



SAMUEL AND JEAN
FRANKEL CARDIOVASCULAR CENTER
UNIVERSITY OF MICHIGAN HEALTH SYSTEM

Activity and Outcomes 2013

2013 Activity and Outcomes



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From the Directors

We are pleased to share the University of Michigan Samuel and Jean Frankel Cardiovascular Center Activity and Outcomes Report for 2013. Several changes over the past year bolstered our mission to be the best academic heart and vascular center in the world. Changing our name to honor a visionary couple is just one of them. The following pages highlight many more.

Collaborative and seamless care is essential to improving quality of life and rates of survival for patients with all types of cardiovascular disease, from common to rare and complex. We provide access to the latest technologies and methods to manage this disease and achieve the best possible outcomes. Our research is at the forefront of not only exploring potential cures, but also going further upstream to learn more about the mechanisms of cardiovascular disease and how to prevent them in the first place.

By adding more experts, locations and clinic hours, we are better able to meet the needs of those we serve. Our goal is to guarantee that our patients and their families have a voice in the care we provide every day.

As a team, we are prepared not only to meet the challenges of cardiovascular care, but to solve them. We invite you along as we move medicine forward together.



Left to Right:

James C. Stanley, M.D., Kim A. Eagle, M.D., Linda R. Larin, M.B.A.,
David J. Pinsky, M.D. and Richard L. Prager, M.D.

New Name, Re-dedicated Mission



Samuel and Jean Frankel

When the Cardiovascular Center opened its doors in 2007 on the University of Michigan main medical campus in Ann Arbor, it was made possible in large part due to the groundbreaking support of a philanthropic family. The Frankel family believed in our model of care that emphasizes collaboration among health care providers and partners with patients and families to achieve exemplary care. In 2013, we changed our name to honor their gift, and now we are proudly known as the Samuel and Jean Frankel Cardiovascular Center at the University of Michigan.

Comprehensive and Complex Cardiovascular Care

The Frankel Cardiovascular Center brings together all of the University of Michigan Health System's specialists in preventing, treating and studying heart disease, blood vessel disorders and stroke. Our emphasis on a collaborative and integrated patient care model has created multidisciplinary programs in aortic, structural heart, peripheral arterial and adult congenital heart disease, as well as venous health and cardio-oncology. These multidisciplinary teams provide expertise to address complex patient conditions. Our providers collaborate closely with referring physicians, patients and their families to strive for the safest and highest quality care. This model serves as a paradigm of excellence amongst cardiovascular programs around the world.

Throughout this brochure you will meet a number of the patients and families who entrusted their care to the specialists of the Samuel and Jean Frankel Cardiovascular Center. Their stories represent the best of what we do and how improving the quality of someone's life makes all the difference in the world.

Creating the
Future of
Cardiovascular
Care Together

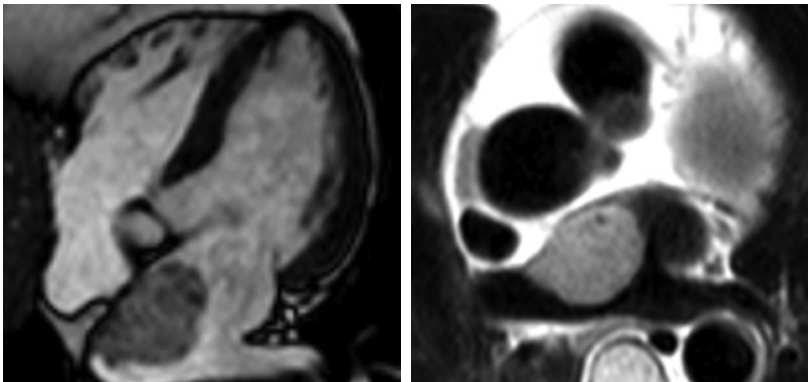
M University of Michigan
Samuel and Jean Frankel
Cardiovascular Center

FY13 Frankel CVC Overview

5,692		Inpatient Discharges
59,108		Clinic Visits
3,758		Cath Lab Cases
1,737		EP Lab Cases
2,567		Adult Surgical Volume

Cardio-Oncology

New Clinic Coordinates Cancer and Heart Patient Care



With the increase in cancer survivorship, there is a need to better understand how cancer therapies can affect the heart during and after treatment. The Cardio-Oncology Clinic is a multidisciplinary partnership between the Frankel CVC and the Comprehensive Cancer Center. As one of a few institutions in the country to offer this level of coordinated care, our goal is to work with oncologists to treat cancer patients and survivors who develop cardiac problems, as well as cardiac patients who are diagnosed with cancer.

Through the Cardio-Oncology Clinic, cardiologists and oncologists collaborate to improve quality of life for patients and eliminate barriers to effective treatment by:

- Working with patients who are diagnosed with a heart problem prior to cancer treatment
- Preventing heart disease in patients who are at risk
- Closely monitoring patients who are receiving potentially cardiotoxic cancer treatments
- Treating cardiac problems related to cancer therapy so patients can continue treatment as soon as possible
- Screening patients who are high risk for heart disease due to cardiotoxic drugs with echocardiographic strain imaging
- Following up with pediatric and adult cancer survivors—these patients are at higher risk than the general population for developing heart disease in their later life

Cardiotoxicity

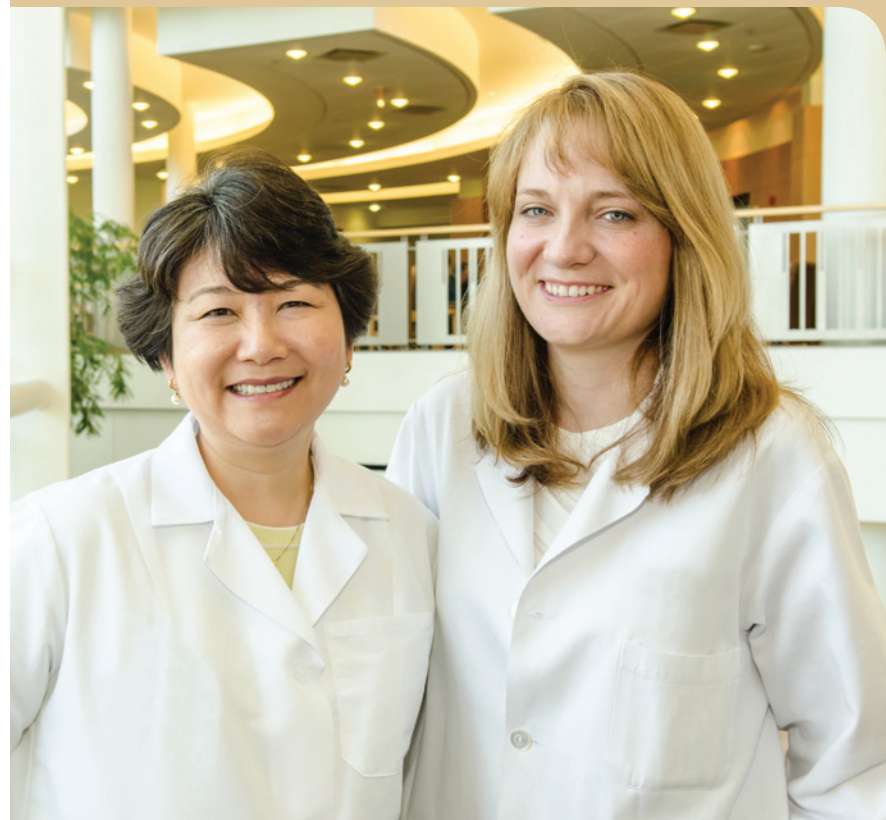
We coordinate care with oncologists to minimize the risks for patients to develop cardiotoxicity during their cancer treatment.

Cardiac Tumor Program

Recently launched as a multi-center effort, the Cardiac Tumor Program brings together leading experts from around the country via videoconference once a month to develop coordinated care practices and also better understand the genetics of heart tumors.

Current Cardio-Oncology Research

Our specialists are dedicated to pushing the frontier of health care for patients who have a preexisting heart condition and are diagnosed with cancer, or patients who are suffering from the toxicity side effects of cancer treatment drugs. Research in the Cardio-Oncology Clinic includes projects where basic scientists are working to better understand the mechanisms of cardiotoxicity at the cellular level, and participating in new chemotherapeutic drug studies with the goal of minimizing cardiotoxicity in future cancer drugs. Most recently, we started an interdisciplinary integrative medicine program that will look at how nutrition and exercise impact cancer survivorship.



**The Cardio-Oncology Clinic
is a multidisciplinary partnership
between the Frankel CVC and
the Comprehensive Cancer Center.**

Coronary Heart Disease

Comprehensive Care for Common to Complex Heart Disease

Coronary heart disease is the most common type of heart disease. In the United States, coronary heart disease is the leading cause of death for both men and women. Our heart team includes surgeons and interventional cardiologists who collaborate to determine the most appropriate therapy for patients with coronary artery disease.

Surgical Options

Our faculty is well known for its expertise in a wide variety of innovative services. Even with the declining number of cardiac surgical cases nationwide, our procedure volume continues to grow. Our surgeons perform standard on-pump coronary bypass as well as beating heart off-pump bypass and arterial conduits. Surgeons from Adult Cardiac Surgery in the newly formed Department of Cardiac Surgery provide cardiac surgical care to patients at the Frankel CVC and throughout the University of Michigan Health System.

Angioplasty and Stenting

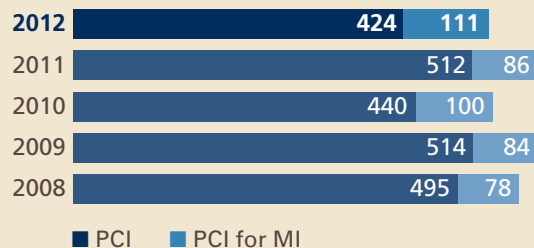
The Advanced Interventional Cardiology Program offers patients comprehensive and individualized care, with our skilled team of interventional cardiologists utilizing the latest technologies available for angioplasty and stenting. For acute myocardial infarction patients, our time from door to intervention is well below the national goal of 90 minutes, utilizing a team approach and in-house staff.

Multiple assist devices may be implanted to maintain blood supply to the heart tissue during high-risk angioplasty and as a bridge to LVAD or cardiac transplantation, including the TandemHeart™ Percutaneous Ventricular Assist Device and the Impella 2.5 and 5.0 Catheters.

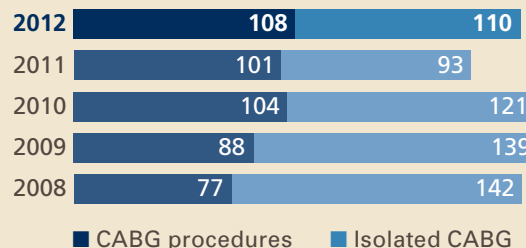
Cardiovascular Stem Cell Research

Engineering cardiovascular tissue from stem cells is one of the most challenging problems in cardiovascular medicine today. With a \$2 million NIH grant and recent advances in stem cell science, the Frankel CVC has recruited researchers from across the country to form a cardiovascular regenerative group. One part of the group will work to transform stem cells into cardiovascular cells, while the other will generate cardiac tissue and vascular grafts. Both teams include a surgeon and a full-time researcher so that breakthroughs can be more easily integrated into clinical applications. This research will make it possible to supplement or replace diseased cardiovascular tissue with engineered functional cardiovascular tissue to restore the normal function of the heart and vessels.

