Leading the evolution of cardiovascular care.

The true hallmarks of a world class cardiovascular program are having extraordinary breadth and depth of knowledge extending across intersecting specialties, strengthened by an organization that supports those efforts resulting in superior clinical outcomes. I am pleased to present this MedStar Heart & Vascular Institute Capabilities Performance and Outcomes Report, in which I believe these attributes are demonstrated in abundance.

The report displays our continued dedication to increasing understanding of cardiovascular care across the wide geographic region that we serve. No matter the patient’s point of entry, it is our promise that each will receive the same high-quality care. Additionally, our growing understanding of the connectivity between organ systems and disease states demands an approach that facilitates linkages that span traditional specialty lines, and our “systemness” connects these efforts in this kind of collaboration.

There has been no greater test of our system’s personal and professional ability to adapt than the worldwide coronavirus pandemic. We quickly ramped the way we interact with patients and with each other. Virtual patient appointments replaced in-person encounters whenever possible. Conferences turned virtual almost overnight. A robust digital campus was created for continuing education. All of this has been a nearly seamless transition and the experience and creativity will doubtless have an impact on how we deliver medical care and continually educate ourselves as long after COVID-19 is no longer an immediate threat.

A great cardiovascular program is first and foremost built upon a contingent of superior clinicians who interact and collaborate freely with one another. Our success is the result of a talented multidisciplinary cadre of experts—outstanding leaders in their fields. I am delighted to welcome Abeel Mangi, MD, as the system chief of Cardiovascular Surgery. Dr. Mangi comes to us from his position as professor of surgery and surgical director of the Structural Heart and Cardiac Valve Program at Yale New Haven Health. He takes the helm of a cardiac surgery program that has set the standard in our region for nearly four decades.

Our groundbreaking research enterprise continues to grow exponentially, with dozens of clinical trials underway. Likewise, we continue to enrich physician training, including a recent expansion of our highly selective MedStar Georgetown University-Washington Hospital Center Cardiovascular Disease Fellowship Program, now one of the largest in the nation.

All of that we do is singularly focused on improving the lives of our patients and the well-being of our community at large. I welcome your comments, feedback, and participation in our programs.

Throughout this report, we share our best available data. In many cases, due to the consequences of the COVID-19 pandemic, that data is calendar year 2019. Please submit any comments to charles.m.gill@medstar.net or jennifer.e.freas@medstar.net.

Visit us at MedStarHeartInstitute.org.
Structural heart disease

Drawing from the collective expertise of cardiac surgeons, interventional cardiologists, cardiac imaging specialists, and others, we offer the widest range of treatment options and devices for patients with structural heart disease. Our multidisciplinary team analyses each case to determine the optimal approach to achieving sustainable results. We manage the most challenging cases and often provide second opinions, as well as alternative options for interventions and devices.

**Mitrval and tricuspid valve interventions**

As leaders in aortic valve procedures, we continue to expand options available for patients with mitral and tricuspid valvular disease.

- **MitralClip**® is a transcatheter mitral valve replacement (TMVR) device that is delivered percutaneously. As part of the ongoing, early feasibility study, we are evaluating its use for treatment of degenerative mitral regurgitation in patients considered high risk for open surgery.

- We are the second high-volume center in the country for the AORTIC trial, testing the safety and efficacy of the **Intrepid™** transcatheter mitral valve replacement system as an alternative to open-heart surgery.

- **The trileaflet TAVR system** is a new option for patients with severe, symptomatic mitral regurgitation, currently under investigation in the MOSAIC trial.

- **Transcatheter Mitral Graftendorf Ablation** involves a new technique and device that was developed in partnership with the National Institutes of Health. The procedure involves a novel, minimally-invasive approach to ablation of the mitral valve and annulus, using a new device that is designed to deliver ablative energy directly to the mitral valve annulus, reducing the need for mitral valve surgery.

- **In the CLASP IID clinical trial, the Edwards FASCIA™ transcatheter valve replacement system** was tested in patients with degenerative mitral regurgitation who are at prohibitive risk for open surgery.

- **As an alternative to open-heart surgery, patients with symptomatic severe mitral valve regurgitation are benefitting from the AltaValve™ TMVR system**.

- **In the CLASP IID clinical trial, the Edwards FASCIA™ transcatheter valve replacement system** was tested in patients with degenerative mitral regurgitation who are at prohibitive risk for open surgery.

- **The Intrepid™ system** is being evaluated in patients with degenerative mitral regurgitation who are at prohibitive risk for open surgery.

- **The FASPICA™ transcatheter valve replacement system** was tested in patients with degenerative mitral regurgitation who are at prohibitive risk for open surgery.

- **B. Mitral valve disease**

  - **MitraClip™**
  - **MitraDock™**
  - **Telescope™ transcatheter mitral valve replacement (TMVR) system**
  - **ENCIRCLE trial for SAPIEN M3 System**

- **Aortic valve disease**

  - **SAPIEN™ 3**
  - **COREValve®**, **Evolut™ PRO**
  - **Portico™ (trial)**

- **Transcatheter Mitral Valve Replacement System**

  - **SAPIEN S3™ Ultra**
  - **Amplatzer™ Para-valvular leak**

- **Transcatheter Aortic Valve Replacement (TAVR)**

  - **Xience™, Evolut™ PRO**

- **D. Stroke prevention and AFib**

  - **WATCHMAN FLX™ device**
  - **VSD occluder**
  - **PFO occluder for cryptogenic stroke**

- **C. Congenital heart defects**

  - **PFO occluder for cryptogenic stroke**
  - **WATCHMAN FLX™ device**
  - **VSD occluder**

- **B. Mitral valve disease**

  - **Intrepid™ Transcatheter Mitral Valve Replacement (TMVR) system**
  - **MitraClip™**
  - **MitraDock™**

- **A. Aortic valve disease**

  - **SAPIEN™ 3**
  - **CoreValve®, Evolut™ PRO**

- **E. Dysfunctional RVOT conduit/obstruction-LAMPOON Procedure**

  - **MitraClip™**
  - **MitraDock™**

- **F. Cerebral protection**

  - **Sentinel®**
  - **Melody™ Transcatheter Pulmonary Valve**

- **D. Stroke prevention and AFib**

  - **WATCHMAN FLX™ device**
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Interventional cardiology
The specialists in our cardiac catheterization labs see high volumes of patients, affording an elevated degree of experience and expertise to diagnose critical patients and treat complex cases.

