Dartmouth Health

Heart and Vascular Center

Cardiovascular Compendium

A Comprehensive Review of Heart and Vascular Innovations

What's inside

Dartmouth Health's Heart and Vascular Center is grounded in its deep relationships with the Geisel School of Medicine at Dartmouth. As a distinguished leader in clinical trials and advanced medical science, Dartmouth Hitchcock Medical Center is the #1 ranked hospital in New Hampshire, according to *U.S. News & World Report*, and is nationally recognized for its innovative approach to academic research and clinical care.

Dartmouth Health | Dartmouth Geisel School of Medicine

Heart and Vascular Center

Dear Colleagues,

Please join me in celebrating our Dartmouth Health best-in-class heart and vascular care. While cardiovascular disease remains the leading cause of death and disability in the United States, heart and vascular care is experiencing incredible growth and innovation. We at Dartmouth Health are at the forefront of making these new discoveries that have a direct impact on our patients' health and quality of life. While these advances are important, it is equally important that we try to care for patients as close to home as possible.

In this issue of the Cardiovascular Compendium, we outline an array of state-of-the-art cardiovascular imaging technologies that are now available throughout our clinical group practices in Nashua, Manchester, and Concord. We also discuss that, should a patient require the advanced multidisciplinary heart and vascular care provided at Dartmouth Hitchcock Medical Center, patients can be assured that this will happen in a seamless manner and that their postoperative and follow-up care can usually be performed in the communities where they live.

Additional highlights include the use of a novel minimally invasive interventional procedure to improve blood pressure control in patients with difficult-to-control hypertension. This procedure, which Dartmouth Health was the first to perform in New Hampshire or Vermont, will likely become an important future tool in the care of patients with difficult-to-control hypertension. We also discuss the development of our robotic mitral valve repair program that allows patients to undergo cardiac surgical repair of the mitral valve in a minimally invasive manner without the need for a median sternotomy. And, lastly, learn how we are using artificial intelligence technology to predict and reduce the length of stay in patients hospitalized with congestive heart failure.

At Dartmouth Health, we understand the importance of the trust that patients, families and providers place in us. We are committed to offering a patient-centered experience in which patients and families can trust that they will receive access to the best cardiovascular care within the region. This trust is, in fact, a pact between the patient and our healthcare system to continue to care for them throughout their lives. While we remain at the forefront of innovation and complex cardiovascular disease management, we do this one patient at a time..

Sincerely,

Richard J. Powell, MD
Director, Heart and Vascular Center
Dartmouth Hitchcock Medical Center
Professor of Surgery and Radiology
Geisel School of Medicine at Dartmouth

One the cover: Kalyan Ghanta, MD

Renal Denervation: A New Option for Refractory High Blood Pressure

Dartmouth Health now offers a minimally invasive interventional cardiology treatment for hypertension—taking a team approach to long-term blood pressure control

In January 2025, Dartmouth Health's Heart and Vascular Center at Dartmouth Hitchcock Medical Center began offering renal denervation, a new, minimally invasive procedure for treating high blood pressure that has not responded to medication or lifestyle changes.

"We know that untreated high blood pressure comes with a significant risk of stroke, heart disease, and kidney disease—but for some people, medications cause side effects, or the combination of medication and lifestyle changes isn't enough to provide adequate control," said interventional cardiologist James DeVries, MD.

During the procedure, an interventional cardiologist inserts a catheter into a blood vessel in the leg and uses radiofrequency or ultrasound energy to destroy overactive nerves surrounding the renal arteries. This prevents the transmission of nerve signals to the brain that raise blood pressure.

