

Frederik Meijer Heart & Vascular Institute

Heart, Lung and Vascular
Outcomes Report

2021

From prevention to transplant and everything in between.

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Dear Colleagues,

On behalf of the Spectrum Health Frederik Meijer Heart & Vascular Institute, we are delighted to share our outcomes report showcasing the exceptional care we provided to our patients—and each other—during a challenging year. The data shows largely that our volumes continued to climb for the essential services we provide, and our strong outcomes did not waver.

Due to COVID-19, changes were made to the way we approach many facets of cardiovascular care, including virtual education ahead of procedures, extra communication avenues to help patients and families navigate changing environments, and new protocols for care and vaccination. Many of our team members were redeployed to ICU, ambulatory or telehealth settings to adapt to the needs of our communities.

Through it all we supported one another, recognizing those who helped find care solutions, and offering wellness virtual town halls to share and listen with the goal of not only coping, but thriving, during the pandemic. We are proud of the Frederik Meijer Heart & Vascular Institute staff for demonstrating our values of compassion, collaboration, courage and curiosity to innovate and do the right thing, even when it was hard.

We are greatly privileged and thankful for the philanthropic contributions made in 2020. Gifts allowed us to grow our cardio-oncology program and add new equipment to the Jacob and Lois Mol Cardiovascular Simulation Center. The state-of-the-art space was one of six host sites in the U.S. to participate in the European Society for Vascular Surgery simulation sessions. An endowment and other generosities allowed us to pursue groundbreaking research in telerobotics, creating the ability to perform robotic-assisted vascular interventions from thousands of miles away.

The use of technology is just one way we’re working to increase access to care and reduce time to treatment for our patients. As a mature health system, we are able to focus on value-based care and health equity—initiatives that the nation is beginning to recognize as imperative. In spring 2020, we formed an official Population Health department to reimagine our collective work and better manage the health of our patients through innovative partnerships, payments and analytics. Spectrum Health also publicly acknowledged that racism is a health crisis and pledged to take on the challenge of eliminating racism and its impacts on health, hope and lives, both within our organization and in the communities we serve.

We invite you to read on and learn about the ways we are leading in our fields, defining new clinical pathways and growing preventive medicine, and for ideas on how we can connect with you. We strive to ensure that both our patients and referring providers have seamless experiences interacting with our health system.

Sincerely,

Nancy P. Schwallier, MPAS, PA-C
Vice President, Acute and
Cardiovascular Health

Dr. Penny Wilton, MBBS, FANZCA, FRCA, FFICM, MBA
Vice President, Department Chief, Cardiovascular
Health, Frederik Meijer Endowed Chair

John Heiser, MD
Division Chief, Cardiac &
Thoracic Surgery

M. Ashraf Mansour, MD
Division Chief, Vascular &
Endovascular Therapy

David Wohns, MD, MBA, FACC
Division Chief, Cardiovascular
Medicine



A 2nd, 3rd and 4th opinion in one place.

Spectrum Health’s multidisciplinary heart team of more than 30 physicians works to collect incomparable expert analysis while considering the most up-to-date research and technology to achieve optimal outcomes. The breadth of our clinicians’ expertise is key to providing a comprehensive evaluation and treatment plan tailored to the needs of each patient.

Through partnership with Abiomed®, we conduct heart team training programs to bring this best-practice approach to other centers around the country.



cases reviewed since 2015

↓
Patients and their families value this service, and the providers benefit from collaborative decision-making for complex procedures.



Myocardial infarction

Using the coordinated process of the STEMI Transfer Network, 17 different sites sent patients to Spectrum Health Fred and Lena Meijer Heart Center in 2020 where high-risk percutaneous coronary intervention and advanced ventricular support is available 24/7.

Acute myocardial infarction

STEMI patient volume

2017	329
2018	344
2019	366
2020	294

Chest Pain - MI Registry™
Delayed presentation for STEMI was a well-documented phenomenon in 2020.

FEATURED RESEARCH

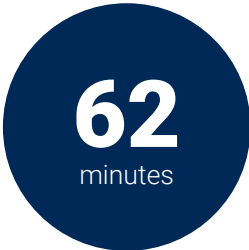
Spectrum Health enrolled the first patient in the [Door to Unload STEMI](#) pilot trial, published in Circulation. We are now enrolling patients in the full-scale trial to explore the possibility that patients with STEMI may have improved myocardial salvage if unloaded with an Impella device prior to PCI.

This pioneering trial may cause a paradigm shift in the acute management of heart attack.

PI: David Wohns, MD

↓
More STEMI patients are treated at Fred and Lena Meijer Heart Center than any other center in the state of Michigan.

Door to balloon



Spectrum Health: 62 minutes*
Goal: 90 minutes
CathPCI Registry®

Transfer-in door to balloon



Spectrum Health: 120 minutes*
Goal: 120 minutes
CathPCI Registry®

*COVID-19 protocols and increased use of ventricular support devices prior to PCI led to longer 2020 door to balloon time.

Radiation safety for patients and clinicians is a top priority in the Meijer Heart Center cath labs. Radiation exposure for PCI patients as measured by dose area product is 61.7Gy · cm² compared to published levels for PCI of 118Gy · cm².

Radiation Protection Dosimetry (2019) Vol. 184, No. 1, pp. 1-4

Diagnostic catheterizations

4,530

Percutaneous coronary interventions

1,280

CathPCI Registry®

In 2020, 59.14% of all PCIs were performed radially, higher than the national rate of 52.38%. Radial access results in fewer complications and reduces length of stay, allowing patients to get out of bed soon after the procedure is complete.

CathPCI Registry®

Spectrum Health PCI risk-adjusted bleeding rate

2.2%

CathPCI Registry®

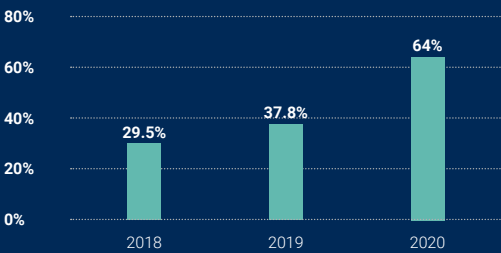
NCDR® rate

2.6%

CathPCI Registry®

Intravascular ultrasound or optical coherence tomography

Post-PCI imaging rates



In 2020, 65.7% of scheduled, elective PCI patients were discharged on the same day of the procedure, compared to 40.4% nationally.

CathPCI Registry®

Post-PCI imaging use

64%

Spectrum Health

5%

Published rates

Interventional cardiologists at Spectrum Health use post-PCI imaging with intravascular ultrasound or optical coherence tomography at rates far exceeding those in the published literature.* Having visual confirmation of procedural success reduces the incidence of acute stent closure and restenosis.

*Smilowitz NR, Mohanane D, Razzouk L, et al. Impact and Trends of Intravascular Imaging in Diagnostic Coronary Angiography and Percutaneous Coronary Intervention in Inpatients in the United States. Catheter Cardiovasc Interv 2018 Nov 15;92(6):E410-E415.

Robotics expand care access

Ryan Madder, MD, interventional cardiologist, in partnership with Corindus, A Siemens Healthineers Company, performed the first-ever cross-country simulated telerobotic procedure to show that the technology works and that it has the promise to increase access to care and reduce time to treatment for patients.

In the documentary “Speed of Thought,” Emmy Award-winning documentarian Mila Aung-Thwin features this example of advanced connectivity tackling some of society’s biggest challenges. The film is available on Amazon Prime Video, Peacock and Fios On Demand. Dr. Madder also spoke about the technology in a video interview.



An Impella ventricular assist device moves multiple liters of blood per minute from the left ventricle into the body, allowing the heart to rest.

74

Impella-supported
PCI procedures

We perform the largest volume of high-risk, Impella-supported PCI procedures in West Michigan, expanding treatment options for our patients.

Chronic total occlusion
PCI volume



The CTO program offers treatment options for patients who often feel left with no options. More than 400 procedures have been conducted since program inception, with an 88% success rate achieved in 2020.

While CTO treatment is more complex than typical PCI, the procedure is still minimally invasive and patients often return home the following day with a dramatic reduction of symptoms.

CASE STORY

A 79-year-old man with heart failure, recurrent chest pain and shortness of breath was referred to Spectrum Health for evaluation of complex CAD. His history of CABG, CKD, severe PVD and EF of 20% made his case particularly challenging. A heart team review recommended he not undergo repeat surgery. Intravascular lithotripsy was used to gain Impella access through the axillary artery and support a successful rotablation and stenting procedure of the left main, LAD and circumflex coronary arteries. Performing a high-risk, Impella-supported PCI using axillary access can only be completed at select centers. It is one more example of the expertise and experience that sets Spectrum Health's interventional cardiology team apart.



Mitchel Kok, cardiovascular technician; David Wohns, MD, cardiologist; and Kevin Wolschleger, MD, cardiologist

FEATURED RESEARCH

NIRS-IVUS Registry Multimodality Advanced Intracoronary Imaging with Near-infrared Spectroscopy and Intravascular Ultrasound to Characterize Coronary Artery Plaques Before and After Percutaneous Intervention

The purpose of this study is to collect and analyze specific information from heart catheterization procedure related to health over 5 years.

PI: Ryan Madder, MD



Coronary Artery Disease – Surgical Intervention

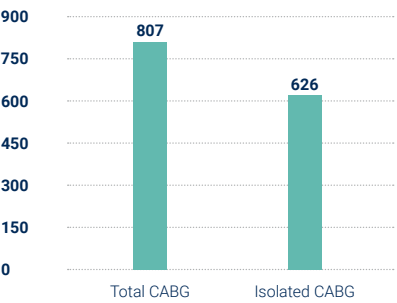
Spectrum Health cardiac surgeons perform open surgical as well as minimally invasive revascularization procedures, eliminating the need for a large sternal incision in some patients. Our highly experienced providers also perform beating heart surgery to avoid use of a heart-lung bypass machine.

Advanced techniques are used, such as multiple arterial grafting, using the left internal mammary artery, right internal mammary artery and radial artery. Our surgeons perform high-risk coronary artery bypass grafting surgeries on patients with low ejection fractions and those requiring a reoperative surgery.

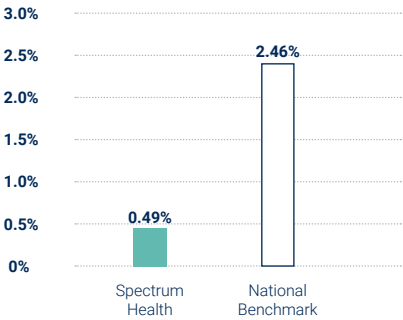


Cardiothoracic surgeon John Heiser, MD, was honored as the recipient of the American Heart Association's Richard M. DeVos Award for Medical Excellence for his decades-long leadership in cardiothoracic surgery.

CABG volume



CABG operative mortality



The Society of Thoracic Surgeons
Adult Cardiac Surgery Database

Highest volume of
CABG procedures in the
state of Michigan

99th percentile of all
centers for observed
operative mortality

Open-heart surgeries
in 2020



Spectrum Health received an STS 3-Star Rating, the highest possible rating, from The Society of Thoracic Surgeons for quality of CABG surgery.

National data coverage period: January 2020 to December 2020.

CASE STORY

A 61-year-old male with chest pain and acute decompensated heart failure was found to have a new cardiomyopathy, multivessel CAD and LV thrombus. Surgical risk was prohibitive, as he was inotrope dependent, with an EF of only 15% and known severe PVD. The heart team reviewed the case. A decision was made for the patient to undergo left main PCI. Given the LV thrombus, Impella support could not be used, so the procedure was performed with peripheral ECMO backup in the hybrid OR. With coordination of vascular surgery, cardiothoracic surgery, interventional cardiology and cardiac anesthesia, this patient underwent a successful PCI.

FEATURED RESEARCH

PREVENT AF

Performing a prophylactic surgical maze procedure—left atrial appendage amputation and pulmonary vein isolation ablation—along with open-heart surgery in patients who do not have a history of atrial fibrillation, may decrease and/or prevent the occurrence of atrial fibrillation in postoperative open-heart surgery patients.

PI: Charles Willekes, MD

Critical Care

The cardiothoracic critical care team at Spectrum Health is available to provide guidance to referring providers prior to transfer, and to discuss if transfer is needed. The CTCC team is staffed 24/7 by physicians who are board certified in critical care and cardiac anesthesia, and advanced practice providers, nurses, pharmacists and respiratory therapists, who all have cardiovascular expertise.

Daily multidisciplinary rounds focus on the care of patients with complex cardiovascular disease, sometimes requiring ventricular support devices or even transplant. The team also provides emergent support to the cath lab for unstable patients, especially those in cardiogenic shock.

Spectrum Health has 16 cardiovascular anesthesiologists, all of whom are double board certified and diplomats of the National Board of Echocardiography. In addition to specialized anesthesia care for cardiovascular procedures, they provide bedside care as intensivists in the cardiothoracic critical care unit.