- 2,631 Percutaneous coronary interventions (PCIs)
- 7,860 Diagnostic catheterizations
- 133 MitraClips to date
- 56 PFO closures

Average primary PCI door-to-balloon time is 61 minutes

National benchmark: 90 minutes

Success rate of PCIs for chronic total occlusions is 92.5%

- Patients return home same day
- 25-30%

Leading the transradial approach
Throughout the system, our specialists select the site of catheter access—radial or femoral—depending on the specific device and the unique health status of each patient.

When appropriate, transradial cardiac catheterization provides less risk of bleeding, lower mortality, and increased comfort for the patient. Patients are often able to return home within hours of their procedure.

At MedStar Union Memorial Hospital, we use radial access for 90 percent of both diagnostic and interventional procedures, more than twice the average reported by the ACC. Patients recover in a dedicated lounge, with WiFi, iPads, and private areas to wait with their visitors.

Our extensive involvement in new research provides access to the latest available technologies, customized for our patients. Some key innovations include:

- A NO-CAD clinic for INOCA (ischemia with no obstructive coronary artery disease). The objective is thorough evaluation and treatment for this previously underserved and often undiagnosed population.
- The Heart-Brain Team at MedStar Washington Hospital Center, a collaboration between neurologists and interventional cardiologists, initially developed to determine if PFO closure is an optimal treatment for patients with stroke. Teams system-wide performed 56 PFO closures in 2019 and the volumes continue to grow.
- Clinical use of our state-of-the-art cardiac imaging abilities, such as fractional flow reserve derived from CT, to better evaluate and treat coronary anatomy and indeterminate stenoses. Read more about our imaging technology on page 28.
- Early adoption of the MitraClip®. To date, we have performed 133 transcatheter mitral valve repairs using the MitraClip. Now that the technique has been approved for use in patients with asymptomatic moderate-to-severe or severe mitral functional regurgitation, we continue to grow our volumes and offer this expanded pool of patients.
Our cardiac surgeons, in addition to producing some of the finest outcomes and strongest volumes in the country, are leaders in professional societies, research, and education. They collaborate with subspecialists across the cardiovascular spectrum, (aortic disease management, vascular surgery, electrophysiology, advanced heart failure, LVAD implantation, transplantation, interventional cardiology, and structural heart disease) nationally and internationally.

They are among the top 5 centers in the country for LVAD implantation volumes.

Our team performed 29 heart transplantations in 2020, making us one of the busiest centers in the mid-Atlantic region.

The Intrepid™ TMVR system is a new option for patients with severe, symptomatic mitral regurgitation, currently under investigation in the APOLLO trial.

Together with vascular surgery, our Aortic Disease Management program accepts referrals for emergent, urgent, and elective evaluation and treatment of any routine or complex aortic disease. Read more on page 10.

We perform combined endocardial and epicardial ablations and other complex hybrid procedures, including convergent procedures and de novo thoracoscopic ablation for the treatment of inoperable sinus tachycardia (STT) and posterolateral tachycardia syndromes (POST).

Read more about these collaborations and others on the pages that follow.

Michael Fiocco, MD
Chief, Cardiac Surgery
MedStar Union Memorial Hospital

Christian Shults, MD
Interim Chief, Cardiac Surgery
MedStar Washington Hospital Center

Abeel A. Mangi, MD, named as new MedStar Health Chair of Cardiac Surgery. Arriving this spring, Abeel A. Mangi, MD, will lead the cardiac surgery programs across MedStar Health. He most recently served as Surgical Director of the Structural Heart and Cardiac Valve Program for Yale New Haven Health, where he was also Managing Director of the Yale Cardiac Surgery Network; and the Director of System Integration and Quality.

Dr. Mangi specializes in complex and re-operative cardiac surgery, aortic and mitral valve repair and replacement, transcatheter valve repair and replacement, and ascending aorta and aortic arch surgery.

He earned his undergraduate and medical degrees from Brown University. After completing his residency in general surgery at the Massachusetts General Hospital/Harvard Medical School, he received a postdoctoral National Research Service Award fellowship from the National Institutes of Health and pursued award-winning stem cell research at Brigham and Women’s Hospital. He completed his fellowship in cardiac surgery at Columbia University Medical Center prior to faculty appointments at the Cleveland Clinic, Temple University, and for the past ten years, Yale New Haven Health, where he is also Managing Director of the Yale Cardiac Surgery Network.

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MedStar Heart & Vascular Institute

Aortic disease management

The aortic disease management program is one of the largest in the mid-Atlantic and our teams perform more aortic interventions than any other program in the region. We treat the most complex cases—including patients who have been denied care elsewhere—with the full spectrum of available options, including open, minimally invasive, and transcatheter approaches.

Patients benefit from a team that is truly multidisciplinary, led by cardiac and vascular surgeons. Together, they perform a collaborative assessment to determine the patient’s least invasive, most effective, solution. Procedures take place in a hybrid operating room to allow for both open and endovascular approaches, as well as contemporaneous imaging.

