



Cardiovascular innovation: Setting the standard

Minneapolis Heart Institute® at Abbott Northwestern Hospital
Overview and outcomes report 2014



MINNEAPOLIS
HEART
INSTITUTE®

Allina Health 

ABBOTT
NORTHWESTERN
HOSPITAL



**"WE DON'T WANT TO
BE THE EARLY
ADOPTERS. WE WANT
TO BE THE EARLY
LEADERS."**

**WILLIAM KATSIYIANNIS, MD,
ELECTROPHYSIOLOGIST**

Minneapolis Heart Institute® was established in 1981 with a simple, yet lofty goal – to help prevent and treat the universal problem of heart disease. Today, Minneapolis Heart Institute® is recognized as one of the world's leading providers of heart and vascular care. Its programs, many of which are provided in partnership with Abbott Northwestern Hospital, address the full range of cardiovascular needs, and its physicians are committed to improving cardiovascular care throughout the region.

**Minneapolis
Heart Institute**

920 E. 28th St.

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Cardiovascular Emergency Care



Minneapolis Heart Institute® created the first comprehensive Cardiovascular Emergency Center capable of immediately triaging and treating all forms of cardiovascular emergencies. This center is made possible because of the depth and breadth of services available at our Abbott Northwestern Hospital location, along with standardized processes and close collaboration with community providers and emergency medical services (EMS). We have board-certified cardiologists in-house 24/7 emergency teams who are always ready, and specialists who can provide the most advanced therapies.

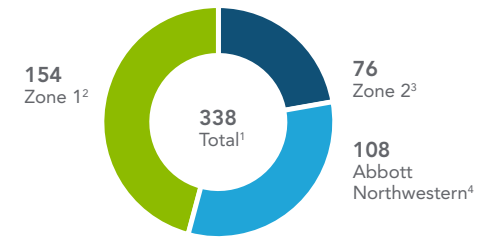
Timely, expert care for all cardiovascular emergencies

- » Level One Heart Attack Program
- » Cool It Program (therapeutic hypothermia for cardiac arrest)
- » Aortic dissection
- » Critical limb ischemia
- » Ruptured aortic aneurysm
- » Non-STEMI and unstable angina
- » Cardiogenic shock

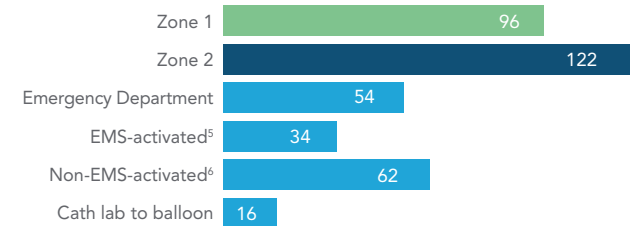
We treat patients with all types of acute coronary syndromes and use established protocols to identify which patients need to be transferred to Abbott Northwestern and which can remain in their communities for testing and follow-up.

Download cardiovascular emergency protocols at mplsheart.com.

STEMI: PATIENT VOLUME, 2013



LEVEL ONE DOOR-TO-BALLOON MEDIAN ELAPSED TIME (MINUTES), 2013



STEMI: PATIENT DEMOGRAPHICS, 2013

| | |
|--|-------|
| Male | 75% |
| Female | 25% |
| Average age | 63.8 |
| Anterior myocardial infarction or left bundle branch block | 41.7% |
| Cardiogenic shock | 11.2% |
| Pre-percutaneous coronary intervention cardiac arrest | 14.2% |
| Transport ground | 55.3% |
| Air | 44.7% |

OVERALL PROGRAM OUTCOMES

| | |
|--|--------|
| In-hospital mortality | 7.4% |
| Median hospital length of stay | 2 days |
| Thrombolysis in myocardial infarction major bleeding | 4.2% |

OUTCOMES WITH EXCLUSIONS⁷

| | |
|-----------------------|----|
| In-hospital mortality | 0% |
|-----------------------|----|

¹ Total number of STEMI's treated at Abbott Northwestern Hospital.

² Zone 1: Hospitals 22-60 miles from Abbott Northwestern Hospital. No thrombolytic therapy. Immediate transfer and PCI.

³ Zone 2: Hospitals 61-190 miles from Abbott Northwestern Hospital. Half-dose thrombolytic therapy followed by immediate transfer and PCI.

⁴ Patients presenting directly to Abbott Northwestern.

⁵ Patients presenting directly to Abbott Northwestern Hospital whose STEMI's were activated by EMS prior to arrival (n=44).