CTCC multidisciplinary rounds: Liam Gavin, RT; Lauren Bifano, RN; C.J. Michaud, PharmD; Brian Trethowan, MD; Jennifer Williams, NP

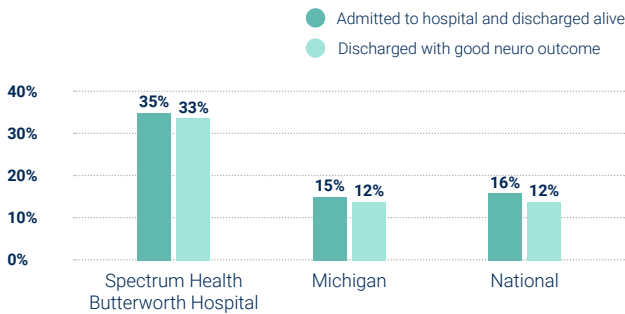
Cardiac Arrest/Shock

A shock team alert assembles providers from different specialties to rapidly evaluate patients in cardiogenic shock and determine the best treatment approach.

Our survival and outcomes are significantly better than the state and national rates. Good neurological outcomes pay testament to excellent prehospital care, followed by expert stabilization in the ED, early and appropriate interventions, meticulous ICU care and avoidance of early prognostication.

Targeted temperature management is used in cardiac arrest patients going to PCI 2.5 times more than the national benchmark from the CathPCI Registry®.

Cardiac arrest survival rates



Cardiac Arrest Registry to Enhance Survival_CARES
2020 Hospital Benchmarking Report (Non-Traumatic Etiology)



CASE STORY

A 56-year-old male suffered a STEMI while hunting in Lake County, drove to Spectrum Health Reed City Hospital, and was flown by Aero Med to Spectrum Health Butterworth Hospital to have a stent placed and open his artery. It was 70 minutes from the time he called his wife from the woods to getting the reperfusion intervention he needed.

More details from the patient and provider perspective are available at spectrumhealthbeat.org, or watch the video at vimeo.com/586412756.

In 2020, 141 cardiac and vascular patients were airlifted to Meijer Heart Center.

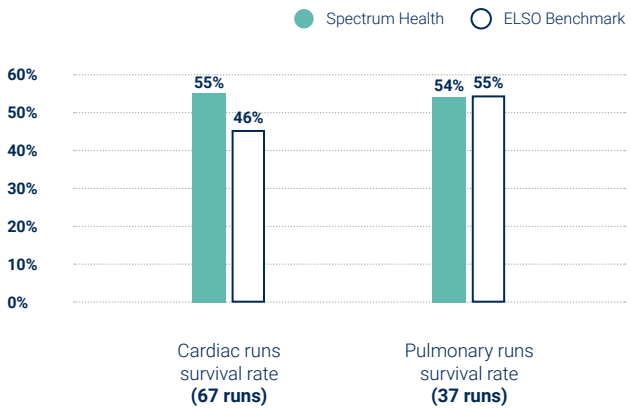
Extracorporeal Membrane Oxygenation

Spectrum Health employs full-time, specially trained staff to respond when a shock call is paged. Advanced lifesaving options include: ECMO, Impella (2.5, CP, RP, 5.0 and 5.5) and CentriMag®.

By Extracorporeal Life Support Organization standards, Spectrum Health is a high-volume ECMO center. Numerous COVID-19 patients received pulmonary ECMO in 2020.



ECMO survival



Extracorporeal Life Support Organization

ECMO-supported resuscitation procedures

11

With ECPR, practitioners can maintain end-organ perfusion while determining the cause of the arrest and potential for reversing it, with the goal of improving long-term survival and neurological outcomes.



The team responds to evaluate patients transported by Aero Med Spectrum Health and North Flight Aero Med. Aero Med provides scene flight services as well as inter-hospital transport for patients with emergent cardiovascular conditions.

FEATURED PUBLICATIONS

[Improved Survival After Heart Transplantation in Patients Bridged With Extracorporeal Membrane Oxygenation in the New Allocation System](#)

Gonzalez MH, Acharya D, Lee S, Leacche M, Boeve T, Manandhar-Shrestha N, Jovinge S, Loyaga-Rendon RY. J Heart Lung Transplant. 2021 Feb;40(2):149-157. doi: 10.1016/j.healun.2020.11.004. Epub 2020 Nov 9. PMID: 33277169

[Extracorporeal Membrane Oxygenation as a Bridge to Durable Mechanical Circulatory Support: An Analysis of the STS-INTERMACS Database](#)

Loyaga-Rendon RY, Boeve T, Tallaj J, Lee S, Leacche M, Lotun K, Koehl DA, Cantor RS, Kirklin JK, Acharya D. Circ Heart Fail. 2020 Mar;13(3):e006387. doi: 10.1161/CIRCHEARTFAILURE.119.006387. Epub 2020 Mar 13. PMID: 32164436



CASE STORY

A 21-year-old male was diagnosed with cardiomyopathy and admitted to the ICU with severe heart failure, ventricular enlargement and an EF of only 10%. Despite aggressive medical therapy he continued to decline. For the next six months he underwent multiple ventricular assist device surgeries, moved in and out of medically induced comas and spent time on ECMO to support his heart and lungs before undergoing a lifesaving 14-hour heart transplant.

More details from the patient and provider perspective are available at spectrumhealthbeat.org, or watch the video at vimeo.com/558064813.



Pulmonary Embolism Response

The focus on pulmonary embolism response has taken on increased prominence as a result of patients presenting with COVID-19-related massive PE. Acute PE is associated with mortality as high as 30%.

Many therapeutic options exist for treatment of these patients, and deciding on an appropriate method can be difficult and inconsistent. Spectrum Health was the first health system in West Michigan to introduce the concept of a Pulmonary Embolism Response Team (PERT) to optimize care in the acute phase for each patient with intermediate and high-risk PE.



Pulmonary Embolism Response Team: David Langholz, MD, cardiology; Glenn VanOtteren, MD, pulmonology; Nate Bishop, DO, emergency medicine; Trevor Cummings, MD, emergency medicine; Marzia Leacche, MD, cardiothoracic surgery; Mike Knox, MD, interventional radiology; Joseph Pitcher, MD, pulmonology and critical care

PERT responds to emergency situations with appropriately identified PE patients. The team is available to consult with providers on PE patients throughout the region.

Spectrum Health's median length of stay, in-hospital major bleeding and in-hospital mortality rates for pulmonary embolism are better than national benchmarks (PERT Registry).

Standardized care has been developed for emergency evaluation and intervention, patient follow-up, outpatient treatment and anticoagulation/IVC filter management.

Aortic Valve Disease

Our cardiothoracic surgeons perform a high volume of valve procedures, including:

- Transcatheter valve replacement
- Minimally invasive open-heart valve surgery
- Traditional open-heart valve surgery with one sternal incision

Our long-established structural heart program treats patients of all risk levels, providing streamlined, multidisciplinary care. The team's expertise reflects the experience of some of the highest volumes in the state. Cutting-edge technologies and a robust research program allow us to offer every option for patients at Meijer Heart Center.

Virtual care options, direct admits, next-day urgent access and provider-to-provider conversations make it easy to refer to our program.



In 2020, we saw an influx of complex cardiovascular cases. The heart is at high-risk for damage from COVID-19, as severe inflammation in the body can trigger cardiac events.

Transcatheter aortic valve replacement

The TAVR team at Spectrum Health began using a minimally invasive approach to aortic valve implantation when our physicians were part of a landmark clinical trial in 2011.

“ The patients that we see most often for surgery have severe aortic stenosis, and most have a very limited life expectancy. Traditional treatment has been surgical replacement of the aortic valve. The main difficulty is that some patients aren't good candidates. Treating with transcatheter valves allows more patients to have the procedure at reasonable risk. ”

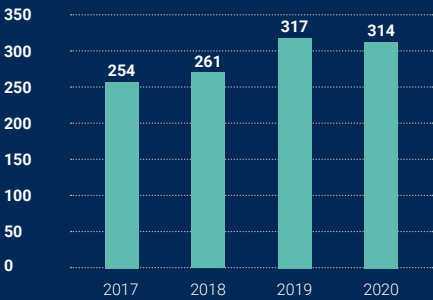
– John Heiser, MD, cardiothoracic surgeon



Spectrum Health was awarded Transcatheter Valve Certification in May 2020, speaking to the excellence in care provided.

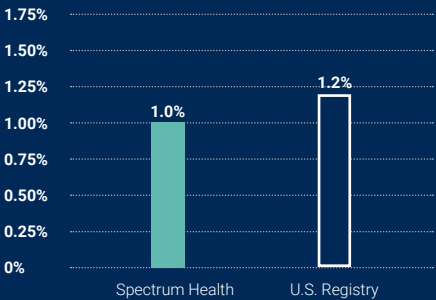


TAVR volumes



Volumes include patients who participated in a Spectrum Health research program.

TAVR hospital mortality



STS/ACC TVT Registry™



Spectrum Health received an STS 3-Star Rating, the highest possible rating, from The Society of Thoracic Surgeons for quality of aortic valve replacement surgery when performed with CABG.

National data coverage period: January 2018 to December 2020.



“ The TAVR team affords the patient the best view from all disciplines. It's a meeting of the minds. ”

– William Merhi, DO, interventional cardiologist



John Heiser, MD and William Merhi, DO

In 2020, 25.2% of our TAVR patients were considered inoperable (extreme risk) compared to a national rate of 5.5%.

STS/ACC TVT Registry™

Higher use of moderate sedation promotes faster recovery. 93% of TAVR patients received moderate instead of general anesthesia, compared with 64% nationally.

STS/ACC TVT Registry™

As early adopters of a new valve positioning technique, we were able to reduce the need for permanent pacemaker post TAVR from 18.5% in 2018 to 7.5% in 2020.

Health equity

Spectrum Health is participating in the Michigan TAVR registry to evaluate disparities in care related to race, gender and geographical location, including opening a structural heart and cardiothoracic surgery outreach clinic in Muskegon to engage underserved populations.

Traditional aortic valve replacement

Surgical aortic valve replacement volumes—alone or with CABG

187

Aortic valve replacement operative mortality

Spectrum Health: 2.04%

National Benchmark: 2.23%

The Society of Thoracic Surgeons Adult Cardiac Surgery Database

FEATURED PUBLICATION

[Transcatheter Aortic-Valve Replacement With a Self-Expanding Valve in Low-Risk Patients](#)

Popma J, Deeb GM, Yakubov JS, Mumtaz M, Gada H, O'Hair D, Bajwa T, Heiser JC, Merhi W, et al. N Eng J Med 2019; 380:1706-15 DOI: 10.1056/NEJMoa1816885.

FEATURED PUBLICATION

[Magna Ease Bioprosthetic Aortic Valve: Mid-Term Haemodynamic Outcomes in 1126 Patients](#)

Thorp SD, Khazaal J, Yu G, Parker JL, Timek TA. Interact Cardiovasc Thorac Surg. 2021 Feb 11:ivab016. doi: 10.1093/icvts/ivab016. Online ahead of print. **PMID:** 33570145

CASE STORY

An 83-year-old female was told she needed open-heart surgery to treat ongoing chest pain, despite having a stent placed at another center. She sought a second opinion from the experts at Meijer Heart Center. Following consultation with the team, it was determined she could undergo transcatheter aortic valve replacement along with repeat PCI. Instead of a long surgical recovery, she was able to sit up and walk a few hours after her procedure. More details from the patient and provider perspective are available at spectrumhealthbeat.org.



Mitral Valve Disease

Spectrum Health is the only site in West Michigan with a dedicated transcatheter mitral valve replacement system, a minimally invasive alternative to conventional open-heart mitral valve surgery. Participation in the APOLLO trial allows us to offer TMVR to patients who have severe symptomatic mitral regurgitation and are either a candidate for, or ineligible for, conventional valve surgery.

MitraClip® procedure is a less-invasive option for those with degenerative mitral regurgitation who are at high or extreme risk for open-heart surgery.

In addition to treating native mitral valve disease, Spectrum Health treats failed mitral bioprosthetic valves via a transcatheter approach utilizing the Edwards SAPIEN valve system.

TMVR volume

26

Number of procedures in the first three years.

Includes the APOLLO trial and the SAPIEN valve in mitral position.

MitraClip procedures in 2020

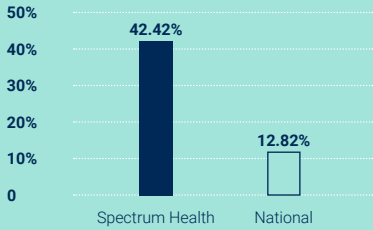
23

0.0% observed mortality
STS/ACC TVT Registry™



Robotic surgery is used for isolated mitral valve repair at more than three times the national rate.

The Society of Thoracic Surgeons
Adult Cardiac Surgery Database



The Society of Thoracic Surgeons

Mitral valve surgery—isolated or combined procedures

122

The Society of Thoracic Surgeons Adult Cardiac Surgery Database

Mitral valve repair may be performed through traditional sternotomy as well as other minimally invasive means, including robotic and mini thoracotomy. Mitral valve repairs can include chordal transfer, artificial chordae and leaflet resection.

FEATURED PUBLICATIONS

[Long-Term Outcomes of Mosaic Versus Perimount Mitral Replacements: 17-Year Follow-Up of 940 Implants](#)

Beute TJ, Goehler M, Parker J, Boeve T, Heiser J, Murphy E, Timek T, Willekes CL. Ann Thorac Surg. 2020 Aug;110(2):508-515. doi: 10.1016/j.athoracsur.2019.10.075. Epub 2019 Dec 20. **PMID:** 31866480

[Long-Term Outcomes of Etiology Specific Annuloplasty Ring Repair of Ischemic Mitral Regurgitation](#)

Timek TA, Malinowski M, Hooker RL, Parker JL, Willekes CL, Murphy ET, Boeve T, Leung S, Fanning JS, Heiser JC. Ann Cardiothorac Surg. 2021 Jan;10(1):141-148. doi: 10.21037/acs-2020-mv-fs-0166. **PMID:** 33575184 Free PMC article.