Clinical trial highlights

• **GORE® TEE Thoracic Branch-Endoprosthesis (TBE Device) for the treatment of lesions of the aortic arch and descending thoracic aorta**

• **GORE® TAMBE Thoracoabdominal Branch-Endoprosthesis for the treatment of thoracoabdominal and paraaortic aortic aneurysms**

• **ChEVAR pararenal aortic aneurysm repair using aortic sac management system by Endologix**

• Physician-sponsored IDE for repair of juxtarenal, pararenal, and thoracoabdominal aortic aneurysms

0% Mortality rate

Abdominal aortic aneurysm (AAA) elective infrarenal repair

0% Mortality rate

Ascending aortic elective procedures

58

Aortic root elective procedures

Complex Aortic Centers

Located at MedStar Washington Hospital Center and MedStar Union Memorial Hospital, we offer 24/7 referral for emergent, urgent, and elective evaluation and treatment of complex aortic disease.

Complex referral cases may include:

- Aortic dissection
- Aneurysm
- Occlusion
- Intramural hematoma
- Penetrating ulcer
- Other aortic pathology

Our MedSTAR Transport service provides expedited air and ground access to care, regardless of patient location. We accept all transfers.

To refer a patient and arrange for a 24/7 transfer, call:

Washington, D.C. region: 800-824-6814
Baltimore region: 410-554-2332

Cardiac surgeon Christian Shults, MD, and vascular surgeon Javeriah Fatima, MD

Cardiac surgeon Ricardo Quarrie, MD, andvascular surgeon Raghuveer Vallabhaneni, MD

Vascular surgeon Suzanne Knod, MD, cardiac surgeon Ricardo Quarrie, MD, and vascular surgeon Baghvand Vahidifard, MD

MedStar Health | Aortic Disease Management

MedStar Heart & Vascular Institute | Aortic Disease Management

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MedStar Health | Aortic Disease Management

MedStar Heart & Vascular Institute | Aortic Disease Management
**Vascular surgery**

The MedStar Health vascular program is the largest in the region and among the most sophisticated in the nation. Our diverse team specializes in the diagnosis and treatment of all vascular disorders, from the common to the esoteric, including acute and chronic deep vein thrombosis, inferior vena cava occlusive disease, and retained IVC filter.

**Carotid artery disease**

Our expertise covers the spectrum of carotid diseases, including treatment for stenosis, tumor, and aneurysm.

**Peripheral arterial disease**

PAD is managed at every stage, beginning with non-invasive screenings, through all varieties of therapy and intervention.

**Aortic disease**

We provide treatment for all aortic pathologies, from stenosis to aneurysms. We are leading the region in the use of the novel TCAR procedure.

**Deep venous disease**

We treat all forms of deep venous disease with open and endovascular techniques, including acute and chronic deep vein thrombosis, inferior vena cava occlusive disease, and retained IVC filter.

**Cosmetic and varicose veins**

MedStar Health Vein Centers are convenient outpatient clinics dedicated to the treatment of venous disease, including cosmetic and functional. These boutique settings offer clients the comfort and luxury of a specialty vascular center, paired with the expertise of vascular surgeons who provide comprehensive diagnostics and treatment in the event of a more serious underlying condition. Each center has an on-site, accredited vascular lab staffed with licensed technologists who can run tests for fast, same-day turnarounds. Services are now available at nine locations in Maryland, Virginia, and Washington, D.C.

**Stroke rates**

We are part of the ClotTriever Outcomes registry (CLOUT) for treatment of acute, subacute, and chronic clots with single-session thrombectomy using the ClotTriever® Thrombectomy System.

**Innovation highlights**

We are part of the Innovation Highlights program, a national quality program of the Centers for Medicare & Medicaid Services national standard is 66 percent. We are the only provider in the region to participate in the Innovation Highlights program, which allows for more thorough removal of acute, subacute, and chronic clots with single-session thrombectomy using the ClotTriever® Thrombectomy System.

**Revascularization (TCAR)**

We are the only provider in the region to offer endovascular, minimally invasive technique combining open and endovascular surgery to treat deep vein post-thrombotic syndrome.

**Deep venous disease**

We treat all forms of deep venous disease with open and endovascular techniques, including acute and chronic deep vein thrombosis, inferior vena cava occlusive disease, and retained IVC filter.

**Carotid revascularization strike rates**

We are part of the ClotTriever Outcomes registry (CLOUT) for treatment of acute, subacute, and chronic clots with single-session thrombectomy using the ClotTriever® Thrombectomy System.

**Vascular access program**

We provide the largest vascular hemodialysis access program in the mid-Atlantic region, an area with some of the highest rates of dialysis dependence in the United States. We focus on maintaining new and existing vascular access lines, while managing percutaneous fistulae, AV fistule, and bypass grafts. Our prevalent arteriovenous fistula rate is 70 percent, thereby reducing infection and improving mortality. The Centers for Medicare & Medicaid Services national standard is 66 percent.

**Innovation highlights**

We are the regional leader in InMotion® graft placements and have among the highest volumes in the country. We also serve as a regional proctor for the approach. The specialized grafts applicable for patients in whom access cannot be obtained through the standard route, due to blocked vein or previous surgery.

**Deep venous disease**

We treat all forms of deep venous disease with open and endovascular techniques, including acute and chronic deep vein thrombosis, inferior vena cava occlusive disease, and retained IVC filter.