⁶ Patients presenting directly to Abbott Northwestern Hospital whose STEMI's were not activated by EMS prior to arrival (n=60).

⁷ Excludes patients with cardiac arrest, cardiogenic shock, age ≥80, or non-cardiac related death; (n=233 patients remaining).

Source: Minneapolis Heart Institute® Level One Database.



MINNEAPOLIS HEART INSTITUTE® AT ABBOTT NORTHWESTERN HOSPITAL IS MINNESOTA'S FIRST ACCREDITED CHEST PAIN CENTER.

Diagnostic Catheterization and Coronary Therapeutics

With innovative programs to treat coronary artery disease, cardiac emergencies, and structural and valvular heart disease, Minneapolis Heart Institute® is a nationally recognized leader in coronary therapeutics. Our interventional cardiologists are dedicated to advancing new and novel approaches to treatment.

ECMO: Life-saving care for cardiogenic shock

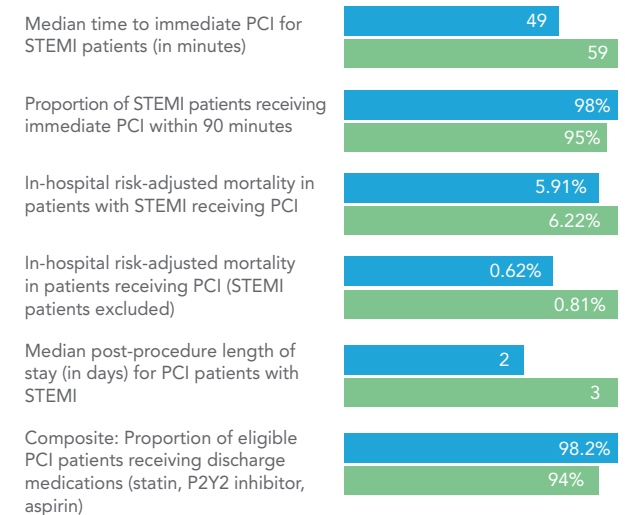
Patients who present with STEMI complicated by cardiogenic shock and cardiac arrest suffer a high mortality rate. In such cases, the multidisciplinary ECMO team coordinates the emergent placement of peripheral veno-arterial extracorporeal membrane oxygenation (VA-ECMO). More than 90 percent of VA-ECMO circuits are inserted percutaneously in the cath lab, and about one out of seven patients treated with ECMO undergoes cannula implant during active CPR. See page 6 for information about patient outcomes.

Clinical innovation: Chronic total occlusion

We are a national leader in treating chronic total occlusions (CTO), helping patients who are unable to be treated using traditional revascularization methods. Ours was the first center in the Upper Midwest to use revolutionary retrograde techniques and technologies to open CTOs, and we have:

- » treated more than 250 patients using these techniques, achieving a greater than 85 percent success rate and low complication rates
- » led patient enrollment in the FAST-CTO trial, which introduced new technology for opening CTOs
- » trained physicians across the U.S.
- » presented at national and international meetings, and authored or edited papers and text books describing these new approaches to treating CTOs.

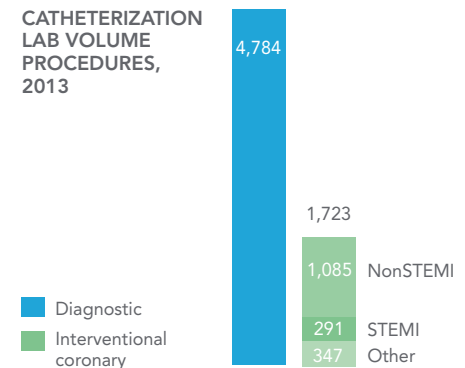
CATHETERIZATION/PERCUTANEOUS CORONARY INTERVENTION (PCI) OUTCOMES, 2013



Source: American College of Cardiology National Cardiovascular Data Registry

■ Abbott Northwestern
■ Like hospitals

CATHETERIZATION LAB VOLUME PROCEDURES, 2013



Valve and Structural Heart Disease

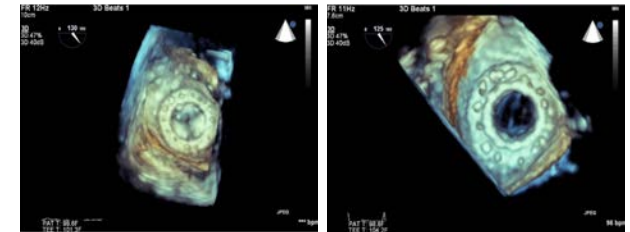


Minneapolis Heart Institute® is a national center of excellence in valve care, with subspecialists in cardiology, cardiovascular imaging, interventional cardiology and cardiothoracic surgery. We provide state-of-the-art patient evaluation and pioneering therapies for the entire spectrum of valvular and structural heart disease. These therapies include:

- » transcatheter aortic valve replacement (TAVR or TAVI)
- » percutaneous mitral valve repair (MitraClip)
- » percutaneous repair of paravalvular prosthetic leak
- » catheter-based valve-in-valve therapy
- » balloon mitral and aortic valvuloplasty
- » minimally invasive valve surgery (valve repair and replacement).