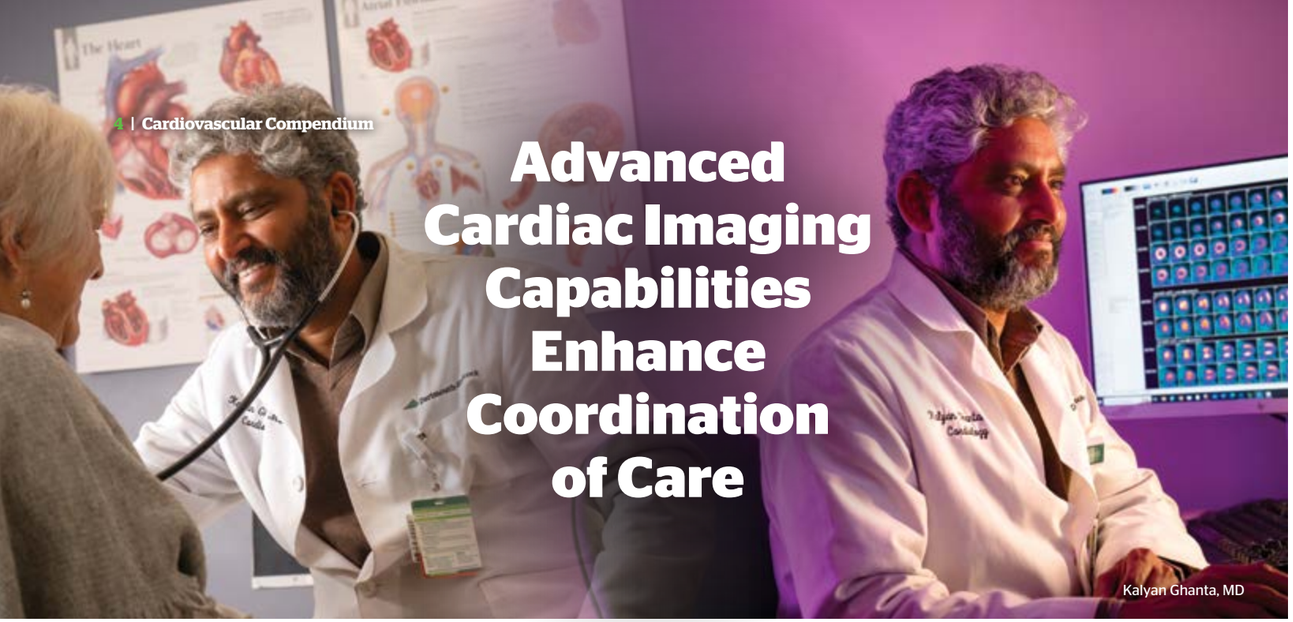
"Before renal denervation, there weren't a lot of options for people with difficult-to-control high blood pressure," said Dr. DeVries. "We take a team approach with our interventional cardiology, nephrology and vascular surgery experts to select the patients who will benefit most from renal denervation."

According to Dr. DeVries, research shows that even a minimal drop in blood pressure has a dramatic effect on cardiac risk. So far, the team has seen a high treatment response rate, with most patients successfully reducing their medications.

However, because renal denervation is a new procedure that only recently received FDA approval, it isn't always covered by insurance. To connect more patients with this potentially life-saving treatment option, Dartmouth Health has been selected to participate in the SPYRAL AFFIRM clinical trial—providing an additional treatment pathway for patients who could benefit from renal denervation, but don't have insurance coverage for the procedure.

"Having both the commercial and clinical trial treatment avenues is unique to our center, and we're proud to be able to offer the full range of treatment options to our patients," said Dr. DeVries.

> "We take a team approach with our interventional cardiology, nephrology and vascular surgery experts to select the patients who will benefit most from renal denervation" **-James DeVries, MD**



Advanced Cardiac Imaging Capabilities Enhance Coordination of Care

Kalyan Ghanta, MD

Dartmouth Health is now offering cardiac PET and will soon offer cardiac CT in southern New Hampshire, creating a new referral option for primary care providers and patients.

As part of Dartmouth Health's expansion of cardiovascular services to southern New Hampshire, residents of Concord, Manchester, Nashua, and surrounding communities now have access to advanced cardiac PET imaging services to diagnose coronary artery disease (CAD).

"Cardiac PET is a special nuclear stress test that uses a radioactive tracer to show blood flow through the coronary arteries at rest and under stress," said Dartmouth Health cardiologist Kalyan Ghanta, MD. "After taking a series of images, we administer a medication and take another series of images to assess for significant blocked arteries in the heart."

Apart from the ability to diagnose blocked arteries that supply blood to the heart, cardiac PET stress test is also used to diagnose microvascular disease, which occurs when smaller blood vessels become blocked.

"Until recently, we weren't able to diagnose microvascular disease because a regular angiogram wouldn't allow us to see blockages in small blood vessels," said Dr. Ghanta. "With cardiac PET, we identify circulation problems in the smaller blood vessels, diagnose the cause of chest pain, shortness of breath, and other symptoms, and treat microvascular disease effectively."