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<tbody>
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<td>Raghuveer Vallabhaneni, MD</td>
<td>Washington, DC 20007</td>
<td>106 Irving St., NW Washington, DC 20007</td>
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<tr>
<td>Krystal C. Maloni, MD</td>
<td>MedStar Washington Hospital Center</td>
<td>202-713-7710</td>
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<tr>
<td>Ayesha Hatch, MD</td>
<td>MedStar Union Memorial Hospital</td>
<td>202-444-2255</td>
</tr>
<tr>
<td>John Harvey, MD</td>
<td>MedStar Medical Center</td>
<td>877-376-2434</td>
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<tr>
<td>Faris Z. Hakki, MD</td>
<td>MedStar Health at Chevy Chase</td>
<td>703-286-2720</td>
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<tr>
<td>Arthur Flatau, III, MD</td>
<td>MedStar Health at McLean</td>
<td>866-955-5354</td>
</tr>
<tr>
<td>Javairiah Fatima, MD</td>
<td>MedStar Health at Prince Frederick</td>
<td>410-350-3357 (call center, front desk)</td>
</tr>
<tr>
<td>Steven D. Abramowitz, MD</td>
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<td>Samsung M. Kiuchi, MD</td>
<td>MedStar Franklin Square Medical Center</td>
<td>410-571-8430</td>
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<td>Lucy B. Kapurtshiev, MD</td>
<td>MedStar Franklin Square Medical Center</td>
<td>443-444-3431</td>
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<td>MedStar Health Cardiology Associates</td>
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Cardiac electrophysiology

The Section of Cardiac Electrophysiology (EP) aims to provide comprehensive, cutting-edge, personalized heart rhythm care for every single one of our patients, close to home and work. MedStar Health offers one of the largest and most geographically expansive EP service lines in the country, with 23 convenient locations in Maryland, Washington, D.C., and Virginia. We manage the full spectrum of heart rhythm conditions and are the region’s leading referral center, offering highly technical procedural care along with longitudinal outpatient management in concert with and in support of our referring physicians. High-volume experience and concentrated expertise, coupled with state-of-the-art technology, distinguish this program.

Innovation
MedStar Health Cardiac Electrophysiology Director Zayd A. Eldadah, MD, PhD
Electrophysiologists

19
Locations

23
Electrophysiologists

WATCHMAN™
MedStar Health pioneered development of the original WATCHMAN PFO closure device over 15 years ago and was the first institution in the region to implant it. Today, we are among the country’s highest volume implantation programs for this device.

563
WATCHMAN procedures to date

1,637
Cardiac ablations

Our cardiac electrophysiologists also contributed to the development of cryoballoon ablation for atrial fibrillation and continue to be among the country’s highest volume experts employing this technology.

As an internationally recognized contributor to advances in this field, our team continues to play a critical role in the development of devices and approaches, including these recent highlights:

- Foregoing some standard postablation procedures as cardiac catheterization (CI) is now a standard of care for many patients.
- Testing novel multi-electrode radiofrequency balloon catheters for the treatment of mitral valve regurgitation as one of the country’s highest volume centers.
- Testing new balloon closure systems to address mitral valve regurgitation.
- Launching clinical trials of percutaneous mitral annuloplasty, using a next-generation transcatheter device.
- Participating in a groundbreaking minimally invasive MitraClip® procedure.
- Pioneering same-day discharge after catheter procedures as one of the country’s highest volume centers.
- Testing novel PFO closure devices to address mitral valve regurgitation.
- Ongoing study of a next-generation ICD system, in which defibrillation therapy is delivered by a lead placed outside of the heart and veins.

Harnessing our partnership with the Cleveland Clinic’s Miller Family Heart, Vascular, and Thoracic Institute, we work closely to redesign the EP Labs at MedStar Union Memorial Hospital, resolving issues including fluoroscopy software, surgical lighting, family heart, vascular, and thoracic Institute, we work closely to redesign the EP Labs at MedStar Union Memorial Hospital, resolving issues including fluoroscopy software, surgical lighting, family heart, vascular, and thoracic Institute, we work closely to redesign the EP Labs at MedStar Union Memorial Hospital, resolving issues including floroscopy software, surgical lighting, family heart, vascular, and thoracic Institute, we work closely to redesign the EP Labs at MedStar Union Memorial Hospital, resolving issues including fluoroscopy software, surgical lighting, family heart, vascular, and thoracic Institute, we work closely to redesign the EP Labs at MedStar Union Memorial Hospital, resolving issues including fluoro...
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<tr>
<td>Baltimore</td>
<td>5601 Loch Raven Blvd., Ste. 206</td>
<td>410-544-6727</td>
<td>Cardiac Electrophysiology</td>
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<td></td>
<td>MedStar Good Samaritan Hospital</td>
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<td></td>
<td>9105 Franklin Square Dr., Ste. 306</td>
<td>202-877-7685</td>
<td>Cardiac Electrophysiology</td>
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<td>MedStar Health Cardiology Associates</td>
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<td></td>
<td>7501 Surratts Rd., Ste. 304</td>
<td>301-877-5677</td>
<td>Cardiac Electrophysiology</td>
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<td>Hagerstown</td>
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As the most comprehensive advanced heart failure program in the area, our multidisciplinary team provides regional coverage across hospitals and outpatient clinics, bringing sophisticated disease management closer to patients.

We offer advanced drug therapy, mechanical circulatory support, and heart transplantation—often for patients whose case complexity or advanced disease state precludes them from receiving care at other centers.