Research

The Center for Valve and Structural Heart Disease participates in valvular therapy clinical trials. Recent and current clinical trials include COAPT, PERIGON, PARTNER 2, PARTNER Sapien 3, SURTAVI, PORTICO and REPRISE III. These studies, offered in partnership with Minneapolis Heart Institute Foundation, provide state-of-the-art therapies to appropriate patients.

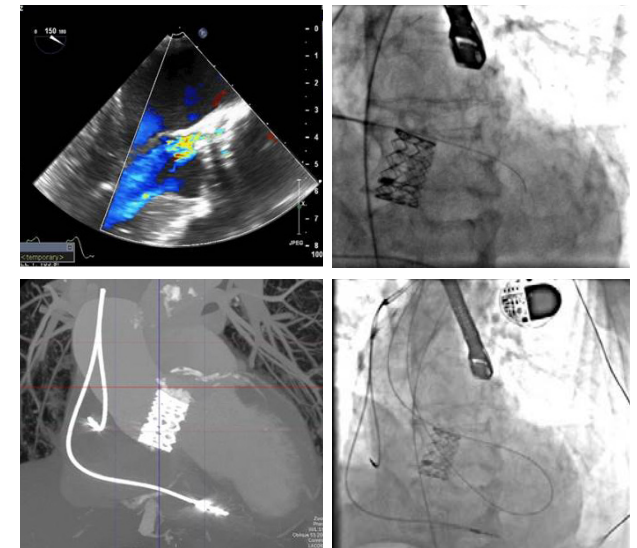


MITRAL VALVE-IN-VALVE THERAPY

An 80-year-old woman with a severely degenerated mitral prosthesis (left) underwent successful mitral valve-in-valve therapy with an Edwards Sapien valve (right). Her mean mitral gradient decreased from 17 mmHg to 4 mmHg following the procedure.

PARAVALVULAR LEAK REPAIR

A 79-year-old man, who previously underwent TAVR with a balloon-expandable valve, presented with paravalvular regurgitation. This defect was treated with CT-guided wiring of the defect and placement of an AVP-2 vascular plug.



“THE OPTIONS WE HAVE TODAY TO TREAT VALVE PROBLEMS WITHOUT OPENING THE CHEST WOULD HAVE BEEN UNIMAGINABLE 10 YEARS AGO.”