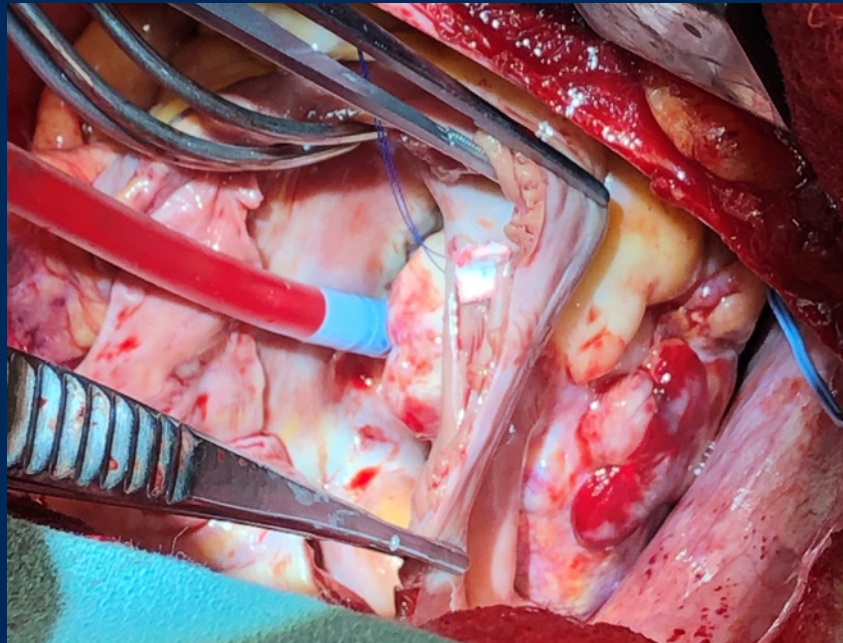
Charles Willekes, MD,
cardiothoracic surgeon

Tricuspid Valve Disease

Tricuspid valve dysfunction frequently is functional in nature and may require placement of an annuloplasty band at the time of heart surgery performed for associated mitral or aortic valvular disease. Less common indications for surgery include situations where the tricuspid valve is damaged by endocarditis or a malignancy.

A SURGEON'S VIEW

A 62-year-old male was found to have a metastasis of malignant melanoma to the heart. Preoperative cardiac MRI demonstrated a tumor involving the tricuspid valve and a portion of the adjacent right atrium and right ventricle. Edward Murphy, MD, cardiothoracic surgeon and Richard DeVos Endowed Chair for Lung Transplantation, removed the tumor as one intact specimen consisting of the tricuspid valve, a full-thickness portion of the right atrium and ventricle, and part of the right coronary artery. The artery was bypassed, and a bovine pericardial patch was utilized to reconstruct the heart. The prosthetic valve was anchored to the patch during implantation. The surgical pathology margins were clear, and the patient had an unremarkable recovery and remains well.



Intraoperative photograph of the heart with forceps shown grasping the open right atrial wall, which runs from top to bottom. A suction catheter traverses the tricuspid valve. Tumor is present involving the valve and extending through to the right ventricular pericardial surface on the right side of the image.

Spectrum Health surgeons will see all patients, regardless of the complexity of their disease, and welcome patients seeking a second opinion.



Julie McKinney, RN; Julie Rodibaugh, RN; Kurt Phillips, RN

→ **The Meijer Heart Center cardiovascular operating room hub has been recognized as one of the most efficient operating room hubs in the nation.**

Advanced Heart Failure

Spectrum Health employs seven board-certified advanced heart failure physicians. Our well-established care pathways make us the primary health destination for patients who need the brightest minds and most skilled hands in the industry and require complex procedures like ventricular assist devices and transplantation.

In 2020, we received the Silver Plus Honor Roll Award from the American Heart Association® Get With the Guidelines® program for achieving a score of 85% or greater on all heart failure achievement measures.

Inpatient care

Spectrum Health Grand Rapids is the leader in the state for inpatient cardiovascular care. As one of the busiest advanced heart failure hospitals, we have every tool available to care for patients, along with two highly trained and specialized inpatient rounding teams that are dedicated solely to heart failure care.

A heart failure nurse navigator was added to the team in 2020 to:

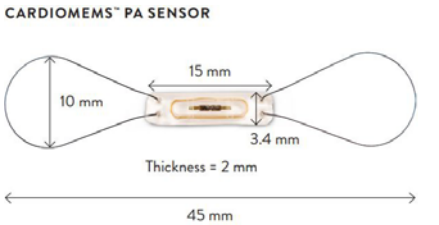
- Guide patients through diagnosis and treatment, both during and after discharge
- Improve communication between patient and multispecialty health care teams
- Ensure seamless access to services and connection to follow-up clinic

Within the Advanced Cardiopulmonary ICU, customized, hemodynamically tailored medical treatment is available to each patient. Options include ventilatory and circulatory support, ECMO, intra-aortic balloon support, Swan-Ganz monitoring and a wide spectrum of inotropic care.

Our pulmonary artery sensor implant program has grown nearly fivefold since it began in 2015. The program allows patients to be monitored remotely, preventing readmissions and providing timely care. Spectrum Health uses novel heart failure therapies like CardioMEMS™, a sensing device implanted to monitor heart pressure and better manage medical therapy.



Advanced heart failure rounding team: Sangjin Lee, MD, advanced heart failure cardiologist; Rachel Herman, PA-C; Sarah Vermeulen, RN; Megan Owen, PA-C; Ashly Sweet, PA-C



Ambulatory care

In one coordinated visit to the Advanced Heart Failure Disease Management Clinic, patients are able to confer with care managers, social workers, pharmacists and heart failure nurses. This team is particularly skilled at navigating the complexities of heart failure. Consultation with palliative care occurs as recommended by the care team.

In 2020, 2,967 patients were actively managed for advanced heart failure.

For those experiencing an acute episode of volume overload, we offer quick clinical triage for urgent—same or next day—intravenous diuresis, a safe and effective option for avoiding hospitalization.



Patients with implantable cardioverter defibrillators or pacemakers can have device checks with each appointment and review their data with a provider.

Advanced Heart Failure

An AHF device diagnostics program utilizes remote monitoring for early identification of high-risk patients headed for a decompensating heart failure episode. Multiple devices, such as pulmonary artery sensors, Boston Scientific Heart Logic™ and Medtronic Triage HF™, are used to give providers oversight of large populations of patients. We proactively manage those at risk before they experience an acute exacerbation of heart failure.

To keep care local, advanced heart failure services have expanded to multiple regional locations.



“ We are excited to bring the specialized care of our advanced heart failure cardiologists to the many communities we serve. It is better for our patients and their families, and supports our regional referring providers. ”

– David Wohns, MD, division chief, cardiovascular medicine

Cardiac Amyloidosis Clinic

Spectrum Health's heart failure team has been working to increase recognition of amyloidosis among referring providers through internal and external education. Early diagnosis and referral are critical to improving the prognosis for patients with amyloidosis. This is especially true of AL amyloidosis, a malignant hematologic condition with a high mortality rate if not diagnosed and treated early.

Now that disease-modifying treatments are available for transthyretin amyloidosis, we are able to work with patients to expedite diagnostic testing and approval of treatment.

FEATURED RESEARCH

EMBARK-HFpEF Trial

Our AHF clinic was selected as an enrolling site for the EMBARK-HFpEF trial, a study of mavacamten. The novel molecular therapy for heart failure with preserved ejection fraction (HFpEF) works directly on the heart muscle fibers. Studying new mechanisms of treatment for HFpEF promises to bring significant advances in treatment for this condition that makes up about 50% of all heart failure and currently has very few scientifically proven treatments.

PI: David Fermin, MD

Ventricular Assist Devices

Richard DeVos Heart & Lung Transplant Program

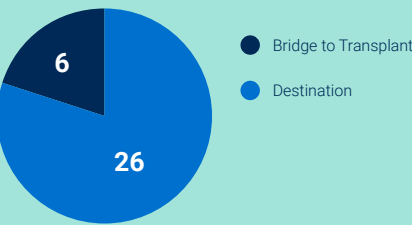
As part of the Spectrum Health Richard DeVos Heart & Lung Transplant Program, we are proud to bring the latest VAD technology to West Michigan and the expertise to successfully implant devices with better-than-national survival rates. Our standardized processes allow for streamlined testing and evaluation by multiple experts to give patients quick answers regarding their candidacy for LVAD placement sooner.



Implanted devices can be used long term or temporarily to improve a medical condition.

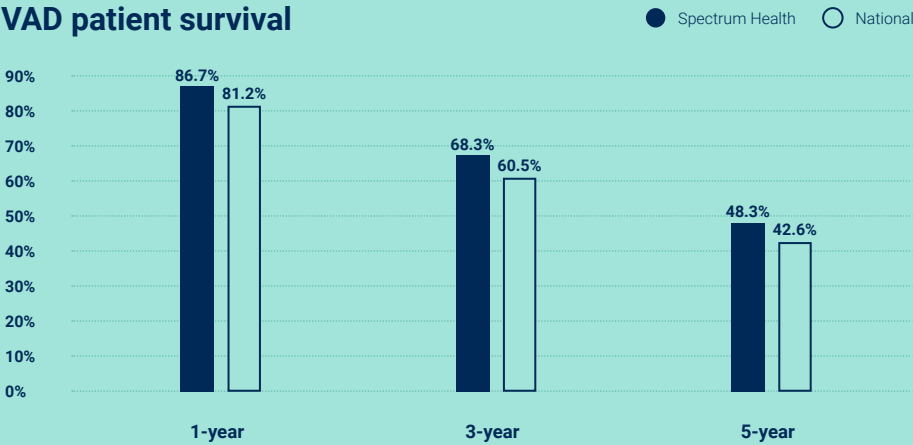
Timely evaluation and decision-making are important so that patients in need of ventricular assist devices can get them before they become too ill for surgery.

VAD surgery volume



We cared for 115 VAD patients throughout the community in 2020.

VAD patient survival



INTERMACS 2020 Q4 Cumulative

The Joint Commission recertified our LVAD program with zero citations, a perfect review.

The LVAD clinic has three shared care locations throughout the state of Michigan. These sites allow referring cardiologists to care for LVAD patients in their own cardiology office and decrease trips between home and Grand Rapids.

FEATURED RESEARCH

SWIFT Trial

As the only center in Michigan invited to participate in this study, we evaluate the less invasive implantation technique of the Abbott HeartMate 3 LVAD via a lateral thoracotomy.

PI: Marzia Leacche, MD

FEATURED PUBLICATIONS

[Antiplatelet and Anticoagulation Strategies for Left Ventricular Assist Devices](#)

Loyaga-Rendon RY, Kazui T, Acharya D. Ann Transl Med. 2021 Mar;9(6):521. doi: 10.21037/atm-20-4849. PMID: 33850918

[LVAD Implantation or Heart Transplantation for ECMO-Supported Patients](#)

Loyaga-Rendon RY, Acharya D, Kirklin JK. J Am Coll Cardiol. 2020 Nov 24;76(21):2575-2576. doi: 10.1016/j.jacc.2020.07.072. PMID: 3321373

CASE STORY

LVAD implantation allowed a 66-year-old patient to enjoy life again and travel often after years of worsening heart failure. Hear the story from the patient and provider perspective at spectrumhealthbeat.org.



The patient featured here received a transplant in February 2021 after more than three years with LVAD.

Heart Transplantation

Richard DeVos Heart & Lung Transplant Program

Experience matters.

Spectrum Health is the only health system in West Michigan to perform heart transplantation.

For more than 10 years, the surgical team within the Richard DeVos Heart & Lung Transplant Program has worked to perfect the highly complex process for our patients, and these efforts are reflected in survival rates.

In 2020, our teams developed and implemented protocols and procedures to ensure the safety of transplant candidates in the midst of COVID-19. Despite the pandemic, we had the highest-volume year of transplants since the program's inception.

January 2021, our busiest month yet, included 10 transplants (five heart, four lung, one pediatric kidney). Four surgeries took place within 24 hours, with transplants from four different donors. Two of the lung transplants were performed using ex-vivo lung perfusion, a technology that enables further evaluation of donor lungs that would otherwise have been rejected.

“ Our ability to achieve this many transplants within 24 hours is due to a culture of respect and commitment to always aspiring to do the right thing for the patient. Our emphasis on multidisciplinary teamwork makes it possible. ”

– Dr. Penny Wilton, vice president, cardiovascular health

Health equity

The transplant team has taken a deep dive into patient demographics related to race, gender and age and looked hard at incoming referrals and conversion rates into advanced therapy programs. We are engaging various teams around the organization to discuss health disparities in the advanced therapy world of health care, and we strive to ensure that all potential patients realize that LVAD and transplant can be an option.

Patient satisfaction is 95.8% for the collective Richard DeVos Heart & Lung Transplant Program.



Spectrum Health actively managed the care of 176 heart transplant patients in 2020.

