

Froedtert &

MEDICAL
COLLEGE of
WISCONSIN

HEART AND VASCULAR OUTCOMES

2021-2022



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Froedtert & the Medical College of Wisconsin Heart and Vascular Services Director Letter

It is with pleasure and a sense of accomplishment that we present the Froedtert & the Medical College of Wisconsin Heart and Vascular Outcomes Book. This publication highlights cardiovascular clinical performance in our health network and emphasizes our commitment to using data and analytics to provide transparent clinical quality metrics.

As we reflect on the previous year — and plan for the future — we are guided by our vision for the Froedtert & MCW heart and vascular team. Our vision is to be the trusted leader in cardiovascular health by providing a superior patient experience and the best place to work through an unwavering dedication to caring, discovery and innovation.

Striving to live that vision has spurred growth in the cardiovascular team at Froedtert Hospital, the academic medical center of the Froedtert & MCW health network, as well as at our numerous facilities in the communities we serve. This growth helps us offer more access points for cardiovascular care, linking patients to the best of what academic medicine can offer. Through our expertise, combined with access to the latest technology, we provide the most current and cutting-edge treatments for all cardiovascular conditions. We are proud that while our organization has grown larger, we continue to deliver high-quality care with outcomes that meet or exceed the highest national quality metrics across cardiovascular programs.

We have continued to focus on advancing options for all cardiovascular diseases, with an emphasis in select areas, such as advanced heart failure, vascular diseases, arrhythmia, coronary artery disease and heart valve disease. We recently implemented the Froedtert & MCW Complex and High-Risk Coronary Intervention Program to provide comprehensive care for people with the most complex coronary artery disease. Our vascular and endovascular surgery teams are growing and evolving, managing patients with the highest level of acute and chronic vascular problems. Additionally, our cardiothoracic surgery team has continued to offer the most complex cardiovascular surgery options, including the latest mechanical circulatory support device placement, as well as heart and lung transplantation.

In addition to disease-specific programs and new therapies, clinical research and clinical trials are a foundation of the advanced treatment opportunities we offer our patients. This research can lead to treatment options for patients who have had little or no success with other treatment methods.

Our commitment to delivering high-quality care across the cardiovascular disease spectrum continues to be recognized through national awards and top-decile performance outcomes. Our Extracorporeal Membrane Oxygenation (ECMO) Program is recognized as a Gold Level Center of Excellence by the Extracorporeal Life Support Organization, and it continues to be a life-sustaining treatment for critically ill patients.

We have retained a three-star rating from The Society of Thoracic Surgeons for coronary artery bypass grafts. Less than 10% of participating programs earn the three-star rating. Froedtert Hospital was named one of the 50 highest performing cardiovascular hospitals in the nation in IBM Watson Health's annual 100 Top Hospitals® benchmark series. Additionally, each of our hospitals has been recognized for excellence through the American Heart Association Get With the Guidelines® awards for coronary artery disease and heart failure.

Our entire team places a special emphasis on our relationships with referring physicians throughout the region as we collaborate to provide the highest level of care to referred patients. We are grateful for the trust our referring physicians place in us to deliver the best in cardiovascular care, and we are committed to returning patients to their communities and to their referring physicians as soon as possible to continue their long-term care locally.

Guided by our vision, our expert cardiovascular teams are dedicated to providing compassionate, personalized care with the most advanced, comprehensive diagnostic and treatment options. I am grateful to work with such talented, devoted medical professionals. We continue to forge ahead, guided by discovery and innovation, as well as our quest to seek the best possible outcome for each patient.



A handwritten signature in dark ink, appearing to read 'J Saucedo'.

Jorge Saucedo, MD, MBA, FACC, FAHA, FSCAI

Professor; Chief, Cardiovascular Medicine; Director, Heart and Vascular Services
Froedtert & the Medical College of Wisconsin health network

About the Froedtert & the Medical College of Wisconsin Health Network

The Froedtert & the Medical College of Wisconsin health network is a partnership between Froedtert Health and the Medical College of Wisconsin supporting a shared mission of patient care, innovation, medical research and education. Our health network operates eastern Wisconsin's only academic medical center and adult Level I Trauma Center at Froedtert Hospital, Milwaukee, an internationally recognized training and research center engaged in thousands of clinical trials and studies. The Froedtert & MCW health network, which includes 10 hospital locations, more than 2,100 physicians and more than 45 health centers and clinics, draws patients from throughout the Midwest and the nation. In our most recent fiscal year, outpatient visits were more than 1.7 million, inpatient admissions to our hospitals exceeded 58,000 and visits to our network physicians totaled more than 1.17 million.

About Heart and Vascular Services

Our team of nationally and internationally recognized cardiovascular specialists offers the full spectrum of specialized treatments for all forms of heart and vascular disease, from the common to the complex. Our team approach is central to the care we deliver, helping us provide optimal and thorough diagnostic and treatment approaches for each patient. We lead and champion clinical and transactional research aimed at providing the best value to patients by delivering the right care at the right time in the right place. Our highly trained physicians and researchers are at the leading edge of cardiovascular care. With the comprehensive resources only an academic medical center can offer, our physicians and researchers are advancing the level of cardiovascular care available across Wisconsin.

In addition to our services available on the Froedtert Hospital campus, our team-based cardiovascular care is available in communities throughout southeastern Wisconsin. A complete list of locations can be found at froedtert.com/heart-vascular.



The Froedtert & MCW Heart and Vascular Center, located within the Center for Advanced Care on the Froedtert Hospital campus, provides patients an enhanced care experience where all their cardiovascular needs can be met under one roof.

Froedtert & the Medical College of Wisconsin

Heart and Vascular Programs

Adult Congenital Heart Disease

Aortic Disease

Arrhythmia and Atrial Fibrillation

Cardiac Amyloidosis

Cardiac Imaging

Cardiac Rehabilitation and Intensive Cardiac Rehabilitation

Cardiogenic Shock

Cardio-Oncology

Carotid Artery Disease

Complex and High-Risk Coronary Interventions

Comprehensive Heart Failure and Transplant

Coronary Artery Disease

Extracorporeal Membrane Oxygenation (ECMO)

Heart Disease in Pregnancy

Heart Valve Disease

Hereditary Hemorrhagic Telangiectasia (HHT)

Hypertrophic Cardiomyopathy

Limb Preservation

Peripheral Arterial Disease

Peripheral Arterial Disease Rehabilitation

Preventive Cardiology

Structural Heart

Thoracic Outlet Syndrome

Vascular Emergency Response

Venous Disease

Women and Heart Disease

Program Spotlights

Adult Congenital Heart Disease

To meet the unique needs of adult patients with congenital heart disease, the Froedtert & the Medical College of Wisconsin health network has collaborated with Children's Wisconsin to create the Wisconsin Adult Congenital Heart (WAtCH) Program. As part of the program, patients may be seen in both the outpatient and inpatient setting, and undergo diagnostic tests or treatments at either Children's Wisconsin or Froedtert Hospital. Our program brings together experts in congenital heart conditions and structural heart disease, providing a full range of care options for patients, from testing and diagnosis to the latest in cardiovascular treatments.

Complex and High-Risk Coronary Intervention Program

The Froedtert & MCW Complex and High-Risk Coronary Intervention Program (CHIP) provides advanced percutaneous approaches for patients with complex coronary artery disease — generally defined as multivessel blockages and complete or near-complete blockages. Among a select few CHIP programs in the region, our multidisciplinary team offers leading-edge interventional procedures to treat patients with multivessel coronary artery disease, chronic total occlusions, those who are not candidates for surgical bypass or who want to avoid surgery, patients with highly calcified arteries and patients with heart failure. Our CHIP Program is staffed by a multidisciplinary team consisting of board-certified, fellowship-trained physicians who collaborate to identify the best possible treatment solutions for referred patients. Our physicians have access to and experience with the latest technology to help break up calcium in coronary arteries, including Rotablator™, which shaves plaque accumulation away, and Shockwave Intravascular Lithotripsy, which uses sonic pressure waves to break up calcification.

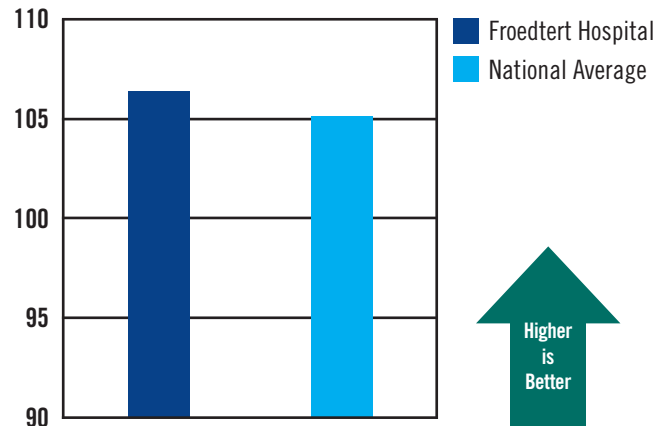
Comprehensive Heart Failure and Transplant

The Comprehensive Heart Failure and Transplant Program provides patients with access to a highly experienced team of advanced heart failure cardiologists and heart transplant surgeons. Individualized medical therapy is the first treatment approach for heart failure patients and part of the full spectrum of treatment options. Options include managing heart failure patients with the latest technology, such as Barostim™ Baroreflex Activation Therapy, which uses the power of the autonomic nervous system to improve heart failure symptoms in patients who have had little or no success with other treatment methods. In addition, the program offers patients the latest in available short-, intermediate- and long-term mechanical circulatory support, including total artificial hearts (TAHs) and ventricular assist devices (VADs). Froedtert Hospital is one of only three hospitals in Wisconsin certified by The Joint Commission and recognized by the Centers for Medicare and Medicaid Services as a VAD Destination Therapy Program. If patients require a transplant, they are treated by some of the most experienced transplant surgeons in the country. As part of an academic health network, the team also participates in and conducts substantial research, which enables them to further understand the causes of heart failure and identify innovative treatments, including increasingly sophisticated VADs and TAHs.