> **In addition to the convenience of having their testing done closer to home, patients now have access to improved coordination of care. If a patient is diagnosed with a condition requiring more advanced treatment, they can be treated by our experts at Dartmouth Hitchcock Medical Center in Lebanon—without needing care outside the Dartmouth Health network."**
> –Dr. Ghanta

Another advantage of cardiac PET is that it can be done in patients who cannot exercise on a treadmill as there is no exercise involved. When compared to other modalities of stress testing, this new technology is also much more accurate in obese patients whose BMI is 35 or above.

In addition to its cardiac PET capabilities, the team will soon begin using cardiac CT to noninvasively diagnose CAD and perform coronary calcium scoring.

"Coronary calcium scoring is a low radiation dose, low-cost, low-risk, non-contrast, noninvasive test to assess calcium buildup in the coronary arteries," said Dr. Ghanta. "The test provides a score that can predict heart attack risk in the future and is a useful tool to guide preventive strategies, especially for younger people with heart disease risk factors, such as a strong family history of premature heart attacks in young family members."

With advanced cardiac imaging now available in southern New Hampshire, Dr. Ghanta said Dartmouth Health referring providers can send patients for streamlined, comprehensive care within the same health system.

New Electrophysiology Device Clinic Serves Southern NH Residents

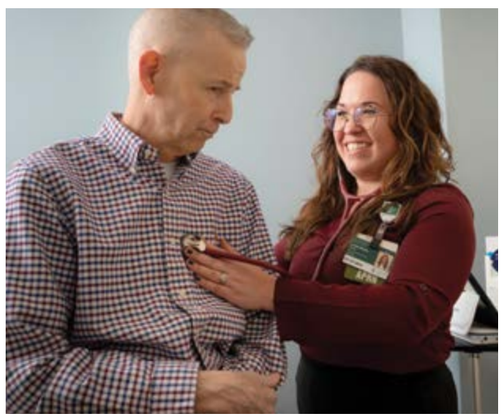
> **Right now, we're seeing more than 100 patients a month, with room for additional expansion."**

Patients in Concord, Manchester, and Nashua who need a pacemaker, defibrillator, or loop monitor can now access pre- and post-surgical care and ongoing follow-up close to home

For people with devices to manage heart rhythm disorders, ongoing monitoring is essential to high-quality electrophysiology (EP) care.

However, traveling from southern New Hampshire to Dartmouth Hitchcock Medical Center in Lebanon, NH, for EP care can present a challenge for many patients. In good weather, the round-trip commute takes more than two hours, and in winter conditions, it can quickly become treacherous and take even longer.

To address these concerns, the Heart and Vascular Center at Dartmouth Health's Dartmouth Hitchcock Medical Center opened an Electrophysiology Device Clinic in Manchester, NH, in September 2024. The clinic serves the Concord, Manchester, and Nashua communities and allows patients to receive convenient care from Dartmouth Health electrophysiologists closer to home.



Caitlin Booze, APRN, at Dartmouth Hitchcock Clinics Manchester with patient Stephen Pratte.

"Right now, we're seeing more than 100 patients a month, with room for additional expansion," said Caitlin Booze, MSN, APRN, FNP-BC, Manchester Device Clinic Coordinator. "We have two physicians from the Lebanon campus—Dr. [Kevin] Kwaku and Dr. [Robert] D'Angelo—who see patients in-person at the Manchester clinic and monitor patients remotely."

Although patients who need electrophysiology devices—including pacemakers, defibrillators, or loop monitors—still need to travel to Dartmouth Hitchcock Medical Center for their device placement procedure, they can now receive all their pre- and post-surgical care, as well as ongoing annual or semi-annual follow-up, in the Manchester clinic.

"All devices can transmit data and send alerts directly to our team, so we can catch abnormal heart rhythms before they cause a heart attack or identify extra fluid in the body that could indicate a heart failure exacerbation," said Booze. "When we can identify and treat these conditions early, we can reduce hospital readmissions and patient events."

As the clinic prepares to celebrate its six-month anniversary, Booze said patients are grateful for the care and convenience.

"We're proud to bring device care to this region of the state and provide residents of southern New Hampshire with access to our Lebanon-based EPs—so our patients don't have to commute to get the expert treatment they need," said Booze.

Expanded Vascular Services Now Available at SVMC

Dartmouth Health's Heart and Vascular Center at Dartmouth Hitchcock Medical Center (DHMC) is expanding services to the cardiology department at Dartmouth Health's Southwestern Vermont Medical Center (SVMC) in Bennington, VT. This expansion will allow patients to stay closer to home for consultations, relevant testing, and follow-up care.