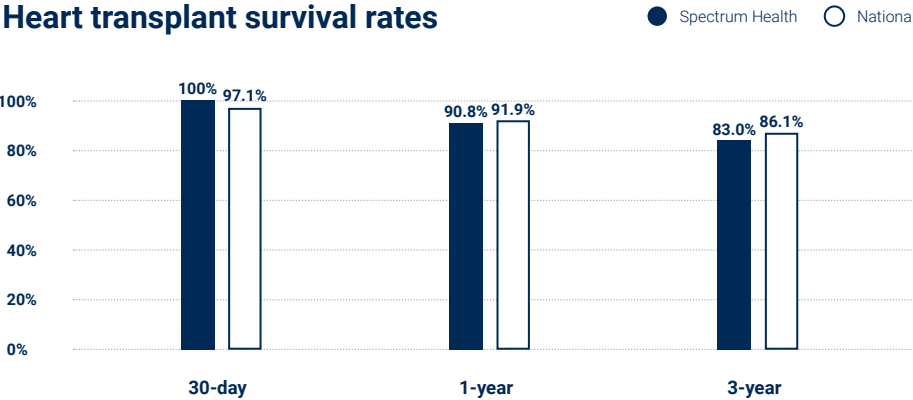


In early 2021, Marzia Leacche, MD, cardiothoracic surgeon, began her new role as the first woman to serve as Richard DeVos Endowed Chair for Heart Transplant and Mechanical Circulatory Support. Dr. Leacche is one of the few female surgeons in the U.S. performing both lung and heart transplantation.

Dr. Leacche and Sangjin Lee, MD, advanced heart failure cardiologist, serve as associate editors of the Journal of Heart and Lung Transplantation. It is unusual to have both a cardiologist and a surgeon from the same institution on the editorial board of this journal.

Before considering surgery, patients are medically optimized and remote monitoring is used to track progress. Once transplant is an option, a member of the transplant team is available 24/7 for any referral, question or need.

Heart transplant survival rates



July 2021 SRTR Report, data ending March 12, 2020

After transplantation, we utilize less-invasive surveillance testing for rejection through use of the HeartCare™ system.

In an attempt to decrease time on the transplant waitlist, we now accept donors infected with hepatitis C. Advancements in hepatitis C treatment have made this possible, and we are one of the few centers in the region offering this option. Oral antiviral therapy for four weeks after transplant has led to a sustained viral load of zero within the first two weeks and a survival rate of 100%.

Paragonix SherpaPak™, an FDA-cleared system, is used to transport hearts while monitoring and maintaining optimal temperature, giving surgeons and patients the best possible chance of success. This technology aids in prevention of primary graft dysfunction, and since adopting the approach, we have decreased our PGD rate to 0%.



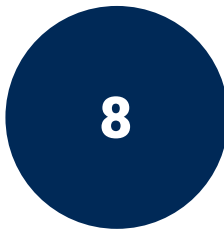
FEATURED PUBLICATION

[Increased Frequency of Heart Transplantation, Shortened Waitlist Time and Preserved Post-Transplant Survival in Adults with Congenital Heart Disease, on the New Heart Transplant Allocation System](#)

Jani M, Cook S, Huang SH, Boeve T, Leacche M, Manandhar-Shrestha NK, Jovinge SV, Loyaga-Rendon RY. Clin Transplant. 2021 Apr;35(4):e14205. doi: 10.1111/ctr.14205. Epub 2021 Feb 25. **PMID:** 33368608

Cardiac Rhythm Management

Spectrum Health's cardiac rhythm management program is one of the largest in the country, offering ablation, device implantation, extraction and medical management for the electrical activity of the heart. Partnerships with other disciplines, such as neurology, cardiothoracic surgery, sleep medicine and many others, help customize plans to meet the needs of each patient.



board-certified
electrophysiologists



laser lead extractions
for patients with
malfunctioning or
infected device leads



device implants,
revisions and
replacements



total
electrophysiology
procedures



patients followed
through the Cardiac
Device Clinic

Atrial Fibrillation

Spectrum Health's comprehensive atrial fibrillation program performs more than 500 ablations per year, leading the country in protocols for same-day discharge—a significant patient satisfier in terms of recovery and cost.

We are a high-volume center, yet we still see patients within two to three business days of referral in our Atrial Fibrillation Clinic, allowing for quick entry to our nationally recognized care pathway.

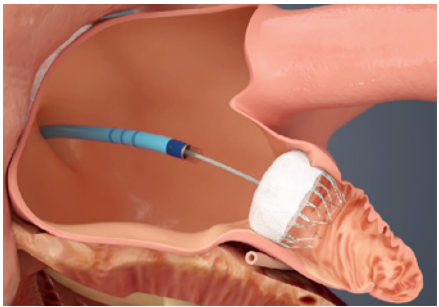
Highlights

Only 30% of AFib patients seen in the Spectrum Health Butterworth Hospital ED are admitted for treatment, versus roughly 70% of patients nationwide. Our protocols have received national attention as a best practice and have been presented throughout the U.S. to allow success to spread.

In 2020, we improved the lives of 58 patients with persistent atrial fibrillation through our Convergent™ hybrid ablation program. The method allows for a tiny incision in the patient's chest followed by radiofrequency ablation. The procedure yields excellent results and avoids the use of cardiopulmonary bypass.

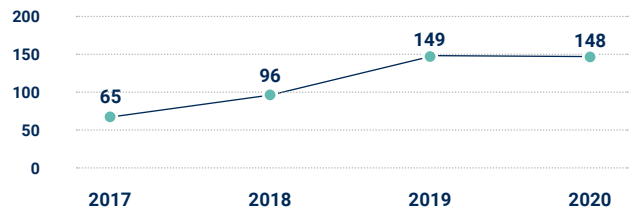
From 2019-2020 reporting, Spectrum Health is No. 1 in the Midwest for Convergent procedure volumes and No. 3 in the U.S.

Spectrum Health interventional cardiologists and electrophysiologists use the Left Atrial Appendage Occlusion (Watchman™) procedure, with a current success rate of 92%. The method offers a significant reduction in stroke risk for patients with non-valvular atrial fibrillation in whom anticoagulation with warfarin poses a significant risk.



Courtesy of Boston Scientific

Watchman procedures



LAAO Registry™

Spectrum Health Grand Rapids has implanted more than 600 Watchman devices. We are one of the top destinations in the state and the leader in West Michigan for this procedure.



Andre Gauri, MD, electrophysiologist, and David Spurlock, MD, cardiothoracic surgeon

“ Atrial fibrillation is a complex, chronic disease that requires a multifaceted approach to achieve the best patient outcomes. Our program consists of many specialties working together to offer patients consistent, high-quality care and the most contemporary data-driven treatment options available. ”

– Andre J. Gauri, MD, FHRS,
section chief,
cardiac electrophysiology,
and medical director,
atrial fibrillation program

We are a high-volume cardiac ablation center, as defined by NCDR®.

Atrial fibrillation procedures

504

VT/PVC procedures

74

Total ablation procedures

1,107

ICDs

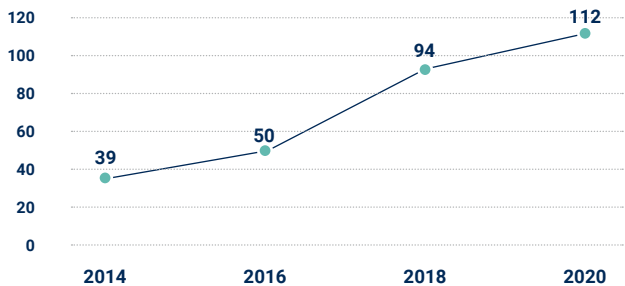
500

Pacemakers

814

Spectrum Health's Cardiac Device Clinic provides ongoing care for patients who receive an implanted device, such as an ICD, pacemaker or loop recorder, to monitor heart function and rhythm.

Lead extractions of ICDs and pacemakers



Spectrum Health is a high-volume, high-referral center for lead extractions.

Device clinic volume

8,125

Remote monitoring volume

18,875

We research the latest technologies to suit each patient's needs. Improved event monitors are used to detect and diagnose irregular heart rhythms.



In 2020, 14,909 external cardiac rhythm monitors were placed.

Value-based care

Spectrum Health and Medtronic have partnered to develop and deploy a program around cardiac resynchronization therapy for patients with heart failure and electrical dyssynchrony. The program will automate the identification of readmission events in patients who receive a Medtronic cardiac resynchronization therapy device with the AdaptivCRT™ algorithm. The algorithm adjusts therapy according to minute-by-minute evaluations of heart rhythm and has been shown to reduce the likelihood of 30-day heart failure hospital readmissions, reduce the risk of atrial fibrillation and improve patient survival.

FEATURED PUBLICATIONS

Cryoballoon Ablation as Initial Therapy for Atrial Fibrillation

Wazni OM, Dandamudi G, Sood N, Hoyt R, Tyler J, Durrani S, Niebauer M, Makati K, Halperin B, Gauri A, Morales G, Shao M, Kaplon RE, Nissen SE et al. N Engl J Med 2021; 384(4):316-324.

Same-day Discharge After Cryoballoon Ablation of Atrial Fibrillation: A Multicenter Experience

Kowalski M, Parikh V, Salcido JR, Chalfoun N, Albano A, O'Neil PG, Boweres MR, Gauri A, Bragelmann KM, Lim HW, Akhrass P, Shah R, Bekheit LM, Aryana A. J Cardiovasc Electrophysiol 2021;32(2): 183-90.

FEATURED RESEARCH

STELLAR

The purpose of this study is to establish the overall safety and effectiveness of the multi-electrode RF balloon catheter, in conjunction with the multi-electrode circular diagnostic catheter and multi-channel RF generator, for the treatment of subjects with drug refractory, symptomatic, paroxysmal atrial fibrillation.

PI: Sanjay Dandamudi, MD

CASE STORY

A 61-year-old male collapsed in his office from ventricular fibrillation. Co-workers used an AED machine and provided CPR while awaiting transport. Upon arrival at Spectrum Health Butterworth Hospital, the patient was placed on a LUCAS machine to automate CPR compressions, and the team was able to regulate his heart. Despite the interruption of blood flow to vital organs, CT revealed no lasting brain damage and a miraculous recovery. Watch the video at vimeo.com/573096070 or read more from the patient and provider perspective at spectrumhealthbeat.org.



Health equity

The vast technology used for heart rhythm procedures can make cost a barrier. Our care coordination team partners with financial counseling to explore options for coverage and payment so that financial burden does not stand in the way of patient care.

Stopping heart problems before they start.

Spectrum Health's preventive cardiology and cardiovascular rehabilitation program focuses on halting and reversing coronary artery disease through primary (preventive) and secondary (rehabilitation) efforts.

Our experienced team provides broad assessment of behaviors, medical conditions and risk factors affecting disease development and progression, incorporating treatment specific to each patient. We use:

- Advanced medical therapies
- Behavior modification
- Digital technologies
- Genetic testing
- Nutrition-based therapy
- Physical conditioning
- Psychological counseling

A lipid clinic assists patients with challenges reaching their cholesterol goals.

Clinical Cardiology

Spectrum Health's clinical cardiology section provides the full continuum of care through inpatient and outpatient services—including regional ambulatory clinics—for patients with cardiovascular diagnosis. This may include peripheral artery and venous disease, acute coronary syndrome, heart failure, cardiac valve disease, cardiac dysrhythmias, implanted pacemaker or defibrillator, post-percutaneous coronary intervention and any cardiovascular conditions requiring medical treatment and imaging.

This team also partners with a local kidney transplant center to provide risk assessment and surgical optimization prior to transplant to make optimal use of the graft.

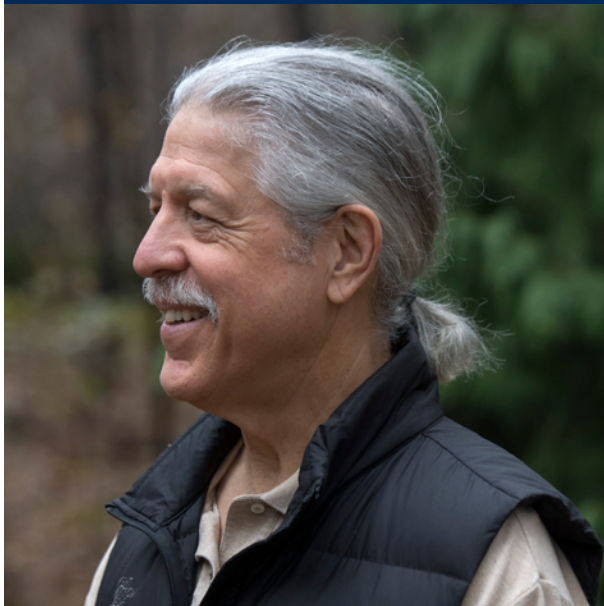
An early access clinic expedites urgent evaluation for all kinds of cardiology patients. Five hundred patients were seen within 72 hours of referral in the first six months of the clinic opening.



CASE STORY

"No medications, no blood thinners, it's all diet. If I had done this years ago, I never would have needed the heart surgery. I'm sure of it. It's thrilling." Watch one patient's experience with reversing his disease through lifestyle changes after a coronary bypass surgery.

More details from the patient and provider perspective are available at spectrumhealthbeat.org, or watch the video at vimeo.com/580355078.



Cardiovascular Rehabilitation

Pairing exercise with education, our cardiovascular rehabilitation program is designed to provide information, tools and confidence for patients to be able to improve their cardiovascular health, physical function and quality of life. Intervention can begin in the hospital setting, where certified exercise physiologists meet with patients at risk for cardiovascular disease.

Low- to moderate-risk patients may qualify for our home-based or hybrid model of care, with virtual exercise and education options. Certified exercise physiologists determine individual needs and goals to ensure progress and set outcomes.