Clinical Outcomes: Heart Failure and Heart Transplant

Rate of Transplanting Patients on Heart Transplant Waitlist

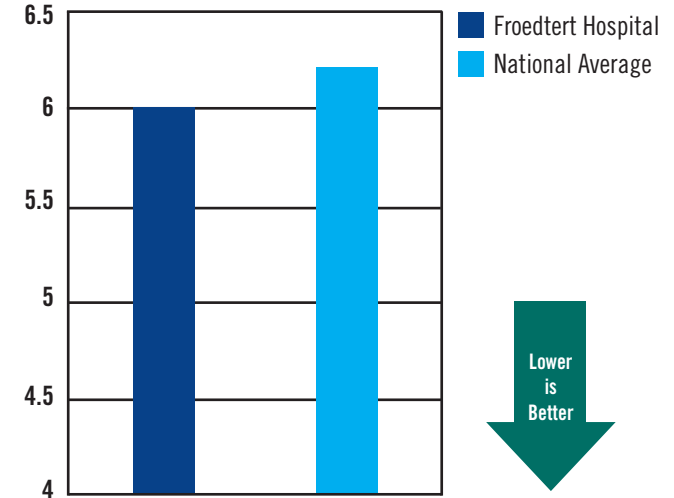
Transplant Rate



Source: Scientific Registry of Transplant Recipients, srtr. org, July 2022

Overall Mortality After Listing Adult Heart Transplant

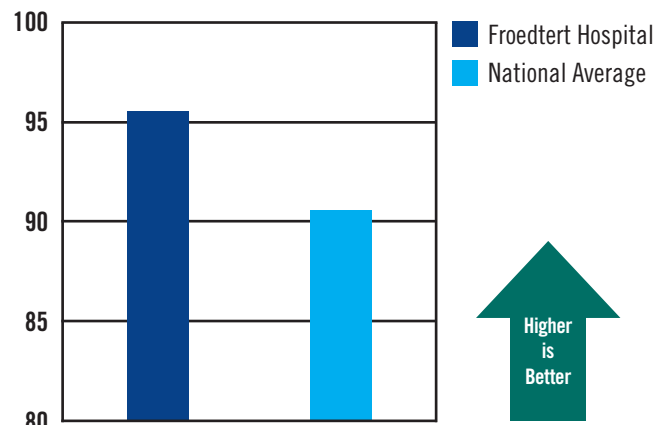
Percent



Source: Scientific Registry of Transplant Recipients, srtr. org, July 2022

Heart Transplant Adult Survival Rate – One Year

Percent



Source: Scientific Registry of Transplant Recipients, srtr. org, July 2022



Takuski Kohmoto, MD, PhD, Cardiothoracic Surgeon

Heart Failure Admissions

	Froedtert Hospital	Vizient Percentile Rank*
Mean Length of Stay	6.21 Days	90.7%
Mortality	2.09%	93.5%

*Our percentile ranking positions us as a top performer in these measurements and indicates the percentage of scores that we rank greater than.

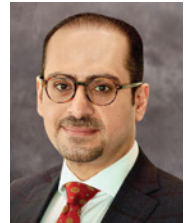
Source: Vizient Inc. Clinical Database, CY 2021

Advanced Techniques for Complex Coronary Artery Blockages

The Froedtert & the Medical College of Wisconsin Complex and High-Risk Coronary Intervention Program (CHIP) is among a select few in the region, offering leading-edge interventional procedures to treat complex coronary disease conditions.

New percutaneous approaches are expanding the options for treating patients with complex coronary artery disease — generally defined as multivessel blockages and complete or near-complete blockages.

“As life expectancy has increased and more older patients are presenting with severe disease, we’re seeing the need for more complex interventions,” said Iyad K. Azzam, MD, interventional cardiologist and MCW faculty member. “The technology has improved so much that things that were once impossible to do percutaneously are now performed with great success.”



**Iyad Azzam,
MD**

Leading-Edge Approaches for a Range of Coronary Conditions

Dr. Azzam is part of a team of interventionalists, cardiologists and cardiac surgeons in the Froedtert & MCW Complex and High-Risk Coronary Intervention Program (CHIP). Among a select few in the region, this program offers leading-edge interventional procedures to treat the following complex conditions:

- Multivessel coronary artery disease
- Chronic total occlusion — 100% blockages that are at least three months old
- Patients who are not candidates for surgical bypass or who want to avoid surgery
- Patients with highly calcified arteries
- Patients with severe heart failure

A Coronary Artery Disease Symptom That May Be Overlooked

Dr. Azzam advises physicians to be especially alert for shortness of breath as a symptom.

“Shortness of breath — not necessarily chest pain — can be a sign of long-term blockages of the heart arteries,” he said. “Patients may define it in different ways, but when it doesn’t respond as expected to certain medications and therapies, we recommend investigating different cardiac conditions.”

New Choices for Treating Complex Coronary Artery Disease

The goal in treating high-risk patients is to improve their symptoms of chest pain, pressure or discomfort, shortness of breath, fatigue and exercise intolerance. They may already be receiving the maximum doses of medical therapies and still experiencing symptoms, which can lead to depression and limitations in daily activities. Our CHIP Program can provide choices where none seemed to exist previously.

“It’s important to identify which patients can benefit from this through early referral by their physicians,” Dr. Azzam said. “It’s also important to know we use a heart team approach, which is highly recommended by the American Heart Association and the American College of Cardiology. We develop a plan and provide various options, and then ask the patient and family to make a decision.”

To refer a patient to our team, call **414-777-7700**. To learn more about our program and team of physicians, visit froedtert.com/CHIP.

Alternate Routes for TAVR

In the relatively short time since its approval, transcatheter aortic valve replacement (TAVR) has been a life-changing procedure for many people, relieving their aortic stenosis without open-heart surgery. However, the traditional access for TAVR — the femoral artery — is not appropriate for every patient.

“Patients who have aortic stenosis and coronary disease may also have peripheral vascular disease and narrowing of the femoral and iliac arteries,” said Peter Mason, MD, MPH, interventional cardiologist and Medical College of Wisconsin faculty member. “Given this narrowing, their leg arteries may be too small to introduce the catheter necessary to deliver the transcatheter valve.”

Medical technology is helping more arteries become accessible for catheter-based treatment. The Froedtert & MCW health network was the first in Wisconsin to use intravascular lithotripsy balloon angioplasty (IVL) to help expand calcified iliac and femoral arteries to allow for the safe insertion of catheters to perform transfemoral TAVR.

The goal of ensuring TAVR availability to all who need it has led to the development of alternative approaches for reaching the aortic valve. The Froedtert & MCW team offers patients and their physicians extensive experience in a range of alternate access procedures:



**Peter Mason,
MD, MPH**

- **Transapical (TA) TAVR** — The first alternative approved, transapical TAVR requires a 3- to 5-inch incision in the chest near the left nipple. Surgeons then make a small incision in the apex of the beating heart, which provides direct access to the aortic valve through the left ventricle.
- **Transvaal (TCv) approach** — This novel percutaneous alternative circumvents artery disease by using the femoral vein. Surgeons make a wire and electrical cautery passage from the inferior vena cava to the abdominal aorta, then go up to perform TAVR. After the valve is placed, a small plug is delivered to seal the passage that was created.
- **Transaortic (TAo) access** — “Historically, the alternate artery to the femoral is the ascending aorta,” Dr. Mason said. Surgeons make a small incision near the sternum and directly access the aorta to place the valve.
- **Transcarotid (TC) approach** — A newer alternative, the transcarotid approach, has become one of the favored options when patients are not eligible for transfemoral access. We are fortunate to have surgeons, including Lucian Durham III, MD, PhD and Stefano Schena, MD, PhD, who have extensive experience with transcarotid access.
- **Trans-subclavian (TS) approach** — “The second alternate artery used, and perhaps favored, is called the axillary subclavian artery,” Dr. Mason said. A small incision near the clavicle exposes the subclavian artery, and surgeons direct a catheter through it into the aorta and across the narrowed aortic valve.

Thorough and detailed planning is critical with all forms of TAVR. “Quality CT scanning and talented radiologists are key to recommending the best approach for patients,” Dr. Mason said. “The full spectrum of cardiovascular specialists — surgical and transcatheter — that you are likely to find only at an academic center allows us to offer these procedures safely and effectively for our patients.”

The vast experience of Froedtert & MCW cardiovascular specialists, combined with their ability to offer alternatives through investigational trials, facilitates the best match of patient and procedure. “We would prefer the transfemoral approach when we can use it and do the majority of our cases this way,” Dr. Mason said. “The literature clearly shows it to be the safest and in the best interest of the patient.

“Transfemoral access is available more often due to new techniques such as Shockwave peripheral balloon lithotripsy, Dr. Mason said. “However, when this access point will not work, we have a host of alternative approaches for our patients.”

TAVR via femoral access was the first minimally invasive procedure for replacing the aortic valve without open-heart surgery, but it is no longer the only option.

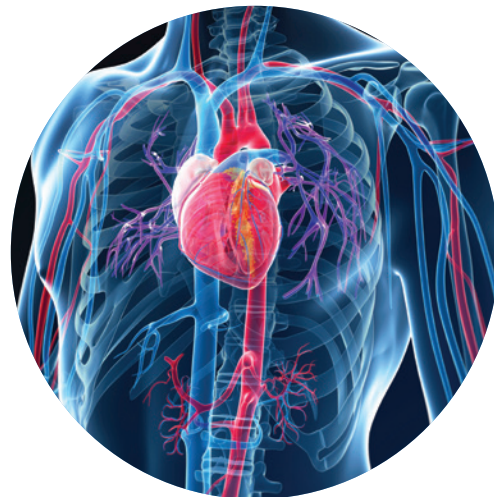
To refer a patient to our team, call **414-777-7700**. To learn more about our program and team of physicians, visit froedtert.com/TAVR.

Clinical Outcomes: Vascular and Endovascular Surgery

Froedtert & the Medical College of Wisconsin vascular disease specialists use a collaborative and comprehensive approach to care for patients with all forms of vascular disease from the common to the complex, including peripheral artery disease, aneurysms of the vascular system, vascular malformations and complications due to vascular disease.

Our multidisciplinary team, including vascular surgeons, vascular medicine specialists and vascular and interventional radiologists, has the experience and resources to treat even the most complicated vascular disease cases. In addition, as an academic medical center, our team is a leader in advancing the understanding of vascular disease and identifying innovative treatments through research and clinical trials.

Our team works closely with referring physicians, updating them each step of the way, as we collaborate to develop a long-term care plan for each patient. We also make ourselves available to provide continual assistance and resources as patients transition back to the referring physician for continued care.