Matthew J. Alef, MD.

Starting Wednesday, February 12, DHMC vascular surgeons Matthew J. Alef, MD, and Philip P. Goodney, MD, MS, will see patients in the SVMC cardiology office two times a month and perform procedures on the second Wednesday of each month. There are plans to expand this access further in the future.

"Our collaboration with the Heart and Vascular Center will be extremely beneficial for patients," said Scott W. Rogge, MD, SVMC Cardiology Medical Director. "This expansion of services is both exciting and essential for keeping patients closer to home, offering greater convenience and contributing to improved outcomes."

Under the new program, Drs. Alef and Goodney will perform procedures like vein ligation, phlebectomy, and ablation at SVMC, with more complex procedures offered at DHMC's Lebanon campus.

"We are very excited to see patients in Bennington at SVMC," said Dr. Goodney, Section Chief of Vascular Surgery at Dartmouth Health. "Patients with vascular disease often have difficulty traveling, and expanding our services locally will be an important next step. We look forward to providing vein care in Bennington, and also seeing patients for dialysis access, treatment for leg artery blockages, carotid artery blockages, and abdominal aortic aneurysms. We are pleased to continue to build our outreach pathways to include on-site services in Bennington."

> **"Patients with vascular disease often have difficulty traveling, and expanding our services locally will be an important next step."**
>
> –Philip P. Goodney, MD, MS

Trey Dobson, MD, SVMC's Chief Medical Officer and Vice President of Clinical Services, said the vascular collaboration is a benefit of being part of the Dartmouth Health system.

"Bringing the expertise of these accomplished vascular surgeons to SVMC helps us meet an important need in our small community hospital," said Dobson. "Our skilled team at SVMC cardiology will work closely with the DHMC team to provide the highest quality of care, and we hope to grow this program in the future."

Physician referrals for vascular services are now being accepted by calling SVMC Cardiology at (802) 442-0800. Learn more at svmc.org.

Robotic Cardiac Surgery Promotes 'Game-Changing' Patient Care

Dartmouth Health to become the only health system in the region to offer minimally invasive robotic mitral valve procedures that reduce risks and recovery time

Robotic cardiac surgery is an advancing minimally invasive technique that allows cardiac surgeons to perform what were once considered major surgical procedures through small incisions—without the need for sternotomies, the associated surgical risks, and lengthy recovery times.

At Dartmouth Health, Henry J. Tannous, MD, Section Chief of Cardiac Surgery, and his team will begin using the hospital's da Vinci robotic technology to perform mitral valve repair and replacement procedures.

With Dartmouth Health soon to become the only center in northern New England to offer robotic cardiac surgery, patients will no longer have to travel to Boston or New York to access this innovative surgical technique.

"In more than 95 percent of cases, we can repair the mitral valve," said Dr. Tannous, "and very soon we will be able to perform these procedures robotically through small incisions. Our patients don't have to travel far from home to get this level of care."

According to Dr. Tannous, these small incisions—combined with the robotic surgical system's enhanced visibility and precision—enable surgeons to provide the same level of care as they would using traditional cardiac surgery techniques, but in a less invasive way.

"The robotic surgical system has four robotic arms—one to hold the camera, and three that hold the surgical instruments," said Dr. Tannous. "This effectively gives surgeons a third hand, and the added dexterity allows us to be more precise with our movements. The 10× magnification also gives us a better view from the surgical console compared to surgical loupes."

With Dartmouth Health soon to become the only center in northern New England to offer robotic mitral valve surgery, local patients will no longer have to travel to Boston or New York to access this innovative surgical technique.

Dr. Tannous also said that most people who need isolated mitral valve replacement are candidates for robotic surgery. However, if other procedures—such as bypass surgery, multiple valve replacements, or aneurysm treatment—need to be performed at the same time, traditional open surgery is still the recommended approach.

As the robotic cardiac surgery program grows, Dr. Tannous said the team plans to conduct registry-based research on their surgical outcomes—to validate their approach and find new ways to leverage robotic technology in cardiac surgery.

"Robotic cardiac surgery will be game-changing for our program and our patients," said Dr. Tannous. "When patients come to Dartmouth, they can have the peace of mind that they are getting world-class collaborative care, and have access to all available treatment options—including robotic cardiac surgery."

Henry J. Tannous, MD, Section Chief of Cardiac Surgery

A Heart Way of Life: Susan's Way Forward

Nursing is a calling that comes from the heart.

