MedStar Health

MedStar Heart & Vascular Institute

CAPABILITIES

PERFORMANCE

OUTCOMES

2023-2024

MedStar Health

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MEDSTAR HEART & VASCULAR INSTITUTE

FY22 Stats at a glance


6,959 Diagnostic catheterizations


2,633 PCIs

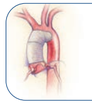

542 TAVR procedures


46 PFO closures


52 MitraClip procedures


7,753 Cardiac MRI studies, CT images, and TEEs


2,323 Cardiac surgery procedures


536 Open and endo aortic procedures


289 Surgical mitral, aortic, tricuspid repair and replacement procedures


71 Convergent ablation procedures


74 Durable LVAD implantations


28 Heart transplantations


2,425 Cardiac ablations


139 Laser lead extractions


235 LAAO implants

Visit us at **MedStarHealth.org/Heart**

Throughout this report, we share our best available data from fiscal year 2022.

Please submit any comments to **jennifer.e.freas@medstar.net.**

Some of the photos in this publication were taken prior to the COVID-19 pandemic. All patients and clinicians are expected to follow the current MedStar Health guidelines for safety including proper masking and physical distancing where appropriate. Learn more at MedStarHealth.org/Safe.

Talent, teamwork, and tenacity advancing cardiovascular care.

From rising stars to established experts, from breakthrough technology to advanced research, MedStar Heart & Vascular Institute (MHVI) continues delivering the best in cardiovascular care. In this latest Capabilities, Performance, and Outcomes Report, you'll see how our team-driven efforts are leading to innovative approaches for increasingly complex clinical issues, influencing care both locally and beyond.

Key to such progress is having the right leadership, supported by a multidisciplinary cadre of experts. Toward that end, we welcomed two nationally recognized luminaries to the team in 2022. Thomas MacGillivray, MD, joined us from Houston Methodist Hospital as our system lead for Cardiothoracic Surgery. Keki Balsara, MD, joined us from Vanderbilt University Medical Center as our surgical director of Heart Failure and Transplantation. Dr. Balsara's collaboration with Farooq Sheikh, MD, who now leads our medical Advanced Heart Failure team, promises to further accelerate the trajectory of this critically important program. In keeping with our commitment to retain and promote top talent from within our own ranks, Drs. Steven Abramowitz, Brian Bethea, Samer Najjar, and Allen Taylor have assumed expanded leadership roles in their respective areas–further augmenting and enhancing our experienced and dedicated clinical leadership team.

On other fronts, we further expanded our culture of collaboration within and beyond the traditional borders of cardiovascular care, with specialists and sub-specialists from different fields working together towards a truly integrated model of patient care. Our researchers participated in more than 150 clinical trials, contributing to advancing scientific knowledge to afford patients access to new and innovative therapies. We strengthened existing programs and established new ones, achieving additional national and international recognition. MedStar Washington Hospital Center continues its rise nationally in U.S. News & World Report's annual ranking of cardiology and heart surgery programs, this year to #28, creating a halo effect for the entire Institute.

These impressive achievements are further stepping stones to the future. I believe that we have secured our strong position by constantly pursuing emerging opportunities and exploring promising techniques, technologies, and therapies. In the continually changing clinical environment, our resilience and adaptability allows us not only to keep up with the rapid evolution, but be the leaders for change. Intellectual curiosity has been the bedrock of the MedStar Heart & Vascular Institute since its inception–leading to better, safer, and more compassionate care for our patients today. With that ethos as our guide, we look forward to what tomorrow holds.

As always, I welcome your comments and feedback, and invite you to join us on this journey.

Stuart F. Seides, MD
Physician Executive Director
MedStar Heart & Vascular Institute

Interventional cardiology

MedStar Health's interventional cardiologists have some of the highest procedural volumes in the region and are nationally recognized for their contributions to the field of research. We engage in nearly all major clinical investigations for de novo percutaneous approaches and devices—and are often among the first sites to do so. Strengthening our position on the frontlines of advanced technology allows our patients options that might otherwise not be available—particularly for individuals at a high surgical risk or those with significant comorbidities.

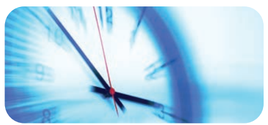
In addition to our established programs at MedStar Union Memorial Hospital and MedStar Washington Hospital Center, we also have growing interventional programs for PCI at MedStar Southern Maryland Hospital Center and MedStar Franklin Square Medical Center.

6,959 Diagnostic catheterizations

2,633 Percutaneous coronary interventions (PCIs)

52 MitraClips

46 PFO closures



Average primary PCI door-to-balloon time: **59 minutes**

National benchmark: 90 minutes *Source: ACC/AHA*

Lowell F. Satler, MD, Medical Director
Cardiac Catheterization Lab
MedStar Washington Hospital Center

William O. Suddath, MD, Medical Director
Cardiac Catheterization Lab
MedStar Southern Maryland Hospital Center

John C. Wang, MD, Medical Director
Cardiac Catheterization Lab
MedStar Union Memorial Hospital
MedStar Franklin Square Medical Center

Fiscal year 2022 data

Microvascular angina

MHVI is one of only a few programs in the nation to acquire the Coroventis CoroFlow™ Cardiovascular System, an advanced, software-based platform that, along with a special companion guidewire, can effectively measure the workings of the heart's tiniest blood vessels—a feat beyond the capabilities of standard CT and coronary angiogram. This allows us the ability to correctly identify and then treat coronary microvascular dysfunctions (CMD).

Ultra-low contrast angiography

Using a refined protocol that significantly reduces the use of contrast media, we are among a small number of programs in the United States to offer ultra-low contrast angiograms. The technique reduces the risk of acute kidney injury in all patients undergoing angiography.

Interventional Heart Failure Program

Collaboration between colleagues in the Advanced Heart Failure Program and Interventional Cardiology is longstanding. This relationship offers a growing number of investigational treatments that require engagement of both subspecialties. There are promising interventional therapies now available to individuals with heart failure that can delay the need for LVAD or transplantation. Read more about our interventional heart failure program on page 23.

Transradial approach

Throughout the system, interventional specialists select the site of catheter access—radial or femoral—depending on the specific device and the unique anatomy and physiology of each patient. Transradial cardiac catheterization provides less risk of bleeding, lower mortality, and increased comfort for the patient. At MedStar Union Memorial Hospital, radial access is used for 90 percent of both diagnostic and interventional procedures, more than twice the average reported by the American College of Cardiology (ACC).

Interventional cardiology physicians

Washington, D.C. region
Lowell F. Satler, MD
Ron Waksman, MD
Srinivas Addala, MD
Itsik Ben-Dor, MD
Nelson L. Bernardo, MD
Brian C. Case, MD
Eric S. Ginsberg, MD
Hayder Hashim, MD
Scott M. Katzen, MD
Toby Rogers, MD
William O. Suddath, MD
Nardos Temesgen, MD

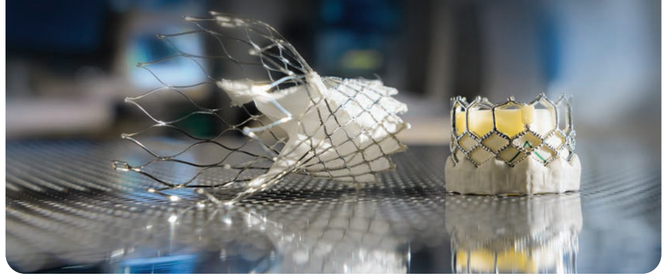
Baltimore region
John C. Wang, MD
Fady H. Iskander, MD
Antony G. Kaliyadan, MD
David B. Peichert, MD
Nauman Siddiqi, MD

Fiscal year 2022 data

Structural heart disease

Our approach to treating structural heart disease is always multidisciplinary and customized. We've assembled a team with niche expertise in their fields–cardiac surgeons, interventionalists, and cardiac imaging specialists–who work together to accurately diagnose the condition, select the optimal treatment, and perform the procedure, including cases deemed too complex for many other centers.

This team approach, combined with our involvement in nearly all clinical trials for structural heart devices, provides uniquely personalized treatment. This allows us to select the option that best fits the anatomy, risk factors, and preferences of each patient.