Vascular and Endovascular Surgery Mortality

	2021	2022*
Carotid endarterectomy	0%	0%
Elective carotid artery stent	0%	0%
Elective endovascular aneurysm repair (EVAR)	0%	0%
Elective Infra bypass	0%	0%

*As of June 2022

Elective Endovascular Aneurysm Repair Complications

	2021	2022*
Access site hematoma	0%	0%
Access site infection	0%	0%
Congestive heart failure	0%	0%
Dialysis	0%	0%
Intestinal ischemia	0%	0%
Myocardial infarction	0%	0%
Respiratory	0%	0%
Stroke	0%	0%

*As of June 2022

Clinical Outcomes: Vascular and Endovascular Surgery

continued

Elective Thoracic Endovascular Aortic Repair (TEVAR) Complications

	2021	2022*
Access site hematoma	0%	0%
Congestive heart failure	0%	0%
Myocardial infarction	0%	0%
New dialysis	0%	0%
New dysrhythmia	0%	0%
Puncture site hematoma	0%	0%
Spinal ischemia	0%	0%
Surgical site infection	0%	0%
Any cerebrovascular symptoms	0%	0%
Any reintervention	0%	0%

*As of June 2022

Transcarotid Artery Revascularization (TCAR) Complications

	2021	2022*
Congestive heart failure	0%	0%
Dysrhythmia	0%	0%
Hematoma/bleeding	0%	0%
Mortality	0%	0%
Myocardial infarction	0%	0%
Neurologic events at discharge – stroke	0%	0%
Pseudoaneurysm	0%	0%

*As of June 2022

Vascular Emergency Response Program Provides Resource for Health Care Teams Across the Region

The Froedtert & MCW Vascular Emergency Response Program provides a 24/7 resource for patients who experience a vascular emergency, including aortic aneurysms, aortic dissections, acute limb ischemia and acute mesenteric ischemia. A delay in the recognition of the acute diagnosis and rapid treatment of these conditions can lead to limb loss or death. Our program focuses on partnering with physicians across the region for rapid recognition, transportation and treatment of patients with these acute life-and-limb-threatening emergencies.

To activate the vascular emergency response protocol team, call the Froedtert & MCW Access Center at **414-805-4700**. Upon receiving the page, a group of specialists collaborate to discuss the patient's needs with each specialist weighing in to determine the best treatment. The care team will quickly deliver a recommendation and, in appropriate cases, arrange to transport the patient to Froedtert Hospital for care.

Following treatment, our team works with the referring physician to coordinate the return of the patient for continued, long-term care.

Kathy's House – Hospital Guest House Now Open Near Froedtert Hospital

In response to growing demand, a new, larger Kathy's House — a hospital guest house — opened in summer 2021 near the Froedtert Hospital campus.

Open 365 days a year, Kathy's House offers affordable lodging in a caring, supportive environment for people traveling to Milwaukee for medical care. It is compliant with the Americans with Disabilities Act and features 38 patient rooms, a separate wing for patients with compromised immune systems and room for basic clinical services such as blood draws and video telehealth visits. Kathy's House is the only facility of its kind in southeastern Wisconsin serving patients of all ages, their families and their caregivers. It accepts referrals from all accredited area hospitals.

In 2017, Froedtert Hospital, a longtime partner of Kathy's House, pledged \$6 million to build the new facility.

To contact Kathy's House on behalf of a patient, call **414-453-8290** or e-mail Kathy Wagner, director of operations and guest services, at kathyw@kathys-house.org.

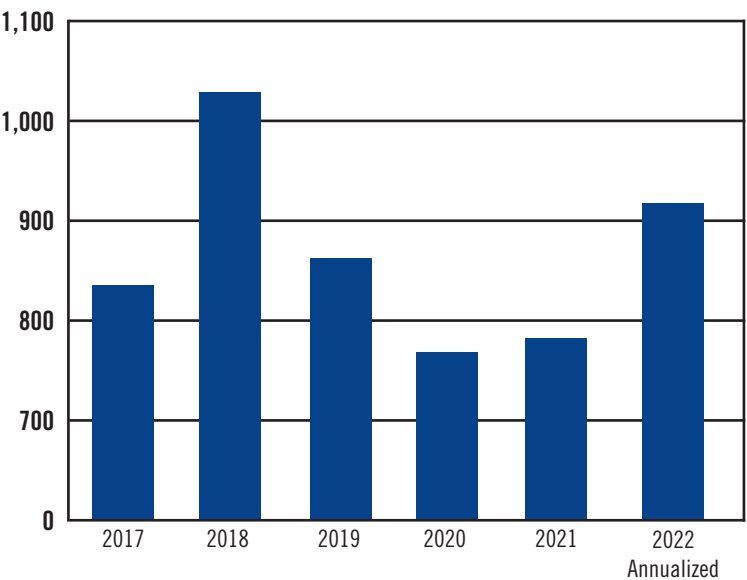


Clinical Outcomes: Cardiothoracic Surgery

Cardiac Surgery Volume (Open Surgical Procedures)*

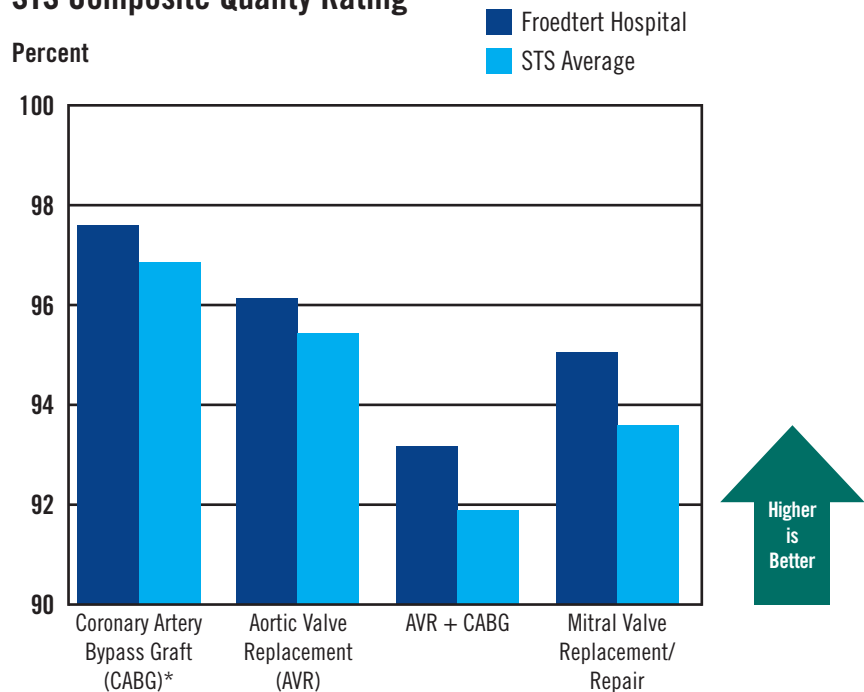
The Froedtert & the Medical College of Wisconsin cardiovascular team has been an early adopter of endovascular techniques. These minimally invasive options have replaced the need for open surgical procedures for many patients.

Volume



*Cardiac procedures performed in the operating room

STS Composite Quality Rating

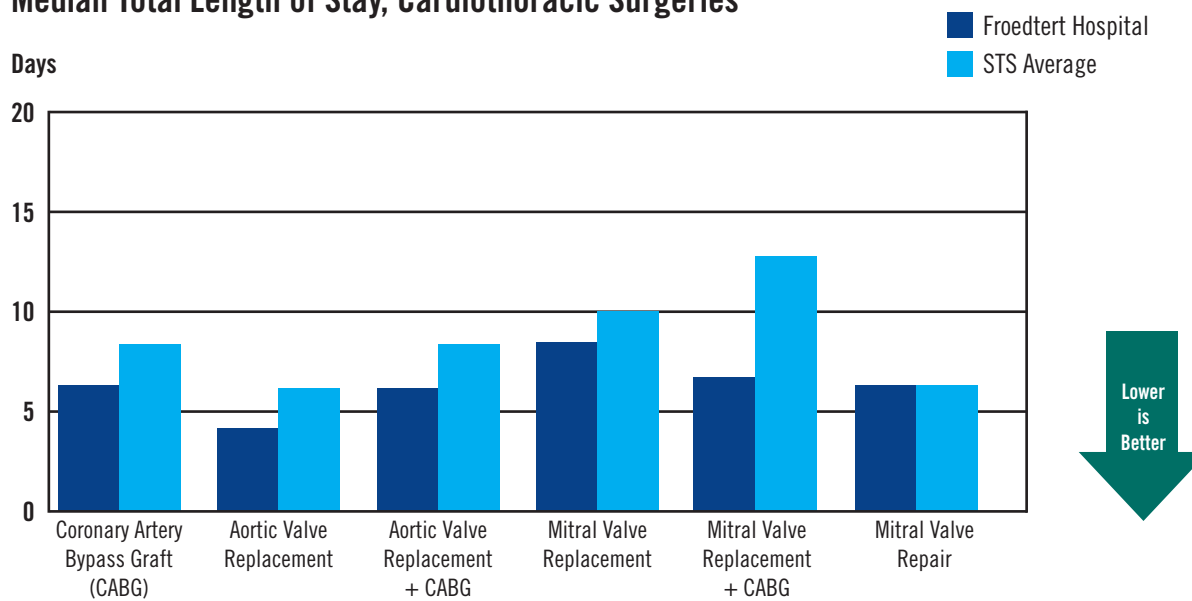


*Our cardiovascular surgery program has earned a distinguished three-star rating from The Society of Thoracic Surgeons (STS) for its patient care and outcomes in isolated coronary artery bypass grafting (CABG).

Source: STS Harvest Report, period ending 6/30/2022

Clinical Outcomes: Cardiothoracic Surgery *continued*

Median Total Length of Stay, Cardiothoracic Surgeries



Source: STS Harvest Report, period ending 6/30/2022

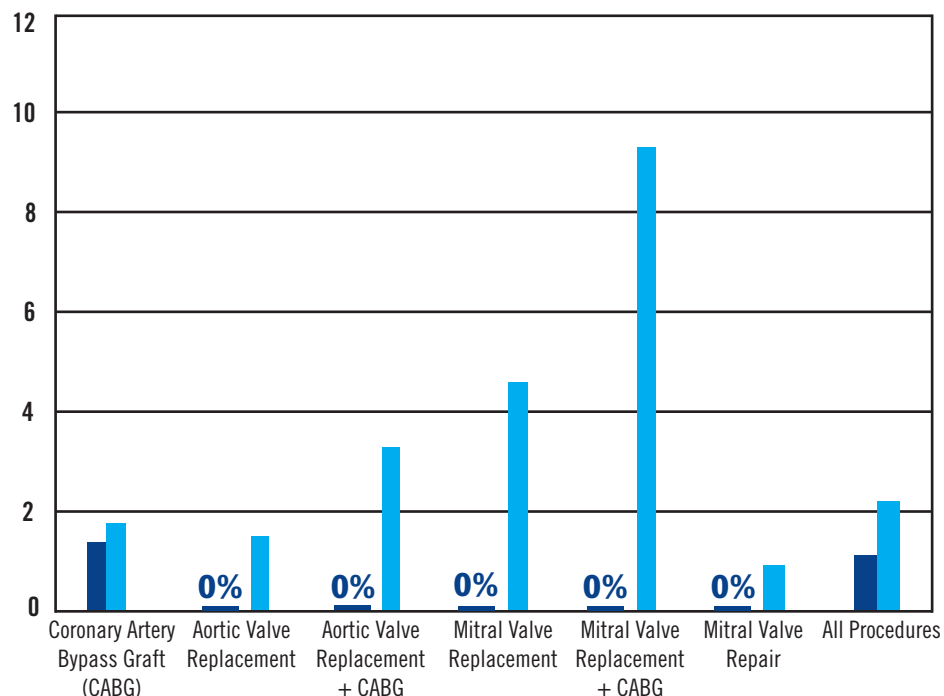
Jacquelyn Kulinski, MD,
Cardiologist



Clinical Outcomes: Cardiothoracic Surgery *continued*

Risk-Adjusted Mortality — The Society of Thoracic Surgeons (STS)