Patients in program

628

Patient visits

10,547

“ The heart is just kind of waiting for you to do the right things and it will respond unbelievably. ”

– Thomas Boyden, MD, noninvasive cardiologist, and medical director, preventive cardiology and cardiac rehabilitation program



Cardiac rehabilitation improvement metrics

Average MET level (physical activity)

62% better

Average Dartmouth (quality of life assessment)

22% better

Average PHQ-9 (depression score)

45% better

Duke Activity Status Index (functional capacity)

59% better

Watch how our rehabilitation process begins at vimeo.com/509995323



Peripheral artery disease and exercise

PAD occurs when blood vessels in the extremities narrow or become blocked due to buildup of fatty plaque. The most common symptom of PAD is discomfort in the legs with activity due to reduced blood flow. Our PAD-SET program team designs and supervises individualized walking programs to aid in recovery and education.

Health equity

Cardiovascular disease claims more women’s lives than all forms of cancer combined. Our complete health improvement program through our Lifestyle Medicine group reaches out to young women to encourage them to know their numbers. Hispanic and Black women—found to have higher risk—are a focus. True North and Michigan Rehabilitation Services are two programs offered to patients who may need additional assistance with co-pays or out-of-pocket responsibilities for our services. Both programs focus on the importance of attending rehab to prepare the body for return to work/previous functional capacity.

Lifestyle Medicine

Lifestyle is the most critical piece of health and is important to reversing the increased prevalence of chronic disease. Spectrum Health officially opened a Lifestyle Medicine practice in 2020, embracing the approach as the future of medicine. Patients have shown meaningful improvements, such as reducing cholesterol and glucose levels. Many reduced or eliminated medicine by week eight of the six-month program.

Shared medical appointments are available for patients to benefit from group discussion and peer support.

Lifestyle Medicine is located in the same space as our Culinary Medicine Teaching Kitchen.

The Spectrum Health Frederik Meijer Heart & Vascular Institute awarded a \$42,518 research grant to study the feasibility and acceptability of engaging heart failure patients in culinary medicine programming.

Genetic testing helps to identify individual risk of statin-induced myopathy.

A dozen educational sessions are offered each week for patients to learn the fundamentals for a healthy lifestyle.



CASE STORY

A 64-year-old female awoke in the night with heartburn and shortness of breath. She arrived at the hospital, where it was determined she had suffered a heart attack. Two stents were placed and medications prescribed. The patient was hesitant to schedule cardiac rehab due to a sedentary lifestyle, previous lung issues and sciatic pain. Through an individually designed program, she worked hard to complete 36 rehab sessions and can now walk 25 minutes on the treadmill. She learned relaxation techniques from behavioral medicine to manage her stress, and adopted a modified version of a heart-healthy Mediterranean diet. More details from the patient and provider perspective are available at spectrumhealthbeat.org.

TAKEheart

Spectrum Health was chosen to participate in the TAKEheart initiative led by the Agency for Healthcare Research and Quality. The national effort is designed to assist health systems in increasing cardiac rehabilitation referrals, enrollment and retention to drive better outcomes. Auto-referrals are newly generated for cardiovascular rehabilitation patients based on primary diagnosis or cardiac procedure.

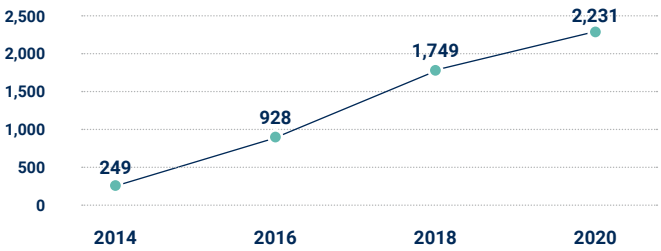
Adult Congenital Heart Disease

Patients born with congenital heart disease become adults with a complex evolution of structural and physiological heart issues. In conjunction with the American Heart Association, we recognize that adults with congenital heart disease are best managed by specially trained cardiologists and surgeons who work exclusively with congenital heart patients. We have mindfully created a model to deliver the best possible care, diagnosing and treating patients of all ages.

The adult congenital heart program, based in the Karl and Patricia Betz Congenital Heart Center at Helen DeVos Children’s Hospital, is one of a limited number of nationally recognized specialist centers. The Betz Congenital Heart Center team collaborates seamlessly with clinicians in the Meijer Heart Center to care for adult patients in an age-appropriate environment, with immediate access to any adult or congenital subspecialty care that may be needed. This co-location of expertise is unique in Michigan and is supported by eight board-certified ACHD physicians and two experienced ACHD surgeons.



Adult congenital outpatient visits



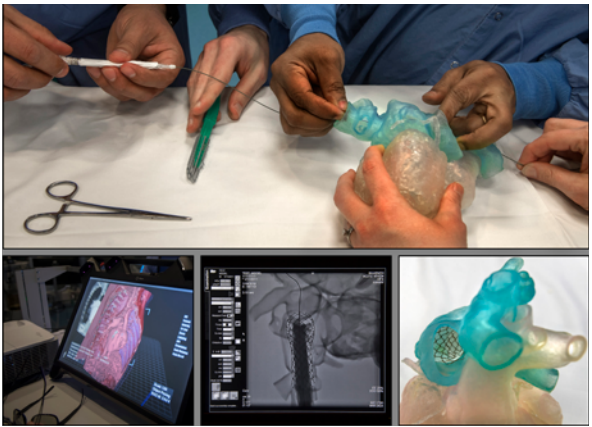
For four consecutive years, we have been one of the few congenital heart centers in the country to earn the highest rating by The Society of Thoracic Surgeons for surgical outcomes and exceptionally low mortality.

The program is fast-growing, as the majority of children with congenital heart disease now survive to adult life and many need specialty care as they get older.

Innovation leads to better care and training

Our team developed an interactive visualization and prototyping program using 3D printing and holographic imaging that allows surgeons and cardiologists to design patient-specific surgeries and cardiac catheter-based interventions. The system offers the ability to rotate images in multiple planes, perform dissections, segment the dataset and take measurements.

When paired with a 3D projector the tool is used for patient and family education, and training in multiple medical disciplines with clear resolution and depth perception.



Adult congenital procedures

Cardiac catheterization

69

Cardiothoracic surgery
(2017-2020)

190

Electrophysiology

23

Cardiothoracic surgery survival rate
(2017-2020)

98.9%

The use of novel technology allows surgeons and cardiologists to perform unique, less invasive procedures. New imaging techniques allow us to offer the most complex surgeries to patients who have been denied treatment at other centers.

Our adolescent to adult transition program supports patients ages 12 years and above in developing the necessary skills to manage their congenital heart disease. Each adolescent or young adult is provided with personalized education and resources to prepare them to take ownership of and responsibility for the lifelong care required.

Collaboration with our colleagues in the field of pulmonary artery hypertension has put to use the innovative atrial flow regulator for lifesaving situations.

Cardio-obstetrics

Collaboration with Women's Health allows monitoring of congenital heart disease patients who are pregnant or seeking to become pregnant. Since opening the Cardio-Obstetrics Clinic in mid-February 2021, we have seen upward of 140 patients.

FEATURED PUBLICATION

[The Pregnancy Heart Team Approach for the Adult With Hypertrophic Cardiomyopathy and Severe Left Ventricular Outflow Tract Obstruction](#)

Huang, Sihong; Samuel, Bennett P.; Cordoba, Marcos; Romero, Vivian C.; Chalifoux, Laurie; Fermin, David R.; Cook, Stephen C. Maternal-Fetal Medicine: January 2021 - Volume 3 - Issue 1 p71-74 doi: 10.1097/FM9.0000000000000083

CASE STORY

A 30-year-old male born with truncus arteriosus had already undergone four open-heart surgeries when he arrived at Meijer Heart Center. Following thorough non invasive testing to evaluate his complex congenital anatomy, a multidisciplinary team of congenital heart specialists developed a treatment plan that included a repeat heart catheterization and open-heart surgery. Fibrotic tissue surrounding stents in the pulmonary artery made removing the stents the best way to ensure that the scar tissue would not return. The revised pulmonary artery was reattached to the heart using a graft conduit, and a new pulmonic valve was inserted. The goal is to use a transcatheter approach for future valve replacements, avoiding further open-heart surgery. More details from the patient and provider perspective are available at spectrumhealthbeat.org.



Cardiovascular Imaging

Spectrum Health offers multi-modality cardiovascular imaging services at 17 labs throughout West Michigan. With the addition of new locations, it has never been easier to access our facilities. This growth supports our directive of providing equitable access to health care for all.

Cardiovascular imaging volume

49,505

includes adult echocardiography and cardiac nuclear medicine exams



Stephanie Langlios, echo technologist

Imaging labs support the many advanced programs of Spectrum Health Frederik Meijer Heart & Vascular Institute, including transplant, structural heart and cardio-oncology. Our state-of-the-art techniques and board-certified imaging specialists are essential to aid in the technically challenging work of our teams.

We offer the full range of advanced imaging technology, including cardiac MRI, PET and coronary CT with noninvasive fractional flow reserve. Particularly high volumes of echocardiogram exams are processed, utilizing cutting-edge technologies such as **3D Echo** and **Myocardial Strain** imaging.

The cardiac MRI (CMR) program continues to provide expertise in the noninvasive diagnosis of various cardiovascular conditions, including ischemic, non-ischemic, infiltrative and inherited cardiomyopathies, as well as myocarditis, pericardial disease, cardiac masses and valvular heart disease. Stress CMR allows for a single examination to evaluate for ischemia, myocardial infarction, and valvular or myocardial pathology.

CMR volume

1,813



Spectrum Health has the only CMR program in the greater Grand Rapids area. Rapid growth necessitated the construction of a dedicated CMR Suite that opened September 2021.

In 2019, Spectrum Health launched the only cardiac PET/CT program in West Michigan. Cardiac PET/CT is used to assess myocardial viability in preparation for revascularization, guide treatment decisions for patients with infiltrative cardiomyopathies and improve the diagnostic accuracy of stress testing. The tool is particularly helpful for patients with larger body sizes.

Cardiac PET volume

266

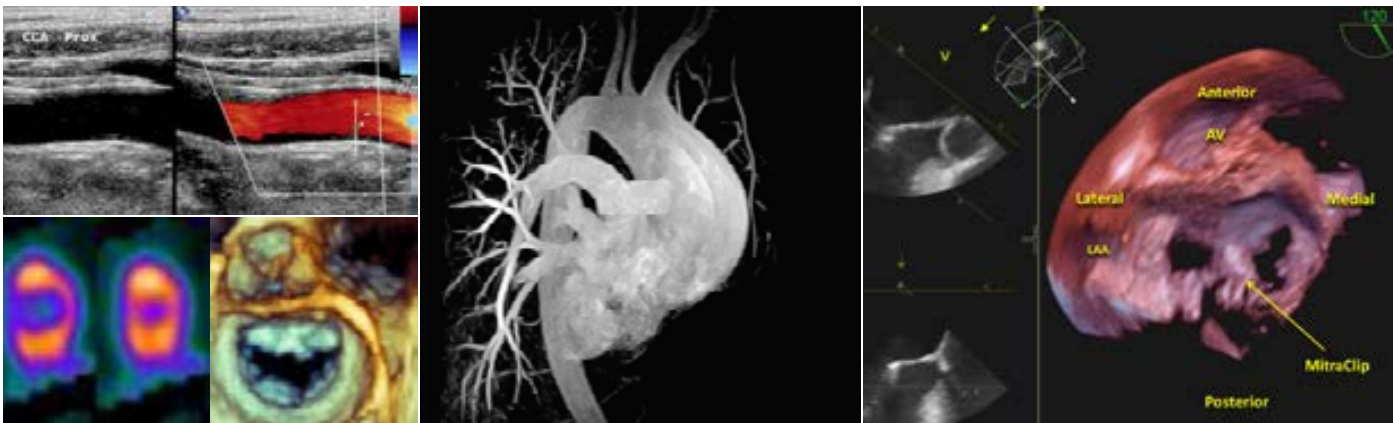
Coronary CTA volume

411

The European Society of Cardiology and the American College of Cardiology now endorse coronary CTA as first-line evaluation for patients with stable chest pain. Innovative technologies such as dose modulation, adaptive acquisition protocols and coronary fractional flow reserve provide more accurate and efficient analysis of coronary artery disease.

Highlights

- The average time from study completion to physician interpretation is five hours, with 99% of all imaging studies reviewed by the physician within 24 hours.
- We offer 24-hour in-house cardiac sonographer echo coverage. Reduction in the time from initial order to first image decreases patient length of stay and hastens critical medical decisions.
- Cardiovascular images are now available for viewing through the EHR, which greatly enhances patient-provider communication. This connectivity extends to other hospital systems, aiding collaboration and decision-making with our clinical cardiologists.
- We educate the next generation of cardiovascular specialists through the Richard McNamara Cardiovascular Fellowship Program. There is opportunity for additional expertise in a cardiac imaging modality by completing an extra year in our Advanced Cardiac Imaging Fellowship.



Multiple cadmium-zinc-telluride cameras for nuclear medicine allow for 50% less radiation exposure and shorter imaging times.

Thirty-two physicians read cardiovascular imaging studies, including 10 advanced imaging cardiologists.



The IAC accreditation process demonstrates Spectrum Health's commitment to the performance of quality imaging, assuring patients they receive the highest level of care.

Preventing today’s cancer patients from becoming tomorrow’s heart patients.