Washington, D.C. region team

Baltimore region team

Aortic valve highlights

2022 marked 20 years of investigational and clinical work with transcatheter aortic valve replacement (TAVR). MHVI was one of the first centers in the country to participate in the initial studies. We continue to explore new frontiers of TAVR, providing long-term follow-up along with de novo studies to examine the durability in younger patients, the use of the technology for aortic regurgitation, and newer valve-in-valve TAVR techniques for patients who outlive their tissue valves.

Our patient-centered TAVR pathway offers an expedited and carefully managed process for workup, recovery, and discharge. In fact, the time from initial referral to procedure is less than 2 weeks. Patients benefit from a seamless, streamlined, and straightforward experience.

542 TAVR procedures

Fiscal year 2022 data

Mitral valve highlights

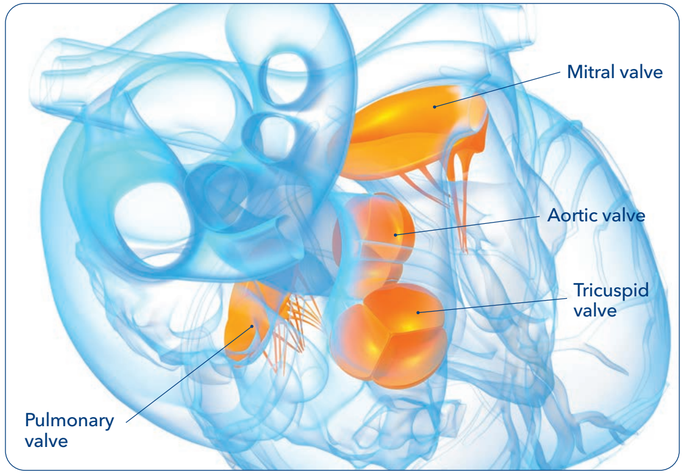
Mitral valve regurgitation (MR) is the most prevalent valvular disease in the U.S. Our team is focused on expanding options for treatment, including interventions for the management of mitral annular calcification (MAC), a complex and often difficult-to-treat diagnosis.

- The AltaValve™ offers a percutaneous approach for mitral valve replacement for those who have either primary or secondary MR, or for those who have undergone previous valve repair. The study investigates its potential for a reduction in complications and length of stay in a broader population of patients.
- Investigation of the Intrepid™ TMVR system continues, with recent completion of our first case done via femoral access, in addition to the many cases performed transapically. This approach potentially offers a new and less risky solution for patients who are very ill, or are poor candidates for conventional mitral surgery.
- We remain one of the highest-volume centers for the Tendyne™ transcatheter mitral valve replacement in the country.

Tricuspid valve highlights

Building on the success of mitral valve techniques, promising interventions are now available to treat conditions of the tricuspid valve, for varying anatomies.

- Patients with symptomatic, severe tricuspid regurgitation may be candidates for the ongoing study of the TriClip™ transcatheter tricuspid valve repair. This minimally invasive option is an exciting alternative for high-surgical risk patients.
- Participation continues in the early feasibility study of the CorMatrix® Cor ECM® Tricuspid Valve for patients requiring surgical replacement.



Comprehensive structural heart options *(includes investigational and market devices)*

Aortic valve disease
- SAPIEN X4 Transcatheter Heart Valve
- SAPIEN S3™ Ultra
- CoreValve®, Evolut™ PRO+
- Navitor™
- JenaValve for stenosis and regurgitation
- ACURATE *neo2*™ Aortic Valve System
- BASILICA

Para-valvular leak
- Amplatzer™ Vascular Plug

Tricuspid valve disease
- TriClip™ Transcatheter Tricuspid Valve Repair for symptomatic, severe TR
- CorMatrix® Cor ECM® surgical replacement

Mitral valve disease
- Intrepid™ Transcatheter Mitral Valve Replacement (TMVR) system
- MitraClip™
- Tendyne™ transcatheter mitral valve replacement (TMVR) system
- ENCIRCLE trial for SAPIEN M3 System Transcatheter mitral valve replacement via transseptal access
- SAPIEN S3 for mitral annular calcification (MITRAL trial)
- Novel technique to prevent LVOT obstruction-LAMPOON Procedure
- AltaValve™ TMVR

Congenital heart defects
- ASD occluder
- VSD occluder
- PFO occluder for cryptogenic stroke

Stroke prevention and AFib
- WATCHMAN FLX™ device
- CHAMPION-AF (trial)
- AMPLATZER™ Amulet™ device

Dysfunctional RVOT conduit/pulmonary valve
- SAPIEN™ 3
- Melody® Transcatheter Pulmonary Valve

Cerebral protection
- Sentinel®

Fiscal year 2022 data

Cardiac surgery

MedStar Health's cardiac surgery program has been a nationwide destination for patients for more than half a century. Our surgeons are internationally recognized for their intellectual rigor, technical expertise, and high volumes. We are leaders in research, clinical, and surgical innovations for even the most complex cases—often patients who have been denied care elsewhere.

2,323
Cardiac surgery procedures

74 Durable LVAD implantations

28 Cardiac transplantations

Advanced heart failure

In 1987, the first heart transplantation in Washington, D.C. was offered at MedStar Washington Hospital Center, and in 1988, we became one of the first centers in the world to implant a ventricular assist device (VAD).

The advanced heart failure program has grown continuously since then, providing superior survival rates even for the most critical, highly complex patients. Read more about our surgical Advanced Heart Failure Program on page 24.

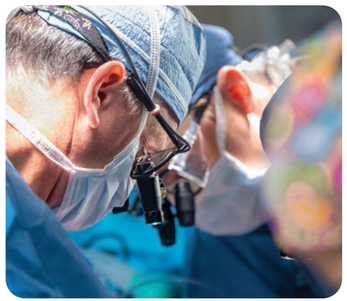
Fiscal year 2022 data

Aortic disease

Our Aortic Disease Program is one of the largest in the mid-Atlantic region and our teams perform more aortic interventions than any other program in the region.

The most complex cases can be treated with the full spectrum of available options—including open, minimally invasive, and transcatheter approaches, by a team that is truly multidisciplinary—through a partnership with our vascular surgeons. Read more about how we manage aortic disease on page 12.

536 Open and endovascular aortic procedures



Complex coronary disease

Coronary artery bypass graft (CABG) surgery remains the most common cardiac surgical intervention, but it has become much more difficult and nuanced due to increasing patient age and comorbidities and the frequency of prior procedures. Our surgeons have specialized training, advanced knowledge, and can offer customized solutions based on the complexity of each case. From our use of multiple arterial grafts when appropriate, to our developing and perfecting off-pump bypass surgery as an option, and our coordination with our interventional cardiology colleagues for revascularization by percutaneous coronary intervention, we remain committed to providing the best treatment possible for each individual patient.

We have broadened the application of "bloodless" surgery protocol. While it has long been an offering for our Jehovah's Witness patients, we now apply the same techniques to avoid (or minimize) transfusion when possible.

The Society of Thoracic Surgeons

★★★

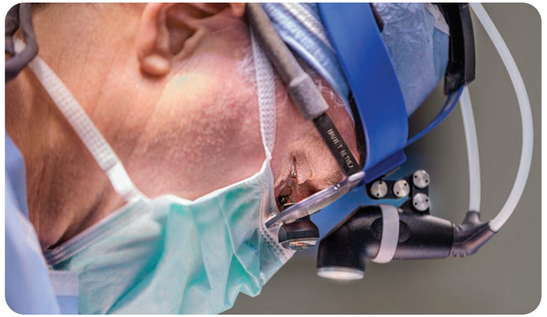
CABG

Coronary Artery Bypass Grafting

Three stars represents the highest achievable metrics in the U.S.

MedStar Washington Hospital Center and MedStar Union Memorial Hospital both have achieved this recognition

Fiscal year 2022 data



Complex valvular disease

Our hospitals serve as clinical testing sites for nearly every major U.S. trial for valve repair and replacement solutions. Drawing from the collective expertise of cardiac surgeons, interventional cardiologists, and advanced cardiac imaging specialists, the treatment options for aortic, mitral, and tricuspid valve conditions continue to be expanded. Our surgeons are experts in valve-sparing aortic root replacement, complex aortic and mitral valve repair, multiple reoperations, minimally invasive valve repair and replacement, robotic mitral valve repair and replacement, and transcatheter repair and replacement. For details on our Structural Heart Program, see page 6.