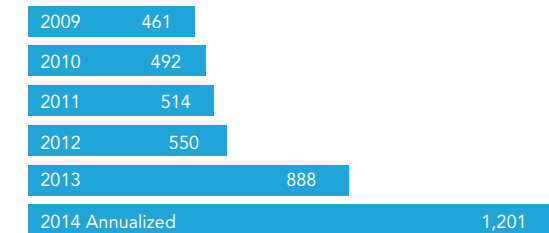
PAUL SORAJJA, MD, DIRECTOR,
VALVE AND STRUCTURAL HEART
DISEASE CENTER

Leading the nation in valve care

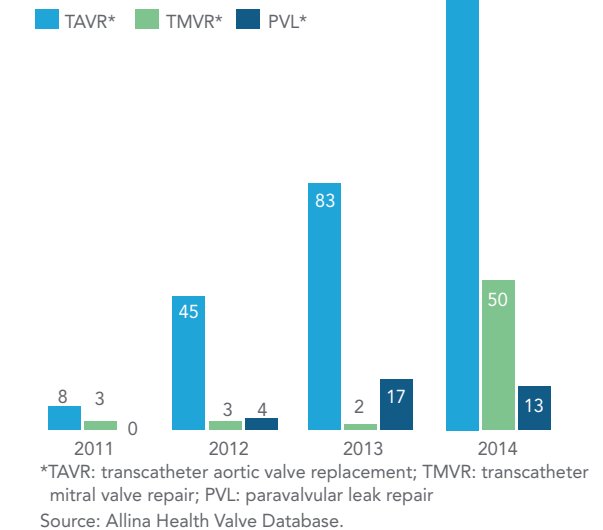
- 2013**
- » First successful treatment in the U.S. of mitral prosthetic dysfunction with valve-in-valve therapy using an Edwards Sapien prosthesis
 - » 100th transcatheter aortic valve implant case at Abbott Northwestern
 - » First worldwide treatment of obstructive hypertrophic cardiomyopathy with the MitraClip device
 - » 437 open surgical procedures for valvular heart disease performed at Abbott Northwestern
- 2014**
- » First commercial implant of a Medtronic CoreValve in the United States
 - » National and regional physicians attend the Valve Summit 2014: The Science and Delivery of Optimal, Multidisciplinary Care, a medical conference organized by Minneapolis Heart Institute®
 - » First successful therapy with MitraClip in the United States performed independently of industry clinical support
 - » Paul Sorajja, MD, co-authors the national ACCF/AHA practice guidelines for the management of valvular heart disease
 - » The 200th transcatheter aortic valve implant case performed at Abbott Northwestern
 - » Establishment of a fellowship in structural heart disease interventions
 - » First TAVR case without general anesthesia performed at Abbott Northwestern Hospital

VALVE CLINIC VOLUME

Patient visits



ANNUAL CATHETER-BASED THERAPIES VOLUME



Advanced Heart Failure Treatment



Star Tribune/Minneapolis-St. Paul 2014

Minneapolis Heart Institute® delivers comprehensive care for the most complex, end-stage heart failure patients. We offer the full spectrum of therapeutic options, from traditional treatment to breakthrough approaches.

Heart failure management

We are the only cardiology practice in the state of Minnesota providing 24-hour in-house care by board-certified advanced heart failure and transplant cardiologists. Dedicated heart failure cardiologists, nurse practitioners, nurse coordinators, dietitians and pharmacists ensure comprehensive heart failure management.

Pulmonary hypertension

A specialized, multidisciplinary team provides comprehensive assessment, including vasoreactivity testing for all clinical classifications of pulmonary hypertension. Diverse treatments are available, including oral, inhalational, subcutaneous and intravenous therapies, with 24/7 access for outpatient and inpatient support. The team also participates in FDA-approved research on novel treatment approaches.

OPTIMAL CARE*

96.6%

Abbott Northwestern, 2013

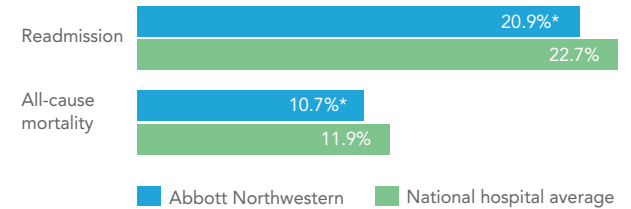
94.6%

National rate all hospitals, 2013

Source: Allina Health Enterprise Data Warehouse and Oklahoma Foundation for Medical Quality under contract with the Centers for Medicare and Medicaid services.

*Optimal care includes appropriate medications, discharge instructions and assessment of left ventricular systolic dysfunction.

CMS HEART FAILURE OUTCOMES July 2010-June 2013



*Categorization: No different than the U.S.

Source: Shown are hospital 30-day risk-standardized rates compared with national crude rate from medicare.gov/hospitalcompare/search.html.

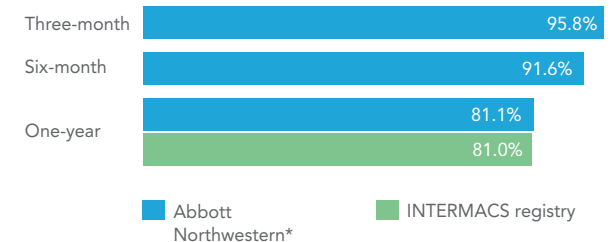
HEART TRANSPLANT SURVIVAL RATE



*January 2010 - December 2013, n=57

Source: Scientific Registry of Transplant Recipients srrtr.org; December 2014.

LEFT VENTRICULAR ASSIST DEVICE IMPLANTATION SURVIVAL RATE



*January 2010 - December 2013, n=57

Source: Kirklín JK, et al; Sixth INTERMACS annual report: a 10,000-patient database. *J Heart Lung Transplant.* 2014;33:555-564.