This program intersects with other subspecialties across our system. Our patients have access to:

- A dedicated cardiogenetics specialist (more on page 25)
- Pulmonary hypertension expertise (more on page 26)
- Early identification and diagnosis through specialized cardiopulmonary stress testing
- Delivery of home-based, intravenous, inotropic drugs, for patients with end-stage disease
- Palliative care planning, embedded with symptom management and family support

Our interdisciplinary team meets weekly to discuss details of each patient’s plan of care. More than 75 professionals participate, including:

- Cardiologists and cardiothoracic surgeons
- Internists
- Hospitalists
- Advanced practice providers
- VAD and transplant coordinators
- Nurse navigators
- Clinic and home health nurses
- Nutritionists
- Medical ethicists
- Palliative care specialists
- Social workers
- Physical and occupational therapists
- Pharmacists

Innovative new treatments and phases 3/clinical trials may soon offer treatment options that can make the difference between life and death for patients:

- In HELIOS-B, a worldwide, multicenter study, we are evaluating the efficacy and safety of Venetoclax in patients with transthyretin amyloidosis with cardiomyopathy (ATTR-TTR amyloidosis with cardiomyopathy).
- In CARDIO-TTR, we are investigating the use of AKCEA-TTR-LRx (ION-682884) compared to placebo in patients with transthyretin-mediated amyloid cardiomyopathy (ATTR-CM).

Infiltrative cardiomyopathy

Our infiltrative cardiomyopathy program provides diagnoses and management for all forms of infiltrative cardiomyopathy, including the most common and challenging forms: cardiac sarcoidosis and cardiac amyloidosis.

Innovative new medications and phase 3/clinical trials may soon offer treatment options that can make the difference between life and death for patients:

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Hypertrophic cardiomyopathy

Our hypertrophic cardiomyopathy program provides diagnoses and management for all forms of hypertrophic cardiomyopathy, including the most common and challenging forms: hypertrophic cardiomyopathy and infiltrative cardiomyopathy.

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Full range of therapies for heart failure patients

Prescription medications
Intravenous inotropic agents
Mechanical circulatory support
Heart transplantation
**Ventricular assist devices**

In 1988, we became one of the first centers in the world to implant a ventricular assist device (VAD). The program has grown continuously with multiple devices and superior survival rates for even the most critical, highly complex patients—those who are often denied treatment at other centers.

- 60% of implantations are currently performed through a minimally invasive technique. Studies of the HeartMate III show that the most common complication is driveline infection, which occurs in 7% of SWIP patients. The HeartMate 3/VAD. The approach results in less bleeding and fluid retention, shorter ICU and hospital stays, and possibly reduced risk of stroke and infection.
- Our VAD lower thoracic access is designed for patients with minimal family support or those who require ongoing mechanical circulatory support.
- Through a robust local ECMO and Impella 5.0/5.5 program, patients presenting with cardiogenic shock will be supported by a circulatory bypass system until VAD implantation after a period of acute mechanical support. This approach continues through participation in the Paragonix SherpaPak™ Cardiac Transport System, which allows our team to transplant highly complex, severely ill patients with minimal family support by providing the critical medical and social care needed.
- Our goal of offering this life-saving procedure to more patients.
- We are one of five regional heart transplant programs participating in an NIH research project to evaluate novel methods to non-invasively assess rejection obviating the need for biopsy.

**Heart transplantation**

Since performing the first heart transplantation in Washington, D.C., in 1987, we remain committed to expanding our program with the ultimate goal of offering this life-saving procedure to more patients.

- Top 5 heart transplant centers in the country.
- Among the top 5 centers with highest volumes of VAD implants in the country.
- 700+ VADs implanted to date.
- TOP 5 Heart Transplant Centers.
- Medical Director.
- 350+ Heart transplants since 1987.
- *Through our use of the Paragonix SherpaPak™ Cardiac Transport System, we have minimized deaths in our donor program and have expanded our opportunities for transplantation by allowing retrieval of donor hearts from further distances.*
- We are able to transplant hearts from Hepatitis C positive donors without inducing immunosuppression. The hypothesis is that the number of transplantable hearts may increase by more than 15 percent per year.

**TOP 5**

Among the top 5 centers with highest volumes of VAD implants in the country.

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**VAD IMPLANTS**

- Post implant survival.
- Adults waiting list mortality rates.
- Heart transplantation one-year survival.
- Heart transplantation volumes.

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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.

For more than 60 years, we have served as a major referral site locally, across the mid-Atlantic region, and the country. Our providers are embedded in each subspecialty detailed in this report, as well as the unique programs highlighted here.

**Clinical cardiology and specialty programs**

Cardio-oncology

Cardio-oncology is a medical subspecialty dedicated to minimizing the effects of cardiovascular morbidity and mortality in people with cancer. Chemotherapy and radiation therapy, along with new cancer treatments, can contribute to a number of cardiovascular complications including heart failure, coronary artery disease, heart rhythm disorders, peripheral vascular disease, valvular heart disease, and more.

We are committed to supporting effective methods for fighting cancer while minimizing the impact on heart function. Our multi-site consultative practice can establish a comprehensive cardiovascular treatment plan before, during, and after a patient’s cancer treatment.

From the program’s initiation in 2012, we have been a national leader in this field, pioneering and participating in progressive research to develop new cardiovascular diagnostic and treatment protocols that are compatible with evolving oncologic approaches. Ana Barac, MD, PhD, served as the founding chair of the American College of Cardiology’s new Cardio-Oncology Council from 2015 to 2019 and is the director of the ACC Live course on Advancing Cardiovascular Care in Oncology Patients. She also is an associate editor of the JACC: CardioOncology.

Ambulatory cardiology practices

MedStar Health ambulatory services expands cardiovascular expertise to the outpatient setting throughout Maryland, Northern Virginia, and Washington, D.C. Our 89 providers are available at these sites, allowing for streamlined follow-up close to home.