PCI Volume



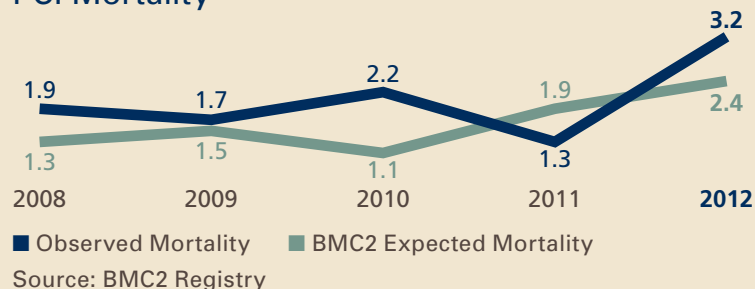
CABG Volume



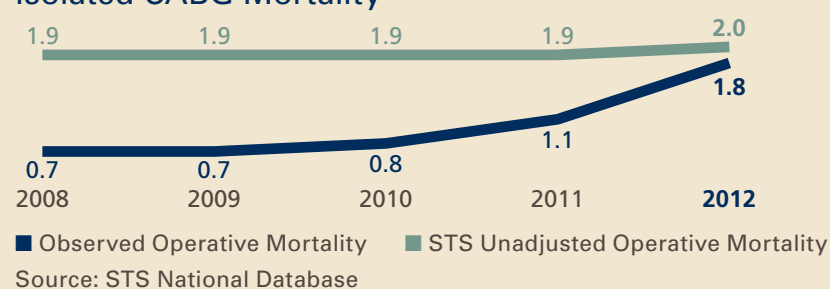
Median Door to Balloon Time



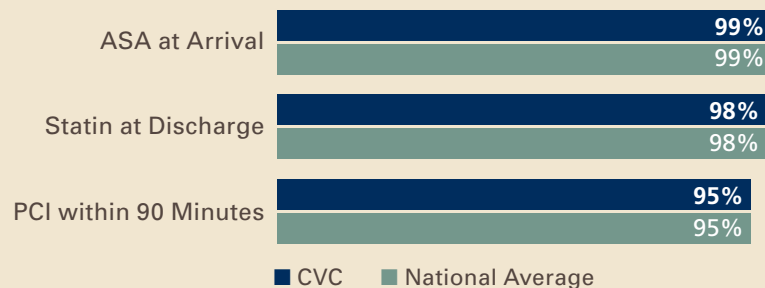
PCI Mortality



Isolated CABG Mortality



Acute MI Process Measures



Source: Hospital Compare October 2011 – September 2012

Data is calendar year unless otherwise noted.

Structural Heart Disease

Expanding the Possibilities of Optimal Valve Interventions



The Frankel CVC's Structural Heart Program is a multidisciplinary heart team consisting of cardiologists, cardiac surgeons, radiologists and vascular surgeons working together to provide innovative treatments to patients with valve and structural heart disorders.

Our program has implanted more than 230 transcatheter aortic valves to date. In addition to the full range of TAVR procedures, our services have expanded to include all possible treatment options for valve and structural heart disorders. We specialize in managing the most complex cases and offer patients expert care through:

- Prevention of atrial appendage embolic events with surgical occlusion, percutaneous atrial appendage occlusion and percutaneous trans-pericardial occlusion, combined with optimal anticoagulation strategies
- Weekly revascularization strategy conferences to discuss the most appropriate medical therapy for each patient — from surgery to complex PCI to hybrid procedures
- PFOs and ASDs
- Paravalvular leak closures
- Comprehensive management of mitral valve disorders

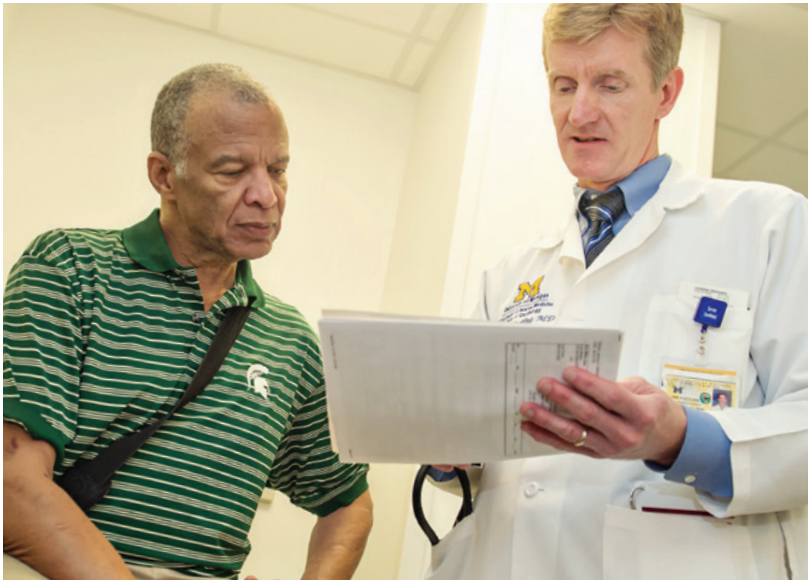
Our team also includes nurse practitioners and a clinical care coordinator who coordinates care and multi-specialist appointments.



Surgeons and cardiologists see patients in tandem during clinic visits for more complete consultations and fully integrated care.

Heart Failure

Leading Experts Changing Heart Failure Treatment



The Heart Failure Program at the Frankel CVC focuses on the complex management of advanced heart failure, circulatory support and heart transplantation. Our team has extensive, high-volume experience in the treatment of patients with acute heart failure. We share in the care of these patients with referring physicians to help patients survive and thrive with a better quality of life.

Heart Failure Management

Our heart failure services include a telemanagement team of nurses as well as an inpatient team of nurse practitioners and physician assistants to ensure safe, collaborative, patient- and family-centered care.

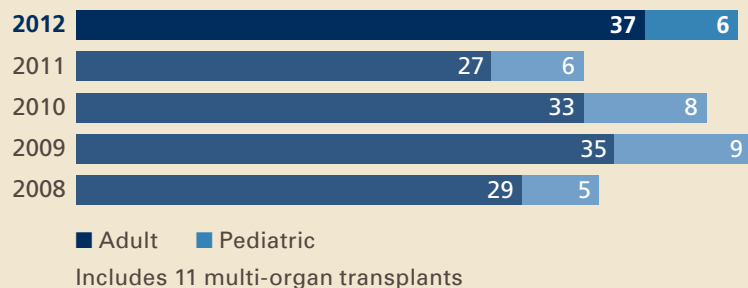
Cardiac Transplant Program

We are the leading cardiac transplant center in Michigan. We perform an average of 30 adult cardiac transplants each year. Our transplant team includes multidisciplinary specialists with extensive experience in managing the complexities of transplant patients, including:

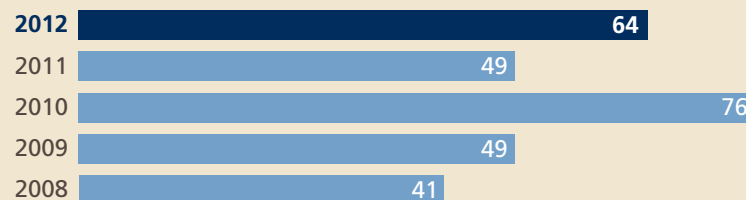
- Adult cardiac transplant surgeons
- Heart failure and transplant cardiologists with advanced training in transplantation
- Advanced circulatory support
- Cardiac critical care
- Nutritionists
- Social workers

Our team also works closely with faculty who specialize in congenital heart disease, inherited cardiomyopathies and transplant infectious diseases to provide each patient with seamless comprehensive care.

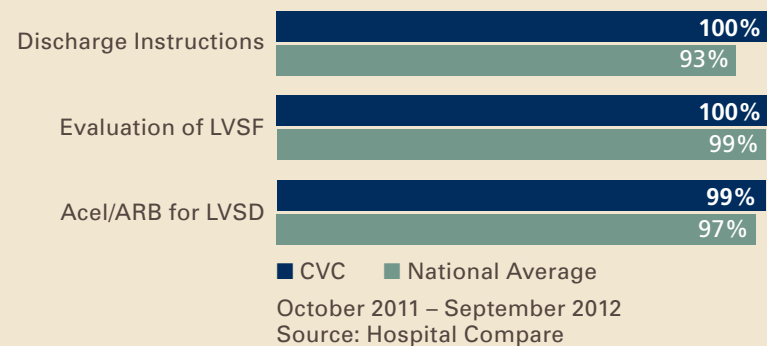
Heart Transplant Volume



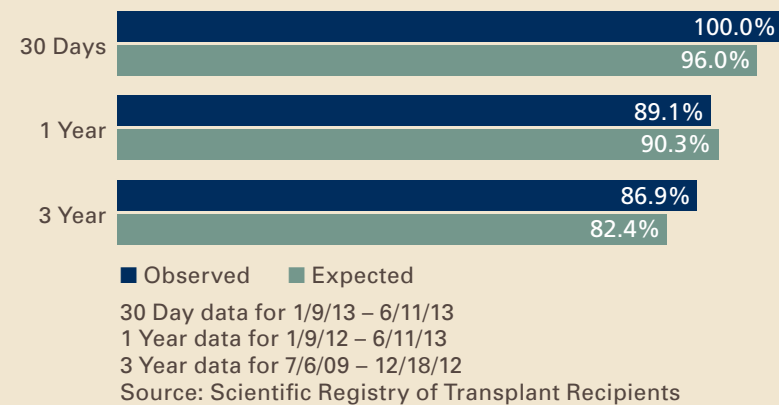
Long-Term Implantable VAD Volume



Heart Failure Process Measures



Heart Transplant Survival



Data is calendar year unless otherwise noted.

Heart Failure

(continued)



Center for Circulatory Support (CCS) and Ventricular Assist Devices (VAD) Program

The CCS is one of only a few programs worldwide with access to many investigational and FDA-approved VADs, like the HeartMate II® manufactured by Thoratec Corporation for the REVIVE-IT trial. Our VAD Program is one of the largest in the country. Specialists on our team work with referring physicians in the evaluation and selection of the most appropriate device based on each patient's individual needs.

Seal of Approval

Our CCS earned the Gold Seal of Approval® for health care quality in 2008, and was one of the first centers to be awarded Disease-Specific Care Certification for Advanced Ventricular Assist Devices by The Joint Commission. We received recertification from The Joint Commission in March 2012.

Extra Corporeal Life Support (ECLS)

The University of Michigan is the world leader in ECLS, which was pioneered at the University. Our team is capable of instituting Extra Corporeal Membrane Oxygenation (ECMO) within minutes or, under special circumstances, traveling to referring institutions to initiate ECMO for a safer transport to our center.

REVIVE-IT Trial

The heart failure team at the Frankel CVC is leading the REVIVE-IT trial, a landmark study that is looking at the benefit of earlier implantation of Left Ventricle Assist Devices in patients with advanced heart failure as characterized by New York Heart Association Class III Symptoms. Researchers will determine whether operating in the course of heart failure before patients become acute would allow patients to recover quicker, experience fewer complications, and enjoy more of the benefits of Ventricular Assist Device therapy. Our team is participating in this study in partnership with the NIH, Thoratec Corporation, the University of Pittsburgh and 16 other clinical sites.

Drive to Thrive

As the longest surviving patient with a single heart assist device, JoeAnn Bivins not only lives her life virtually symptom-free of heart failure, but also inspires others to improve their quality of life with an LVAD. JoeAnn is so well supported with the device implanted in 2005, she and her cardiologist have decided to no longer pursue a heart transplant.

Read more about JoeAnn at umhealth.me/jbivins

“It’s certainly something special to be given a second chance, and it’s even more of a blessing to know that my story can give others with heart failure the same hope.”

— JoeAnn Bivins



Current Heart Failure Research

In addition to the REVIVE-IT trial, our faculty are engaged in a wide variety of heart failure research, from preventive to rehabilitative studies. Some of these include:

- Determining if Vitamin D helps patients with heart failure
- Testing the safety and effectiveness of Medtronic’s Viva™ Quad C CRT-D device
- Demonstrating vagus nerve stimulation in conjunction with the CardioFit system as a treatment for heart failure in the INOVATE-HF study
- Learning more about the effects of a computerized cognitive training intervention on memory in people with heart failure in the MEMOIR 2 study
- Participating in the St. Jude Registry to better understand clinical care strategies for patients who have cardiac resynchronization devices (CRT-D) implanted to treat heart failure
- Understanding the effects of the DASH diet in diastolic heart failure compared to healthy controls

Cardiac Arrhythmia

New Paradigm for Atrial Fibrillation

The Cardiac Arrhythmia Service at the Frankel CVC is a high-volume tertiary referral center for the management of complex arrhythmias, including atrial fibrillation, supraventricular and ventricular tachycardia, atrial flutter, PVCs and WPW syndromes. We also specialize in care for patients with complex device conditions, such as malfunction of devices and leads, infected devices and extraction of leads and devices. Each year our 10 dedicated electrophysiologists perform 1,000 ablations and more than 500 device procedures including pacemakers, ICD and biventricular devices, and is one of a few centers in the country with this level of volume and experience.

In partnership with the Center for Arrhythmia Research, we are creating new technology to facilitate the mapping of complex arrhythmias, particularly atrial fibrillation. Our combined efforts are moving the field forward in our understanding and treatment of the most challenging and prevalent heart rhythm conditions.