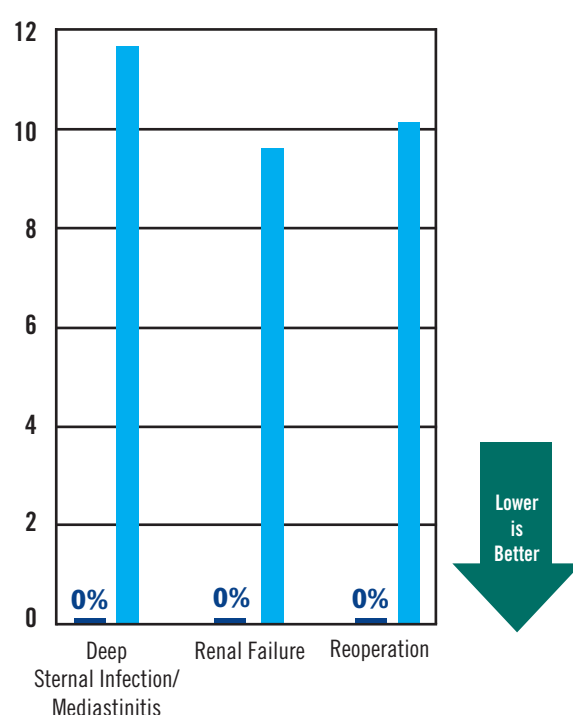
Percent



Source: STS Harvest Report, period ending 6/30/2022

Mitral Valve Replacement Complications

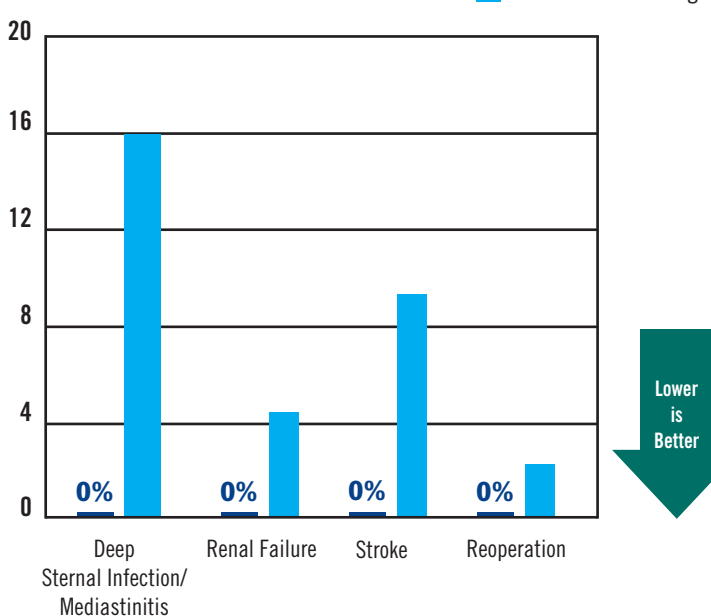
Percent



Source: STS Harvest Report, period ending 6/30/2022

Aortic Valve Replacement Complications

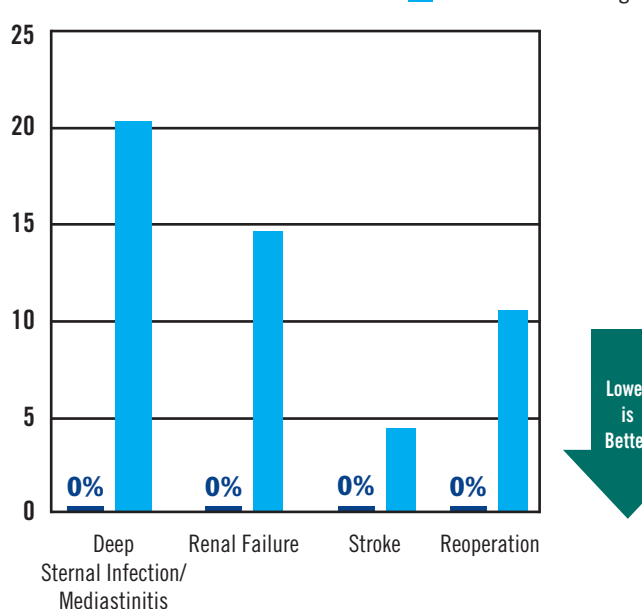
Percent



Source: STS Harvest Report, period ending 6/30/2022

Mitral Valve Replacement and CABG Complications

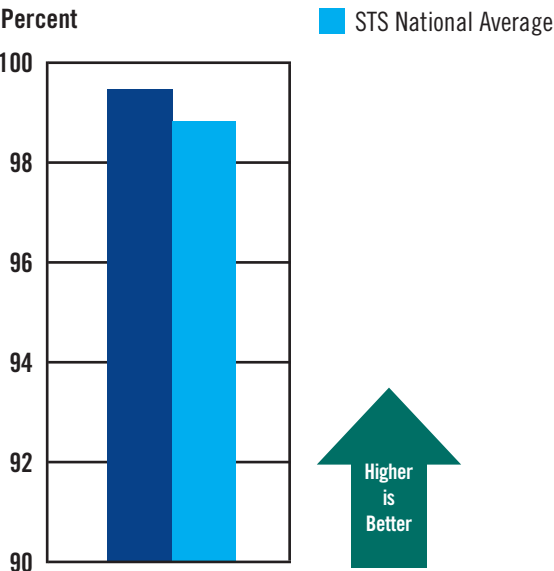
Percent



Source: STS Harvest Report, period ending 6/30/2022

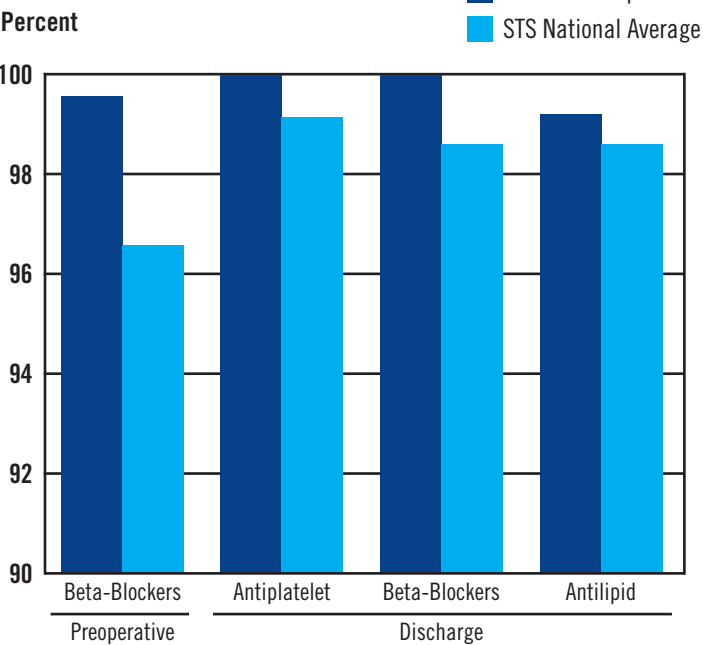
Clinical Outcomes: Cardiothoracic Surgery *continued*

Isolated CABG Arterial Graft Use



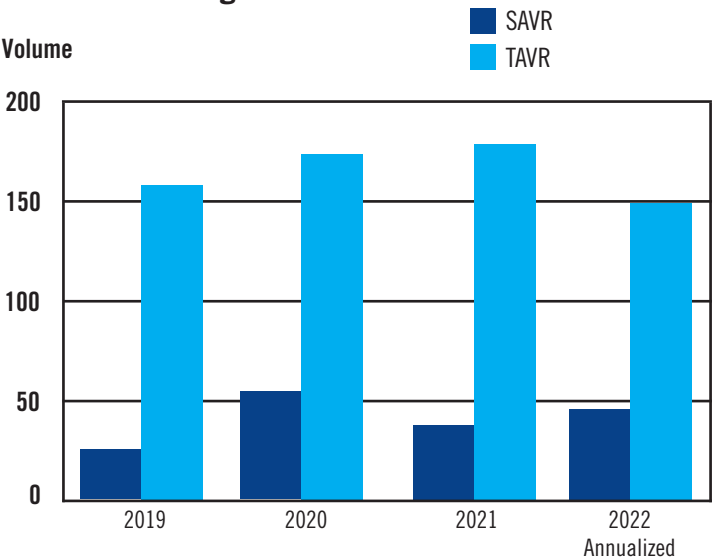
Source: STS Harvest Report, period ending 6/30/2022

CABG Perioperative Medications



Source: STS Harvest Report, period ending 6/30/2022

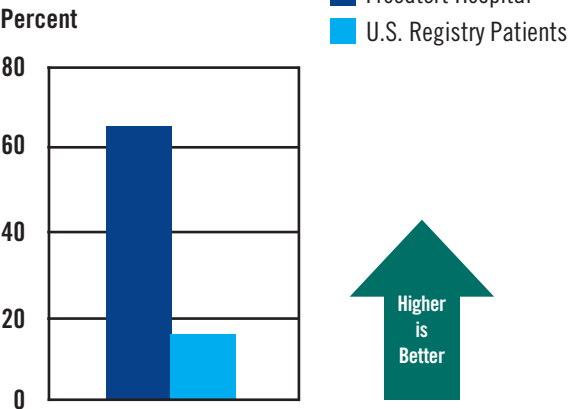
Aortic Valve Program Growth



Paul Pearson, MD, PhD, Cardiothoracic Surgeon
Chief, Division of Cardiothoracic Surgery