134 Surgical mitral valve repairs and replacements

115 Surgical aortic valve repairs and replacements

40 Surgical tricuspid valve repairs and replacements

Arrhythmias

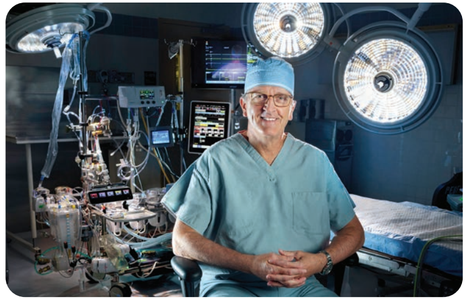
Expertise in all aspects of surgical ablation including concomitant and stand-alone ablation in all minimally invasive varieties is well-established. We were the first–and remain the most experienced–health system in the region to offer Hybrid AF™ Convergent Therapy for treatment of longstanding, persistent atrial fibrillation. We were also the first in the region to offer thoracoscopic ablation for the treatment of IST and POTS–a groundbreaking new option for patients who have exhausted other therapies for these historically underdiagnosed and often untreated conditions. Read more about our partnership with cardiac electrophysiologists on page 18.

71 Convergent ablation procedures

Fiscal year 2022 data

Robotic surgery

MedStar Washington Hospital Center is one of the few sites in the mid-Atlantic region to offer robotic cardiac surgery. The approach is credited with shorter recovery times, less post-surgical pain, and fewer surgical complications with excellent clinical results. Yuji Kawano, MD, director of the program, trained at Emory University Hospital under one of the first, and most experienced, robotic cardiac surgeons, worldwide.



Thomas E. MacGillivray, MD, Physician Executive Director Cardiac Surgery, MedStar Health
Chairman, Cardiac Surgery
MedStar Washington Hospital Center

Thomas E. MacGillivray, MD, has been named physician executive director of Cardiac Surgery at MedStar Health, and chairman of Cardiac Surgery at MedStar Washington Hospital Center.

Dr. MacGillivray joins us from Houston Methodist Hospital, where he spent the last five years as the Jimmy F. Howell, MD, endowed chair in Cardiovascular Surgery and chief of the Division of Cardiac Surgery and Thoracic Transplant Surgery. He also served as associate medical director of the Cardiovascular Intensive Care Unit at Houston Methodist. Previous roles include surgical director of the Adult Congenital Heart Disease Program, co-director of the Thoracic Aortic Center, and surgical director of the Mechanical Circulatory Support Program at Massachusetts General Hospital.

He holds several national leadership roles, including president of the Society of Thoracic Surgeons. Additionally, he serves on the Board of Directors of the Thoracic Surgery Foundation and on the editorial board of the Annals of Thoracic Surgery.

Dr. MacGillivray received his medical degree from Tufts University School of Medicine. He completed his residency at Massachusetts General Hospital, followed by fellowships in congenital heart surgery at Boston Children's Hospital and fetal surgery research at the University of California San Francisco.

Cardiac surgeons

Washington, D.C. region
Thomas E. MacGillivray, MD
Aiman Alassar, MD
Ammar S. Bafi, MD
Keki R. Balsara, MD
Jeffrey E. Cohen, MD
Gabriele M. Iacona, MD
Yuji Kawano, MD
Christian C. Shults, MD

Baltimore region
Brian T. Bethea, MD
Rachel E. Harrison, MD
Ricardo O. Quarrie, MD

BEST HOSPITALS U.S.News & WORLD REPORT CARDIOLOGY & HEART SURGERY 2022–23

MedStar Washington Hospital Center awarded

Fiscal year 2022 data

Comprehensive management of aortic disease

Our cardiac and vascular surgeons perform more aortic interventions than any other team in the mid-Atlantic region. We continue to add new approaches and devices to our treatment toolbox, providing a wide variety of options for each patient's unique preference and anatomy—including the most complex of cases.

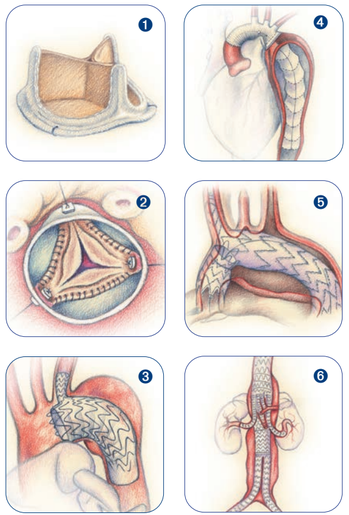
Several of the available options, including minimally invasive, transcatheter, and open approaches, include:

Aortic Valve

- Aortic valve replacement
  - Transcatheter, minimally invasive, or surgical
  - New generation of mechanical and tissue valves (recognized center for INSPIRIS RESILIA ❶ and On-X valves)
  - Ross procedure-using the patient's own pulmonary valve and artery to replace a diseased aortic valve and/or root
- Aortic valve repair
  - HAART annuloplasty ring

Aortic Root

- Aortic root replacement
  - Valve sparing root replacement (David procedure) ❷
    - Resects aneurysm, retains native valve, delays valve degeneration and need for anti-coagulation
  - Traditional root replacement (Bentall procedure)
    - Minimally invasive approach in select cases
    - Removes aneurysm and replaces degenerated native aortic valve with:
      - KONECT RESILIA aortic valve conduit
      - Freestyle porcine aortic root
      - Homograft (cryopreserved human aortic root)
      - On-X Valve Conduit
  - Ross Procedure



Fiscal year 2022 data

Ascending Aorta

- Ascending open replacement
- Minimally invasive ascending aortic replacement
- Ascending endovascular replacement
- Hybrid repair

Aortic Arch

- Open replacement
  - Standard arch replacement with re-implantation of the arch vessels
  - Frozen Elephant Trunk: Arch replacement with TEVAR extending into the descending aorta
- Hybrid replacement
  - Standard TEVAR
  - Aortic arch debranching with subsequent TEVAR
  - GORE® single branch (TBE) ❸
  - Thoraflex™ aortic arch replacement ❹ (arch graft replacement with connected stent)
- TRIOMPHE study to investigate the NEXUS® Aortic Arch Stent Graft System, offering a less invasive procedure for patients with arch aneurysms and/or dissections ❺

Descending Thoracic Aorta

- Approaches for aneurysmal disease, aortic dissection, and other pathology:
  - Minimally invasive endovascular repair
  - Standard open repair
  - Hybrid repair

Thoracoabdominal Aorta

- Open thoracoabdominal aortic aneurysm repair
- Minimally invasive endovascular repair
- Clinical trial to evaluate aortic endograft to repair thoracoabdominal aortic aneurysm (TAAA)
  - GORE TAMBE trial ❻
- FDA-approved Investigational Device Exemption (IDE) to use physician-modified endografts with fenestrations and branches (FEVAR and BEVAR) tailored specifically to each patient's individual anatomy. Extends the ability to offer less invasive aortic repair to patients who are considered high risk for open thoracoabdominal aortic repair using commercially available endografts. ❼

Infrarenal Aorta

- Open aortic aneurysm repair
- Endovascular aortic aneurysm repair (EVAR)
- Ongoing clinical trials for novel therapies and devices
  - JAGUAR trial
  - TREO device

536 Open and endovascular aortic procedures

When the need for aortic care is urgent, we provide immediate transfer and treatment.

In both Washington, D.C. and Baltimore, our Complex Aortic Centers provide immediate care for all complex aortic conditions, including acute dissections, ruptures, aneurysms, and penetrating ulcers.

Our program:

- Offers a rapid and streamlined referral process with just one phone call
- Transports patients from your location via our own helicopter or ambulance
- Provides closed-loop communication and easy image-sharing abilities
- Accepts all transfers

Read more about MedSTAR Transport on page 35.