In addition to catheter ablations and device procedures, we also provide:

- Cardiac resynchronization in patients with heart failure
- A program for atrial appendage occlusion for prevention of stroke in patients with atrial fibrillation (coming in 2014)

Creating a New Paradigm for the Treatment of Atrial Fibrillation

At the Center for Arrhythmia Research, our focus is on the mechanisms of arrhythmia, from the molecule all the way to the organ level. Through research, we believe we can uncover a new paradigm for the prevention and treatment of atrial fibrillation.

Located in the Cardiovascular Research Center (CVRC), our team collaborates not only with colleagues within the Frankel CVC, but also with fellow physicians and researchers from physiology, pharmacology, biochemistry and pathology. Being a part of the CVRC grants us access to ample resources and core facilities, and allows us to share the technology and experimental models we use to study other types of disease, such as heart failure and inheritable diseases like long QT syndrome. As we expand our understanding of how and why these diseases come about, our goal is to develop therapies that will be robust enough to ensure long-term success in the treatment of these complex arrhythmias.



Rhythm of Life

For several years, Cynthia Apostolakis lived under the cloud of atrial fibrillation. Her adventurous spirit gave way to apprehension about carrying on her favorite activities, always having to rely on friends and neighbors when she was incapacitated by her irregular heartbeat. After her stroke, Cynthia's local physician referred her to the Frankel CVC for further evaluation and expertise with performing catheter ablations.

See Cynthia's video at umhealth.me/cynthia-apos

"They took time with me and made me feel as if I were the only person under their care. After my catheter ablation, it was like a new lease on life. I just felt like living again, really living."

— Cynthia Apostolakis

FY13 Procedure Volume

235 | Pacemakers

355 | ICDs

962 | RF Ablations

492 | Cardioversions

Valve Disease

Minimally Invasive Valve Replacement Gives Higher Risk Patients More Options

Aortic Valve

Open surgical repair of the aortic valve is the preferred treatment for severe aortic stenosis. For intermediate- to extreme-risk patients who do not qualify for this option, transcatheter aortic valve replacement (TAVR) offers a viable alternative. The TAVR team at the Frankel CVC is well equipped and fully experienced in the complete spectrum of minimally invasive devices. Interventional cardiologists and cardiac surgeons work closely together for a seamless approach to these procedures.

Our team has experience delivering these devices through a variety of access points, depending on the individual patient including: femoral, transapical, direct aortic, subclavian or carotid arteries.

We offer the following TAVR options:

- Edwards SAPIEN
- Medtronic CoreValve®
 - Pivotal Trial — intended for high-risk and inoperable patients
 - SURTAVI — intended for intermediate risk patients

Our team of experts is on the leading edge for aortic stenosis treatment and have access to all the newest devices available through clinical trials as well as FDA approved devices.

Our multidisciplinary approach also enables us to offer additional options for patients with complex aortic valve problems, including:

- Valve-sparing operations on the aortic root
- Catheterization of paravalvular leaks
- Placement of stentless aortic valves
- Hypothermic circulatory arrest procedures

TRANSFORM Trial

The Frankel CVC is one of only a few sites in the nation to conduct the TRANSFORM clinical trial for the INTUITY valve system developed by Edwards Lifesciences, due to our reputation as one of the premier valve repair and replacement programs in the country. This trial offers a potentially significant advancement in valve replacement surgery because it allows the surgeon to implant the valve with only three sutures, significantly decreasing the time required for the surgical intervention.



Feeling Good Again

Slowing down was not an option for 87-year-old Genevieve Boguszewski, diagnosed with aortic stenosis following a bout of pneumonia last year. Her age and condition made her an ideal candidate for a minimally invasive TAVR — one of more than 200 procedures performed in our high-volume center. Genevieve quickly returned to enjoying her life with family and friends.

Read more about her story at umhealth.me/gbogus

“Before the surgery, I told my doctor I knew people older who could run circles around me — not anymore. I can shop without getting out of breath, and I’m getting outside to do the things I want to do.”

— Genevieve Boguszewski

Each year, we perform more than 700 surgical valve procedures — more than any other hospital in the state.

We’ve performed more than 230 TAVR procedures to date, the highest number in Michigan, ranking our program among the top in the country.

Valve Disease

(continued)

Repair Is Best Option for Mitral Valve Patients

The Mitral Valve Clinic at the Frankel CVC is one of the largest practices in the country with a focus on mitral valve repair. Our team's extensive experience in the operating room is a direct result of high procedure volume, which translates into better outcomes for patients overall.

Mitral valve repair is one of the few cardiac procedures where a patient's life horizon returns to what it would have been naturally without a mitral valve condition. Performing these repairs in patients before their mitral valve disease progresses into life-threatening heart conditions such as atrial fibrillation, embolism, blood clots, stroke and congestive heart failure is our top priority. We offer surgical valve replacement in cases where that is the patient's best option.

Each member of the Mitral Valve Clinic team has extensive experience in diagnosing, monitoring and treating mitral valve disease, including mitral regurgitation, mitral stenosis and mitral valve prolapse (Barlow's syndrome).

We provide specialized services, including:

- A multidisciplinary approach to the diagnosis and treatment of mitral valve disease
- Evaluation of the etiology of mitral valve disease
- Up-to-date literature regarding mitral disease
- Identification and targeting of adult patients with and at risk for mitral valve disease

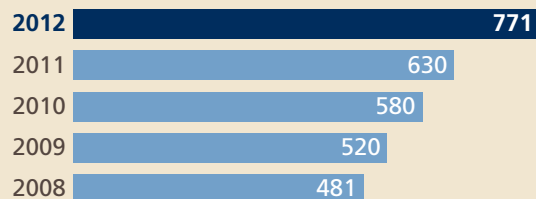


Our Mitral Valve Clinic is also a leader in the treatment of mitral regurgitation associated with heart failure from both dilated and ischemic cardiomyopathies.

Current Mitral Valve Research

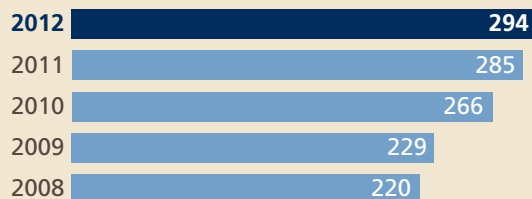
The research efforts of our Mitral Valve team tie directly to our repair success rate, especially in patients with end-stage left ventricular failure and those with the most challenging mitral valve abnormalities. The Cardioprotection Research Lab is examining the possibility of reducing post-operative atrial fibrillation through experimental practices that enhance antioxidant defenses by studying the protective effects of anthocyanins found in dark fruits in patients who undergo valve procedures.

Valve Volume



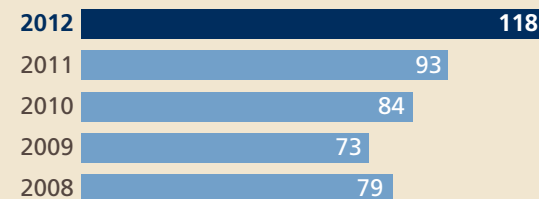
5 Year Average Mortality 3.2%

Mitral Valve Volume

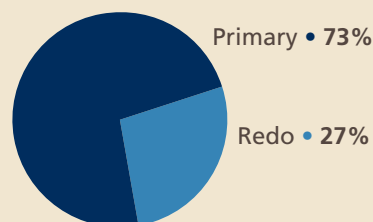


5 Year Average Mortality 2.7%

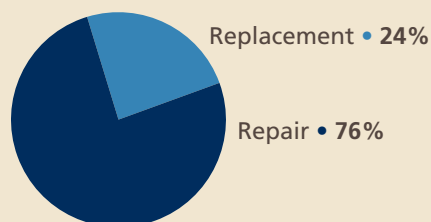
Isolated Aortic Valve Volume



Primary vs. Redo Valve

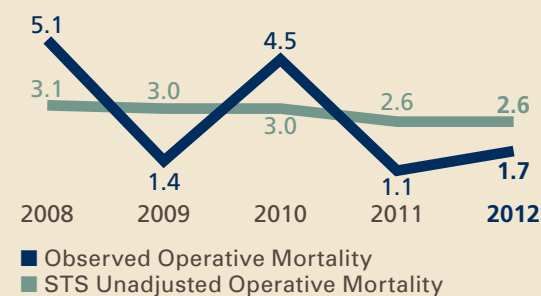


Mitral Valve Repair vs. Replacement



5 Year Isolated Mitral Valve Degenerative Repair Rate 99.4%

Isolated Aortic Valve Mortality



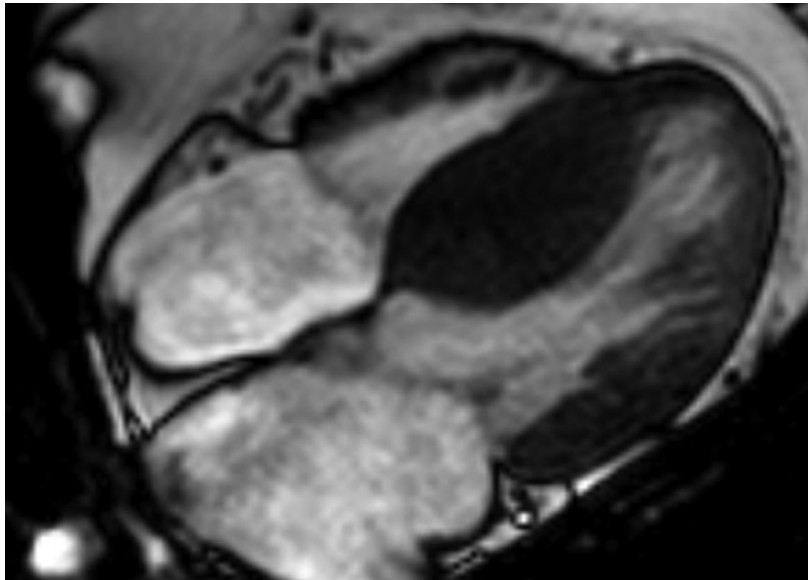
Aortic Valve Distribution

	2008	2009	2010	2011	2012
Replacement	189	228	249	270	323
TAVR	–	–	–	27	99
AV Repair or Resuspension	35	44	60	65	47
Valve Sparing	12	26	34	25	31
Apico-aortic Conduit	1	3	3	5	3

Data is calendar year unless otherwise noted.

Inherited Cardiomyopathies

Large-Volume Clinic with Latest Knowledge



The Inherited Cardiomyopathy Clinic at the Frankel CVC is one of only 14 in the country — and the only one in Michigan — to specialize in the treatment of inherited cardiomyopathies, including hypertrophic cardiomyopathy (HCM). Our pediatric and adult clinicians work closely with each other, along with specialists in radiology, physiology, heart failure and genetics, to provide the most comprehensive care to patients and families living with these diseases.

Serving a large volume of patients through our clinic, we are able to offer up-to-date knowledge and treatment recommendations, including:

- Expert consultation
- State-of-the-art MRI
- Genetic screening and counseling for individuals and families
- Medical therapies
- Interventional and surgical procedures

Our physicians treat entire families and coordinate care between adult and pediatric clinics so that we can treat children who are affected as well as their parents.

Current Inherited Cardiomyopathy Research

All of our physicians are actively involved in basic, translational and clinical research projects.

HCM Net is an NIH-sponsored clinical trial that includes patients who are at risk for hypertrophic cardiomyopathy and patients who have HCM symptoms. The study is looking at ways to prevent the onset of HCM in people who are genetically predisposed or to attenuate the disease course in those with established HCM.

We are studying the effects of exercise training in patients with HCM and how this disease affects exercise capacity. Our clinic also participates in multi-center registries to try to develop new diagnostic and treatment strategies for patients and gain better insight into inherited cardiomyopathies.

Perfect Timing

Ryan Cliff had few signs of his genetic condition before the day he stepped out onto the soccer field as a starter for the first time. He was taken away in an ambulance and later diagnosed with arrhythmogenic right ventricular cardiomyopathy by the specialists at the Frankel CVC. They were able to save Ryan's life and discover the causative gene in his mom and two younger brothers.

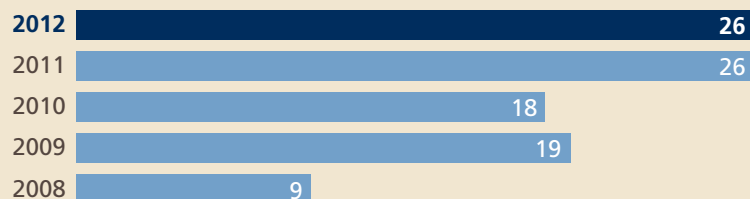
See Ryan and his parents talk about their experience at umhealth.me/rcliff

"It was nice seeing a team of doctors working together, comforting us, making us feel at home. The Michigan Difference is that they are very knowledgeable, and I appreciate everything they've done."