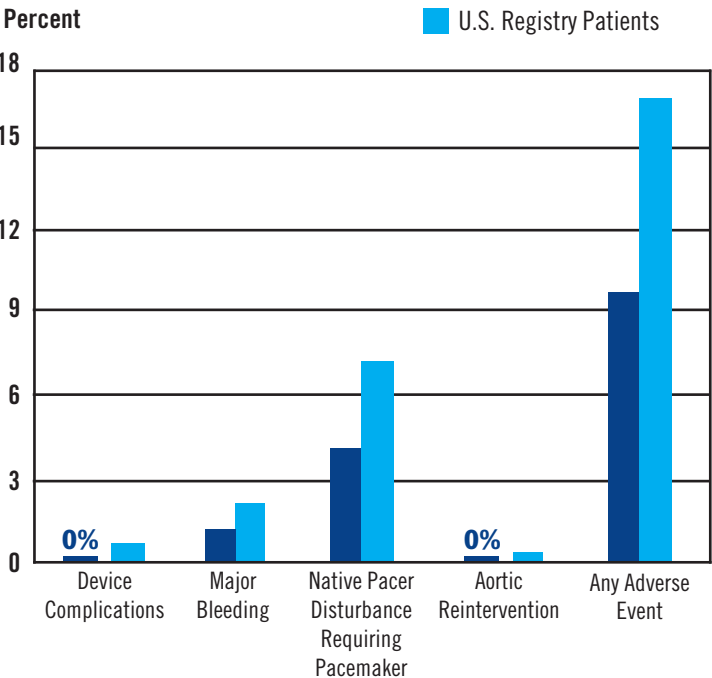
Clinical Outcomes: Structural Heart

Embololic Protections Deployed During TAVR



Source: STS/ACC TVT Registry™ Outcomes Report 2021 Q4

TAVR Complications



Source: STS/ACC TVT Registry™ Outcomes Report 2021 Q4



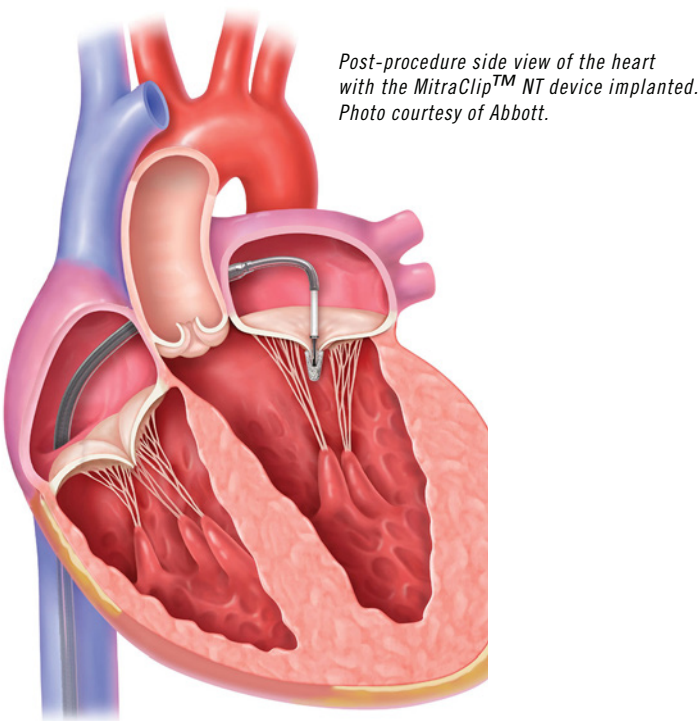
Peter Mason, MD, MPH
Interventional Cardiologist

Clinical Outcomes: Structural Heart *continued*

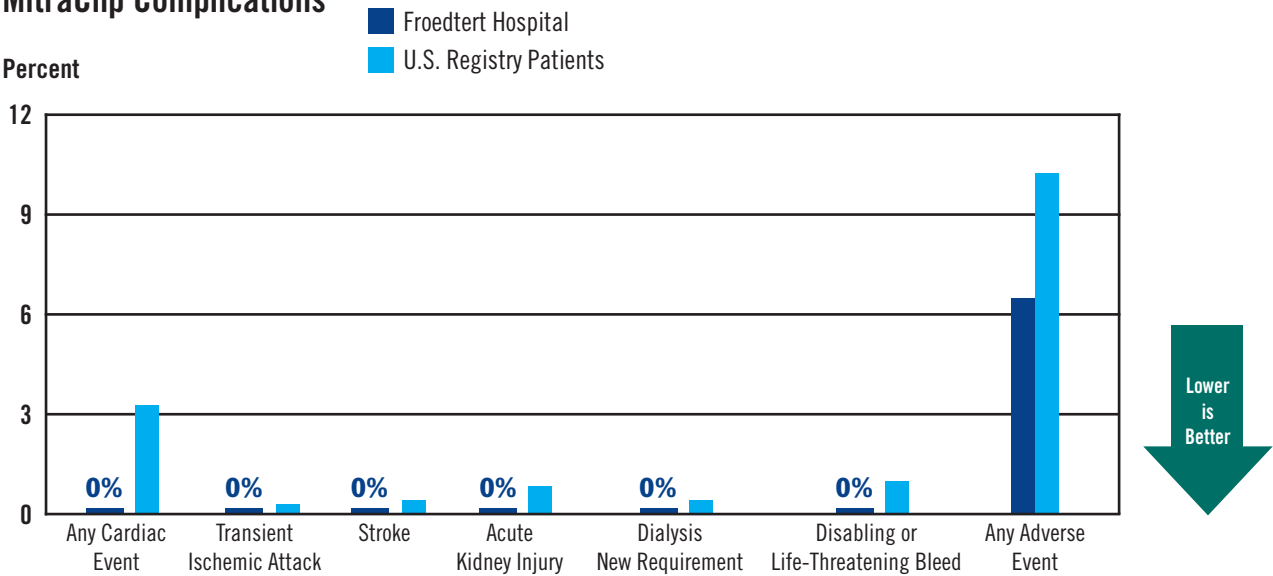
MitraClip Length of Stay



Source: STS Harvest Report, period ending 12/31/2021



MitraClip Complications



Source: STS/ACC TVT Registry™ Outcomes Report 2021 Q4

Nationally Recognized Cardiovascular Care

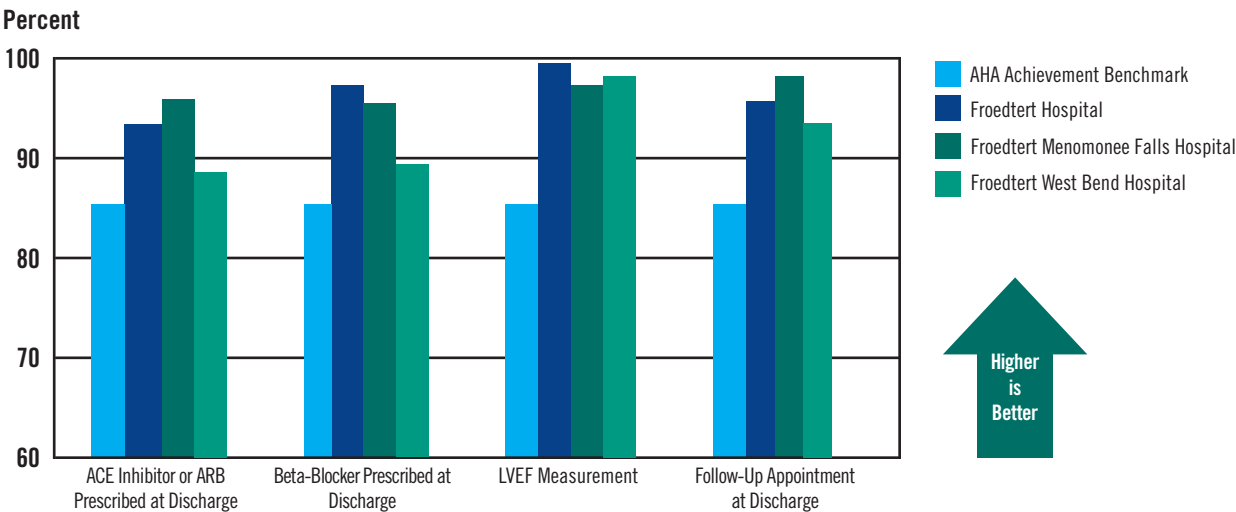
Froedtert & the Medical College of Wisconsin heart and vascular teams are regularly recognized with national awards and accreditations. These accomplishments are testaments to our dedication to delivering exceptional patient care.

Below, we highlight a few recent recognitions we've received:

Extracorporeal Membrane Oxygenation (ECMO) Center of Excellence Gold Level — Extracorporeal Life Support Organization		Cure HHT Foundation International Center of Excellence	
IBM Watson Top 50 Cardiovascular Hospitals		Three-Star Coronary Artery Bypass Grafting (CABG) Program — The Society of Thoracic Surgeons (STS)	
Vizient Heart and Vascular Top 10 Academic Ranking		Vascular Quality Initiative 3 Star Participation	

In recognition of three Froedtert & MCW hospitals' commitment and success in implementing the highest standard of cardiac care, the American Heart Association/American Stroke Association recognized Froedtert Hospital and Froedtert Menomonee Falls Hospital with the Get With The Guidelines® Heart Failure Gold Plus and Froedtert West Bend Hospital with the Get With The Guidelines® Silver Plus achievement award in 2022. These hospitals were also recognized with Get With The Guidelines® Coronary Artery Disease awards. In addition, Froedtert Hospital and Froedtert Menomonee Falls Hospital received Get With The Guidelines® Atrial Fibrillation awards.

American Heart Association (AHA) Get With The Guidelines Heart Failure Achievement Measurement



Patient Experience: Vascular Surgery

Expert Vascular Care: Top-Tier Treatment for Common and Complex Conditions

In October 2021, Tim Combs, a retired carpenter from Elkhorn, lost more than 10 pounds and developed a fever. His primary care doctor advised him to go to the local emergency department, where physicians discovered a dangerous infection in a stent that had been placed in his abdomen seven months earlier. The stent was used to repair an aortic aneurysm.

The infection made Tim so sick that doctors recommended moving him to an academic medical center where he could receive a higher level of care. Tim and his wife, Karen, chose Froedtert Hospital, the academic medical center of the Froedtert & the Medical College of Wisconsin health network.

Abdominal Aortic Surgery

At Froedtert Hospital, Tim met Peter Rossi, MD, vascular surgeon and MCW faculty member, who specializes in treating aortic problems. Dr. Rossi and a team of providers performed two back-to-back surgeries. The first was to remove the infected stent and the infected tissue nearby. The diseased part of Tim's aorta was replaced with a fabric graft infused with infection-fighting antibiotics. He also had marble-sized beads loaded with antibiotics placed in his abdomen, a temporary measure to treat any remaining infection. Two days later, the surgical team did a second procedure, removing the beads and closing the sizable incision.

Vascular Technology and Treatment Options

The surgeries were a success, but Tim's recovery took time. He spent almost six weeks in the hospital. He raves about the people who cared for him, particularly the physicians and nurses, physical therapists and cleaning staff.

"Everyone was so friendly, so accommodating," he said. "I had a great experience." He has regular appointments with Dr. Rossi and an infectious disease specialist who continue to monitor his health. The Froedtert & MCW team uses the latest treatments and technologies for vascular health problems, from simple conditions to complex issues like Tim's.

"We're experienced with the most complex vascular conditions, including redo procedures," Dr. Rossi said.