This belief is fully embraced by Susan Martellotto Januszewski of Claremont, New Hampshire, who has devoted most of her life to nursing. Throughout her 47-year career and counting, she always puts patients' needs first, treating them "as if they were my family," she said.

However, in December 2020, while visiting her daughter, Susan collapsed without warning. She was unable to walk, and was rushed to the Emergency Department for treatment.

After being referred for evaluation at Dartmouth Hitchcock Medical Center, doctors determined that Susan had an infection that had spread to her bloodstream and damaged the mitral valve in her heart. She would need open-heart surgery.

Susan was brought to the cardiac intensive care unit (CICU), hooked up to a catheter, and given IV antibiotics.

"All of a sudden I was the patient, not the nurse," she said.

The path to recovery

Susan was referred to Jock N. McCullough, MD, a cardiac surgeon at Dartmouth Hitchcock Medical Center who would operate on and repair her mitral valve. Following surgery, she completed a three-month recovery program at Dartmouth Health's Valley Regional Hospital for Cardiac Rehab in Claremont, New Hampshire.

These days, Susan doesn't skip a beat. She now works as a registered nurse for Willows of Windsor, a senior living community in Vermont.

"Every day, I still get excited to go to work after all these years," she said.


Susan Matellotto.

"The whole Dartmouth Health system needs to be applauded. They looked at me as a person, not as a number or as a room number."

Work is close to home, close to family, and close to Dartmouth Hitchcock Medical Center, where she visits the cardiology department every year.

Knowing how life can suddenly change—and having experienced it firsthand—Susan can now bring an ever deeper understanding to her patients.

"The whole Dartmouth Health system needs to be applauded," she said, for how they cared for her. "They looked at me as a person, not as a number or as a room number."

Scan to read Susan's full story

Heart Failure Length-of-Stay Research Aims to Optimize Patient Care

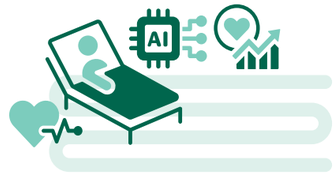
Researchers are using AI to look for factors that contribute to a longer length of stay, with the aim of identifying at-risk patients and developing scalable management strategies.

Dartmouth Health's clinician-researchers are leading the way in advanced heart failure care, delivering multidisciplinary treatment and conducting innovative research to develop best practices that enhance quality of care.

"A huge number of people are affected by heart failure, and it's the common denominator of all cardiac conditions," said heart failure cardiologist Hannah E. Bensimhon, MD. "Because there's no simple mechanical fix for heart failure, we partner with every cardiac subspecialty to optimize patient care and cross the bridge between inpatient and outpatient cardiology."

Led by Dr. Bensimhon, the heart failure team is conducting a new study to determine which measurable factors contribute to a longer length of stay for heart failure patients admitted to the hospital. By using artificial intelligence (AI) and partnering with statisticians, the team hopes to identify patients at risk for a longer stay and develop scalable best practices for managing their care—before, during, and after their hospital stay.

"We hope to publish our results and develop management guidelines that clinicians across our network and throughout the nation can use to optimize care for their patients," said Dr. Bensimhon.

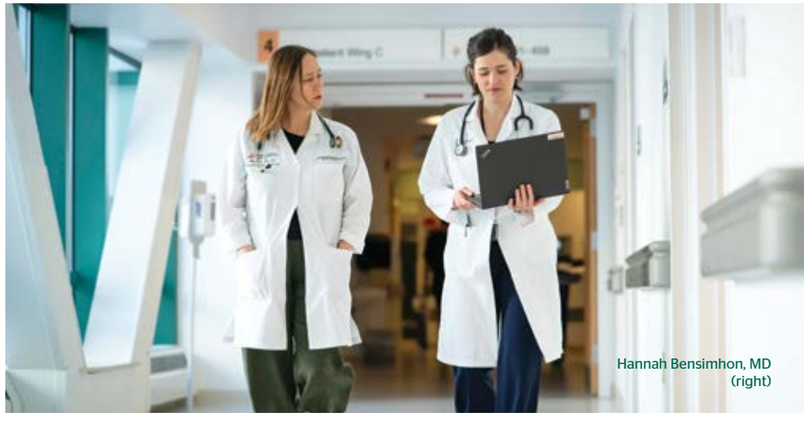


The team also uses remote monitoring technology to follow patients closely at home, giving them the best chance of identifying and treating potential exacerbations before they result in a hospital stay.