With one phone call, we will initiate transfer and treatment for your patients:

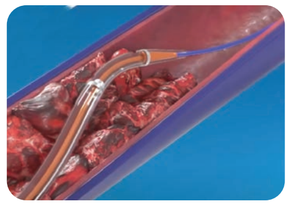
800-824-6814
(Washington, D.C. region)

410-554-2332
(Baltimore region)

Fiscal year 2022 data

Vascular surgery

Our Vascular Surgery Program remains the largest in the mid-Atlantic region with 22 board-certified surgeons coordinating care at 11 hospitals and 20 outpatient sites.



Deep venous thrombosis and pulmonary embolism

Treatment for all forms of deep venous disease with open and endovascular techniques, including acute and chronic deep venous occlusive disease, inferior vena cava occlusion, retained IVC filters, and pulmonary embolism is available. Our internationally recognized DVT program has recently pioneered several techniques and devices, including:

- Endovascular iliocaval reconstruction, a minimally invasive reconstructive technique paramount in the treatment of vena cava stenosis and central venous occlusive disease
- Endovenectomy, a minimally invasive technique combining open and endovascular surgery to treat deep vein post-thrombotic syndrome
- ClotHunter™ thrombectomy catheter (first in the world to implement)
- FlowTriever2® thrombectomy-assist tool
- Home to multiple DVT and PE randomized and clinical trials including DEFIANCE, HI-PEITHO, and the WOLF thrombectomy IDE

Our system-wide pulmonary embolism (PE) protocol and response system provides rapid and comprehensive intervention for patients with PE. Each time a PE is suspected, the multidisciplinary team immediately comes together to review the case and implement a treatment plan. Early data shows quicker recoveries and shorter ICU stays, along with better outcomes due to more appropriate interventions.

Fiscal year 2022 data

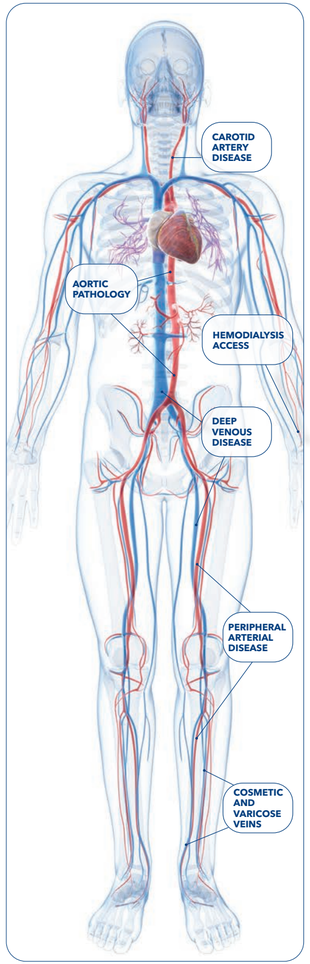
Carotid artery disease

Our vascular surgeons are highly experienced in carotid endarterectomy and carotid artery stenting, and offer treatment for atherosclerotic disease, dissection, aneurysmal degeneration, and carotid body tumors.

We are leading the region in the use of the novel TransCarotid Artery Revascularization (TCAR) procedure.

Complex aortic pathology

We provide treatment for all types of aortic pathology through open, endovascular, and combined techniques. Multidisciplinary approaches are facilitated by several hybrid operating rooms. Read more about our comprehensive management of aortic disease on page 12.



Peripheral arterial disease

Patients are cared for at every stage of peripheral arterial disease (PAD), beginning with community screenings, to diagnosis in our noninvasive laboratories, and through all varieties of therapy and intervention.

Our unique specialization in retrograde pedal access offers patients, who are not candidates for standard transfemoral arterial percutaneous procedures, a new option for identifying and treating their PAD.

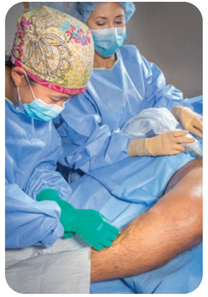
Limb salvage

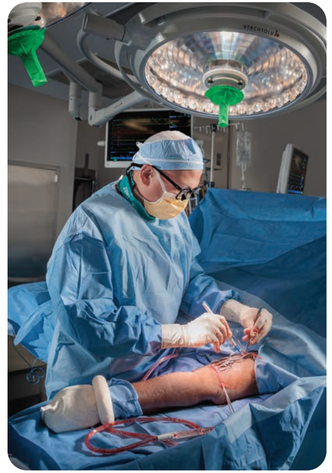
MedStar Health Wound Healing Institute offers a multimodal approach and unified expertise for wound care and limb salvage. Vascular surgeons, together with plastic surgeons, podiatric surgeons, and other specialties, collaborate on each wound case that presents throughout the system. Patients receive an integrated evaluation and comprehensive treatment plan, and a coordinated approach to debridement, infection removal, revascularization, and other necessary interventions.

Venous disease: medical, surgical, and cosmetic

Our experienced and board-certified vascular surgeons provide specialized venous care including the treatment of venous varicosities as well as offering aesthetic procedures. At each of our vein centers, patients receive comprehensive care, as our surgeons have capabilities in the full range of catheter-based, and surgical-based techniques.

Each center has an on-site, accredited vascular lab, staffed with experienced, certified technologists who work concurrently with the surgeons to facilitate rapid diagnostic evaluations.





Dialysis access

As the largest vascular dialysis access program in the mid-Atlantic region, our surgeons perform over 2,500 cases each year. Whether creating the initial access, amending failed access points, or reestablishing flow to thrombosed blood vessels, we focus on long-term results and reduced risk of infection.

Our team can manage even the most complex dialysis patients with an array of fistulae and graft options tailored to each person.

Noninvasive vascular imaging

At 17 laboratories across the region, our elite specialists use state-of-the-art technology to ensure that the first diagnosis the patient receives is the right diagnosis. We provide advanced diagnostic and treatment options for conditions of the carotid, peripheral, and abdominal venous and arterial systems.

Steven Abramowitz, MD
Chair, Department of Vascular Surgery
Physician Executive Director
MedStar Health
Vascular Surgery Program

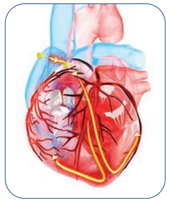
Vascular surgeons

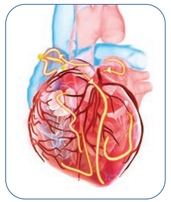
Washington, D.C. region

Steven Abramowitz, MD
Cameron Akbari, MD
Kevin Brown, MD
Joshua Dearing, MD
Javairiah Fatima, MD
Jesse Garcia, MD
Ayesha Hatch, MD
Sadia Ilyas, MD
Geetha Jeyabalan, MD
Misaki Kiguchi, MD
Lucy Kupersmith, MD
Krystal Maloni, MD
Melissa Meghpara, DO
Mark Peeler, MD
Kyle Reynolds, MD
Danielle Salazar, MD

Baltimore region

Raghuveer Vallabhaneni, MD
Maggie Arnold, MD
Jason Chin, MD
Jason Crowner, MD
Suzanne Kool, MD
Stephen Stanziale, MD





The human heart and its electrical system: The yellow lines depict electrical conduction through the heart during a normal heart beat (top) and in atrial fibrillation (bottom).

2,425
Cardiac arrhythmia ablations

Cardiac electrophysiology

Cardiac arrhythmia management is evolving rapidly. We are pleased to help drive this development via cutting-edge clinical trials and highly subspecialized expertise. Our team handles all aspects of heart rhythm care and is the region's leading EP referral center. High-volume experience and concentrated expertise, coupled with next-generation technology, distinguish our program.

Convergent ablation as first-line therapy for longstanding, persistent AFib.

Convergent AFib ablation is now a first-line therapy for longstanding, persistent atrial fibrillation. The procedure, which we first introduced to the region in 2011, is a hybrid collaboration between cardiac surgery and electrophysiology. This powerful technology expands therapeutic options for patients whose longstanding AFib may cause symptoms and/or be refractory to medications and traditional catheter ablation. This is a minimally invasive, two-part ablation procedure that uses heat to stop the erratic electrical signals that cause AFib and restore a normal heart rhythm. A cardiac surgeon performs the first procedure by making a small incision under the breastbone, to create access to the heart and then creates lesions on the back walls of the heart. An electrophysiologist then gains access to the inside of the heart and blood vessels through the groin, to deliver therapeutic energy to areas of the heart to destroy the abnormal electrical activity.