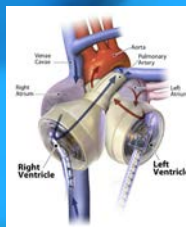
Mechanical support case study

A 50-year-old female developed spontaneous left main coronary artery dissection while in karate class. This resulted in cardiogenic shock requiring ECMO support for hemodynamic collapse with multisystem organ failure. She was decannulated to the HeartMate II LVAD with tracheostomy/percutaneous endoscopic gastrostomy and ongoing renal replacement therapy. She recovered all end-organ function and was transferred to inpatient rehabilitation, where she regained the ability to walk independently. She was discharged and is now being evaluated for transplantation.

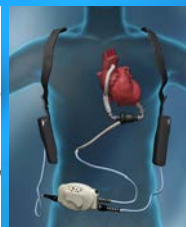
“ECMO IS AN OLDER THERAPY THAT IS UNDERGOING A RENAISSANCE. WE’VE LEARNED THAT POORER OUTCOMES WERE A CONSEQUENCE OF RESORTING TO ECMO TOO LATE AFTER MULTIPLE ORGAN SYSTEM FAILURE. NOW WE’RE STARTING ECMO IN THE CATH LAB, EVEN DURING ACTIVE CPR.”

MICHAEL SAMARA, MD, ADVANCED HEART FAILURE SPECIALIST

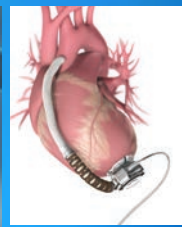
This case highlights the use of acute temporary mechanical support with VA-ECMO without which she would not have survived, as well as the long-term use of the HeartMate II LVAD as a bridge to transplantation.



SynCardia Systems, Inc.



HeartWare International, Inc.



ThoraTec Corporation

Advanced therapies

Advanced heart failure therapies, including heart transplantation and mechanical circulatory support, offer patients hope for improved survival and quality of life.

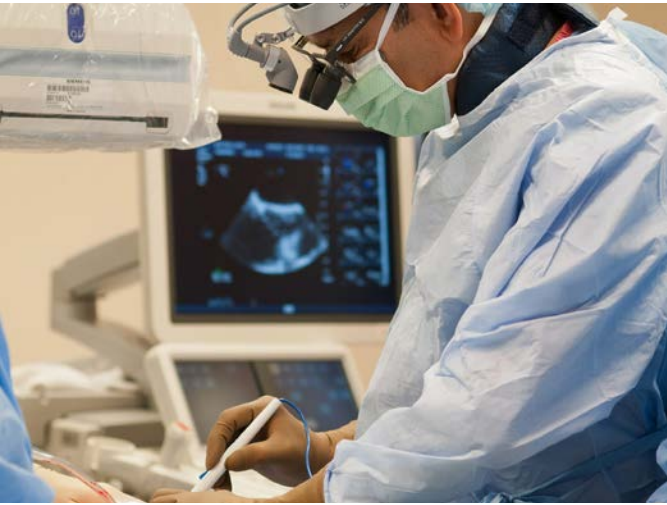
Cardiogenic shock

Our team provides 24-hour critical care for patients with acute cardiogenic shock and/or respiratory failure. We work closely with our cardiovascular emergency and coronary therapeutics colleagues to initiate treatment and manage these complex patients. Both veno-venous and veno-atrial extracorporeal membrane oxygenation (VV- and VA-ECMO) can be rapidly initiated in the catheterization lab.

Cardio-oncology

The cardio-oncology program evaluates and treats the cardio-toxic side effects of chemotherapeutic agents and identifies patients at risk for future adverse events. Working closely with oncologists, the goal of the cardio-oncology team is to help patients complete treatment, giving them the best chance possible for a cure.

Cardiothoracic Surgical Services



Cardiothoracic surgeons partner with referring providers and patients to deliver individualized care using cutting-edge technology and collaboration among multiple disciplines. Through this focus, we can advance innovative surgical techniques and create new treatment options for patients.


Our team participates in daily multi-disciplinary rounding and also meets weekly to discuss complex cases with the aim of coordinating quality care.

We have 125 years of combined experience, offering expertise and options not available at most other hospitals in the region.

“WE NOW HAVE EVERY MODALITY TO TREAT HEART DISEASE IN EVERY PATIENT POPULATION, AND WE HAVE A COLLABORATIVE HEART TEAM THAT MAKES IT ALL WORTHWHILE.”