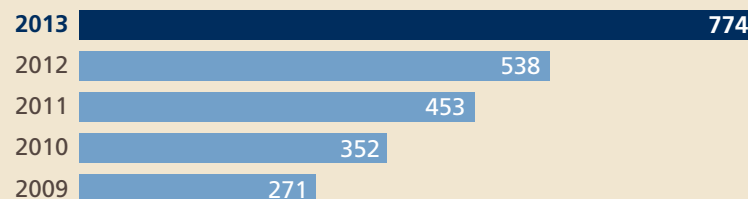
— Ryan Cliff's dad



CY08–12 Myectomy



FY09–13 Clinic Volume



Aortic Disease

Complex Care Expertise



As leading providers of complete care for all types of aortic disease, the Multidisciplinary Aortic Program at the Frankel CVC brings together experts from cardiac surgery, vascular surgery, interventional cardiology and radiology to formulate the best comprehensive plan for each individual patient. Our mortality rates are among the lowest in the country, despite a high volume of complex cases.

Specialists at the Frankel CVC provide treatment and therapy for all types of aortic disease, from management and medical therapies to minimally invasive and open surgical repairs, including:

- Aortic valve disease (stenosis, insufficiency)
- Bicuspid aortic valve
- Ascending and arch aneurysms
- Descending thoracic and abdominal aortic aneurysms
- Aortic dissection
- Arteriosclerotic aortic disease
- Aortic-related connective tissue disorders (Marfan's, Ehlers-Danlos and Loeys-Dietz)

Inherited Aortic Disease

The Frankel CVC is now home to the Inherited Aortic Disease Clinic, a virtual network that studies the genetic factors of aortic diseases. Patients who participate will have access to genetic testing and counseling as well as experts from other relevant specialties, such as high-risk obstetrics and orthopaedics.

EVAR and TEVAR

Endovascular Aortic Repair (EVAR) and Thoracic Endovascular Aortic Repair (TEVAR) have emerged as true alternatives to conventional surgery for many patients suffering from aneurysmal disease of the aorta. These are life-saving options for some patients who are not optimal candidates for traditional open repair. These procedures can shorten hospital stays and recovery periods. Our surgeons have close to two decades of experience in performing EVAR and TEVAR procedures and will soon offer endovascular arch procedures.



All in the Family

After a pattern of aortic dissections in the Aleo family emerged, genetic testing revealed that they carried the SMAD3 gene mutation. Our experienced and compassionate team carefully monitors the family, and performs surgery as needed. The family's involvement in research allows us to collaborate with colleagues in Texas to learn more.

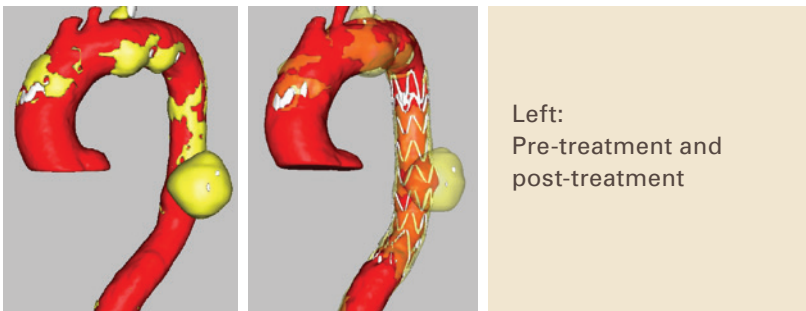
Read more about the Aleo family at umhealth.me/aleofamily

"The treatment our family receives at U-M is unparalleled. It's phenomenal to know they can put this synergy to work for the benefit of patients."

— Sam Aleo, grandfather

Aortic Disease

(continued)



Current Aortic Disease Research

The Frankel CVC is home to the International Registry of Aortic Dissection and several research laboratories that are exploring the molecular etiologies of aortic diseases. Through research and access to clinical trials, our team is helping to advance the best treatment options for all types of aortic pathology.

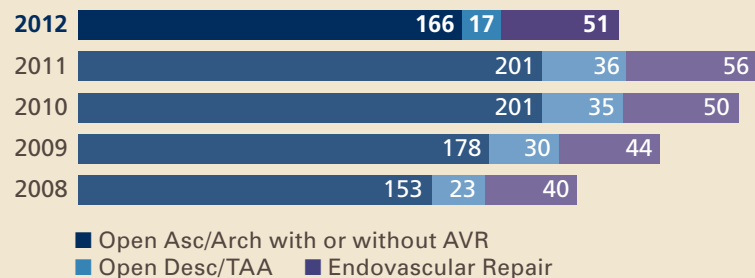
The Multidisciplinary Aortic Program is actively involved in a wide variety of research projects that provide patients with the most up-to-date and progressive treatment options available. Our Program is the only site in the state selected to participate in a clinical trial that will determine whether treatment with doxycycline will reduce the growth of an abdominal aortic aneurysm.

Another active aortic disease study involves the collection of blood and tissue that researchers are reprogramming into stem cells through induced pluripotent stem cell technique (iPS). These stem cells provide an unlimited opportunity to expand our understanding of aortic disease and aid in the discovery of new treatment.

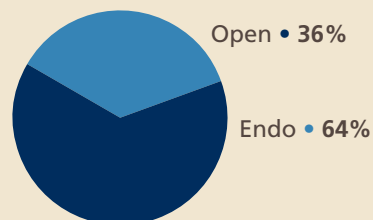
Aortic Biobank

Beginning in July 2013, patients and families who visit the Aortic Program clinic will receive information about how they can participate in the Aortic Biobank. We will collect blood samples for future study of genetic components, proteomics, inflammatory markers and cytokines that are associated with vascular disease. Tissue samples will also be collected for study at the time of procedures. Our goal is to collect sufficient samples to target specific diseases affecting the aorta.

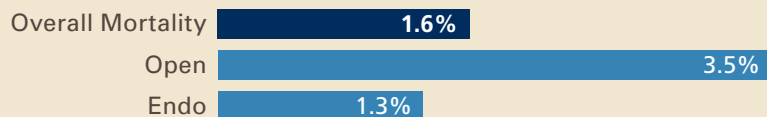
CY08–12 Thoracic Aorta Procedures



FY13 Abdominal Aortic Disease Distribution

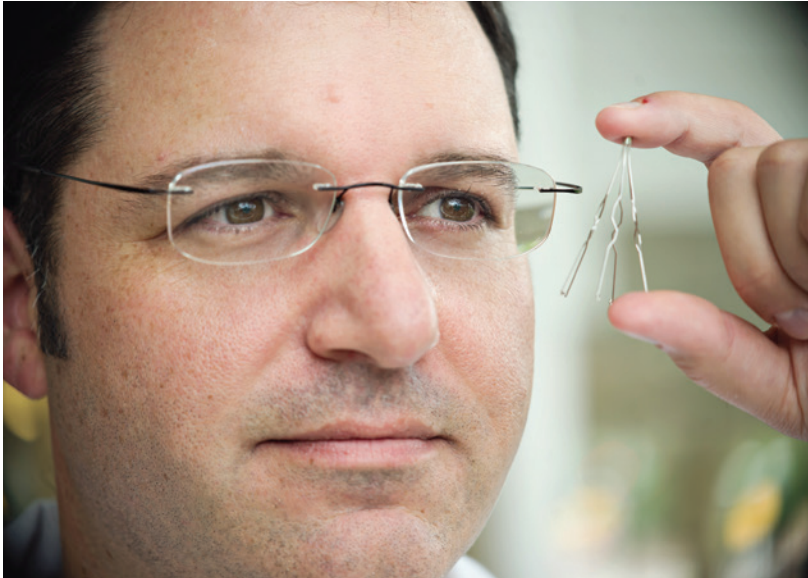


FY13 AAA Mortality



Vascular Surgery

Excellent Outcomes for Common to Complex Conditions



At the Frankel CVC, our attention never diverts from providing the best patient care experience. Our standard of excellence ensures the best possible vascular surgery outcomes from initial clinic visits through subsequent follow-up appointments.

We participate in both the Vascular Intervention Collaborative (VIC) and the Vascular Quality Initiative (VQI) to allow us to benchmark and improve outcomes.

Our surgeons specialize in conventional vascular surgery and the use of minimally invasive endovascular procedures for a wide range of vascular conditions, including:

- Abdominal aortic aneurysm
- Carotid artery disease
- Peripheral arterial disease
- Renal artery disease
- Thoracic outlet syndrome
- Varicose veins
- Venous disease
- Vertebral artery disease

Pediatric Vascular Disease Program

For the past three decades, the Pediatric Vascular Disease Program at the University of Michigan has been the country's most preferred destination for children in need of surgical management of occlusive or aneurysmal diseases of the abdominal aorta and its branches. A multidisciplinary team is led by vascular surgeons and includes physicians from the specialties of interventional radiology, pediatric nephrology, intensive care and anesthesia, as well as nurses and social workers with broad knowledge of pediatric renovascular hypertension and childhood abdominal aortic coarctation. The operative management of children with complex arterial disease numbers more than 225. Our patients come from Western Europe, the Middle East, and many major children's hospitals in Canada and across the United States.

Current Vascular Surgery Research

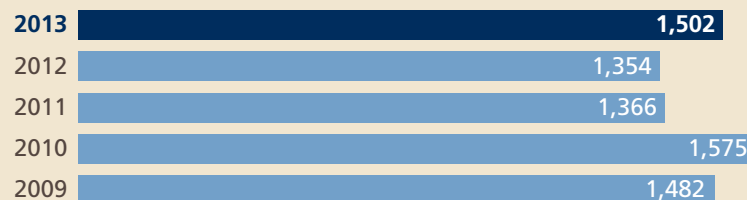
Our vascular surgeons and research faculty are also leaders in the study of vascular disease with significant research endeavors and scholarly pursuits. The Conrad Jobst Vascular Research Laboratory complex includes seven separate but integrated units, and is now part of the Cardiovascular Research Center (CVRC) at the North Campus Research Complex, a consolidation that has allowed the researchers an opportunity to better collaborate on studies and to share resources.

These updated and expanded facilities were instrumental in obtaining multiple NIH research grants, two Department of Defense grants, as well as a substantial grant from Bristol-Myers Squibb. The Vascular Mechanics Laboratory, dedicated to modeling and providing the mechanical effects of septectomy to treat acute aortic dissection, will be home to the Edward B. Diethrich, M.D. Research Professorship of Biomedical Engineering and Vascular Surgery.

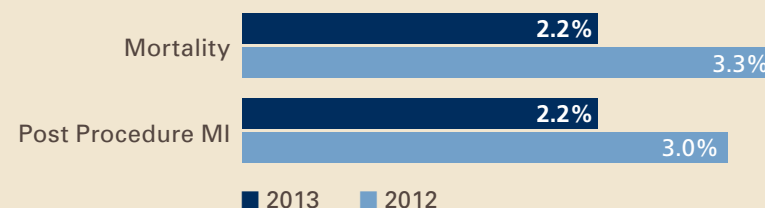
IVC Filter Usage

Retrievable inferior vena cava filters are not always removed once a patient's risk for pulmonary embolism has subsided, and their use is on the rise. Today, an estimated 267,000 IVC filters are deployed and less than 50 percent of retrievable filters are removed. The Frankel CVC is at the forefront of efforts to standardize the use of IVC filters and the protocol for determining which filter will result in the best possible outcomes for individual patients. We led the creation of the nation's first IVC filter registry, and our vascular experts offer recommendations about the ongoing care of the thousands of patients implanted with IVC filters each year.

FY09–13 Vascular Surgery Volume



FY12–13 Arterial Procedures



Venous Health

Comprehensive Care

The Venous Health Program at the Frankel CVC is a multidisciplinary, large-volume clinic that provides full service for the entire spectrum of a patient's venous disease. The program features subspecialty care, establishing a uniform treatment approach. Our team includes specialists from vascular surgery, vascular medicine and interventional radiology at both the Frankel CVC and at our off-site location, the Livonia Vein Center.