"For patients in our large, rural catchment area, remote monitoring has become a crucial part of our practice," said Dr. Bensimhon. "Combined with the shared care we deliver alongside our local cardiologists, our patients get the best of both worlds—local care close to home, and access to advanced heart failure treatment at our Lebanon campus, or at one of our partner transplant or VAD centers, when needed."

At every stage of care, patients can communicate with their heart failure team and work closely with specialized nurse navigators to ensure a seamless treatment experience.

"We have the specialized resources and research capabilities to provide a safety net that reduces readmission," said Dr. Bensimhon. "Across the spectrum of clinical care, inpatient care, and research, our goal is to find ways to get people home and keep them home—which contributes to better health and improved quality of life."


Hannah Bensimhon, MD (right)

CELEBRATING

500 Left Atrial Appendage Occlusion Patients Treated at Dartmouth Health

In January 2025, Dartmouth Health celebrated its 500th Left Atrial Appendage Occlusion (LAAO) procedure—distinguishing itself as one of New England's leaders in minimally invasive left atrial appendage closure treatment.

In addition to being among the region's highest-volume LAAO centers, the team is now performing the procedure under conscious sedation, without the need for general anesthesia.

"We're proud to offer this option for people with A-Fib who need to manage their stroke risk and can't be on blood thinners," said Aaron V. Kaplan, MD, FACC, FSCAI, FNAI, interventional cardiologist at Dartmouth Health. "When patients choose Dartmouth Health for their A-Fib care, they can trust that they will receive a complete, multidisciplinary evaluation and access to all available treatment options—including clinical trials—with enhanced in-network care coordination."

Your patients deserve heart-felt, expert care

Clinical Trials
https://www.dartmouth-hitchcock.org/research/search-clinical-trials?ts=64

Stay Connected
https://go.d-h.org/hvc

Referral

Hours
Monday through Friday, 8 am to 5 pm

Call toll-free
(866) DHMC-DOC or (866) 346-2362
Locally, dial: (603) 653-1999

Transfer
For urgent/emergent transfers, call (877) 999-9870

SPOTLIGHT

3D Scholars Program

Fostering Connections within the Device Development Ecosystem

Dartmouth Health experts—alongside leaders from the FDA, industry, and academics—are driving innovation and forging collaboration in device development through the Dartmouth Device Development (3D) Scholars program.

Dr. Zeitler with patient.

"3D Scholars is a one-year certification program that connects active clinicians from across the U.S. who practice in device-driven fields with experts in the device development community," said Aaron V. Kaplan, MD, FACC, FSCAI, FNAI, interventional cardiologist at Dartmouth Health and director of the Dartmouth Device Development Initiative. "The goals of the program are twofold: We want to help clinicians understand the device development and regulatory processes and provide regulators and members of the medical device community with access to guidance and leadership from practicing physicians."

The 3D Scholars program accepts 8 to 12 participants each year. It includes five week-long retreats and monthly half-day seminars focused on all aspects of the device development ecosystem—including the regulatory process, venture capital, start-ups, insurance, manufacturing, financing, and more.

"Each scholar will be assigned a device case study and will develop a clinical/regulatory development plan, culminating in a simulated FDA pre-submission meeting," said Dr. Kaplan. "Throughout the process, scholars will receive guidance from advisors who represent clinical, regulatory, and industry sectors."

To kick off the 3D Scholars program, Dartmouth Health hosts an annual 3D symposium featuring didactic sessions, research presentations, and networking. Dr. Kaplan works collaboratively with Dartmouth Health electrophysiologist, colleague, and emerging device development leader Emily P. Zeitler, MD, MHS, to coordinate the 3D Symposium and 3D Scholars program. Dr. Kaplan shares, "It's a complex system, and 3D Scholars equips active clinicians to navigate it—creating future device development leaders who can serve as experts in the trenches."

Emily P. Zeitler, MD, MHS

Heart and Vascular Center
BY THE NUMBERS

// Overall Volume:

35,500
Clinical patients

1,100
Electrophysiology and pacemaker procedures

2,150
Operative procedures

$2,621,130
Total funding awarded

3,600
Cardiac catheterization procedures

40
Clinical trials open for enrollment and follow up

U.S. News & World Report High Performing Hospitals 2024-2025
- Aortic Valve Surgery
- Heart Attack
- Heart Bypass Surgery
- Heart Failure

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Heart and Vascular Center Locations

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