- We integrate telehealth, remote monitoring programs, and regional image sharing systems into our practices, further expanding convenience for patients.
- As part of our Urgent Heart program, patients can be triaged in the emergency department and receive rapid discharge with follow-up by a cardiologist within 24 hours, avoiding the delay associated with obtaining a specialist appointment.
- We are at the forefront of guideline creation in our post-COVID recovery program. Patients with a history of COVID-19 can receive cardiac screenings, multidisciplinary clearances for return-to-work, and rehabilitation to treat any unique and lingering effects of the disease.
- A core group of cardiologists are standardizing cardiovascular screening and treatment through the women’s heart health program. Niche areas of care may include causes related to pregnancy, cancer treatment, and genetics. The team effectively transitions patients between inpatient and outpatient settings as appropriate.

Cardiogenetics

Our cardiogenetics practice offers genetic testing and counseling to patients and their family members. Monisha Keding, our dedicated genetic counselor, works across cardiovascular subspecialties to provide early detection and insights into optimal treatment for patients, including particularly complicated diagnoses such as transthyretin amyloid, long QT hypertrophic cardiomyopathy, dilated cardiomyopathy, Brugada syndrome, and familial hypercholesterolemia.

For a consultation, please call 202-877-GENE (4363).
Sports and Performance Cardiology

MedStar Sports & Performance Cardiology is one of the few formal programs in the nation to focus on heart disease in the athlete. Our director Ankit Shah, MD, is a graduate of the Massachusetts General Hospital sports cardiology fellowship program—the only one in the nation. With one foot firmly planted in cardiology and the other in sports medicine, his training ties the two disciplines tightly together.

The program focuses on:

- Preventing sudden, unexpected cardiovascular-related death among athletes
- Helping “weekend warriors” and professionals return to play after myocarditis, myocardial infarction, and other serious heart conditions
- Assisting top athletes enhance cardiovascular performance

We offer specialized cardiopulmonary exercise testing, which provides each athlete with personalized data and insight into potential conditions. Dr. Shah also works with professional teams such as the Baltimore Orioles, Baltimore Ravens, Washington Capitals, and USA Swimming, to help the athletes maximize their performance.

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

Pulmonary Hypertension

Despite major advances in our understanding of pulmonary hypertension (PH) and the availability of 14 FDA-approved medications to treat it, survival remains poor.

Our PH program offers comprehensive evaluation and diagnosis of all forms of PH, plus the full range of management options including the most advanced therapy—prostacyclin infusion.

We collaborate with other internationally recognized programs to provide access to lung transplantation and other specialized surgery applicable to treating chronic thromboembolic PH. Through our partnership with the National Institutes of Health PH program and participation in other clinical trials, we can offer unique therapy options to our patients. We work closely with the Pulmonary Hypertension Association to provide support to patients and their families in coping with this complex disease.

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

The Good Health Center

The Good Health Center at MedStar Good Samaritan Hospital manages patients with heart failure through the myriad services in the outpatient setting for medications, same-visit lab work, coordination with interventional radiology and other imaging modalities, ultrafiltration, and amyloidosis workups are all offered at the Center. Also on site are cardiac and pulmonary rehab, a lymphedema clinic, a clinical pharmacist, dietitian, and mental health support.

The team manages patients quickly and temporarily, ad hoc, or for long-term, life-long care. We address economic and nutritional barriers, connect patients to mental health providers and support groups, help with transportation, and offer free membership to the on-site gym. We also set up home health services upon hospital discharge.

These services work together to improve patient health and quality of life, and reduce hospital readmissions and length of stay.

We accept referrals from any hospital system.

For more information, call 443-446-5993.

Palliative Care

Palliative care specialists are always brought into the process of developing patient care plans when clinically appropriate. These specialists are embedded in our multidisciplinary teams and support patients and their families, and to co-manage goals for care and management of symptoms. This full integration of palliative care into heart failure treatment in particular, is an essential element of patient care. We are proud to have pioneered this personalized and holistic approach.
Medical and surgical specialists across MedStar Heart & Vascular Institute rely on cardiovascular imaging in the diagnosis and treatment of patients. Our patients also benefit from the use of sophisticated and appropriate images in determining their risks and improving their outcomes. Our long-term collaboration with researchers and clinicians from the National Institutes of Health further advances our capabilities.

If you have an image you’d like to discuss, you may upload it to MedStarImageShare.com or call 202-877-5975.

**Echocardiography in the cloud**

Secure digital repositories house all echocardiogram data regardless of where patients undergo a test within MedStar Health. Their results will be available to our clinicians anywhere in their respective regions.

The technology enhances real-time collaboration among our cardiovascular specialists, and provides the free flow of information by putting studies and images in the hands of the most experienced readers, wherever they may be located.

Patients have the benefit of quicker turnaround times, flexible testing locations, and fewer test duplications.

**New cardiovascular imaging options**

Expanding upon previous imaging abilities, the new Thoma Advanced Cardiovascular Imaging Center at MedStar Washington Hospital Center provides pioneering cardiac imaging technology. Baltimore-area patients may have their imaging completed at MedStar Union Memorial Hospital, and read at MedStar Washington, reducing their need to travel.