We are seeing excellent outcomes at this point—more than 70 percent of patients remain free of AFib and related symptoms a year after their procedure.

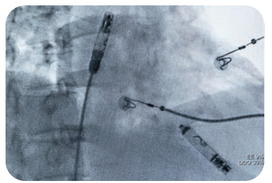
71
Convergent ablation procedures

Fiscal year 2022 data

235
Left atrial appendage occluder implants

Left atrial appendage occlusion (LAAO) systems

Fifteen years after we were first in the region to implant the original left atrial appendage (LAA) occluder, we remain among the country's highest-volume programs implanting these devices. We aspire to continue offering our patients the most innovative, safe, and effective therapies for stroke risk reduction tailored to their unique condition and anatomy—and to remain at the forefront of technology development and adoption. We are now studying other novel LAA occluders, including the WATCHMAN FLX™, Coherex WaveCrest™, and the AMPLATZER™ Amulet™.



Dual-chamber leadless pacemakers

Our physicians are leading the way implanting permanent pacemakers that have a self-contained battery and generator. Starting in 2019 our physicians began implanting the single-chamber leadless pacemaker.

Now, the first dual-chamber leadless pacemaker, the Aveir™ DR, is undergoing a worldwide clinical trial sponsored by Abbott, and MedStar Washington Hospital Center was the only hospital in the region selected to participate. In July 2022, the MedStar Health cardiac electrophysiology team was the first to implant this device in the Baltimore-Washington region.

139
Laser lead extractions

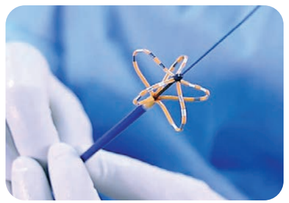
Laser lead extraction

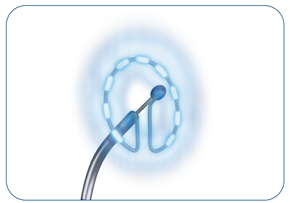
As the premier program for lead extractions in the region, we have the high-volume experience and multidisciplinary breadth to handle the most complex cases. Complete lead and device extraction is often the only way to deal with infrequent but often complicated CIED issues. Through an integrated approach, our electrophysiologists and cardiac surgeons jointly evaluate the patient to select the best procedural approach which may include laser lead extraction technology.

Fiscal year 2022 data

Pulsed field ablation for patients with paroxysmal AFib.

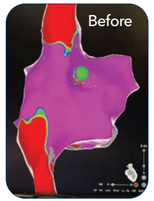
This year, we were selected to conduct trials of multiple competing technologies for pulsed field ablation (PFA), a novel modality to treat AFib. PFA is a catheter-based, non-thermal technique to achieve fast, complete, and targeted ablation of the heart tissue triggering atrial fibrillation. PFA is an exciting advance that may offer enormous potential over traditional ablation and/or medical therapy for AFib.

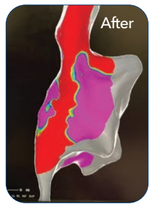




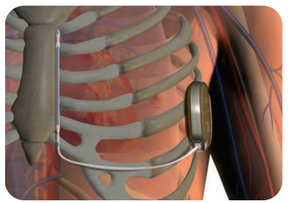
Novel application of hybrid thoracoscopic ablation to treat IST/POTS.

We were first in the region to offer thoracoscopic ablation for the treatment of inappropriate sinus tachycardia (IST) and postural orthostatic tachycardia syndrome (POTS). This minimally invasive hybrid approach, performed collaboratively with a cardiac surgeon, is a groundbreaking option for patients who have exhausted other therapies for these historically underdiagnosed and often under-treated conditions. Our participation in the new HEAL-IST study continues to advance use of this therapy.





Fiscal year 2022 data

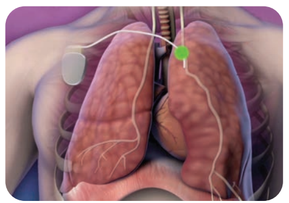


Extravascular implantable defibrillators

Traditional endovascular implantable cardioverter defibrillators (ICDs) are unsuitable for certain patients. We are participating in a study of a novel extravascular ICD system, in which defibrillation therapy is delivered by a lead placed external to the heart.

Breakthrough therapy for central sleep apnea in heart failure patients.

We are the only specialists in the region to have successfully implanted the new remede® system to treat moderate-to-severe central sleep apnea. Like a pacemaker, this implantable device senses apnea and stimulates the phrenic nerve to stimulate breathing.



Radiofrequency balloon catheters

Another leap forward in ablation technology for AFib is the development of multi-electrode radiofrequency balloon catheters. We are testing these novel technologies and have become among the country's highest enrollers in the HELIOSTAR and STELLAR trials.

Zayd A. Eldadah, MD, PhD
Physician Executive Director
Cardiac Electrophysiology
MedStar Health

Cardiac electrophysiologists

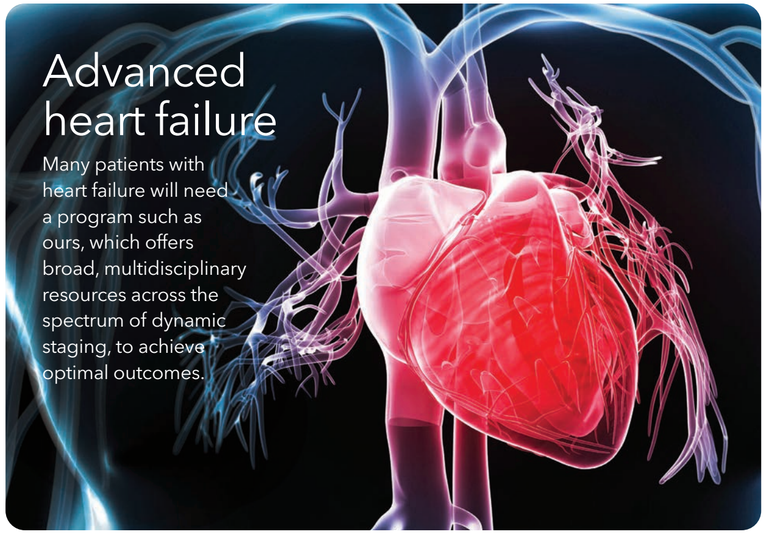
Washington region

Zayd A. Eldadah, MD
Walter L. Atiga, MD
Sarfraz A. Durrani, MD
Margaret B. Fischer, MD
Michael S. Goldstein, MD
Cyrus A. Hadadi, MD
Sung W. Lee, MD
Jay A. Mazel, MD
Susan O. O'Donoghue, MD
Edward V. Platia, MD
Manish H. Shah, MD
John H. Shin, MD
David A. Strouse, MD
Athanasios Thomaides, MD
Seth J. Worley, MD

Baltimore region

Glenn R. Meininger, MD
Malick Islam, MD
Richard Jones, MD

Fiscal year 2022 data



Advanced heart failure

Many patients with heart failure will need a program such as ours, which offers broad, multidisciplinary resources across the spectrum of dynamic staging, to achieve optimal outcomes.

Medical therapy

Our advanced heart failure clinicians often develop life-long relationships with their patients, managing their symptoms and disease process as they evolve. In addition to providing care in our hospitals, we offer services in a number of outpatient clinics across the region, making regular follow-up easier and more accessible. Throughout the course of their care, patients may benefit from:

- Advanced imaging and tests, such as cardiac MRI, high-quality echocardiogram, PYP imaging, whole body/cardiac FDG-PET scans, and cardiopulmonary stress tests, which can assist in early and accurate diagnosis.
- Guideline-directed medical therapy, including unique access to the latest and most advanced medications and intravenous inotropes, due to our involvement in many clinical trials and our ability to manage complex cases, as well as clinical pharmacists and financial counselors who help expedite insurance coverage of new drugs.
- Cardiogenetic testing and analysis with our in-house counselor.
- Palliative care, which is fully embedded in the heart failure program, offering a range of resources periodically and as needed (read more on page 29).