ROBERT SAEID FARIVAR, MD, PHD,
CHIEF, CARDIOTHORACIC SURGERY

| SURGICAL CASES, 2013-14 | 2013 | 2014 YTD |
|---|------------|------------|
| Coronary artery bypass (CAB) | 176 | 200 |
| Valve | 161 | 212 |
| Combination (CAB/valve, dissections, multi-procedure) | 161 | 156 |
| Transcatheter aortic valve replacement (TAVR) | 78 | 156 |
| Other (pericardial window, post-op bleed, debridements) | 119 | 72 |
| Subtotal | 638 | 724 |
| Transplant | 14 | 9 |
| Ventricular assist device | 22 | 26 |
| Extracorporeal membrane oxygenation (ECMO) | 4 | 7 |
| Total | 735 | 838 |



PHYSICIANS IN THE CENTER FOR CARDIOTHORACIC SURGICAL SERVICES ARE CONSISTENTLY IN THE 95TH PERCENTILE FOR WILLINGNESS TO RECOMMEND TO FAMILY AND FRIENDS.

A range of complex procedures are performed:

- » complex multi-valve surgery
- » valve-sparing root, complex mitral valve (including bi-leaflet repairs) and tricuspid valve repairs
- » transcatheter aortic valve replacement (TAVR or TAVI)
- » minimally invasive valve surgery (valve repair and replacement)
- » high risk coronary artery bypass surgery
- » ventricular assist devices for end-stage heart failure and total artificial heart surgery
- » heart transplants
- » adult congenital heart surgery in partnership with pediatric cardiac surgeons
- » complex aortic aneurysm surgery including the transverse arch
- » aortic dissection surgery
- » concomitant and lone atrial fibrillation surgery
- » thoracic surgery including lung cancer and video-assisted procedures.

Research

The Center for Cardiothoracic Surgical Services actively participates in the latest clinical trials. Recent and current clinical trials include PERIGON, PARTNER 2, PARTNER Sapien 3, SURTAVI, PORTICO, COAPT and REPRISE III. These studies, offered in partnership with Minneapolis Heart Institute Foundation, provide state-of-the-art therapies to appropriate patients.

Complex Electrophysiology



With one of the nation's leading arrhythmia programs, Minneapolis Heart Institute® offers comprehensive services to diagnose, monitor and treat complex heart rhythm problems. Our Complex Electrophysiology team performs 2,000 procedures a year with excellent outcomes.

Innovation and leadership in electrophysiology

- » As part of a landmark study on treating atrial fibrillation, Minneapolis Heart Institute® achieved the highest ablation success rate of the participating centers, which included 20 major academic and high volume ablation centers.
- » In the first procedure of its kind in the Upper Midwest, Charles Gornick, MD, implanted the world's smallest pacemaker, the Medtronic Micra™ Transcatheter Pacing System as part of a global clinical trial.
- » Electrophysiologists at Minneapolis Heart Institute® were early adopters of the subcutaneous implantable cardioverter defibrillator (ICD), which, for some patients, can eliminate complications associated with traditional ICDs.

“WE OFFER UNPARALLELED SAFETY. WE’VE PERFORMED HUNDREDS OF LEAD EXTRACTIONS WITH NO DEATHS DIRECTLY RELATED TO EXTRACTION.”

RAED ABDELHADI, MD,
ELECTROPHYSIOLOGIST

- » As part of the Watchman™ left atrial appendage closure device trial, Minneapolis Heart Institute® helped demonstrate that the device can prevent stroke in patients with atrial fibrillation.
- » In collaboration with Advanced Heart Failure Treatment colleagues, the Electrophysiology team delivers comprehensive care for arrhythmia patients who have end-stage heart disease, including offering complex ventricular tachycardia ablation in patients with ventricular assist devices.

Genetic Arrhythmia Clinic

The Genetic Arrhythmia Clinic provides comprehensive care to patients with genetic/familial cardiac conditions and offers screening and guidance for families affected by these conditions. In addition to providing advanced imaging for these conditions, the clinic has developed condition-specific protocols for screening and treating a range of genetic conditions. It also has created a comprehensive registry and database to track patient outcomes, providing a research platform to guide future treatment and studies.

Building the knowledge base to treat rare conditions

- » The Genetic Arrhythmia Clinic has seen more than 500 patients and family members, providing them with easy access to a range of specialists and resources.
- » It has identified and treated multiple families with rare genetic/familial causes of sudden cardiac death, helping to prevent life-threatening cardiac events.
- » In collaboration with the Jesse E. Edwards Registry of Cardiovascular Disease and local medical examiners, the Genetic Arrhythmia team created a sudden cardiac death network that aims to identify potential genetic/familial causes of unexplained sudden cardiac death and provide appropriate follow-up for family members.
- » With its comprehensive database on patient outcomes, the Genetic Arrhythmia team participates in numerous national meetings and contributes to ongoing research in the field.