- **Siemens Dual Source CT scanner SOMATOM® Force**
  - Higher temporal resolution at faster heart rates
  - Significantly lower radiation dosing
  - Reduced contrast dosing
  - Intelligent automation
  - More accurate scanning, especially in technically challenging cases

- **Siemens MAGNETOM® Sola 1.5T MRI**
  - Larger magnet bore for increased patient comfort
  - Faster sequences to support improved imaging in technically challenging situations (e.g., arrhythmia)

- **HeartFlow® FFRCT Analysis**
  - New software offers visualization and physiologic evaluation of coronary stenoses, providing:
    - More accurate evaluation of coronary anatomy and stenoses
    - A reduction in unnecessary catheterization
    - Greater operator perspective and planning prior to intervention

**Cardiovascular imaging**

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  - Higher temporal resolution at faster heart rates
  - Significantly lower radiation dosing
  - Reduced contrast dosing
  - Intelligent automation
  - More accurate scanning, especially in technically challenging cases

- **Siemens MAGNETOM® Sola 1.5T MRI**
  - Larger magnet bore for increased patient comfort
  - Faster sequences to support improved imaging in technically challenging situations (e.g., arrhythmia)

**HeartFlow® FFRCT Analysis**

New software offers visualization and physiologic evaluation of coronary stenoses, providing:

- More accurate evaluation of coronary anatomy and stenoses
- A reduction in unnecessary catheterization
- Greater operator perspective and planning prior to intervention
Cardiovascular critical care

In keeping with our overall mission, our cardiovascular critical care service continues to meet the increasingly complex needs of our patients. We provide post-operative care for those who have undergone surgical procedures, along with cardiac medical conditions and treatments.

Comprehensive services for high-acuity, complex patients

- 24/7 coverage by a multidisciplinary team of providers
- 80 beds for complex surgical and medical patients
- Rooms with ceiling-mounted booms carrying medical gases, and electric and data outlets allow ultimate flexibility and unrestricted access from all four sides of the bed
- Capability to provide temporary circulatory support, including veno-arterial (VA) ECMO, intra-aortic balloon, as well as temporary percutaneous venous assist devices (LVAD, RVAD, BIvAD, Impella)
- Recent expansion of CV critical care at MedStar Union Memorial Hospital increases its ability to provide sophisticated and holistic care for complex patients with multi-system organ dysfunction

Multidisciplinary, specialized team

- Cardiac intensivists uniquely trained in both cardiology and critical care
- Physicians specialized in critical care medicine with primary board training in internal medicine, anesthesiology, surgery, and emergency medicine
- Advanced practice providers (APP), including nurse practitioners and physician assistants, specialized in the unique care of cardiac and vascular patients
- Nurses with specialized training in CVICU care

Holistic, family-focused care

- Interdisciplinary rounds are made with family members and all members of the care team, including physicians, APPs, nurses, and other clinicians
- 24/7 family visitation is encouraged
- Palliative care is fully integrated

In-house training and continuing education

- The care team undergoes a rigorous in-house training program that includes simulation training in high-acuity situations, such as emergency rethorotomy and Cardiac Advanced Life Support, intra-aortic balloon pump placement, and transvenous pacemaker placement

Cardiac hospitalists

Our hospitalists are dedicated to cardiovascular care and provide 24/7 coverage. This team manages care for patients of admitting cardiologists and may serve as a liaison to community physicians upon discharge. They are also involved in quality improvement initiatives across the inpatient service.

Cardiac anesthesiologists

Fellowship-trained anesthesiologists manage the unique challenges of cardiovascular patients. These patients often have multiple comorbidities and undergo complex, sophisticated procedures. This anesthesiology team provides critical pre-, intra-, and post-operative management.

Advanced practice providers

Our advanced practice providers (APPs) are an integral and growing group of cardiovascular specialists. They provide care throughout the system—in acute settings, inpatient sites, and ambulatory care locations. Thirty-five years ago, we were on the leading edge of APP utilization and we continue to support the expansion of their focus areas today.

- ECHO technology
- Medication titration
- Electrophysiology procedures
- Pulmonary hypertension therapies

Nursing

The high-acuity and case complexity of our patients requires sophisticated nursing expertise. Our nurses play a critical role throughout the patient journey, and are involved in niche medical and surgical therapies including:

- ECMO technology
- Device monitoring, including the Impella 5.5
- COVID-19 treatment protocol

Education and certification highlights

- Continuing education and advanced certifications on a regular basis for our nursing teams. Some recent highlights include: The first acute care hospital in Washington, D.C. to receive the Pathway to Excellence designation from the American Nursing Credentialing Center Certification of our nursing residency program by the Commission on Collegiate Nursing Education Certification of a high percentage of our CVICU nurses by the American Association of Critical-Care Nurses

80 Beds for complex surgical and medical patients
We are committed to developing new technologies and strategies to advance clinical knowledge and provide optimal outcomes for all patients. Our research extends throughout MedStar Health, taking place at many of our hospital locations. Ongoing collaboration with the National Institutes of Health, the U.S. Food and Drug Administration, the Centers for Medicare & Medicaid Services, and other leading institutions advances our participation in some of the world's most progressive cardiovascular investigations.

The MedStar Cardiovascular Research Network, part of MedStar Health Research Institute, is the infrastructure for clinical studies. Research is further enhanced by our state-of-the-art pre-clinical evaluation, cardiovascular core laboratories, and academic Clinical Research Organization (CRO). World-renowned investigators, basic and translational scientists, interventional cardiologists, research nurses, technicians, sonographers, and support staff comprise the network.

Research

Ron Waksman, MD
Director
Cardiovascular Research and Advanced Education

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

CRT: Cardiovascular Research Technologies

CRT, supported by and located on the campus of MedStar Washington Hospital Center, is designed to provide access to the world’s leading clinicians and the latest research in order to improve practice and treatment outcomes.

• CRTonline provides exclusive interventional cardiology content to keep physicians up to date on the latest developments in the field. Visit CRTonline.org.

