal diagnostic and treatment platform in lung
- Progressed programs for intratumoral drug and energy therapy in lung cancer

The LCI is a research and development engine that unites the depth and breadth of J&J's expertise to advance science from every angle to create and deliver transformative innovation. By taking a holistic approach to lung cancer, targeting the root causes of the disease, the LCI is working to help enable earlier and more effective intervention.

“We’re collaborating with leading clinicians across a number of disciplines, including Interventional Pulmonology, Medical Oncology, Thoracic Surgery, and Interventional Radiology, to address the greatest needs in lung cancer. With the integration of expertise in engineering, pharmaceutical and data sciences across J&J, we are making significant progress in unlocking breakthrough innovations to change the trajectory of this devastating disease and help improve the lives of millions of people.”

Avi Spira, MD, MSC, Global Head, Lung Cancer Initiative at Johnson & Johnson

Employee Spotlight

“My mission is to help fight against the diseases that try to take the most from us. Lung cancer kills more people every year than any other cancer—our goal is, to the best of our abilities, to fight against lung cancer. Our group has been focused on being able to locate malignancies, help improve diagnostic yield to help improve different therapies, and look at new therapies to apply.”

**Chad Eckert, Senior Principal Engineer,
Engineering Sciences, Lung Cancer Initiative
at Johnson & Johnson**

Learn more about the people who are driving innovation at J&J MedTech: <https://www.jnjmedtech.com/drivers-of-innovation>

This is part of the Johnson & Johnson MedTech series, “Advancing Health, Improving Lives.” To view more information on how J&J MedTech is driving Innovation, Health Outcomes, and Social Impact, visit www.jnjmedtech.com/impact.

References

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Cautions Concerning Forward-Looking Statements

This document contains “forward-looking statements” as defined in the Private Securities Litigation Reform Act of 1995. The reader is cautioned not to rely on these forward-looking statements. Our “Cautionary Note Regarding Forward-Looking Statements” and “Risk Factors” can be found in *Johnson & Johnson Annual Reports* at jnj.com/about-jnj/annual-reports. Neither the Johnson & Johnson MedTech Companies nor Johnson & Johnson undertakes to update any information in this document as a result of new information or future events or developments. Information on annual “Environmental, Social and Governance Disclosures” can be found in the *Johnson & Johnson Health for Humanity Report* at healthforhumanityreport.jnj.com.