Innovative treatments available include:

- Radiofrequency ablations/laser ablations for superficial venous reflux
- Phlebectomies using TRIVEX technique (available in only two other sites in Michigan) for the removal of large and extensive varicose veins
- Pharmacomechanical thrombolysis for a more aggressive treatment of iliofemoral venous thrombosis
- Recanalization of central veins to treat significant chronic venous insufficiency

We also offer consultative and educational programs for referring physicians, especially those who are some distance from Ann Arbor, to help them manage venous disease patients locally.

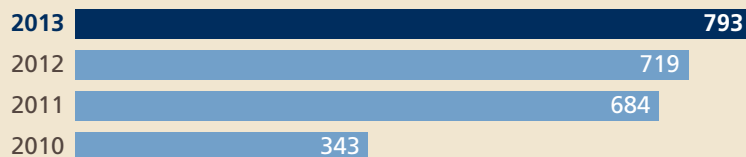
Current Venous Health Research

Our Venous Health Program is well connected to world-class research. Some of our physicians have multiple NIH awards studying basic mechanisms of venous thrombosis formation and resolution while others are working on the prophylaxis and treatment of DVT and aggressive therapies for iliofemoral DVT.

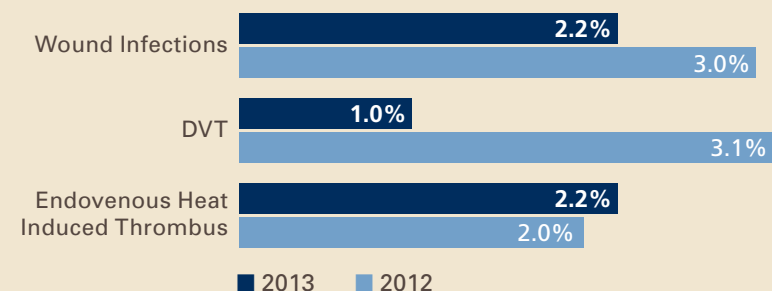
Livonia Vein Center

We offer patients another clinical option through the Vein Center at the Livonia Center for Specialty Care. The LVC serves as the initial triage for the Venous Health Program and is an outpatient procedural site, which allows us to serve patients more efficiently.

FY10–13 Clinic Volume



FY12–13 Venous Procedure Complications





Our centralized care provides patients with a team of experts to treat their venous disease, from mild cosmetic problems to complex venous abnormalities.

Peripheral Arterial Disease

Full Spectrum of Patient Care

From lifestyle modification counseling to more complex limb-sparing procedures, the Peripheral Arterial Disease Program at the Frankel CVC is one of the most comprehensive care centers in the country for patients with this condition. Our multidisciplinary team is comprised of interventional cardiologists, radiologists, vascular surgeons and podiatrists who regularly meet to discuss individual cases and develop optimal management strategies for every patient. We also work closely with podiatry and diabetes specialists to prevent amputations where possible.

Collaborative Care

Our coordination of a standardized outpatient experience as well as increased access to wound care and pain management services has resulted in improvements in procedural complications and guideline-recommended medical therapy, including revascularization when indicated.

In addition, our PAD Program provides:

- Comprehensive testing in ICAVL-accredited vascular lab
- Immediate access to all patients with any degree of PAD, from mild to severe
- Catheterization lab featuring state-of-the-art angiographic equipment with access and expertise in multiple minimally invasive endorevascularization modalities
- Expertise in limb-sparing and limb-salvaging procedures
- Same-day evaluations, including imaging
- Treatment interventions, including angioplasty, stenting, endarterectomy, atherectomy and bypass graft surgery

- Exercise rehabilitation
- Smoking cessation program
- Dietary counseling
- Prosthetics
- Consultative and educational programs for referring physicians

Diagnostic Vascular Unit

The Diagnostic Vascular Unit (DVU) includes full-service clinical diagnostic labs that perform approximately 2,100 tests every month for both inpatients and outpatients. The DVUs at the University Hospital, Frankel CVC, Domino's Farms, and Briarwood are accredited in venous, arterial and cerebrovascular testing by the Intersocietal Accreditation Commission (IAC) Vascular Testing.

Current Peripheral Arterial Disease Research

The PAD program participates in multiple clinical trials, including a vascular surgery stem cell study. We are one of only two sites in the country where an experimental new gene-therapy treatment called MultiGeneAngio is part of a clinical trial to help patients with severe PAD. In addition, we are the coordinating center for the Blue Cross Blue Shield Peripheral Vascular Intervention registry. This is a statewide registry designed to improve the quality of care and outcome of patients who undergo percutaneous peripheral arterial intervention.



Every Step of the Way

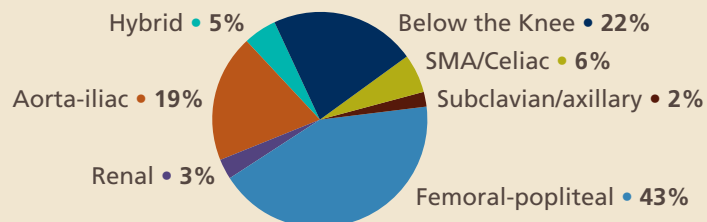
When Jolette Muñoz felt an intense pain in her right leg during a cardiac rehab session, she turned to the PAD experts at the Frankel CVC to give her relief. She soon realized her dream of walking for miles on a three-week tour in Europe.

See Jolette's video at umhealth.me/jolette

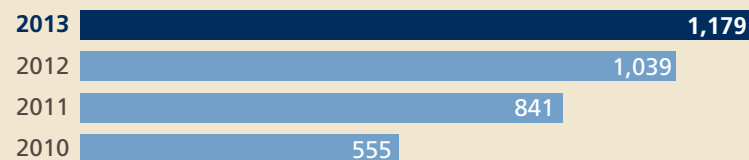
"All these people made my dream come true. They made such a significant difference in the quality of my life. I can do all those things because they cared enough to do what they do."

— Jolette Muñoz

CY12 Percutaneous Peripheral Arterial Procedures



FY10–13 Clinic Volume



Pulmonary Hypertension

Midwest Center of Expertise

The Pulmonary Hypertension Program at the Frankel CVC is the largest and most experienced program in the state, and one of the largest in the country, with a team of physicians, nurse clinicians, research coordinators and support staff. We are a comprehensive, single resource for the care and treatment of patients who live with all stages of this challenging disease.

Partnership with Scleroderma Clinic

Early diagnosis of pulmonary arterial hypertension is key for scleroderma patients. The Pulmonary Hypertension Program regularly partners with U-M's Scleroderma Clinic to investigate new and better screening techniques and treatments for systemic sclerosis-associated PAH. Some of our current projects include:

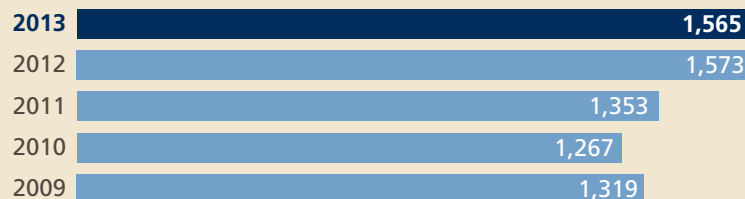
- A recently published study on the novel, evidence-based DETECT algorithm for diagnosing PAH at earlier stages
- Phase 2 multi-center Rituximab trial
- Metabolomics screening

Current Pulmonary Hypertension Research

Research gives patients direct access to the latest therapies to treat and manage pulmonary hypertension. We are active in several clinical and translational projects, including:

- GRIPHON trial, a multi-center, double-blind, placebo-controlled Phase 3 study for Selexipag patients with PAH
- AMBITION trial for combination therapy in newly diagnosed PAH patients
- Riociguat early access program for patients with chronic thromboembolic disease
- Novel study of exercised-induced pulmonary hypertension
- Practice improvement registry for patients with Eisenmenger physiology in conjunction with the Frankel CVC's Adult Congenital Heart Program
- Largest enroller in the Pulmonary Arterial Hypertension Quality Enhancement Research Initiative Extension Program (PAH QuERI Ext), which reviews practice patterns in compliance with guidelines in the treatment of Group I PAH

FY09–13 Clinic Volume





Room to Breathe

When Sharon Stewart was first diagnosed with pulmonary hypertension, her doctor gave her two years to live. Then she came to the Frankel CVC where experts in our PH Program gave her hope with new treatment options that immediately improved her health. Nine years later, Sharon is on the go: keeping up with her grandchildren, walking, riding and traveling as she pleases.

Read more about Sharon at umhealth.me/sstewart

“I’m happy where I am. PH patients don’t always look sick. We have ups and downs, and people don’t understand what we’re going through. In the support group, we help each other. If I can give one patient hope, it’s my way of giving back.”

— Sharon Stewart

World Symposium on Pulmonary Hypertension

Physicians representing the University of Michigan attended the 5th World Symposium on Pulmonary Hypertension in Nice, France, this past February: one as a member of the steering committee and all as participants on several task forces. These collaborative symposia take place every five years and gather together experts from all over the world to update guidelines, pathology, and propose new recommendations for therapy and goals.

Treatment for Chronic Thromboembolic Pulmonary Hypertension

As part of the multidisciplinary team, Cardiac Surgery offers pulmonary endarterectomy as a treatment option for chronic thromboembolic pulmonary hypertension patients. The University of Michigan is currently the only institution in the state, and one of only a few in the region, to offer this therapy.

Pulmonary Hypertension Breakthrough Initiative

The University of Michigan serves as the Data Coordinating Center (DCC) for the PHBI, a network of multidisciplinary, collaborative transplant and research centers that distributes stored clinical specimens and relevant data to researchers and for use in groundbreaking research to better understand the molecular basis of primary pulmonary hypertension.

Adult Congenital Heart Disease

Lifelong Care by Congenital Experts

The Adult Congenital Heart Disease Program at the Frankel CVC provides expert care to adult patients living with congenital heart disease. Our multidisciplinary team of congenital heart disease specialists treats the full spectrum of these inherited conditions with extensive experience in imaging, electrophysiology, interventional catheterization and cardiac surgery, while our expert clinical nurse coordinators oversee patient care between visits. Our goal is to ensure that patients with these conditions enjoy a better quality of life through access to the latest in treatment options, education, technologies and research.

Percutaneous interventions, among other treatments, offer today's patients more options for successful outcomes and a higher quality of life. The University of Michigan Congenital Heart Center has performed more than 50 percutaneous pulmonary valve replacements.

Access for Life

Patients with congenital heart disease require lifelong management and care. All of our physician providers are board-certified in adult internal medicine as well as congenital heart disease and pediatrics. Our program partners with other specialists within the University of Michigan Health System to coordinate care across these disciplines as needed. Our collaborators include experts from:

- High-risk obstetrics
- Heart failure and transplantation
- Cardiac surgery

- Electrophysiology/arrhythmia
- Pulmonary hypertension
- Aortic disease/aortic surgery

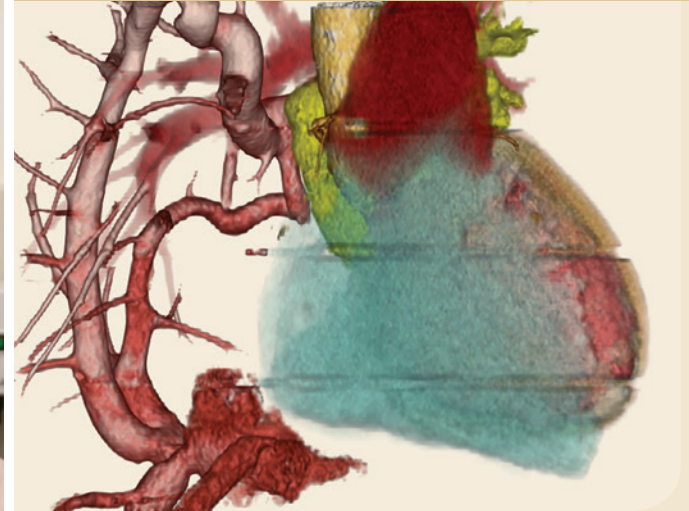
Statewide Clinics

The Adult Congenital Heart Disease Program participates in comprehensive pediatric and adult congenital cardiology clinics for families throughout the state of Michigan, including Lansing, Marquette, Petoskey and Traverse City.

Current Adult Congenital Heart Research

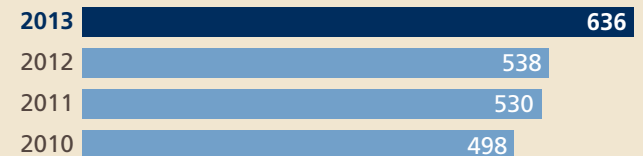
We participate in ongoing research related to congenital heart disease in adults.