Tim and
Karen Combs

Patient Experience: Atrial Fibrillation

Heart 2 Heart: Together, Spouses Resolve Multiple Heart Valve Issues

Tom and Sue Olander know more about heart valve procedures than the average couple. Both were treated by Froedtert & the Medical College of Wisconsin heart valve experts using open-heart surgery. Today, the Brookfield couple is back to their regular schedules of traveling, exercising and enjoying life.

Several years ago, Tom was diagnosed with a heart murmur. It wasn't causing any problems, but his doctor told him to keep an eye out for symptoms. In 2019, Tom noticed he was getting short-winded after exercise. He consulted Paul Pearson, MD, PhD, cardiothoracic surgeon and MCW faculty member.

Tom, now 73, needed an aortic valve replacement for a valve that had narrowed. He had several options but chose a mechanical valve, which is considered a "one-and-done" procedure. While he must take a blood thinner, Tom's mechanical valve will last a lifetime.

In the meantime, Sue, now 72, started to notice shortness of breath and a racing heartbeat. She saw Dr. Pearson to discuss a problem with her mitral valve. An echocardiogram revealed mitral valve prolapse. Sue also had a leaking tricuspid valve and a hole between the right and left sides of her heart. Dr. Pearson was confident he could repair Sue's two heart valves instead of replacing them. Surgery was scheduled to fix all three problems.

"She figured if I could have one valve replaced, she could have three things done," Tom said.



Open-Heart Surgery for Leaking Valves

While Froedtert & MCW experts offer patients the most advanced nonsurgical treatments for heart valve problems, conventional surgery is sometimes the safest and best approach.

"We have a toolbox full of tools for valvular heart disease, and we can choose the tool that's appropriate for each person," Dr. Pearson said. Leaking valves may not cause symptoms early on; the heart can adapt to a leaky valve. However, Dr. Pearson said that if people wait for symptoms as the trigger for intervening, they may experience irreversible heart damage. Thus, surveillance with an echocardiogram is important.

The idea of open-heart surgery may be daunting, but people are often pleasantly surprised to discover that recovery is not as difficult as they expected. While an incision on the chest is required, techniques have evolved to minimize the impact of the surgery and maximize a speedy recovery. Following a cardiac procedure, patients are referred to cardiac rehabilitation, where they undergo a comprehensive program of exercise, risk factor modification and heart health education. Dr. Pearson said these rehabilitation sessions may also lead to a special camaraderie among patients.

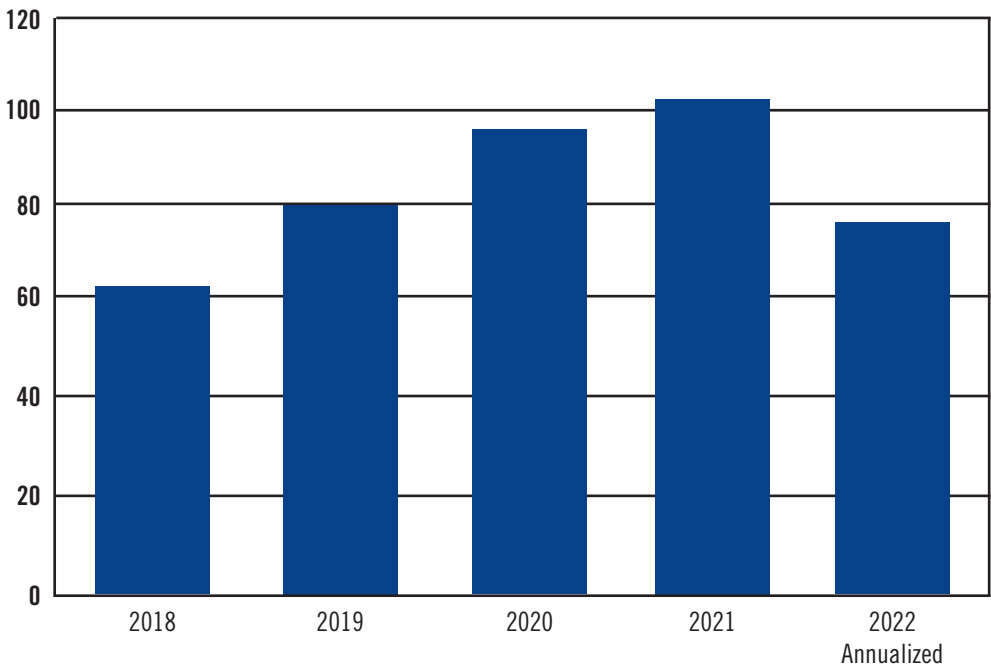
Timely, Accurate Care

Life is good now for the Olanders. They see cardiologists at the Heart and Vascular Center at Froedtert Menomonee Falls Hospital, part of the Froedtert & MCW health network. Tom works with Kevin Cohoon, DO, and Sue sees Subhashish Agarwal, MD, MS. The adage of "listen to your body" proved true for them, and it allowed Tom and Sue to seek help in a timely, efficient manner.

"I was able to pick my doctor, pick my timing and pick my hospital," Tom said. "I would much rather do that than wait until I collapsed."

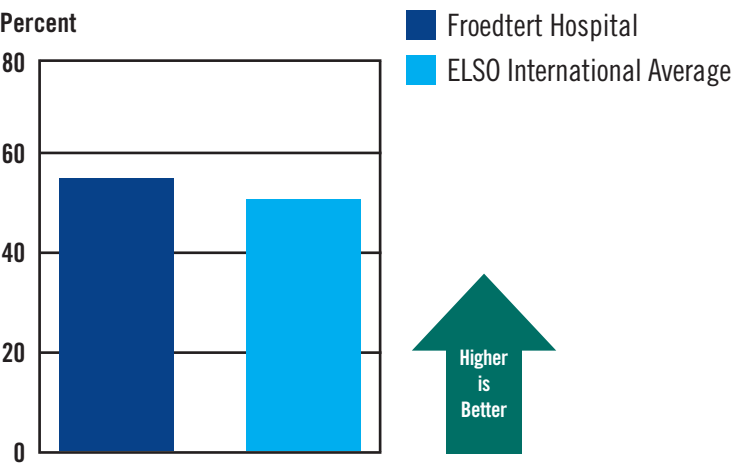
Clinical Outcomes: Extracorporeal Membrane Oxygenation (ECMO)

ECMO Patient Volume



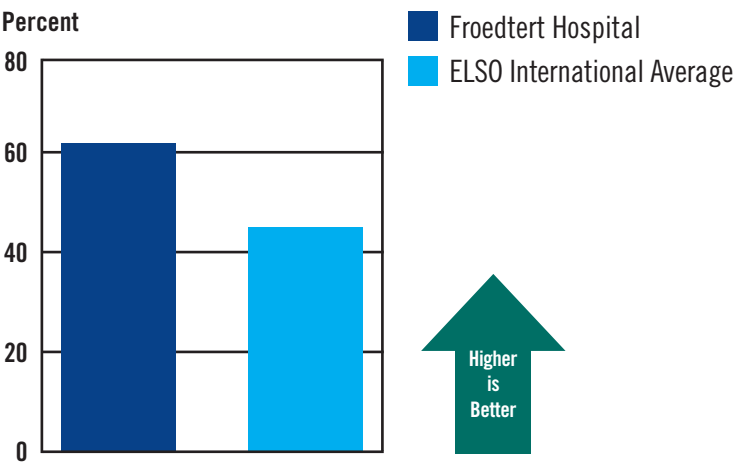
Source: Extracorporeal Life Support Organization (ELSO) Registry

ECMO Survival to Discharge – 2021 Unadjusted Venoarterial ECMO (cardiac)



Source: Extracorporeal Life Support Organization, [elso.org](https://www.elso.org).
*ELSO Registry Report

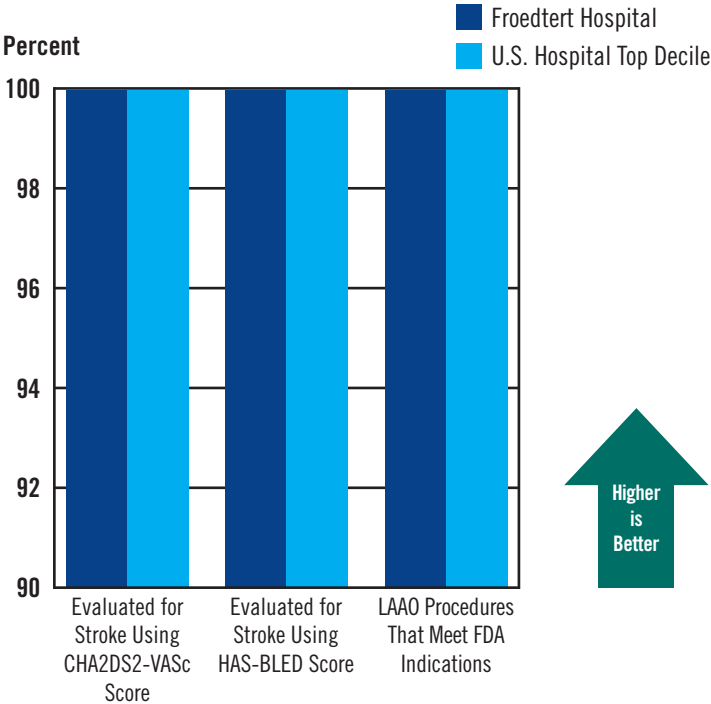
ECMO Survival to Discharge – 2021 Unadjusted Venovenous ECMO (respiratory)



Source: Extracorporeal Life Support Organization, [elso.org](https://www.elso.org).
*ELSO Registry Report

Clinical Outcomes: Electrophysiology

Left Atrial Appendage Occlusion (LAAO) Procedures



Source: ACC NSDR LAAO Registry Outcomes Report, Q4 2021



Taking the Lead: Removing Pacemaker and ICD Leads

An aging population and expanding indications for implantable cardiac support devices mean that more and more patients rely on pacemakers and implantable cardioverter-defibrillators (ICDs) to treat heart rhythm problems. With their growing use, however, comes concerns about extracting fragile leads that connect to the devices when they fail or need replacement. It is estimated that up to 25% of leads fail within eight years.

"Lead extraction requires a great deal of finesse," said Graham Adsit, MD, electrophysiologist and Medical College of Wisconsin faculty member. "We have to take precautions to avoid damage to the heart muscle wall or blood vessels." Froedtert Hospital is one of a small number of centers in the region performing this intricate procedure.

In most cases, leads remain in the body permanently. Some circumstances, however, require leads to be removed. These can include infection where the lead or device is implanted, damage to the inside or outside of the lead, electrical malfunction of the lead or an ICD or pacemaker device upgrade.

Lead extraction is most often performed as a minimally invasive procedure. The Froedtert & MCW lead extraction team places a sheath around the lead and advances it to the tip of the lead. The team then uses a tiny laser or drill-like instrument at the tip of the catheter surrounding the lead, carefully teasing the lead from the heart wall to avoid tears.