Improvements in cancer survivorship and the introduction of a great number of cancer therapies—with various potential cardiac side effects—have driven the need for this rapidly growing program to serve cancer patients.

Our collaboration between Lemmen-Holton Cancer Pavilion and Frederik Meijer Heart & Vascular Institute allows the team to focus on the patient as a whole, providing the most effective cancer treatment while working diligently and proactively to mitigate cardiac side effects.

Clinic evaluation is tailored to each patient, with guideline-recommended imaging studies utilizing echocardiography or cardiac MRI.

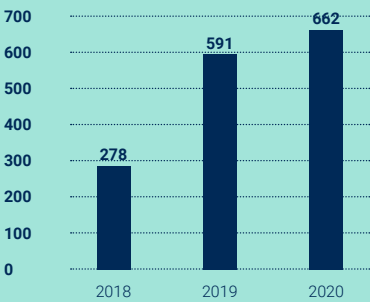
Cancer patients who may benefit from a cardio-oncology evaluation include those who have:

- Abnormal EKG
- Abnormal echo
- Poorly controlled cardiac risk factors
- A strong family or personal history of heart disease
- Chest pain, shortness of breath or lower extremity swelling due to heart failure

Nearly 6,000 new cases of cancer are diagnosed within our system each year. Identifying the patients at risk for cardiac complications, including survivors of childhood cancers, allows us to provide essential long-term surveillance.

Patients may be seen in the Grand Rapids area, through virtual visits from our regional hospital facilities or from the convenience of home.

Cardio-oncology clinic volumes



270%

growth since program inception

CASE STORY

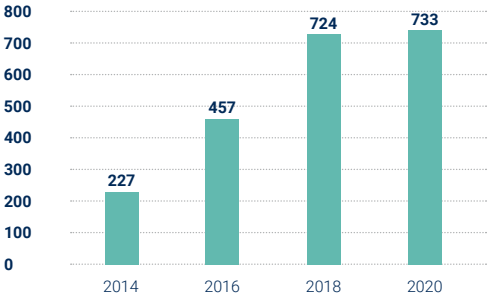
A 42-year-old female was undergoing treatment for Stage 3 breast cancer. After a double mastectomy, she was initiated on chemotherapy and a trial study. She was referred to the Cardio-Oncology Clinic after an echocardiogram revealed a decline in heart function. With the initiation of cardiac medications, including beta blockers and ACE inhibitors, her cardiac function normalized and she was able to continue her chemotherapy as planned. Repeat imaging demonstrated that her heart function has remained in a normal range. More details from the patient and provider perspective are available at spectrumhealthbeat.org.

Hypertrophic cardiomyopathy is the most common inherited heart disorder. We improve quality of life for HCM patients and families through advanced diagnostics, medical and surgical management, genetic testing, education and prevention of sudden cardiac death. Progressive strategies help develop individualized care plans.



Spectrum Health is one of 40 health systems in the nation to be designated a Center of Excellence by the Hypertrophic Cardiomyopathy Association.
We care for local patients and those from around the world.

Hypertrophic cardiomyopathy clinic volumes



Patients and family members actively followed in the HCM program.



The HCM team meets monthly to review cases.

Genetics is an integral part of the Spectrum Health HCM program, benefiting upward of 800 patients and families actively followed in our multidisciplinary clinic. A genetic counselor provides direct clinic care and a complete approach for diagnosis, treatment and education.

The HCM clinic utilizes Progeny®, a program that assists the team in efficiently managing the care of the whole family by tracking familial relationships, surveillance, symptoms, diagnoses and complex genetic test results.

“ Ideally, the path to diagnosis starts when primary care providers notice murmurs, symptoms or family history that lead to further evaluation. ”

– David Fermin, MD, FACC, FHSA, medical director, HCM

The complexity of treatment options for HCM patients, such as surgical removal of heart muscle and myectomy, require extensive expertise, available at few centers around the country.

60

number of patients who have received myectomies at Spectrum Health

CASE STORY

A 53-year-old male was diagnosed with hypertrophic cardiomyopathy, a condition that may have been present in his family for generations, dating back to an ancestor in the Netherlands. He underwent drug therapy but continued to find it increasingly difficult to breathe. A defibrillator was implanted to protect him from sudden cardiac arrest. The next year, he underwent a septal myectomy. Soon after the procedure, the patient was able to return to an active lifestyle, including running again. With a family history of sudden death, his mother underwent genetic counseling. When she was also diagnosed with HCM, she had a defibrillator placed as a logical preventive measure. More details from the patient and provider perspective are available at spectrumhealthbeat.org.



FEATURED PUBLICATION

[Changes in Heart Transplant Waitlist and Posttransplant Outcomes in Patients with Restrictive and Hypertrophic Cardiomyopathy With the New Heart Transplant Allocation System](#)

Loyaga-Rendon RY, Fermin D, Jani M, Gonzalez M, Grayburn R, Lee S, Dickinson MG, Manandhar-Shrestha NK, Boeve T, Jovinge S, Leacche M. Am J Transplant. 2021 Mar;21(3):1255-1262. doi: 10.1111/ajt.16325. Epub 2020 Oct 16.

PMID: 32978873

A research study conducted by our heart transplant, HCM and cardiovascular research programs was the first to report that restrictive hypertrophic cardiomyopathy patients have benefited from the new heart transplant allocation system. Published in the American Journal of Transplantation, the study found an increased probability of transplantation and decreased time on the wait list with equivalent early post-transplant survival. This has held true for Spectrum Health's HCM patients, giving them increased access to transplantation as an option for treatment in advanced heart failure.

Advanced Lung Disease

Pulmonologists collaborate with cardiothoracic surgeons to perform minimally invasive thoracic surgery. Video-assisted thoracoscopic surgery within the chest cavity is performed with a camera and specialized instruments, often yielding incisions of less than a half inch in size. Robotic-assisted VATS adds improved 3D imaging, greater optics magnification and instruments with more precision.

Endobronchial ultrasound bronchoscopy allows more patients the benefit of a navigated procedure, and we are the first in West Michigan to offer targeted lung denervation.

A cone beam CT scanner, provided through philanthropy and housed in our bronchoscopy suite, offers real-time confirmation of our intervention precision and accuracy.

Board-certified pulmonary critical care physicians apply their expertise to reduce time on a ventilator for patients with severe respiratory conditions.

Lung cancer

The Lung Screening Clinic has diagnosed more than 170 patients since inception in 2015, often at an earlier and more treatable stage of cancer progression.

Patients with suspicion of lung cancer complete testing and meet with a clinician on the same day. Our tumor board of pathologists, medical oncologists, pulmonologists, radiation oncologists, radiologists and thoracic surgeons gather to talk about the diagnosis and a patient-centered treatment plan.

Care is managed for nearly 2,000 patients in our Lung Screening Clinic.

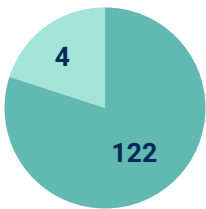
For medical management of lung disease, we work closely with referring providers through specialty clinics. The approach includes education, lifestyle modification, in-clinic therapies and rehabilitation to help improve quality of life.

- Interstitial Lung Disease Clinic
- Pulmonary Hypertension Clinic
- Chronic Obstructive Pulmonary Disease Clinic
- Sarcoidosis Clinic
- Cystic Fibrosis Clinic

General thoracic surgery procedures



Lobectomy procedures for lung cancer



- Open Lobectomies
- Robotic Lobectomies

“ Using a minimally invasive bronchoscopic approach to isolate nerve fibers surrounding the bronchi, we deliver targeted energy to sever the nerves causing bronchoconstriction. This investigational approach is being studied and is believed to relieve breathlessness and minimize COPD exacerbations. ”

– Gustavo Cumbo-Nacheli, MD, interventional pulmonologist

FEATURED RESEARCH

Managing Fatigue Using Virtual Reality for Post-Operative Lung Cancer Patients: Understanding the Post-Surgical Non-Small Cell Lung Cancer Patient's Symptom Experience

PI: Geoffrey Lam, MD

96.8%
performed robotically

Pulmonary Hypertension

Our five pulmonary hypertension physicians provide us the flexibility and capacity to see patients quickly. The strategic location of our clinic—within our Advanced Lung Disease Clinic—promotes communication for timely referrals and ensures appropriate testing prior to patient visits. Physicians are available 24/7 to provide consultation to referring providers or hospital transfers.

The specialized experience of our registered nurses is invaluable to patients. We also benefit from having a medical director who oversees Spectrum Health’s lung transplant program, allowing for early recognition and timely referral for those with advanced or progressive disease.

Through collaboration with the congenital heart disease team, atrial flow regulator devices are used for patients with advanced or refractory disease as either a bridge to transplant or for palliation.

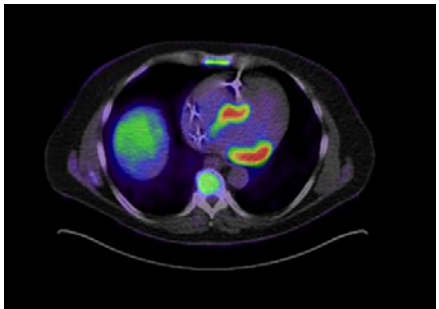
Patients followed for pulmonary hypertension in 2020

450

Sarcoidosis

Cardiac involvement of sarcoidosis can be particularly serious, as patients often present with advanced AV block, ventricular arrhythmias, heart failure or sudden death. Due to the rarity of the disease, few medical centers have extensive experience managing this patient population.

Unique to Spectrum Health, we hold a CME-authorized, monthly multidisciplinary meeting in which subspecialists from pulmonology, advanced heart failure, cardiovascular imaging and electrophysiology discuss patients with confirmed or suspected cardiac sarcoidosis. Diagnostic and therapeutic care plans are created using a team-based approach regarding the need for subspecialty referral, tissue biopsy, electrophysiology studies and ablations, pacemaker, ICDs, immunosuppression and surveillance monitoring. **Since 2019, 85 patients have benefited from this care approach.** Providers can request a patient for discussion or expedited evaluation due to potential life-threatening and time-sensitive complications through an EHR message.



Cardiac PET scan showing cardiac sarcoidosis with regions of bright red representing areas of active inflammation.



CASE STORY

A 26-year-old female was admitted with shortness of breath and hypoxia while 22 weeks pregnant. She was diagnosed with a new atrial septal defect and pulmonary arterial hypertension associated with congenital heart disease. Recognizing the 30% mortality risk of pregnancy in PAH, a multidisciplinary physician team specializing in pulmonary hypertension, maternal-fetal-medicine, ECMO, anesthesiology and congenital heart disease rapidly came together to manage her care, and frequent care conferences were held to plan for delivery. She successfully delivered a healthy boy without complications and is doing well.

Health equity

The prevalence of sarcoidosis is highest in African Americans and persons of Northern European descent, and epidemiologic studies suggest that African American patients have a higher mortality rate. All referred patients receive input and review by our subspecialists, regardless of race or socioeconomic status. Individualized, long-term treatment plans include emphasis on surveillance monitoring and the potential complications of therapy.

CASE STORY

A 45-year-old male transferred to Spectrum Health following out-of-hospital cardiac arrest due to ventricular tachycardia. Cardiac PET imaging identified severe LV systolic dysfunction secondary to cardiac sarcoidosis with active inflammation. After complete neurologic recovery, he was started on immunosuppressive therapy and discharged home following ICD implantation. Unfortunately, he continued to experience recurrent ICD shocks for VT, with evidence of persistent LV dysfunction and ongoing inflammation. After multidisciplinary team discussion and confirmation with colleagues across the country, the recommendation was made to initiate infliximab infusions as a third-line immunosuppressive agent. After 1.5 years of close follow-up with our team, his cardiac inflammation has entirely resolved, and he has had no further ICD shocks.

Lung Transplantation

Richard DeVos Heart & Lung Transplant Program

The Spectrum Health Richard DeVos Heart & Lung Transplant Program is the only program in West Michigan to perform lung transplants—and we’ve been doing them since 2013. The complexity of transplantation requires highly trained and dedicated experts to walk the journey with each patient, family and friend. Our program offers rapid clinical evaluations, innovative research, minimally invasive techniques, top survival outcomes and personal transplant coordinators.



Edward Murphy, MD, cardiothoracic surgeon and Richard DeVos Endowed Chair for Lung Transplantation

Despite caring for an often-riskier patient population, our outcomes are among the top in the nation, with survival rates that exceed the national average.

Similar to nationwide trends, the leading indication for lung transplant has been idiopathic pulmonary fibrosis and other fibrotic interstitial lung diseases. Early referral is critical to reduce pre-transplant mortality and optimize post operative outcomes.

COVID-19 has created a new disease category for two new transplant indications: COVID-ARDS and post-COVID pulmonary fibrosis. Our team has gained experience with these cases and has a successful record of accomplishment in quickly evaluating, listing and transplanting critically ill candidates.

Lung transplant annual volume

48

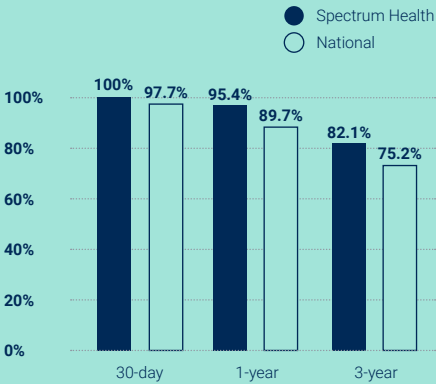
Spectrum Health cared for 196 lung transplant patients through the lung transplant specialty clinic in 2020.