• CRTmeeting is one of the world’s leading interventional cardiology conferences, attended by more than 2,000 cardiovascular specialists. At the 2020 meeting, the 24th annual, more than 1,300 presentations and 20 live cases from eight locations around the world were presented. Held each year in Washington, D.C., the conference serves as a forum for physicians and health-care professionals on new cardiovascular technology and interventional procedures in the field. Visit CRTmeeting.org.

• CRTvirtual is a weekly virtual conference on timely topics across the cardiovascular spectrum, including women in heart disease, valve and structural disease, and cardiovascular imaging and physiology. For more information or to register, see page 35 or visit CRTvirtual.org.

• Cardiovascular Revascularization Medicine (CRM) is the official journal of the CRT meeting and is an international, peer-reviewed journal that publishes original laboratory and clinical investigations related to revascularization therapies in cardiovascular medicine.
Graduate medical education

MedStar Health’s graduate medical education program is one of the largest in the United States. Candidates have access to elite clinical programs and faculty, plus some of the most advanced technology and complex patients in the region. We are committed to a rich and rigorous learning environment for our cardiovascular fellows.

Subspecialty opportunities

Fellows have the opportunity to train in a variety of cardiovascular subspecialties:

- General cardiology
- Interventional cardiology
- Heart failure
- Electrophysiology
- Echocardiography
- Cardiac CT and MRI

Diverse experience

Fellows gain experience with a diverse population through rotations at:

- MedStar Washington Hospital Center
- MedStar Georgetown University Hospital
- Washington DC VA Medical Center
- Children’s National Hospital

Research and innovation

Fellows are provided unique opportunities for involvement in research, clinical trials, and publication through our numerous ongoing studies, as well as those at partner programs, including the National Institutes of Health and Cleveland Clinic Heart, Vascular & Thoracic Institute.

Location in the nation’s capital

Our location in Washington, D.C. allows fellows the opportunity for proximate involvement in healthcare advocacy and policy. For example, fellows have joined the American College of Cardiology in discussions with lawmakers on Capitol Hill about issues related to cardiovascular health.

Continuing medical education

Peer collaboration and continuing education are paramount. Our courses and conferences attract hundreds of weekly attendees from across the globe. We invite you to join us.

CRT virtual

Virtual course

Saturdays, 8 a.m. to noon

Each session will include a deep dive into devices, clinical techniques, and research data, as well as case review and challenging issues in coronary, structural heart, and endovascular procedures. Register at CRTvirtual.org.

DMV Cath Lab Case Review

Virtual course

Monthly, evenings

Colleagues from hospitals in 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 series, including:

- Cardiac catheterization
- Echocardiography
- Electrophysiology
- Cardiac surgery
- Cardiology
- Cardio-oncology

*2019-2020 survey not available due to COVID-19

For our 2018/19 cardiovascular fellows give their programs the highest possible rating

94%

of our 2018/19 cardiovascular fellows give their programs the highest possible rating

94%

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94%

of our 2018/19 cardiovascular fellows give their programs the highest possible rating

94%
The Nancy and Harold Zirkin Heart & Vascular Hospital

The Nancy and Harold Zirkin Heart & Vascular Hospital is a state-of-the-art facility on the campus of MedStar Washington Hospital Center. Serving as a cornerstone of MedStar Heart & Vascular Institute, it unites virtually the entire heart and vascular care team in one central location that drives more effective, streamlined care. 

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. Their $10 million leadership gift was the largest single contribution in the history of MedStar Health.

Cleveland Clinic alliance

Now in its ninth year, our clinical and research alliance with Cleveland Clinic’s Miller Family Heart, Vascular & Thoracic Institute offers coordinated collaboration between two of the largest cardiovascular programs in the United States.

At the operational level, our clinicians work closely with quality and safety experts to implement quality improvement initiatives, evaluate treatment protocols, 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.

MedSTAR Transport

Our MedSTAR Transport service sets national standards for the care of critically ill or injured patients. The transfer center operates 24/7, covering the mid-Atlantic region with helicopters and critical-care ambulances. Since its inaugural flight in 1983, MedSTAR Transport has been on the scene for the most dramatic and traumatic events to affect the national capital area, both natural and man-made. Flights are staffed with a critical care nurse and paramedic, providing tertiary-level care in the air. Patients can be transported on multiple vasoactive medications, ECMO, IABP, LVAS, and pressure control ventilation. Nearly 50 percent of transports involve cardiovascular patients.

Quality and safety

MedStar Heart & Vascular Institute has a dedicated quality and safety improvement department operated by approximately 20 physicians, nurses, and support staff. This team monitors more than 150 processes and outcomes metrics across the spectrum of care. A comprehensive review of our quality metrics against internal goals and national benchmarks is performed monthly. In-depth analysis into each of our cardiovascular subspecialties and surgical departments occurs on a rotating basis. Enhancing internal processes is our long-standing, collegial, and transparent relationship with Cleveland Clinic, which helps facilitate rapid-cycle quality improvements. The ability to learn from one another benefits patients and expedites dissemination of successful quality improvement interventions.

We publicly share our performance data with the following registries:

- STS/ACC TVT Registry
- STS
- ACC/NCDR (CathPCI, Chest Pain/MI, ICD)
- AHA Get With the Guidelines®
- AFIb
- LAAD
- Vascular Quality Initiatives (VQI)
- INTERMACS
MedStar Health

MedStar Franklin Square Medical Center
MedStar Georgetown University Hospital
MedStar Good Samaritan Hospital
MedStar Harbor Hospital
MedStar Montgomery Medical Center
MedStar National Rehabilitation Hospital
MedStar Southern Maryland Hospital Center
MedStar St. Mary’s Hospital
MedStar Union Memorial Hospital
MedStar Washington Hospital Center

MedStar Heart & Vascular Institute
110 Irving St., NW
Washington, DC 20010

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