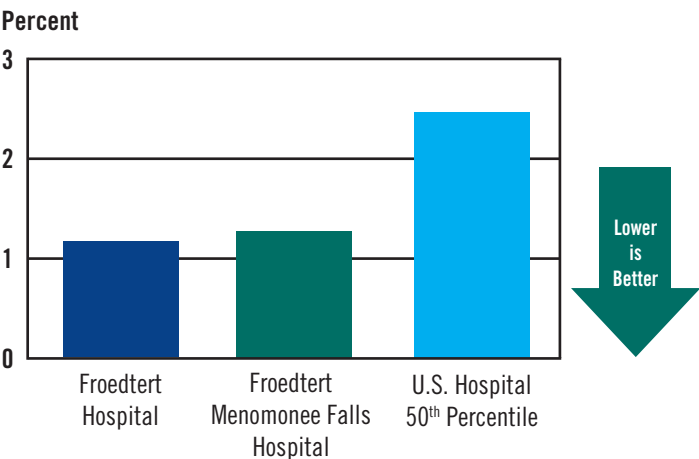
If patients are having new devices or leads implanted, this may take place at the same time as the lead extraction. If leads are being removed due to infection, the medical team will treat the infection prior to implanting new leads. Following the lead extraction, most patients stay in the hospital one or two days.

The Froedtert & MCW team brings years of experience to the lead extraction process. The team includes experts from electrophysiology and radiology. "Lead extraction is a delicate procedure," Dr. Adsit said. "We have all the resources to do it expertly and to help keep pacemakers and ICDs performing at their peak for patients."

Clinical Outcomes: Interventional Cardiology

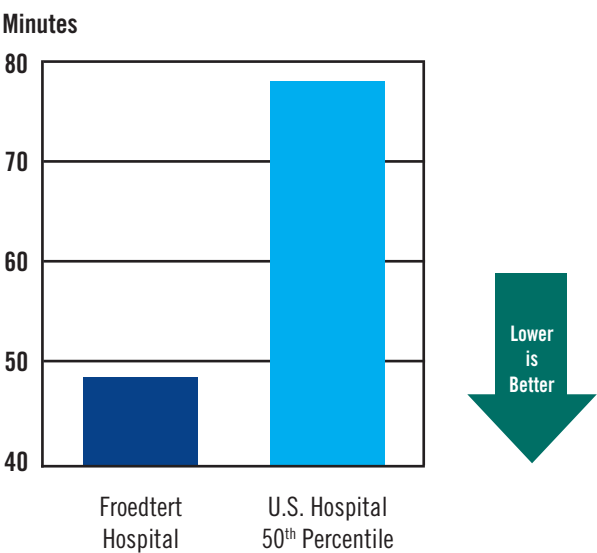
Percutaneous Coronary Intervention (PCI) Procedures

PCI In-Hospital Risk-Adjusted Mortality (All Patients)



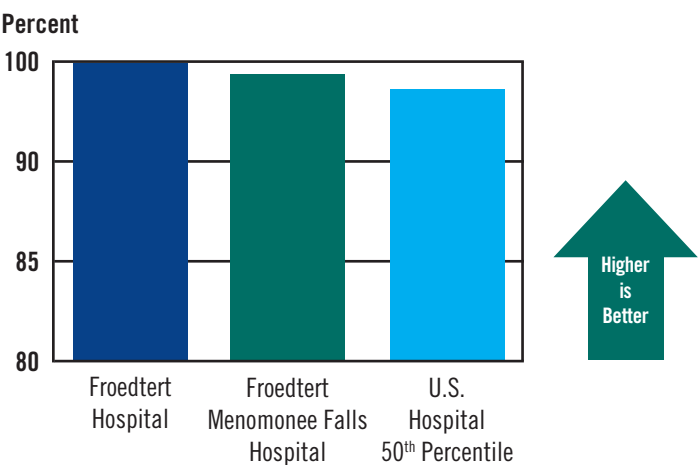
Source: ACC NCDR CathPCI Registry Outcomes Report, Q4 2021

Median Transfer Time From Door to Door (Patients With STEMI)



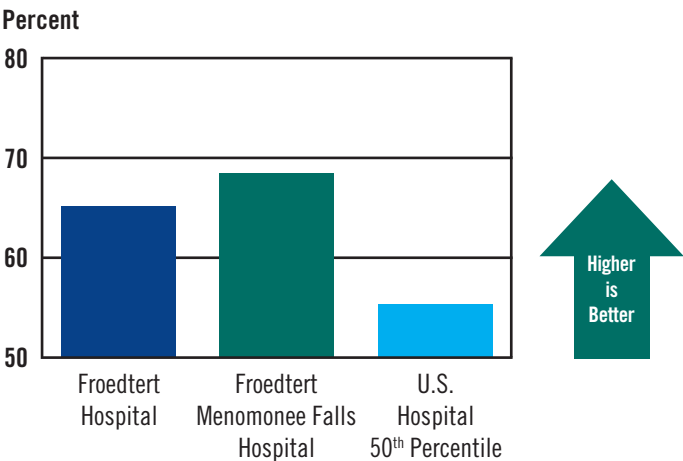
Source: ACC NCDR CathPCI Registry Outcomes Report, Q4 2021

Composite: Guideline Medications Prescribed at Discharge



Source: ACC NCDR CathPCI Registry Outcomes Report, Q4 2021

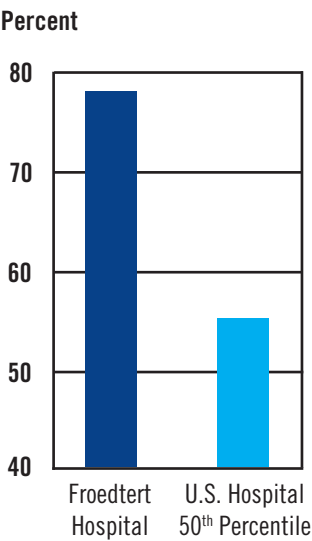
Radial Artery Use



Source: ACC NCDR CathPCI Registry Outcomes Report, Q4 2021

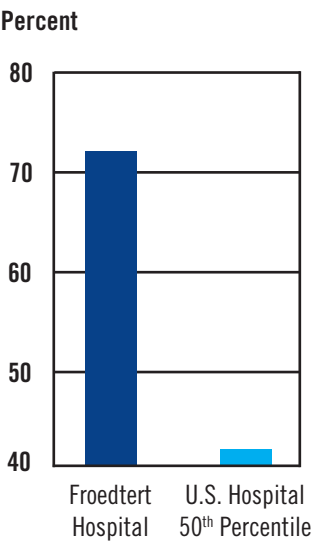
Clinical Outcomes: Interventional Cardiology *continued*

Chronic Total Occlusion Technical Success

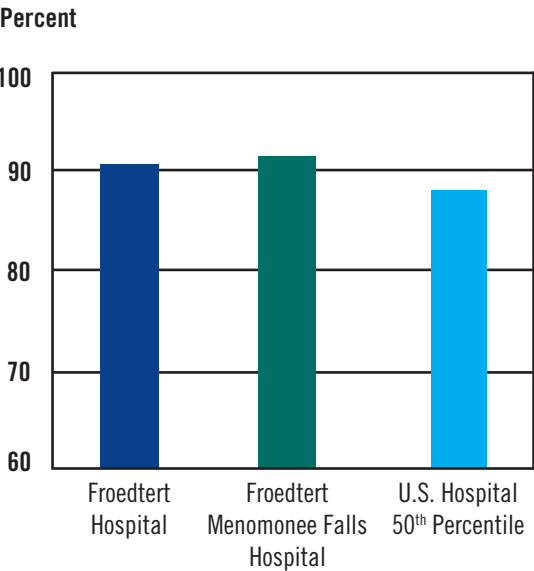


Source: ACC NCDR CathPCI Registry Outcomes Report, Q4 2021

Chronic Total Occlusion Procedural Success



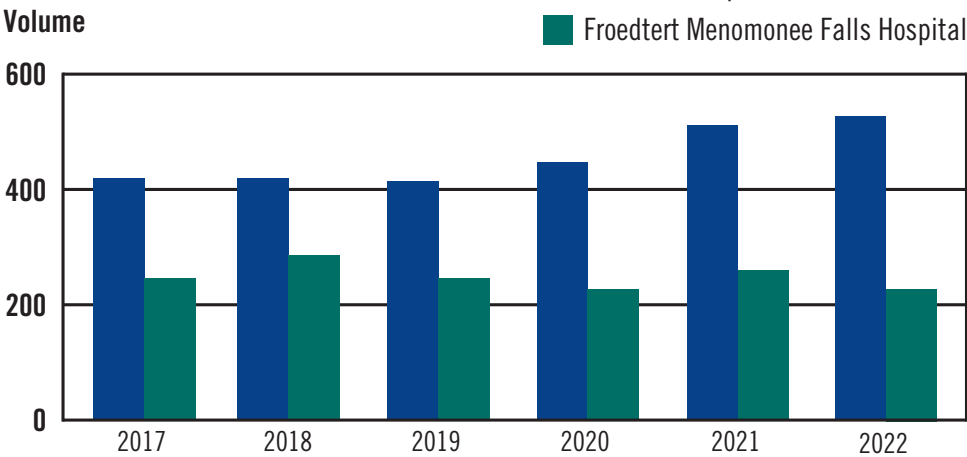
Percutaneous Coronary Intervention (PCI) Quality of Care Composite Score



Source: ACC NCDR CathPCI Registry Outcomes Report, Q4 2021



PCI Volumes



Source: ACC NCDR CathPCI Registry Outcomes Report

Clinical Research

The Cardiology, Cardiothoracic Surgery, Interventional Radiology and Vascular Surgery teams combine specialty expertise, leading-edge technology and consistent research leadership to provide the most up-to-date treatment options, including clinical trials.

Below are some of the active trials in which the team is participating.

ACURATE IDE

This study aims to evaluate the safety and effectiveness of the ACURATE Transfemoral Aortic Valve System for transcatheter aortic valve replacement (TAVR) in subjects with severe native aortic stenosis who are indicated for TAVR.

CATALYST

The CATALYST Trial will compare treatment with Abbott's Amplatzer™ Amulet™ Left Atrial Appendage Occluder to treatment with non-vitamin K antagonist oral anticoagulants (NOACs) in patients with non-valvular atrial fibrillation at high-risk for stroke.

CLASP II TR Pivotal Trial (PASCAL)

This trial is designed as a multicenter, randomized, controlled pivotal trial to compare the safety and effectiveness of the PASCAL system and optimal medical therapy to optimal medical therapy alone for patients with tricuspid regurgitation.