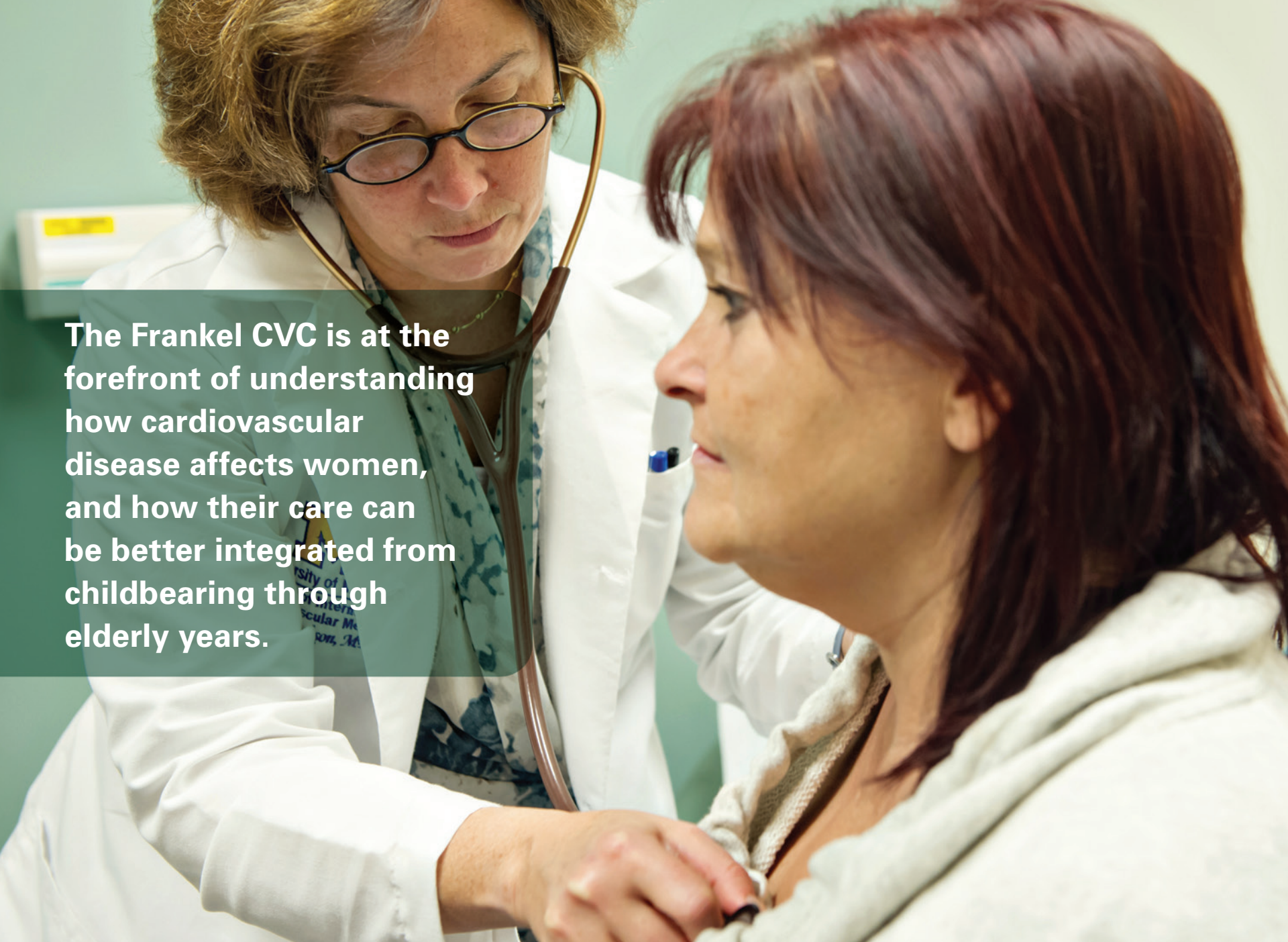
Through research, we are helping to advance the best treatment options for all types of congenital heart disease. Current research underway includes the study of sleep apnea in patients with adult congenital heart disease, as well as the study of quality of life within patients with congenitally corrected transposition of the great arteries.



Complex anomalous pulmonary venous and left circumflex anatomy.

FY10-13 Clinic Volume





The Frankel CVC is at the forefront of understanding how cardiovascular disease affects women, and how their care can be better integrated from childbearing through elderly years.

Women's Heart Disease

Dedicated Prevention, Care and Research

The Women's Heart Program at the Frankel CVC is a vibrant research and clinical venue focused on addressing prevention, diagnosis and treatment of heart disease in women across the lifespan, from childbearing years through menopause and beyond. We offer a comprehensive program with cardiac rehabilitation, stress management, nutrition and exercise counseling, and many testing modalities all in the same building.

Our multidisciplinary team includes experts who specialize in women's heart health, including physicians, nutritionists and exercise physiologists. We coordinate cardiovascular care for women and act as a central point of contact for patients, other cardiovascular specialists within the Frankel CVC and referring physicians.

Research has shown that women who have gestational diabetes, gestational hypertension and postpartum cardiomyopathy are at increased risk for future cardiovascular disease. As we learn more about how cardiovascular disease presents differently in women than men, we are expanding our knowledge and expertise in providing preventive care earlier in their lives, most notably during pregnancy.

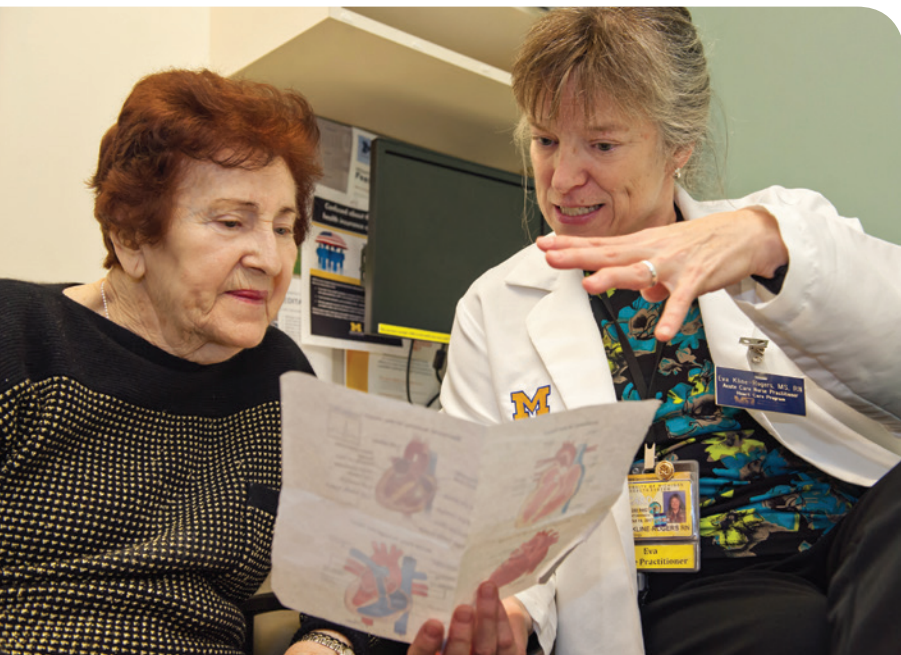
Current Women's Heart Program Research

The Women's Heart Program also supports robust research efforts. Our primary goal is to enhance the research that directly relates to women in vascular disease from childbearing through elderly years. One area of focus is the connection between lifestyle modifications and effects on hypertension with a special interest in nutrition, obesity and physical activity.

We participated as a study site in the VIRGO (Variation in Recovery: Role of Gender on Outcomes of Young AMI Patients) trial, a multi-center NIH-sponsored study that enrolled women who have experienced heart attacks at an early age (under 55) to understand how outcomes are affected by a broad range of factors, like demographics and genetics. More than 2,000 women participated in this first phase, and now we are enrolling for a similar study to look at elderly men and women over age 75 to identify different factors that might impact elderly women and how we treat them.

Preventive Cardiology Care

Lipid Management to Lifestyle Modifications



The Bridge Clinic

Within 14 days of being discharged from the hospital, patients meet with a nurse practitioner at one of our Bridge Clinics for a thorough assessment of follow-up care, including medications, cardiovascular resources needed and cardiologist appointments. Our data has shown that patients who participate in the Bridge Clinic are at less risk for readmission or emergency room visits.

In keeping with the Frankel CVC's mission to deliver holistic cardiovascular care, one of our most important efforts is to prevent coronary and other vascular diseases with early, evidence-based interventions and treatments. Through our Lipid and Hypertension Clinics, Metabolic Fitness, Executive Health Program and Cardiac Rehabilitation, we can provide patients with a level of care and resources not commonly available at other institutions.

Preventive Care Specialists

Our Preventive Care team includes physicians, nurse practitioners, nutritionists and exercise physiologists who specialize in the management of hypertension, lipids, metabolic syndrome, nutrition and exercise. Together, they actively participate in patient care, research and education.

Current Preventive Care Research

Our team is also active in several studies that explore all aspects of preventive care and further our goal to help people live healthier lives. Current research projects include:

- Ethnic disparities and cardiac care
- Novel agents to lower blood cholesterol
- Functional characteristics of the HDL lipid particles
- Strategies to reduce re-hospitalization on the cardiology units
- Analyzing the relationship between psychological symptoms and outcomes in patients with heart diseases

Cardiac Rehabilitation

Keeping Patients Informed and Healthy

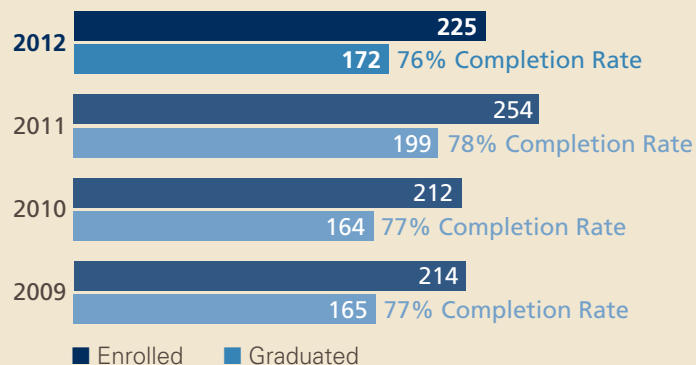
Following a major cardiac procedure, patients are often anxious and unsure about what will happen next. Our Cardiac Rehabilitation specialists are trained to put patients at ease by empowering them with information about diet, exercise and relaxation techniques for an overall improved lifestyle that not only makes them feel better about their recovery, but also helps to reduce future hospitalizations.

Located at Domino's Farms in one of the only facilities of its kind in the country, our Cardiac Rehabilitation program offers expert guidance and support from our staff of dedicated dietitians, exercise physiologists, yoga instructors, nurse practitioners and cardiologists. Most patients continue in our Cardiac Rehabilitation Program up to one year after referral.

Our primary goal is to educate patients about a range of lifestyle modifications, and includes:

- Medically supervised exercise program with a personal case manager
- Educational information about cardiac anatomy and physiology, and disease risk factors
- One-on-one nutrition counseling with a registered dietitian
- Weekly, interactive mini classes on topics ranging from how to read a food label to emotional eating and healthy weight management
- Individual goal setting based on a patient's circumstances
- Yoga for stress reduction
- Access to the PAD Walking Program
- Personalized exercise prescription upon program exit
- A peer group for support

CY09–12 Total Cardiac Rehabilitation Patients



The PAD Walking Program

An exercise physiologist works with patients to create an appropriate walking protocol while monitored on a treadmill to help increase the length of time before any cramping or pain occurs.

Stroke

Dedicated Stroke Specialists



At the University of Michigan, the Stroke Program is an expanded, specially trained multidisciplinary team of experts in emergency medicine, vascular surgery, cardiology, neurology, neurosurgery, neurointerventional radiology and physical medicine and rehabilitation that offers patients the highest level of comprehensive stroke care, from the most advanced stroke treatments to reducing risk. The team includes 10 board-certified vascular neurologists who are active in national stroke guideline development and offer a depth of knowledge about all types of stroke.

Emergency Stroke Care

Timing is critical in treating stroke. Our emergency response services, including Survival Flight, bring patients to our hospital quickly and safely. Our tPA delivery timing surpasses the standard outlined in the American Heart Association Get with the Guidelines® Program, a testament to our well-trained and efficient emergency room staff. When a blood clot is identified in the brain of a stroke patient, the patient is evaluated and treated by a specially-trained neurovascular team in our neurointerventional radiology suite — the only one of its kind in the area.