Fiscal year 2022 data

Washington, D.C. region team

Baltimore region team

Infiltrative cardiomyopathy

Infiltrative cardiomyopathies, principally sarcoidosis and amyloidosis, are increasingly recognized as common etiologies of cardiovascular disease. Historically hard to identify and even harder to treat, tools to accelerate diagnosis and effective methods to manage patients well are finally available. These diseases are indeed progressive, but with earlier recognition and detection they can be treated more effectively, like many forms of cancer.

At MedStar Health, we have built an infrastructure for our infiltrative cardiomyopathy program that brings together the technology, tools, and talent, to give patients the best chance for improved longevity and quality of life.

For information about our hypertrophic cardiomyopathy and pulmonary hypertension programs, see pages 28 and 29 respectively.

Interventional heart failure

This newly formalized service harnesses two subspecialties—heart failure and interventional cardiology—to offer interventional devices that correct aortic, mitral, or tricuspid valve defects, which either cause patients' heart failure, or develop because of it. By adding this component to the treatment spectrum, we enable patients to have an improved quality of life for a longer period, which may delay the need for LVAD and transplantation. An increasing number of investigational studies require representation from both subspecialties, so this formal partnership significantly expands options for patients.

Fiscal year 2022 data

Samer S. Najjar, MD, Medical Director (left), Baltimore region and Farooq Sheikh, MD, Medical Director (right), Washington region Advanced Heart Failure

Advanced heart failure physicians

Washington, D.C. region

Farooq H. Sheikh, MD
Keki R. Balsara, MD
Nana Afari-Armah, MD
Aiman Alassar, MD
Jennifer R. Brown, MD
Richa Gupta, MD
Mark R. Hofmeyer, MD
Ajay Kadakkal, MD
Rania Kaoukis, MD
Ahmed N. Khan, MD
Mrinalini Krishnan, MD
Phillip H. Lam, MD
Miguel A. Pinilla Vera, MD
Sriram Rao, MD
Maria E. Rodrigo, MD

Baltimore region

Samer S. Najjar, MD
Erika D. Feller, MD
Sandeep M. Jani, MD
Tania A. Vora, MD
W. David Xu, MD

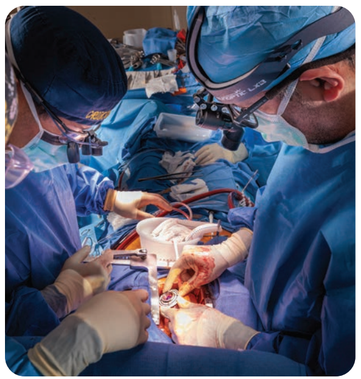
Mechanical circulatory support

Left ventricular assist devices (LVADs)

Since becoming one of the first centers in the world to implant an LVAD over three decades ago, our program has continued to forge innovation in this arena. Though we often manage extremely complex and critical patients—even those who are denied treatment at other centers—our outcomes still show superior survival rates.

74 Durable LVAD implantations

Making us one of the highest volume centers in the country



Keki R. Balsara, MD, Surgical Director Transplantation and Mechanical Circulatory Support

Keki R. Balsara, MD, MBA, FACS, FACC, has joined MedStar Health as surgical director of heart transplantation and mechanical circulatory support. Based at MedStar Washington Hospital Center, Dr. Balsara works closely with the entire advanced heart failure team to provide guidance and surgical expertise for some of the highest acuity cardiovascular patients in the region.

Prior to joining MedStar Health, Dr. Balsara practiced at Vanderbilt University Medical Center—the highest volume heart transplant center in the country—where he served as associate professor of surgery and chief quality and safety officer in the Department of Cardiac Surgery. He was previously assistant professor of surgery in the Division of Cardiothoracic Surgery and surgical director for the Cardiothoracic Surgery ICU at Washington University in St. Louis/Barnes-Jewish Hospital.

Acute mechanical circulatory support

As part of our robust temporary circulatory support program, we offer veno-arterial (VA) ECMO, as well as temporary percutaneous ventricular assist devices (LVAD, RVAD, BiVAD, Impella 5.0/5.5). With these technologies, patients presenting with cardiogenic shock can be stabilized, opening the potential for durable VAD implantation or transplantation after a period of acute mechanical circulatory support.

Fiscal year 2022 data

Heart transplantation

Maria E. Rodrigo, MD, Medical Director
Heart Transplantation

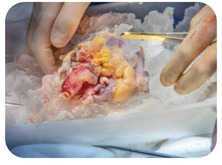
28 Cardiac transplantations

The first cardiac transplantation in Washington, D.C., was performed at MedStar Washington Hospital Center in 1987. Our volumes continue to grow, as does our ability to use higher-risk donor hearts, including those with hepatitis C, or through DCD (donation after cardiac death). This pioneering work is targeted toward improving post-transplant survival, such as through our participation in an NIH research project to evaluate novel methods to non-invasively assess rejection.

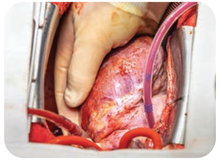
Maria Rodrigo, MD, meets with heart transplant coordinators.

Transport to MedStar Washington Hospital Center: MedSTAR air transport delivers the heart to the awaiting surgical team.

Explant: The damaged heart is removed seconds after the donor heart arrives. All is carefully choreographed with the team in constant contact.



Back bench preparation: Donor heart is unpacked and carefully inspected.



Heart reperfusion: The new heart is allowed to beat and recover before coming off the heart-lung machine.

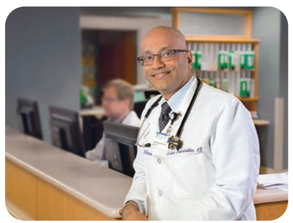
Fiscal year 2022 data

Clinical cardiology and specialty programs

Across our acute care hospitals and advanced outpatient clinics, cardiologists deliver comprehensive, integrated care to our patients—whether for prevention and screenings, or complicated treatment of the very ill and debilitated.

For more than 60 years, we have served as a major referral site locally, across the mid-Atlantic region, and the country.

Samer S. Najjar, MD
Regional Chief, Cardiology
Baltimore Region



Sriram Padmanabhan, MD
Chief, Cardiology
MedStar Franklin Square Medical Center

William O. Suddath, MD
Chairman, Cardiology
MedStar Southern Maryland Hospital Center

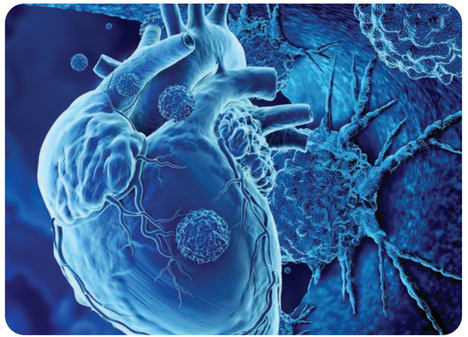
Allen J. Taylor, MD
Regional Chief, Cardiology
Washington, D.C. Region

Cardio-oncology

Due to the rapidly growing population of cancer survivors, many with residual cardiac sequelae, the need for cardio-oncology services has become much more pronounced. Chest radiation, conventional chemotherapy, as well as newer agents like immune checkpoint inhibitors can contribute to cardiovascular risk and complications. As newer oncologic therapies continue to prove more successful, physicians must appropriately monitor and care for the patient's heart—often before, during, and long after their cancer treatment. This niche medical subspecialty has been expanded at our Institute since its original inception in 2012. We have participated in much of the ground-breaking research and protocol implementation directed towards minimizing the cardiovascular impact for patients with cancer.

Last year, thanks to a generous gift from philanthropist Genevieve Murphy, in honor of her late husband, J.D. Murphy Jr., we launched the J.D. Murphy Jr. Cardio-Oncology Fellowship Program, becoming one of only a few sites in the country to provide this unique training opportunity for future leaders in the subspecialty.