C-TRACT Trial

The goal of this study is to determine if the use of imaging-guided endovascular therapy (EVT) is an effective strategy with which to reduce Post-Thrombotic (PTS) disease severity and improve quality of life (QOL) in patients with established disabling iliac-obstructive post-thrombotic syndrome (DIO-PTS).

Impella Supported OPCABG

This study introduces a novel approach to coronary revascularization through the use of a short-term minimally-invasive left ventricular assist device (LVAD) to minimize myocardial injury and eliminate low output state during the perioperative period.

Organ Care System (OCS) Heart Perfusion Post-Approval Registry (OHP)

The objective of this post-approval registry is to provide additional real-world evidence of the performance of the OCS Heart System to preserve donor-after-brain-death (DBD) and donation-after-circulatory-death (DCD) donor hearts

PATH-HHT

The purpose of this study is to determine efficacy of pomalidomide compared to placebo for the reduction in severity of epistaxis after 24 weeks of treatment.

REDUCE Post-Approval Study GSO 18-01

This study will assess the safety and effectiveness of GORE® CARDIOFORM Septal Occluder in a post-approval setting and will evaluate the quality of operator education and training and transferability of trial experience to a post-market setting.

STRIKE-PE

The purpose of this study is to collect information on how patients with a pulmonary embolism recover after treatment with the Indigo Aspiration System. The Indigo Aspiration System is a medical device that has been cleared by the U.S. FDA for removing blood clots from the blood.

Tendyne SUMMIT

This is a clinical trial to evaluate the safety and effectiveness of using the Tendyne™ Mitral Valve System for the treatment of symptomatic mitral regurgitation compared to the MitraClip System.

Cardiovascular Academic Initiative Advancing Clinical Care

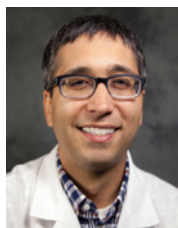
The Cardiovascular Academic Initiative (CAI) at the Medical College of Wisconsin launched in 2020, bringing resources together to advance cardiovascular clinical care. The CAI aims to create collaborative spaces for innovation in cardiovascular research and clinical care; to facilitate the translation of cardiovascular research between basic sciences, early human studies and clinical practice; and to train the next generation of leaders in cardiovascular research and education. The goal of this work is to help clinicians solve clinical problems, including helping bring new interventions to the bedside, developing best practice care models and introducing new clinical tools to the care team.

Physician Listing

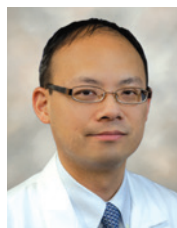
Froedtert & the Medical College of Wisconsin Heart and Vascular Teams

The Froedtert & MCW health network's multidisciplinary team of heart and vascular physicians is comprised of respected specialists who use the latest techniques and technologies to diagnose and treat all forms of cardiovascular disease.

Advanced Heart Failure and Transplant Cardiologists



**Nunzio,
Gaglianello, MD**



**David
Ishizawar, MD**



**Renee
Kursel, MD**



**Jose
Mendez, MD**



**Eugenia
Raichlin, MD**



**Rajakrishnan
Vijayakrishnan, MD**

Cardiologists



**Alexei
Agapitov, MD**



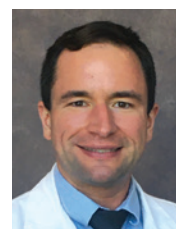
**Subhashish Agarwal,
MD, MS**



**Peter
Bartz, MD**



**Ivor J.
Benjamin, MD**



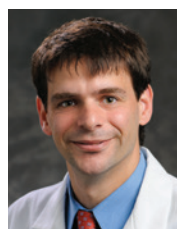
**Christopher
Boyd, MD**



**Matthew
Buelow, MD**



**Yaser
Carcora, MD**



**Scott Cohen,
MD, MPH**



**Kevin
Cohoon, DO**



**Stacey
Gardiner, MD**



**Noelle Garster,
MD, MS**



**Matthew
Gentile, MD**



**Jennifer
Gerardin, MD**



**Salil Ginde,
MD, MPH**



**Michael J.
Gitter, MD**



**David
Groden, MD**



**Sara
Hariman, MD**



**Robert
Horth, MD**

Cardiologists *continued*



**James F.
Kleczka, MD**



**Jacquelyn P.
Kulinski, MD**



**David
Lewandowski, MD**



**Pedro
Lozano, MD**



**Joshua A.
Meskin, MD**



**Silja Majahalme,
MD, PhD**



**Staci
Milosavljevic, MD**



**Divyanshu
Mohananey, MD**



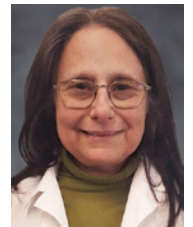
**Christopher
Mueller, MD**



**Charles
Ogdon, MD**



**Steven L.
Peterson, MD**



**Linda
Scaffidi, MD**



**Abhinav
Sharma, MD**



**Neil
Shah, MD**



**Sarah E.
Thordsen, MD**



**Aimee
Welsh, MD**



**Michael E. Widlansky,
MD, MPH**

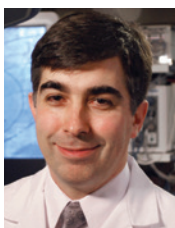
Electrophysiologists



**Graham
Adsit, MD**



**Marcie G.
Berger, MD**



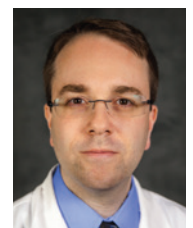
**Evgueni
Fayn, MD**



**James A.
Oujiri, MD**



**James A.
Roth, MD**



**Jason C.
Rubenstein, MD**



**Dalip
Singh, MD**

Interventional Cardiologists



**Saif
Anwaruddin, MD**



**Iyad
Azzam, MD**



**Michael P.
Cinquegrani, MD**



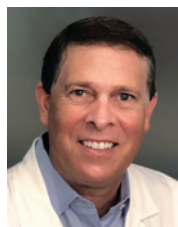
**Panayotis
Fasseas, MD**



**Mina
Iskander, MD**



**Kiran
Kashyap, MD**



**David S. Marks,
MD, MBA**



**Jesse
Martin, MD**



**Peter Mason,
MD, MPH**

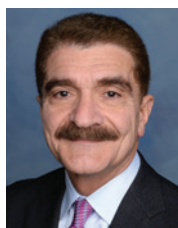


**Jorge Saucedo,
MD, MBA**



**Salim
Shammo, MD**

Cardiothoracic Surgeons



**G. Hossein
Almassi, MD**



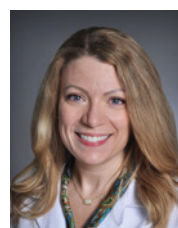
**Nilto
De Oliveira, MD**



**Lucian Durham III,
MD, PhD**



**Mario
Gasparri, MD**



**Tracy Geoffrion,
MD, MPH**



**David
Johnstone, MD**



**Lyle D. Joyce,
MD, PhD**



**Takushi Kohmoto,
MD, PhD, MBA**



**Paul
Linsky, MD**



**Michael
Mitchell, MD**



**Paul J. Pearson,
MD, PhD**



**Stefano Schena,
MD, PhD**



**Ronald Woods,
MD, PhD**

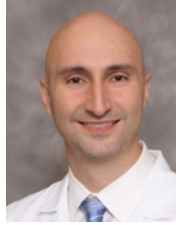


**H. Adam
Uberty, MD**

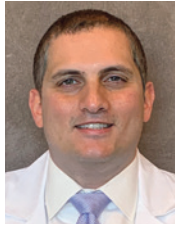
Vascular and Interventional Radiologists



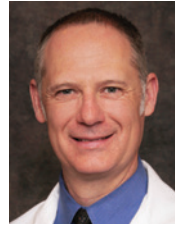
**Robert A.
Beres, MD**



**Mircea
Cristescu, MD**



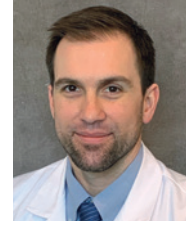
**Mustafa
Haddad, MD**



**Robert A.
Hieb, MD**



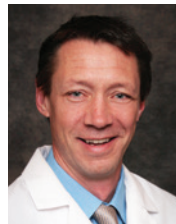
**Eric J.
Hohenwarter, MD**



**Brandon M.
Key, MD**



**Parag J. Patel,
MD, MS**



**William S.
Rilling, MD**



**Matthew J.
Scheidt, MD**



**Amanda R. Smolock,
MD, PhD**



**Sarah B. White,
MD, MS**

Vascular Medicine Specialist



**James B.
Gosset, MD**

Vascular Surgeons



**Shahriar
Alizadegan, MD**



**Kellie R.
Brown, MD**



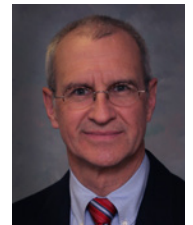
**Mitchell
Dyer, MD**



**Joseph
Hart, MD**



**Christopher
Johnson, MD**



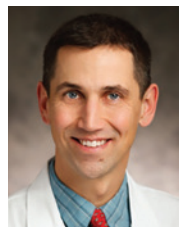
**Dean
Klinger, MD**

Physician Listing *continued*

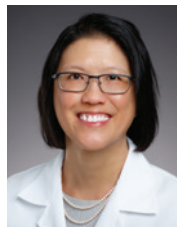
Vascular Surgeons *continued*



Nathan
Kugler, MD



Brian
Lewis, MD



Mona Li, MD



Michael
Malinowski, MD



Peter
Rossi, MD

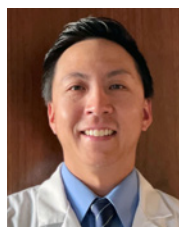


Abby
Rothstein, MD

Critical Care/Anesthesiology — Cardiovascular Intensive Care Unit



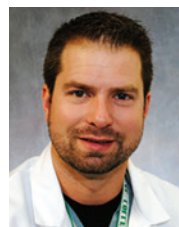
Michael
Fierro, MD



Dustin
Hang, MD



Kim
Jacobsen, MD



Matthew
Jeranek, MD



Hemanckur
Makker, MD



Rachel
Morris, MD



Carolyn
Pinkerton, MD



Chris Roberts,
MD, PhD



Evan
Robinson, DO



Amber
Zdanovec, MD



Jessica
Zenga, MD



M. Tracy
Zundel, MD

Connect With Us

Our team of physicians prides itself on delivering excellent patient care and working with our referring physicians as partners, ensuring the appropriate communication is delivered and patients return to the referring physician for longitudinal care.

To refer a patient to our cardiovascular team, please call **414-777-7700** or visit froedtert.com/refer.

For a physician-to-physician phone consultation or patient transfer, call **414-805-4700**. To learn more about our programs and team of physicians, visit froedtert.com/heart-vascular.

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