Stroke patients are cared for in our dedicated Stroke Unit and Neuro-Intensive Care Unit, which have been shown to improve survival and functional outcomes following stroke, decrease complications and shorten the length of hospital stays. Patients who are medically ready receive physical therapy and personalized guidelines for the best recovery strategies upon discharge.

Preventive Stroke Care

The Stroke clinic provides screening and preventive care to patients who are at high risk for stroke. We work with patients to diagnose and treat conditions that increase risk for stroke. Our location in the Frankel CVC promotes collaboration with cardiologists and vascular surgeons. Together, we put the best stroke prevention plan into action for each patient, which may range from lifestyle changes to the most sophisticated testing and treatment to decrease stroke risk.

Our Commitment to Excellence

The University of Michigan Stroke Program has earned the highest award for quality achievement from the American Heart Association Get with the Guidelines® Program since 2007 and has been an accredited Primary Stroke Center since 2004.

Current Stroke Research

As a regional and national referral center for stroke care, our providers participate in various research projects related to stroke recognition, education, treatment and epidemiology. Through this research, patients have access to research studies that allow them to receive cutting-edge care. Vascular surgeons also participate in research that studies the prevention and treatment of ischemic stroke. Our emergency medicine faculty are internationally known for clinical stroke research.

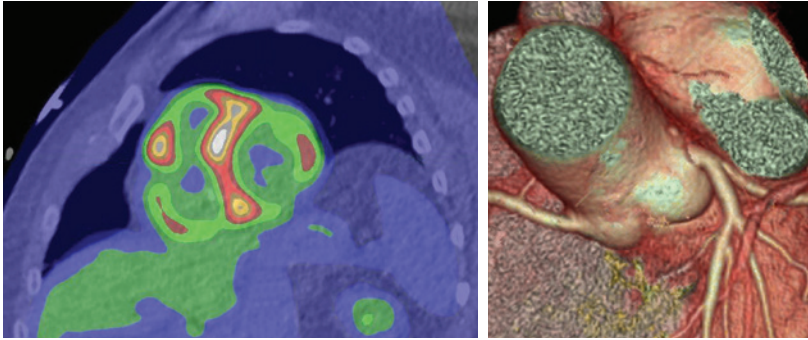
CY12 Stroke Core Measures

	2012	Goal
DVT Prophylaxis	99%	90%
Antithrombotic Therapy at Discharge	100%	90%
Anticoagulation at Discharge for AF Patients	96%	90%
Thrombolytic Therapy on Arrival	100%	90%
Antithrombotic Therapy by Day 2	98%	90%
Cholesterol Reducing Therapy at Discharge	99%	90%
Education	85%	90%
Assess for Rehabilitation	99%	90%

Brain Attack Surveillance in Corpus Christi (BASIC) Project

The BASIC Project is led by Frankel CVC researchers who collaborate with a neurologist and study staff based in Corpus Christi, Texas. Since 2000, BASIC has been the only ongoing stroke surveillance project focusing on Mexican Americans, one of the largest and fastest growing segments of the U.S. population. Recent findings published in the *Annals of Neurology* indicate that while the incidence of ischemic stroke has declined over the past decade among non-Hispanic Whites and Mexican Americans over age 60, the stroke rate is 34 percent higher among Mexican Americans than non-Hispanic Whites.

Vascular & Interventional Radiology and Cardiovascular Imaging



The multidisciplinary Vascular and Interventional Radiology Program at the Frankel CVC is a comprehensive resource for diagnostic angiography techniques that evaluate and treat vascular disease. Our team has developed interventional procedures that provide non-surgical options to a variety of conditions.

We specialize in:

- Arterial embolization
- Central venous recanalization and stenting
- Digital subtraction imaging
- Inferior vena cava filter placement
- Intrapopliteal arterial recanalization
- Percutaneous transcatheter angioplasty
- Stent placement
- Treatment for arteriovenous malformations
- Vascular occlusion therapies

Extensive Experience in Cardiovascular Imaging

The cardiovascular imaging services available at the Frankel CVC are among the top laboratories and centers around the country. Our faculty, staff and technologists maximize our research facilities to bring state-of-the-art equipment and techniques into the clinic. Our team is able to serve large volumes of patients and provide unparalleled levels of detail, including imaging of complex and less common diseases. We collaborate with specialists throughout the Health System and beyond to ensure the most effective diagnosis, analysis and treatment for patients.

Our services include:

Nuclear Cardiology

The Frankel CVC Nuclear Cardiology laboratory and PET imaging center are fully equipped with advanced SPECT/CT and PET/CT imaging systems. We also offer a variety of specialized nuclear tests to diagnose rare causes of cardiac disease, such as sarcoidosis and myocarditis.

Cardiovascular Computed Tomography

Our advanced CT scanners use powerful computer processing techniques that help us acquire images with the lowest possible radiation dose and the highest possible image quality. In partnership with our advanced image processing laboratory, we are able to routinely generate three-dimensional models to aid in diagnosis and treatment decisions.

Cardiac MR

The high-resolution images obtained with cardiac MR allow us to skillfully demonstrate cardiovascular anatomy, to make extremely



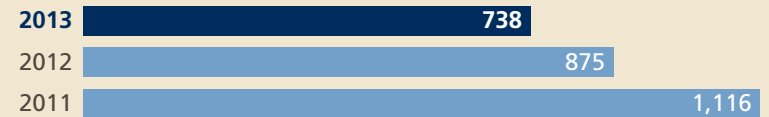
accurate measurements of cardiac function and to identify areas of cardiac scar. These techniques provide an evaluation and diagnosis of many cardiac diseases that are difficult to identify with any other non-invasive test.

Echocardiography

Our Echocardiography Laboratories perform all types of conventional and advanced echocardiograms, including:

- 2-D
- 3-D transesophageal
- Stress
- Strain imaging

FY11–13 Volume of Interventional Radiology Cases

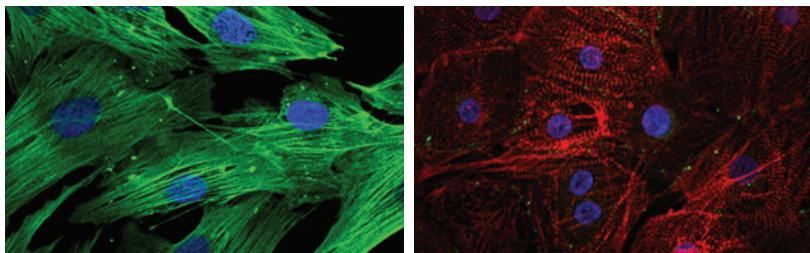


FY13 Cardiovascular Imaging Volume

19,975	2-D Echo
4,309	Stress Echo
2,096	TEE
8,849	CT
3,100	Nuclear Medicine
1,355	Cardiac MRI
25,294	Diagnostic Vascular Studies

Research

Our Vision for Tomorrow



Our scientists and physicians are collaborating across disciplines to fulfill the Frankel CVC's mission of discovering new and better ways to prevent, diagnose and treat cardiovascular disease. As part of the robust and top-funded research environment at the University of Michigan, every clinical department and program within the Frankel CVC is actively engaged in research. Early access to expanded treatment options, from drug therapies and devices to prevention and procedures, is available to referring physicians and patients through these studies.

Finding a Good Match

Cardiovascular clinical studies need all types of volunteers, from those who live with or have a family history of specific conditions to those who are healthy. As part of our efforts to continuously improve the volunteer experience, finding the right patients for each trial is central to our research.

Our dedicated Recruitment Coordinator collaborates with referring physicians and patients to find the most appropriate match available in our cardiovascular research studies. Through our Recruitment Coordinator, referring physicians can also find out more about individual studies and refer patients directly.

For more information about current research at the Frankel CVC, visit www.umcvc.org/researchstudies

Frankel Cardiovascular Center Recruitment Coordinator:

Email: CVCVolunteer@med.umich.edu

Phone: 888-286-4420

Patients and their families can sign up to be matched with research studies for specific health conditions through UMClinicalStudies.org, the greater University's research community website.

Moving Research Forward Together

In October 2012, the University of Michigan CVRC opened as a new home for basic and translational science researchers who are working to understand the mechanisms of cardiac muscle function and cardiac rhythm and developing new techniques in stem cell research. The CVRC is at the forefront of seeking tomorrow's answers for preventing and treating heart and vascular diseases through behind-the-scenes efforts to find cures, invent new devices and develop new techniques for future clinical use.

The CVRC helps to bridge diverse specialties by sharing resources and eliminating barriers of space and access. With so many researchers located in close proximity, our faculty can easily find experts outside of their own fields. This opens up endless possibilities for innovation, collaboration and getting to the next step more quickly.

Quality and Safety

Leading Higher Standards



In an evolving health care environment, the institutional anchors of quality and safety are more important than ever in providing the best patient care as efficiently and effectively as possible. Throughout the Frankel CVC, our focus on quality and safety is essential to our efforts to promote comprehensive coordinated care within and across the University of Michigan Health System. We regularly measure specific cardiovascular care with national benchmarks, continuously make adjustments and improvements in our practices, and survey patients, families and referring physicians for satisfaction ratings.

For more information about our
Quality and Safety measures,
visit www.uofmhealth.org/quality-safety

Recognition

In FY13, the U-M Health System was recognized for quality and safety by several national organizations.

Top 100 Hospital by Truven Health Analytics, one of only 15 major teaching hospitals.

Everest Award by Truven Health Analytics, one of only 17 hospitals of any kind across the country for our ever-improving performance on measures of patient safety, health care quality and financial stability.

LeapFrog Group's **Top Hospital** designation for delivering the highest-quality care while preventing medical errors, reducing mortality for high-risk procedures, and reducing hospital readmission.

"A" Grade for LeapFrog Group's Hospital Safety Score evaluation.

Blue Distinction Center+ for Cardiac Care by Blue Cross Blue Shield of Michigan.



Education

Sharing Our Knowledge

One of the main pillars of the Frankel CVC's mission is education. Expanding our understanding of cardiovascular disease across the lifespan is a collaborative effort between clinicians and scientists, patients and their families. Our focus on the exploration of better treatments, disease mechanisms, genetics and myriad of other factors that impact patient care supports our educational partnerships with referring physicians to improve outcomes for all.



Continuing Education

The Frankel CVC offers several continuing medical education courses taught by our faculty for physicians each year, along with continuing education opportunities for nurses.

Upcoming courses for 2014 include:

- **Update on Advanced Cardiac Imaging**
Saturday, March 8, 2014
Danto Auditorium, Frankel CVC, Ann Arbor, MI
- **Algorithms for Modern Venous Care**
Saturday, March 15, 2014
Danto Auditorium, Frankel CVC, Ann Arbor, MI
- **Point of Care Ultrasound** (this course will provide ultrasound basic principles, image orientation and acquisition and standard views.)
Thursday – Friday, April 10 – 11, 2014
Sheraton Ann Arbor, Ann Arbor, MI
- **Diabetes Update**
Saturday, April 26, 2014
The Inn at St. John's, Plymouth, MI
- **Internal Medicine Spring Review**
Friday – Saturday, May 9 – 10, 2014
Sheraton Ann Arbor, Ann Arbor, MI

- **Update on Arrhythmias and Syncope**

Saturday, May 31, 2014

The Inn at St. John's, Plymouth, MI

- **Internal Medicine Update**

Friday – Sunday, July 25 – 27, 2014

Grand Hotel, Mackinac Island, MI

- **Cardiology Update**

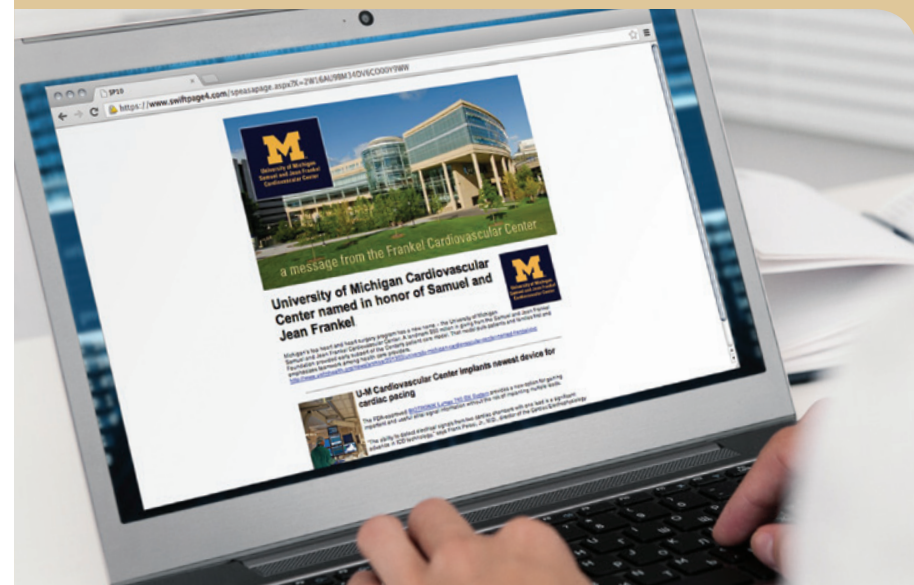
Friday – Sunday, August 15 – 17, 2014

Grand Hotel, Mackinac Island, MI

For more information and/or to register for CME courses, visit cme.med.umich.edu

Patient and Family Education

The Frankel CVC's **Mardigian Wellness Resource Center** is available to provide quality, reliable health information about cardiovascular health in patient-friendly language. Our goal is to help patients and families understand their health condition, make informed decisions and become active members of their health care team.