2014 ELECTROPHYSIOLOGY VOLUME

| | |
|--------------|---|
| 582 | Pacemakers ¹ |
| 105 | Biventricular pacemakers |
| 447 | Implantable cardiac defibrillators (ICD) ¹ |
| 220 | Biventricular ICDs |
| 120 | Lead extractions (includes laser-assisted) |
| 740 | Catheter ablations |
| 470 | Complex catheter ablations ² |
| 270 | Supraventricular tachycardia ablations ³ |
| 720 | Cardioversions |
| 2,609 | Total EP procedures |

¹ Change-outs, change-outs and revisions, revisions, new implants, upgrades

² Atrial fibrillation, atrial tachycardia, ventricular arrhythmias

³ Atrioventricular node, atrial flutter, atrioventricular nodal re-entrant tachycardia, accessory connection

Source: Allina Health EP Database

Vascular and Endovascular Surgery



At this nationally recognized center, specialists from vascular surgery, endovascular surgery, interventional radiology, advanced cardiovascular imaging, vascular medicine and vascular nursing collaborate to provide advanced vascular care. Patients benefit from comprehensive diagnostic imaging and treatment and may have the opportunity to enroll in regional and national multi-center clinical trials that offer new therapies and treatments. Services include:

- » **Vascular and endovascular surgery** – supported by a statewide system of emergency cardiovascular care and specialized facilities including a hybrid surgical suite.
- » **Vascular medicine** – to diagnose and manage a wide range of arterial, venous and lymphatic disorders; specialty services include Thrombophilia Clinic and anticoagulation management using new anticoagulation agents.
- » **Wound Clinic** – for surgical wounds, pressure ulcers, skin flaps, radiation damage and lower extremity wounds.
- » **Hyperbaric Oxygen Therapy Program** – to treat non-healing wounds with 100 percent oxygen delivered at elevated barometric pressure.

ELECTIVE AAA REPAIR MORTALITY 2009-2014 (Open and Endovascular)

500 Cases

0.4% Mortality (2/500)

FENESTRATED STENT GRAFT OUTCOMES

28 Patients

2.88 Average length of stay (days)

77 Average age, range 67-92 years

56 Target vessels incorporated

1 Intraoperative target vessels lost

0 Postoperative dialysis required

100% Technical success rate

98% Target vessel patency

3.5% Mortality (one patient)

Offering the most advanced, minimally invasive treatments

- » endovascular abdominal aortic aneurysm repair (EVAR)
- » endovascular thoracic aneurysm repair (TEVAR)
- » abdominal aortic aneurysm repair
- » percutaneous and surgical revascularization of lower extremity PAD
- » renal/mesenteric stenting
- » carotid stenting
- » stent-graft therapies for complex aortic pathology, including fenestrated EVAR

"NEW TECHNOLOGY HAS ALLOWED US TO REPAIR COMPLEX ABDOMINAL ANEURYSMS WITH A FEW SMALL PUNCTURES IN THE SKIN AND AN OVERNIGHT STAY....TRULY AN AMAZING EVOLUTION IN VASCULAR CARE."

JESSE MANUNGA, MD, VASCULAR SURGEON

**Clinical innovation:
Fenestrated stent graft program**

Endovascular repair of infrarenal abdominal aortic aneurysms has been shown to decrease mortality and hospital length of stay. As such, it has emerged as the standard of care for many patients with this condition. Roughly 20-30 percent of patients with abdominal aortic aneurysms have anatomical limitations, making them poor candidates for the standard endovascular repair. Unfortunately, because many of these patients are of advanced age or have comorbidities, they are at an increased risk for open surgical repair.

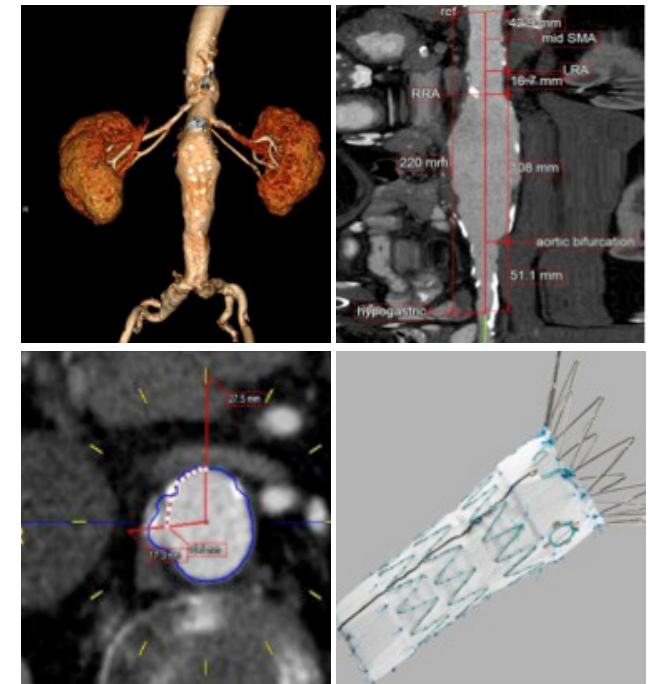
Abbott Northwestern is the first hospital in the Minneapolis/St. Paul area and one of the few centers in the U.S. to offer these patients an