Washington, D.C. region: 202-360-6367; Baltimore region: 877-452-0725



Sports and Performance Cardiology

Since athletes may require different cardiovascular monitoring because of age or anatomy, their care requires a nuanced approach. Our Sports & Performance Cardiology program, one of only a few in the United States, offers specialized and personalized services to "weekend warriors" and professional athletes alike, including the Baltimore Orioles, Baltimore Ravens, Washington Capitals, Washington Mystics, and USA Swimming. The program focuses on preventing sudden, unexpected cardiac death among athletes, helping them return to play after myocarditis, myocardial infarction, and other serious heart conditions, and separately, assisting top athletes enhance cardiovascular performance.

For a consultation, please call 410-554-2201.

Cardiogenetics

Cardiogenetics has become standard-of-care in many of our cardiovascular services. With an increasing number of inherited diseases, genetic testing and counseling plays an important role in the comprehensive management of patients. However, the field is rarely straightforward and requires expertise in interpretation—both for the benefit of the patient and for the treating physician. Our cardiovascular genetic counselor serves on our multidisciplinary teams to help construct a complete picture of a patient's genetic makeup, leading to better diagnosis, treatment, and family screening, where appropriate.

For a consultation, please call 202-877-GENE (4363).

Cardiogenetics Counselor Hillary Porter

Hypertrophic Cardiomyopathy Clinic Directors Patrick Bering, MD, in Washington, D.C. (top), and Sandeep Jani, MD, in Baltimore (bottom)

Hypertrophic cardiomyopathy (HCM)

We offer a comprehensive approach to patients and families with HCM through a streamlined pathway that begins with the initial workup and continues for a lifetime. Managing this condition well requires a collection of tools that only a few very sophisticated programs can provide: advanced imaging technology, multidisciplinary collaboration, and specific, substantial familiarity with the complexities of the condition.

Our patients benefit from accurate and early diagnosis, access to the latest medical therapy including the newly approved medications, treatment for comorbidities, and genetic counseling. As needed, our patients are co-managed by our cardiac electrophysiologists, interventionalists, and surgeons.

Washington, D.C. region: 202-877-2183
Baltimore region: 410-554-6550

Cardiometabolic disorders

A newly established cardiometabolic clinic at MedStar Good Samaritan Hospital in Baltimore now provides integrated, coordinated, and evidence-based care to people with type 2 diabetes and/or cardiovascular risk factors. The clinic offers access to critical support personnel—physician assistants, dietitians, pharmacists, and others—who can help prevent and manage the variety of conditions with which patients may present.

For more information, please call 443-444-5463.

Endocrinologist Malek Cheikh, MD (left), and Cardiologist Kerunne Ketlogetswe, MD (right), cardiometabolic clinic co-directors

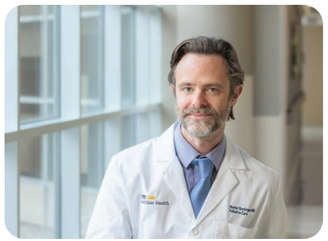
Fiscal year 2022 data

(I to r) Pulmonologist Julian Chung, MD; Cardiologist Raymond Young II, MD; Pulmonologist John Sherner, MD; Director of the Pulmonary Hypertension Program and Advanced Heart Failure Specialist Mrinalini Krishnan, MD; and Advanced Heart Failure Nurse Navigator Julie Dias-Douglas, BSN, RN

Pulmonary hypertension (PH)

Over the last 10-to-20 years, new therapies to treat PH—a disease historically understood to have poor outcomes—have evolved in promising ways. Our specialists are working to keep patients from progressing in their disease, both through clinical trials exploring novel medications and screening protocols. Our program—a multidisciplinary collaboration between cardiology and pulmonology—offers the extensive testing, medical management, and interventions that characterize these complex cases. Since patients can greatly benefit from early recognition and treatment, we frequently work with primary care physicians, cardiologists, rheumatologists, and hematologists to evaluate their patients with suspicious symptoms and map out a treatment plan, if warranted.

Washington, D.C. region: 202-877-2339; Baltimore region: 410-554-6550



Palliative Care Director Hunter Groninger, MD

Palliative care

Our palliative care team has been on the forefront of developing the specialty since 2015, setting an example for new programs across the country. The unique model of early co-management and collaboration provides patient and family satisfaction. When a patient is receiving advanced cardiovascular care at MedStar Health, our deeply interprofessional team of physicians, advanced practice providers, social workers, chaplains, and clinical pharmacists provides comfort services, including acute and chronic pain management; ongoing management of dyspnea, weakness, and fatigue; emotional health challenges; advanced care planning; caregiver support; and assistance with complex medical decision-making.

Women's heart health

A core group of dedicated cardiologists is standardizing cardiovascular screening and treatment through the women's heart health program. Through a variety of approaches for both prevention and treatment, we help women maintain a healthy heart throughout their lifetime, including managing pregnancy complications, autoimmune disease, stress, and other elements that have a particular impact on women.

Fiscal year 2022 data

Robert A. Lager, MD
Chief, Ambulatory Services
Washington, D.C. Region

Samer S. Najjar, MD
Regional Chief, Cardiology
Baltimore Region

Ambulatory cardiology practices

Our network of ambulatory cardiology practices throughout Maryland, Northern Virginia, and Washington, D.C., provides essential continuity of care for patients—regardless of which site they visit. These practices are strategically located throughout our service region, close to where patients live and work.

Cardiovascular specialists at each site are connected through regional image sharing and can facilitate streamlined access to other subspecialists and to our acute care hospitals, allowing patients to receive treatment across the system at locations convenient to them.

Fiscal year 2022 data

Cardiovascular imaging

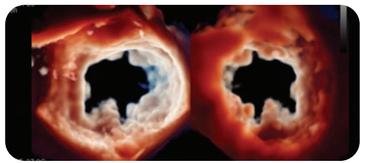
The most advanced and sophisticated cardiac imaging technology in the country, is available at MedStar Health, managed by a team of imaging specialists with high-volume experience and exceptional expertise.

Our program serves as a referral center for the region and is a long-term collaborator with the National Institutes of Health. We are also available to discuss images with our colleagues and referring partners.

If you have an image that you would like to discuss, you may upload it to: **MedStarImageShare.com.**

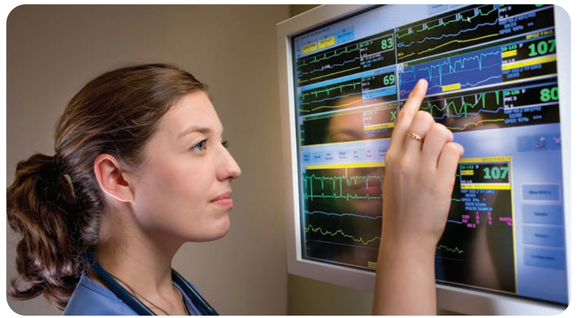
1,500 Cardiac MRI studies

2,200 Cardiac CT images



4,053 Transesophageal echocardiograms (TEE)

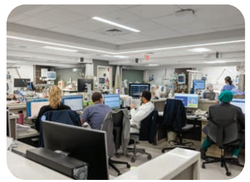
Fiscal year 2022 data



Cardiovascular critical care

Our multidisciplinary team of cardiovascular critical care specialists provides 24/7 care for high-acuity cases, both post-operative and medical. Patients in our cardiovascular intensive care units (CVICU) and cardiovascular recovery room (CVRR) are served by cardiac intensivists, advanced practice providers (APPs), and specially trained nurses, all uniquely qualified in both cardiology and critical care. Among our capabilities, we can provide temporary circulatory support, including veno-arterial (VA) ECMO, intra-aortic balloon pump and percutaneous ventricular assist devices (Impella, Protek Duo), as well as surgical ventricular assist devices (LVAD, RVAD, BiVAD) to fit the patient's individual hemodynamics.

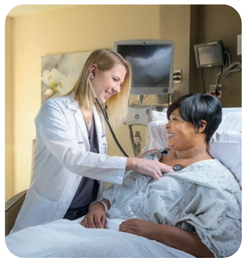
Our deep cardiac expertise combined with the wide breath of general critical care knowledge makes our CVICU clinical team unparalleled. We round with family members and approach treatment through a process of shared decision-making. Palliative care is fully integrated into our treatment strategy.