Median time to transplant

2.1 months

Spectrum Health
SRTT

Lung transplant survival rates



July 2021 SRTT Report, data ending March 12, 2020

Best 1- and 3-year survival metrics in the state and top 5 in the country.

Lung transplants over 8 years

250

Spectrum Health partners with Lung Bioengineering to provide ex vivo lung perfusion through two platform options: FDA approved XPS service model and clinical trial CLES.

EVLP expands the pool of suitable donor lungs, leading to shorter average wait times for transplant candidates. Outcomes of EVLP-treated transplant procedures are equal to those of traditional lung transplants.

FEATURED RESEARCH

[Extracorporeal Photophoresis for Medicare Recipients of Lung Allografts](#)

This multi-center clinical trial examines the use of extracorporeal photophoresis for the treatment of bronchiolitis obliterans syndrome, the major long-term complication after lung transplantation.

Our laboratory in the Grand Rapids Research Center with Michigan State University College of Human Medicine has projects underway investigating cystic fibrosis, IPF and chronic lung allograft dysfunction.

Aortic Disease

Spectrum Health is a high-volume center for aortic disease and acute Type A aortic dissection. We serve as a quaternary referral center for complex cases and provide medical and surgical expertise from endovascular repair to open surgical approach. Patients are closely monitored in our Aortic Clinic to identify if repair is needed.

A multidisciplinary cardiac and vascular aortic surgery team follows and handles long-term management of all aortic pathology.

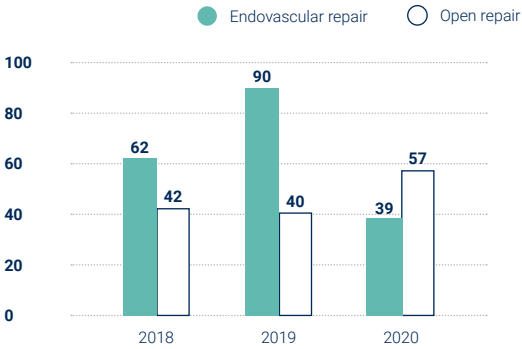
Aortic dissections over 10 years

245

Acute Type A aortic dissection

Once acute dissection occurs, the patient's risk of death increases 1% per hour until the patient has aortic repair. Spectrum Health's rapid response protocols get patients to the operating room quickly, which aids in improving mortality.

Abdominal aortic aneurysm repair volumes



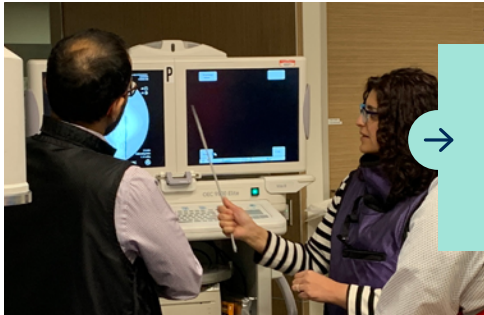
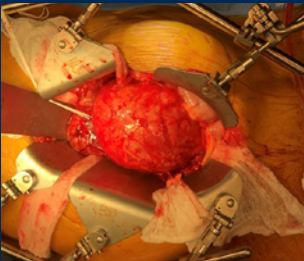
Free vascular screenings

3,200

Aortic aneurysms most commonly occur in the abdomen and are the 10th leading cause of death for men over age 55. There are often no symptoms until emergent presentation.

A SURGEON'S VIEW

A patient was referred for a 15 cm AAA following three separate attempted endovascular repairs and an attempted open surgical repair at other facilities. Continued expansion of the aneurysm posed a life-threatening situation. Spectrum Health vascular surgeons were consulted and successfully repaired the aneurysm. The patient spent one night in the ICU and was back to normal one month post-op.



Just before the pandemic, Eanas Yassa, MD, led a training session on endovascular therapies for thoracic aortic aneurysms and dissections for visiting surgeons from across the U.S.

The adoption of thoracic endovascular aortic aneurysm repair has been reported to decrease morbidity, paraplegia risk and short-term mortality rates.

“ Spectrum Health offers cardiovascular trainees significant advantages, including high procedural diversity and volumes. The state-of-the-art simulation center and the collaborative effort for educational advancement are second to none. The attendings are fantastic teachers, and what stood out most for me was the kindness and compassion of the team.”

– Jacob Frisbie, DO, vascular surgery fellow
Class of 2021

Education and research are cornerstones of our program, allowing us to provide the latest and safest treatment options. The Spectrum Health/Michigan State University vascular surgery residency has trained 18 vascular surgeons since 2003.



Justin Simmons, MD, vascular surgeon; Jacob Frisbie, DO, vascular fellow; Jason Slaikeu, MD, vascular surgeon; and Matthew Armstrong, MD, cardiovascular anesthesiologist

FEATURED RESEARCH

GORE AAA

A multi-center study evaluating the safety and efficacy of the GORE® EXCLUDER® conformable stent graft for treating infrarenal abdominal aortic aneurysms.

PI: Ashraf Mansour, MD

CASE STORY

A 61-year-old female was transferred to Spectrum Health by North Flight Aero Med after a CT scan revealed a thoracoabdominal aortic dissection. The vascular surgery team pinpointed the location of the tear and developed a treatment plan that allowed the inflamed aorta time to heal. After several weeks of careful management, she returned to the Meijer Heart Center for a minimally invasive endovascular aortic repair. The team used a specialized system of fabric-covered and open mesh stents to cover the tear in her aorta and return blood flow to a normal pattern, and the patient to a more normal life. Details from the patient and provider perspective are available at spectrumhealthbeat.org.



Eanas Yassa, MD, vascular surgeon, with vascular surgery team



Watch the treatment story of one patient’s cascade of health problems, including MRSA, a mass near his kidney and spine, signs of renal disease, and an aneurysm developing in his aorta. The story also is published at spectrumhealthbeat.org.

Peripheral Arterial Disease

An estimated 10 million people in the U.S. are affected by peripheral arterial disease, which commonly impacts people with high blood pressure, high cholesterol or diabetes; those who smoke; and those who have a hereditary condition in which the body creates too many triglycerides.

Spectrum Health’s vascular providers handle the most complex cases, at high volumes, using leading technologies with the goal of not only saving lives, but also saving limbs.

Stroke prevention

Carotid endarterectomies

167

Spectrum Health Grand Rapids is the leader for carotid endarterectomy procedures in the state of Michigan.

In-hospital TIA following CEA

0%

Vascular surgeries and procedures

2,346

Mortality rate

2.8%

Procedures include endovascular aortic aneurysm repair, fenestrated endovascular aortic aneurysm repair, open abdominal aortic aneurysm repair, and upper and lower extremity bypass grafting.



Stefano Bordoli, MD, vascular surgeon

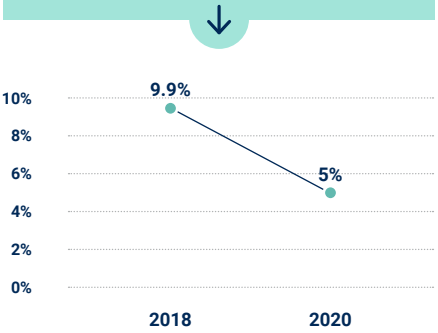
Vascular surgery COVID-19 collaborative

An international research consortium was established in May 2020 to assess the impact of COVID-19 on vascular surgery patients and practices. Spectrum Health surgeons helped design the database and collection tools, contributed to data, and authored published works with more than 60 other surgeons from around the world. Two main focuses of the consortium include:

- Assessing the natural outcomes of those who had elective surgeries delayed secondary to COVID-19 deferments
- Evaluating management and outcomes of COVID-19 patients with acute ischemic events

For safety during the pandemic, we use mobile ultrasound equipment to perform urgent testing on patients in the comfort of their home. Results are provided via virtual visit with a vascular surgeon.

An improved management plan was developed for surgical site infection rates, yielding a 55% improvement over two years.



Screening attention turns to first responders

At a recent screening event, a critical finding was discovered in one of our Grand Rapids police officers, who went on to have a vascular surgery that may have saved his life. GRPD leaders were able to arrange screenings for other officers who met risk factor criteria. After this event, word spread quickly and other local police and fire departments were able to participate, mitigating risk for those who risk their lives for us daily.

In 2020, the vascular surgery team celebrated 30 years of accreditation in vascular testing.



Spectrum Health Vascular Surgery provides lifesaving dialysis access to patients with end-stage renal disease. We were the first in West Michigan to perform percutaneous dialysis access using the WavlinQ™ device, resulting in “no-incision” creation of a fistula for hemodialysis.

Vein Disease

Spectrum Health's Vein Center helps keep patients from needing urgent care through early diagnosis and treatment of potentially life-threatening venous and vascular conditions. Our vast array of treatment options improves quality of life for so many who deal with regular discomfort from blood flow disruptions.

The Deep Vein Thrombosis Clinic has seen increased volumes through partnerships with referring providers in an effort to keep patients out of the emergency department, as clinically appropriate. The team treats suspected acute DVT, superficial thrombophlebitis and chronic DVT. Same-day imaging is used to reach a thorough diagnosis as the first step toward solution.



CASE STORY

In April 2020, a 70-year-old male with known peripheral arterial disease and history of peripheral bypass surgery developed lower extremity pain and weakness. He was able to have a diagnostic ankle-brachial index ultrasound performed at his home, thanks to the innovation of the imaging program at Spectrum Health throughout the COVID-19 pandemic. Two days later, he underwent an angiogram and had a stent placed in the severely narrowed artery above the old bypass graft. Follow-up testing demonstrated a return of nearly normal blood flow in his leg. More details from the patient and provider perspective are available at spectrumhealthbeat.org.

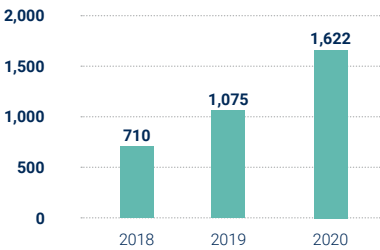


DVT clinic visits

596

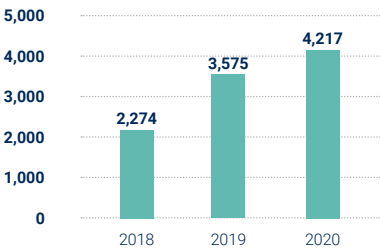
Partnership with Spectrum Health's Anticoagulation Clinic supports management of medication.

DVT imaging



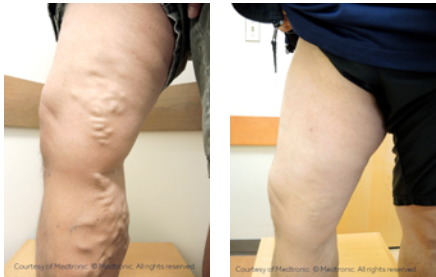
Our interventions are performed by board-certified and fellowship-trained vascular surgeons with extensive and comprehensive experience.

Vein Center office visits



Office visits, including imaging, have increased by several hundred each year.

Venous clinical severity scoring is used to determine severity and response to venous treatment. On average, the Vein Center brings patients from a pre-intervention VCSS score of 7.4 to a post-intervention score of 2.4, showing successful treatment of venous disease.



VCSS 7

VCSS 2

Minimally invasive tools

Our providers use the new FDA-approved Venovo™ stent to reopen narrowed regions of iliofemoral vein. VenaSeal™, a medical adhesive, closes off the vein and allows blood to route through other healthy veins. Varithena™, an injectable foam, fills the vein, causing it to collapse so blood shifts to healthier veins.

Conditions treated:

- Varicose veins
- Spider veins
- Pelvic congestion syndrome
- May-Thurner syndrome
- Chronic deep vein thrombosis

CASE STORY

A 60-year-old triathlete suffered from a swollen and painful leg. He was diagnosed with May-Thurner syndrome and referred to the Spectrum Health Vein Center, where several acute and chronic occlusions were identified. Vein and interventional radiology specialists collaborated to develop a treatment approach for his unique case. Venograms revealed a chronic occlusion of the right iliac vein along with a malpositioned stent in the left iliac vein from a past procedure. A small acute thrombus was cleared, and a stent was placed in the right iliac vein and the malpositioned left iliac stent was corrected with an additional stent. This triathlete is looking forward to training again. More details from the patient and provider perspective are available at spectrumhealthbeat.org.

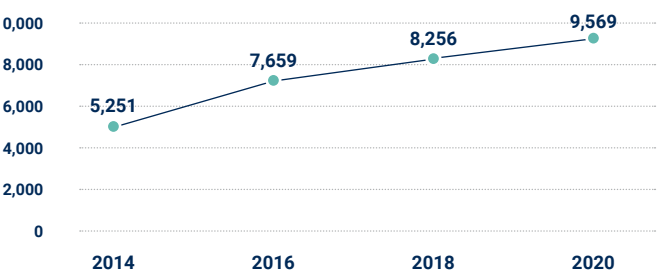
Wound Healing, Limb Care & Preservation, and Hyperbaric Medicine

Wound Healing

This team heals chronic wounds through a holistic and personalized approach. State-of-the-art, real-time perfusion imaging, along with multiple advanced wound care products, helps create our customized care plans. Virtual platforms are used for regional engagement to serve patients close to home. We were an early adopter of in-home virtual care and volumes continued to grow in 2020 despite COVID-19 restrictions.