Ongoing Communication

Referring physicians are invited to subscribe to our monthly e-newsletter that features the latest news about research, procedures, new services and CME courses available at the Frankel CVC. Contact our physician liaison Erika Laszlo to sign up at M-LINE 800-962-3555 or email physicianliaisons@med.umich.edu.

Physician Listing

General Cardiology

Mark R. Benson, M.D., Ph.D.
James B. Byrd, M.D.
Melinda B. Davis, M.D.
Sharlene M. Day, M.D.
Kim A. Eagle, M.D.
Daniel T. Eitzman, M.D.
Peter M. Farrehi, M.D.
James B. Froehlich, M.D., M.P.H.
Santhi K. Ganesh, M.D.
Sascha Goonewardena, M.D.
Adam S. Helms, M.D.
Elizabeth A. Jackson, M.D.
Fareed U. Khaja, M.D.
Michael H. Lehmann, M.D.
Monika J. Leja, M.D.
Vallerie V. McLaughlin, M.D.
Venkatesh Murthy, M.D., Ph.D.
Mark Norris, M.D.
David J. Pinsky, M.D.
Melvyn Rubenfire, M.D.
Michael J. Shea, M.D.
Prashant Vaishnav, M.D.
Scott H. Visovatti, M.D.

Echocardiography

William F. Armstrong, M.D.
David S. Bach, M.D.
Nicole M. Bhav, M.D.
Anna M. Booher, M.D.
Peter G. Hagan, M.D.
Theodore J. Kolas, M.D.
Troy M. LaBounty, M.D.
Rhonda Miyasaka, M.D.
Sara Saberi, M.D.
Kenneth J. Tobin, D.O.
Elina Yamada, M.D.

Interventional Cardiology

Eric R. Bates, M.D.
Stanley J. Chetcuti, M.D.
Claire S. Duvernoy, M.D.
P. Michael Grossman, M.D.
Hitinder S. Gurm, M.D.
Daniel S. Menees, M.D.
Brahmajee K. Nallamothu, M.D.
Michael Thomas, M.D.

Electrophysiology

Frank M. Bogun, M.D.
Aman Chugh, M.D.
Thomas C. Crawford, M.D.
Hamid Ghanbari, M.D.
Eric D. Good, D.O.
Krit Jongnarangsin, M.D.
Rakesh Latchamsetty, M.D.
Fred Morady, M.D.
Hakan Oral, M.D.
Frank Pelosi Jr., M.D.

Heart Failure/Transplant

Keith D. Aaronson, M.D.
David Bradley Dyke, M.D.
Reema Hasan, M.D.
Scott Hummel, M.D.
Todd M. Koelling, M.D.
John M. Nicklas, M.D.
Maryse Palardy, M.D.
Adam B. Stein, M.D.
Audrey H. Wu, M.D.

Hypertension

Robert D. Brook, M.D.
James B. Byrd, M.D.
Kenneth A. Jamerson, M.D.
Ralph H. Stern, M.D., Ph.D.

Cardiothoracic Imaging

Prachi Agarwal, M.D.
Philip Cascade, M.D.
Aamer Chughtai, M.D.
Paul Cronin, M.D.
Luba Frank, M.D.
Barry Gross, M.D.
Ella Kazerooni, M.D.
Aine M. Kelly, M.D.
Jean Kuriakose, M.D.
Troy M. LaBounty, M.D.
Gisela Mueller, M.D.
Smita Patel, M.D.
Perry Pernicano, M.D.
Leslie Quint, M.D.
Jadranka Stojanovska-Nojkova, M.D.
Baskaran Sundaram, M.D.
Dharshan Vummidi, M.D.

Nuclear Cardiology

Richard Brown, M.D.
James Corbett, M.D.
Kirk Frey, M.D., Ph.D.
Venkatesh Murthy, M.D., Ph.D.
Morand Piert, M.D.

Adult Cardiac Surgery

Steven F. Bolling, M.D.
G. Michael Deeb, M.D.
Jonathan W. Haft, M.D.
Francis D. Pagani, M.D., Ph.D.
Himanshu J. Patel, M.D.
Richard L. Prager, M.D.
Matthew A. Romano, M.D.
Bo Yang, M.D., Ph.D.

Adult Congenital

Martin L. Bocks, M.D.
Timothy B. Cotts, M.D.
Mark Norris, M.D.

Congenital Cardiac Surgery

Edward L. Bove, M.D.
Jennifer Hirsch-Romano, M.D.
Richard G. Ohye, M.D.
Ming-Sing Si, M.D.

Vascular Surgery

Ramon Berguer, M.D., Ph.D.
Dawn M. Coleman, M.D.
Enrique Criado, M.D.
Emily W. Cummings, M.D.
Jose A. Diaz, M.D.
Jonathan L. Eliason, M.D.
Katherine A. Gallagher, M.D.
Peter K. Henke, M.D.
Daniel D. Myers, D.V.M.
Lisa E. Pavone, M.D.
John E. Rectenwald, M.D.
James C. Stanley, M.D.
Thomas W. Wakefield, M.D.

Interventional Vascular Radiology

Kyung Cho, M.D.
Narasimham Dasika, M.D.
Joseph J. Gemmete, M.D.
Venkataramu Krishnamurthy, M.D.
Paula M. Novelli, M.D.
Wael A. Saad, M.D.
James J. Shields, M.D.
Ranjith Vellody, M.D.
David M. Williams, M.D.
Zishu Zhang, M.D.

Stroke Neurology

Eric E. Adelman, M.D.
Devin L. Brown, M.D., M.S.
James F. Burke, M.D., M.S.
Lewis B. Morgenstern, M.D.
Lesli E. Skolarus, M.D., M.S.
Michael M. Wang, M.D., Ph.D.
Darin B. Zahuranec, M.D., M.S.

Interventional Neuroradiology

Neeraj Chaudhary, M.D.
Joseph J. Gemmete, M.D.
Aditya S. Pandey, M.D.
B. Gregory Thompson, M.D.

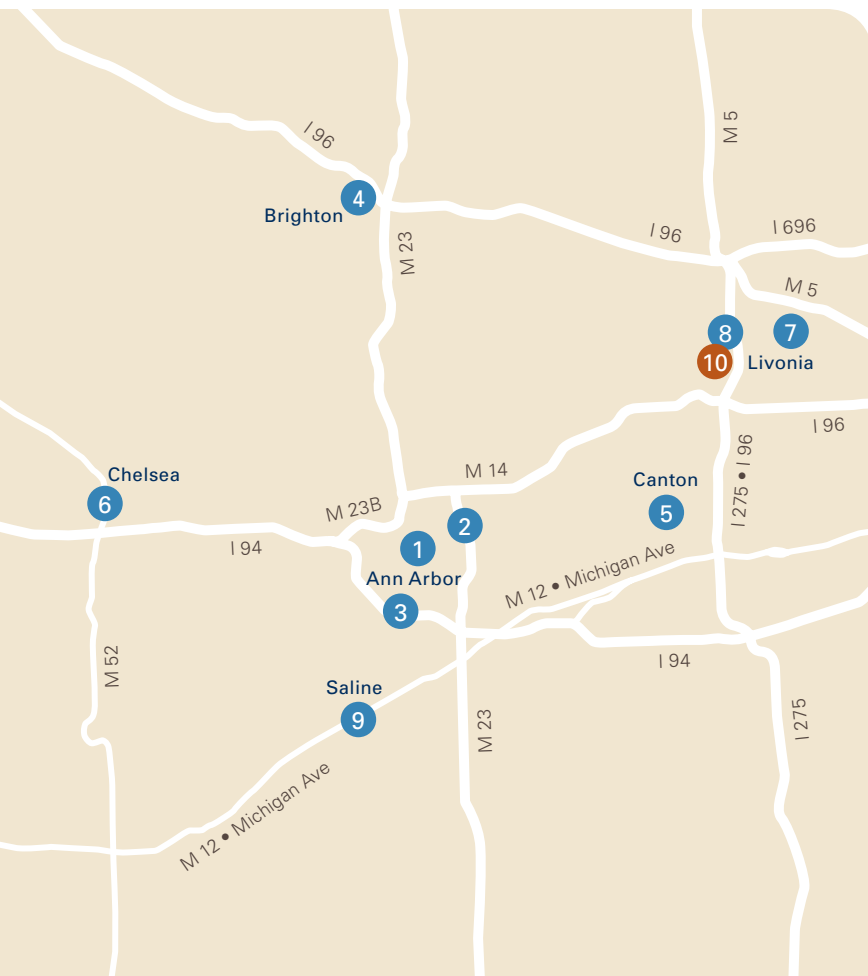
Cardiovascular Anesthesiology

Patrick E. Benedict, M.D.
Matthew D. Caldwell, M.D.
David Cardone, M.D.
Pema Dorje, M.D.
Anna V. Dubovoy, M.D.
Timur Z. Dubovoy, M.D.
Paul E. Kazanjian, M.D.
Sean Neill, M.D.
Erin E. Payne, M.D.
Andrew Powers, M.D.
Jennifer Vance, M.D.
Bryant Wu, M.D.
Amy E. Young, M.D.

Critical Care

Jehad I. Albataineh, M.D.
Ross Blank, M.D.
James M. Blum, M.D.
Milo C. Engoren, M.D.
Jonathan W. Haft, M.D.
Mark Hausman, M.D.
William R. Lynch, M.D.
Michael D. Maile, M.D.
Matthew A. Romano, M.D.
Brian J. Woodcock, M.D.

Locations



- 1** Frankel Cardiovascular Center
1500 E. Medical Center Drive | Ann Arbor, MI 48109
- 2** Domino's Farms
4000 Ave Maria Drive | Lobby A, Suite 1300 | Ann Arbor, MI 48106
- 3** Briarwood Health Associates
325 Briarwood Circle | Building 5 | Ann Arbor, MI 48108
- 4** Brighton Health Center
8001 Challis Road | Brighton, MI 48116
- 5** Canton Health Center
1051 N. Canton Center Road | Canton, MI 48187
- 6** Chelsea Health Center
14700 E. Old US 12 | Chelsea, MI 48118
- 7** Livonia Health Center
20321 Farmington Rd | Livonia, MI 48152
- 8** Livonia Vein Center
19900 Haggerty Road | Livonia, MI 48152
- 9** Saline Health Center
700 Woodland Drive | Saline, MI 48176
- 10** Northville Health Center | **OPENING 2014**

Physician Liaison Program

Your Frankel CVC Connection

Communication with referring physicians is central to improving coordination of patient care. The University of Michigan Health System Physician Liaison Program offers personalized service to community-based physicians in Ann Arbor and throughout the region.



Erika Laszlo,
Physician Liaison

Erika Laszlo is the physician liaison for the Frankel Cardiovascular Center. She is available not only for on-site visits, but also to:

- Provide information about new cardiovascular services, treatment options and clinical trials
- Assess your needs and how we can best meet them
- Share outreach opportunities from our clinical faculty

Please contact Erika at any time to help you with any questions or information about these services. Call M-LINE 800-962-3555 or email physicianliaisons@med.umich.edu.



To make a referral or speak with one of our specialists,
contact M-LINE 24 hours a day, 7 days a week.

M-LINE
800-962-3555

For additional referral information see the
UMHS Health Provider website.

www.med.umich.edu/umhs/health-providers





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