Fiscal year 2022 data

Comprehensive team of clinicians

Our goal is to ensure that every patient interaction provides the highest quality of care possible. Central to this mission is an incredibly specialized, diverse care team. Superior patient outcomes are a result not only of surgical or interventional expertise, but of the finely tuned skills of the entire clinical staff—nurses, APPs, cardiac hospitalists, and cardiac anesthesiologists.



104

Cardiovascular APPs

provide care throughout our acute care hospitals, outpatient sites, and ambulatory care locations.

700+

Cardiovascular nurses

Our nurses have received the Pathway to Excellence designation from the American Nursing Credentialing Center, the first acute care hospital in Washington, D.C. to do so.

15

Cardiovascular anesthesiologists

manage the unique challenges of cardiovascular patients, who often have multiple comorbidities which must be carefully managed.

13

Cardiovascular hospitalists

provide 24/7 management and are fully dedicated to the care of cardiovascular patients while planning a seamless transition back to their referring physicians.

Fiscal year 2022 data

Ron Waksman, MD, Director
Cardiovascular Research and Advanced Education

John C. Wang, MD, Scientific Director
Cardiovascular Research, Baltimore region

Cardiovascular research

There is a prevailing undercurrent of innovation that runs throughout our organization. Our commitment to offering the best, most personalized treatment necessitates constant advancement. From offering patients all available diagnostic and treatment options, to advancing scientific research, innovation is at the heart of what we do.

The MedStar Cardiovascular Research Network brings pioneering research in a variety of disciplines to patients throughout the region. Our ongoing collaborations with the National Institutes of Health, the U.S. Food and Drug Administration, the Centers for Medicare & Medicaid Services, and other leading institutions enable our participation in some of the world's most progressive cardiovascular investigations. Research is further enhanced by our state-of-the-art pre-clinical evaluation, cardiovascular core laboratories, and academic Clinical Research Organization (CRO).

Please visit **MedStarHealth.org/Clinical-Trials** to view all current clinical trials.

21
Scientific leads

45
Investigators

163
Ongoing studies

244
Publications annually in peer-reviewed journals

Fiscal year 2022 data

Cleveland Clinic alliance

For over ten years, MedStar Heart & Vascular Institute has enjoyed a unique clinical and research alliance with Cleveland Clinic's Miller Family Heart, Vascular & Thoracic Institute—the only such alliance in the mid-Atlantic region. This collaboration brings together clinicians and scientists from both Institutes to advance innovations for new therapies, improve quality metrics, and validate and report outcomes.

The alliance facilitates fluid communication between the scientists and clinicians at both Institutes, resulting in a collaborative approach to research. We share individual expertise and large and diverse patient populations in the pursuit of innovative cardiovascular therapies.

The Nancy and Harold Zirkin Heart & Vascular Hospital

Located on the campus of MedStar Washington Hospital Center, the Nancy and Harold Zirkin Heart & Vascular Hospital was the first dedicated heart and vascular hospital in the nation's capital. Since opening in 2016, it has served as a hub for specialists and patients, providing accessible outpatient clinics, modern inpatient units, state-of-the-art critical care spaces, and close proximity to surgical suites. Patients and visitors benefit from the thoughtful layout and innovative spaces, while clinicians can collaborate easily with each other. The Nancy and Harold Zirkin Heart & Vascular Hospital was named to recognize longtime Washingtonians Nancy and Harold Zirkin for their generosity and extraordinary philanthropic support.

MedSTAR Transport

For forty years, MedSTAR Transport has delivered life-saving services for people throughout the mid-Atlantic region. Our MedSTAR Transport service sets national standards for the care of critically ill and injured patients. The transfer center operates 24/7, covering the region with helicopters and critical-care ambulances.

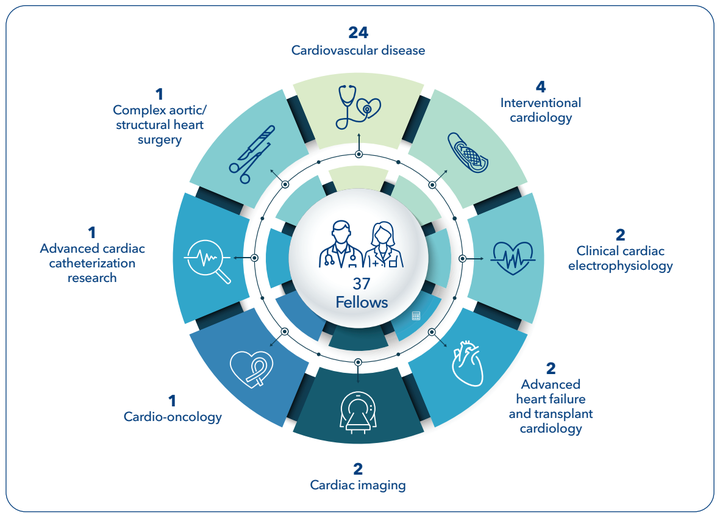
From our complement of helicopters and ambulances, specialized nurses and paramedics provide tertiary-level care, including ECMO, IABP, LVAS, pressure control ventilation, and multiple vasoactive medications, as patients are rapidly transported to our hospitals for life-saving care.

Graduate medical education (GME)

MedStar Health is one of the largest sponsors of graduate medical education in the United States, with over 100 programs and 1,150 residents and fellows.

Our cardiovascular subspecialty fellows receive diverse training at four major medical centers, gain exposure to some of the most advanced technology and complex patients in the region, and have the opportunity for involvement in research, clinical trials, and publication.

Dedicated fellows by subspecialty



Fiscal year 2022 data

Continuing medical education (CME)

Continuing medical education is a key component of MedStar Heart & Vascular Institute. We offer a variety of programming options to connect clinicians from across the globe.

Cardiovascular Research Technologies (CRT) 2023

February 25 – 28, 2023
The Omni Shoreham Hotel, Washington, D.C.

This annual 4-day conference focuses on five tracks—coronary, valve and structural, endovascular and stroke intervention, health disparities, and dedicated programs for nurses and technologists. CRT 2023's concurrent meetings are designed to impact practice through focused sessions that discuss new clinical trial data, explore other evidence-based research, and demonstrate cutting-edge techniques that can be directly applied to clinical and academic practice. CRT 2023 features more than 750 world-renowned faculty and live cases from seven international sites.

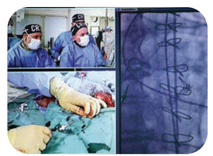
Visit CRTmeeting.org.

CRTvirtual Masters Course

Saturdays, 9 a.m. to noon, virtual

This course covers complex coronary, structural, intravascular imaging, and physiology topics. Attendees will learn "out-of-the-box" techniques, tips, and tricks to handle complications and upgrade their knowledge of conducting and interpreting advanced imaging and physiologic studies. Educational content will be delivered by world-renowned master operators in a live interactive setting through live cases, panel discussions, technical demonstrations, didactic presentations, and debate.

To register please go to crtvirtual.org.



DMV Cath Lab Case Review

Virtual course, monthly, evenings

Colleagues from hospitals in Washington, D.C., Maryland, and Virginia (DMV) engage in thought-provoking discussion regarding interventional cardiology cases.

To request an invitation, please email **lowell.f.satler@medstar.net.**

Regularly scheduled series

Please visit **MedStar.Cloud-CME.com** or call **202-780-1655** for information on all regularly scheduled weekly series, including:

- Cardiac Catheterization Conference
- Cardiac Surgery Grand Rounds
- Cardiology Grand Rounds
- Cardiac Ultrasound and Advanced Imaging Conference
- Electrophysiology Core Curriculum Conference

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Electrophysiology
202-877-7685

Interventional cardiology
202-877-5975

Vascular surgery
202-877-0275

MedStar Union Memorial Hospital

To schedule procedures:
1-888-529-0200 or
call the HeartLine:
410-554-2332

MedStar Southern Maryland Hospital Center

Electrophysiology
301-877-5677

Interventional cardiology
301-877-5677

Vascular surgery
301-877-7353

MedStar Franklin Square Medical Center

To schedule procedures:
1-888-529-0200 or
call the HeartLine:
410-554-2332

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