Cutting-edge, advanced healing options include a variety of tissue substitutes, bedside MicroGen DNA testing, SnapshotNIR perfusion imaging and ultrasonic debridement.

Limb wound care patient visits



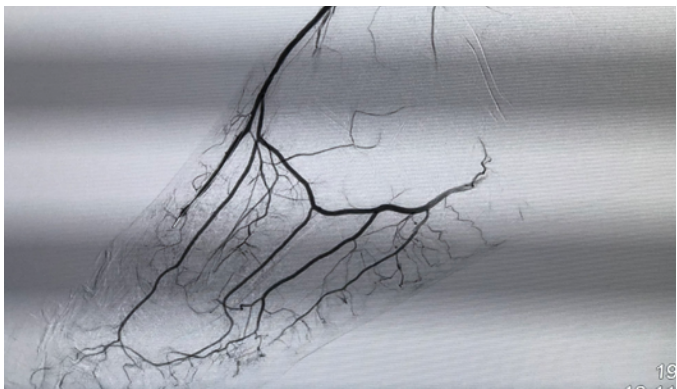
← Patient visits have grown 182% over seven years.

Prevention is a focus through:

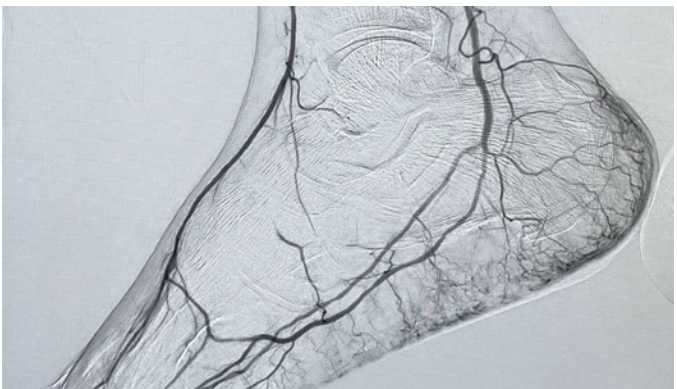
- Collaboration with Lifestyle Medicine
- Consultations with dieticians
- Strong partnerships with podiatry and primary care providers to control comorbidities such as diabetes and heart failure

Limb Care & Preservation

Spectrum Health vascular surgeons are frequently consulted for patients who are facing the prospect of amputation. The Limb Care and Preservation Clinic, in collaboration with regional podiatrists and wound care physicians, is often able to provide options that result in limb salvage and improved quality of life. Time to intervention in our clinic is often two weeks or less from initial consultation.



Before



Catheter-based intervention demonstrating improved perfusion of the foot and ankle to allow wound healing to occur.

Patient referrals are available through all modalities, and within 24-48 hours for urgent cases. Consults can be conducted at regional hospital facilities, and on-site consultation is offered for durable medical equipment needs.

Hyperbaric Medicine

Spectrum Health offers the only 24/7/365 hyperbaric oxygen therapy program in the state of Michigan and is the only program in Michigan to be accredited with distinction through the Undersea and Hyperbaric Medical Society. Led by a fellowship-trained medical director, the program meets the highest standards of care and patient safety, through rigorous evaluation of our facility, equipment and staff.

The program is expanding in winter 2021 with the addition of a multi-place chamber that will allow 10 to 12 patients to be treated at the same time. This allows patients to sit up during treatments, minimizing claustrophobia.



Hyperbaric oxygen chamber patient visits

1,793



Spectrum Health participates in the Multicenter Registry for Hyperbaric Oxygen Therapy through Dartmouth College to gather data about use, outcomes and safety of HBO treatments from centers around the world.



We have the only Michigan facility to offer comprehensive dive physicals, providing necessary medical examination for recreational and commercial scuba divers.

FEATURED RESEARCH

PRESA-DVT: Outcomes of Patients at Risk for Deep Venous Thrombosis Undergoing Endovenous Ablation on Systemic Anticoagulation

The purpose of this study is to determine if there are differences in the endovenous ablation-related outcomes of patients who are on ongoing or short-term anticoagulation therapy (Group A) versus endovenous ablation-related outcomes for non-anticoagulated patients (Group B).

PI: Jennifer Watson, MD

CASE STORY

A 55-year-old patient who has diabetes faced the possibility of losing his leg (his father lost his leg at 52 due to complications of diabetes). It started with necrotizing fasciitis after a blister developed on his toe. A visit to the emergency room led to a 58-day hospital stay. A collaborated effort from podiatry, plastic surgery and the wound healing program helped to save his foot. With surgery, antibiotics and hyperbaric treatment, he is now able to walk the woods on his 25 acres of land with ease. More details from the patient and provider perspective are available at spectrumhealthbeat.org.



Drue Orwig, DO, wound care specialist

Research and Clinical Trials

DeVos Cardiovascular Research Program

The DeVos Cardiovascular Research Program is a collaborative initiative with Van Andel Institute that propels research forward at Frederik Meijer Heart & Vascular Institute. Since its inception in 2014, the annual scientific output has risen from six publications per year and no investigator-initiated studies to last year's 66 publications and 37 investigator-initiated trials.



Through the program, we have built five large research databases that allow real-time monitoring of service performance, generate hypotheses for new projects and inspire new retrospective studies. **The ECMO registry, which comprises more than 800 cases and nearly 6 million data points, is now one of the largest ECMO registries in the world.** Within the DeVos Research Academy, we train our specialists, fellows and residents in clinical science to foster the cutting-edge mindset of our current and next generation of providers.

The program is the direct sponsor of 30 investigator-initiated trials.

We are actively searching for new treatments for people with rare heart muscle diseases. Some of these diseases include a mutation that is especially prevalent in people with Dutch ancestry, which is common in West Michigan.



Stefan Jovinge, MD, PhD, is an internationally recognized critical care cardiologist and scientist. He is originally from Sweden and is an alumnus of Karolinska Institute in Stockholm. As medical director of research for Frederik Meijer Heart & Vascular Institute and director of the DeVos Cardiovascular Research Program, Dr. Jovinge and his colleagues have manifested a robust translational research program.



Our researchers collaborate with fellow scientists locally and nationally to make advances in the field.

Rare Disease Work

The cost of developing drugs to treat rare diseases is usually prohibitive. In response to this challenge, we established a database that encompasses nearly all FDA-approved drugs and their impact on a wide range of genes. In total, more than 1.3 billion data points are now available to help identify already-approved drugs that can improve the function of heart muscle cells for our patients.

Visit devoscvrresearch.org to learn more about the program, including new techniques for regenerative cardiac therapies.

Spectrum Health Office of Research and Education

The research department at Spectrum Health serves as a gateway for researchers to advance science and clinical knowledge, bringing the world of research discovery to the bedside and taking our patient experiences into the lab.

In 2020, 596 research studies were supported systemwide, with 8,563 patients enrolled in 100 of them.

The Spectrum Health Institutional Review Board serves as a source for regulatory, operational and ethical knowledge for our research community. Our IRB develops resources, tools, templates and standard procedures, as well as training and education, consultation and administration.

1,929 IRB submissions in 2020



Fellowships and Education

Through our partnership with Michigan State University College of Human Medicine, we offer ACGME-accredited graduate medical education programs in cardiovascular disease, interventional cardiology, thoracic surgery and vascular surgery. Additionally, Spectrum Health offers a non-ACGME accredited cardiac advanced imaging fellowship. Our continuum of care philosophy ensures residents and fellows are provided a tremendous clinical experience in a multidisciplinary setting. High patient volumes—among the highest in the state—allow for a well-rounded experience for all those in training.

Spectrum Health's academic environment also includes medical students. Faculty mentors are second to none and thrive on fostering growth for those learning the abilities for their clinical careers. Those seeking academic vocations have the benefit of vast research opportunities through the DeVos Cardiovascular Research Program.



Fellows Malav Parikh, MD; Jose Rios Salcido, MD; Lahdan Refahiyat, MD; and Eesha Purohit, MD, learning from forensic pathologist Stephen Cohle, MD



The Jacob and Lois Mol Cardiovascular Simulation Center is a setting for hands-on education utilizing innovative simulation and applied experiential learning. Education is provided in a supportive, controlled environment, allowing clinicians to master key competencies and skills for new procedures with zero risk to patients.

The Spectrum Health Office of Research and Education health equity program offers education, including didactic talks and interactive discussions, on this important component of providing exceptional care.

FELLOW-FEATURED PUBLICATION

Same-day Discharge after Cryoballoon Ablation of Atrial Fibrillation: A Multicenter Experience

Marcin Kowalski, Valay Parikh, Jose Rios-Salcido, Nagib Chalfoun, Alfred Albano, Padraig O'Neil, Mark Bowers, Andre Gauri, Kendra Braegelmann, Hae Lim, Philippe Akhrass, Rina Shah, Soad Bekheit, Laurence Epstein, Arash Aryana. Journal Of Cardiac Electrophysiology. December 20, 2020. Vol 32 issue 2:183-190 doi: 10.1111/jce.14843. PMID: 33345408.

Contact us

To refer a patient: 855.7MYHEART
spectrumhealth.org/fmhvi

Spectrum Health’s physician relations team is specially trained to support relationships with our referring physicians through providing connectivity, resources, education, support and advocacy. Contact us if you would like help navigating our system. We are available to provide you information on our cardiovascular health services and address your questions and needs with face-to-face visits.



Kari Rawles
Senior Provider Program Specialist
Cardiovascular Health
616.486.6672
physician.relations@spectrumhealth.org

Care locations

- 1 Spectrum Health Ludington Hospital**
One Atkinson Drive
Ludington, MI 49431
- 2 Spectrum Health Reed City Hospital**
300 N. Patterson Road
Reed City, MI 49677
- 3 Spectrum Health Big Rapids Hospital**
605 Oak Street
Big Rapids, MI 49307
- 4 Spectrum Health Gerber Memorial**
212 S. Sullivan Avenue
Fremont, MI 49412
- 5 Spectrum Health Integrated Care Campus – North Muskegon**
2009 Holton Road
Muskegon, MI 49445
- 6 Spectrum Health United Hospital Heart & Vascular Center**
615 S. Bower Street
Greenville, MI 48838
- 7 Spectrum Health Zeeland Community Hospital**
8333 Felch Street
Zeeland, MI 49464
- 8 Spectrum Health West Pavilion**
6105 Wilson Avenue SW
Wyoming, MI 49418
- 9 Spectrum Health Pennock**
1009 W. Green Street
Hastings, MI 49058
- 10 Spectrum Health – Lake Drive**
4069 Lake Drive SE
Grand Rapids, MI 49546

- 11 Spectrum Health Fred and Lena Meijer Heart Center**
100 Michigan Street NE
Grand Rapids, MI 49503
- 12 Spectrum Health – Bradford**
2900 Bradford Street NE
Grand Rapids, MI 49525
- 13 Spectrum Health Heart & Vascular Center at Holland Hospital**
602 Michigan Avenue
Holland, MI 49423
- 14 Spectrum Health Professional Building**
705 S. Greenville West Drive
Greenville, MI 48838
- 15 Spectrum Health Integrated Care Campus – Holland**
588 E. Lakewood Boulevard
Holland, MI 49424
- 16 Spectrum Health Grand Haven Center**
15100 Whittaker Way
Grand Haven, MI 49417
- 17 South Haven – Holland Hospital Medical Office**
749 Phillips Street
South Haven, MI 49090
- 18 Spectrum Health Helen DeVos Children’s Hospital – Karl and Patricia Betz Congenital Heart Center**
100 Michigan Street NE
Grand Rapids, MI 49503

Our lakeshore cardiovascular medicine specialists provide adult outpatient services to treat patients with all cardiovascular diagnoses.



Virtual care offerings

Aside from the clear benefits of telehealth associated with the pandemic, the increase in virtual care has allowed more patients to be served, thousands of emergency and urgent care visits to be avoided, and hundreds of thousands of miles of travel saved.

Virtual health encounters across Spectrum Health
West Michigan went from 47,550 in 2019 to 310,483 in 2020.

Spectrum Health recognizes that protecting the environment is directly related to improving health. Factors such as vehicle emissions contribute to health conditions like asthma, respiratory diseases and communicable diseases. As a system, we’ve committed to being carbon neutral by 2040 and outlined other [sustainability goals for 2025](#).

Spectrum Health’s heart and vascular video visits allow patients to consult with a Grand Rapids-based cardiovascular specialist from remote Spectrum Health specialty clinics and hospitals. In addition, direct-to-consumer care is available to anyone in Michigan for low-acuity conditions. This service is often utilized by West Michigan employers, and is available 24/7.

Patients may download the Spectrum Health app or call 844.322.7374 to be connected to Spectrum Health’s on-demand provider team.

To refer a patient: 855.7MYHEART

To download this report:
spectrumhealth.org/fmhvi

For more patient and provider experiences:
spectrumhealthbeat.org/cardiovascular-care



Spectrum Health complies with applicable Federal civil rights laws and does not discriminate on the basis of race, color, national origin, age, disability, or sex.
[81 FR 31465, May 16, 2016; 81 FR 46613, July 18, 2016]

ATENCIÓN: Si usted habla español, tiene a su disposición servicios gratuitos de asistencia lingüística. Llame al 1.844.359.1607 (TTY: 711).

إذا كنيت تتحدث اللغة العربية، فبإمكانك الحصول على المساعدة اللغوية المتاحة لم يتصل على الرقم (TTY: 711) 1.844.359.1607.