endovascular option in the form of fenestrated stent grafts. Each graft is customized to fit the patient's anatomy and designed using 3-dimensional analysis to obtain central line of flow and target vessel position (Figure 1).

Minneapolis Heart Institute® vascular physicians have successfully treated 14 of these high surgical risk patients with juxtarenal and suprarenal abdominal aortic aneurysm using custom-made fenestrated stent grafts, achieving a 100 percent technical success rate.

Patients who have been denied surgery in the past because of multiple comorbidities and the proximity of their aneurysms to visceral arteries can be successfully treated at Minneapolis Heart Institute® using this novel technique.

Figure 1



Top left: 3D CTA showing juxtarenal aneurysm
Top right: Central line of flow (different patient)
Bottom left: Clock position with arc length
Bottom right: Custom-made Cook Zenith fenestrated graft

Cardiovascular Disease Prevention



The Center for Cardiovascular Disease Prevention provides the most up-to-date care for the early detection and prevention of cardiovascular disease. We work collaboratively with primary care physicians to help patients with lipid disorders, statin intolerance and other health issues to reduce their risk of a cardiac event.

By offering in-depth risk assessment, advanced lipid testing, and screening tools like coronary calcium CT scans through HeartScan Minnesota®, we gain a thorough understanding of a patient's risks. Our skilled team of physicians, advanced care providers, dietitians and nurses work together to create a patient-focused plan for lifestyle management. Specialized therapies, like our complete apheresis program and a range of newly approved or investigational medications, are also available.

Practice tools for primary care

- » **Statin Therapy Algorithm** – based on the 2013 American College of Cardiology/American Heart Association Guideline. Download at mplsheart.com/statintherapy.
- » **Cardiobites** – online video presentations on relevant cardiology topics. View at mplsheart.org/cardiobites.
 - **The New Cholesterol Guidelines: A Step in the Right Direction?** – Michael Miedema, MD, MPH
 - **Statin Intolerance: An Update** – Thomas Knickelbine, MD

“WE’RE GETTING TO THE POINT WHERE WE CAN OFFER JUST ABOUT ANYONE TOOLS OR TREATMENTS THAT WILL HELP REDUCE THEIR RISK OF A CARDIOVASCULAR EVENT.”

THOMAS KNICKELBINE, MD,
DIRECTOR, PREVENTIVE CARDIOLOGY

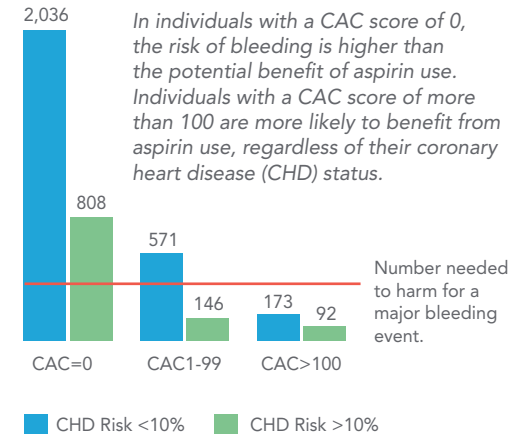
Exploring revolutionary treatments to slow or reverse heart disease

We are participating in clinical trials and treatment registries to evaluate several new medications that show great promise in treating individuals with statin intolerance or familial hypercholesterolemia (FH). Two newly approved medications, Juxtapid™ and Mipomersen™, have been shown to lower LDL cholesterol by as much as 70 percent. We are also in multiple Phase III clinical trials with a new class of cholesterol-lowering medications, the PCSK9 inhibitors. The Odyssey Outcomes trial will help us evaluate whether PCSK9 inhibitors can not

only reduce cholesterol, but also reduce the incidence of cardiac events. Research on lipids, lipoprotein metabolism and their associated disorders is a growing area of study leading to innovations and advances every year.

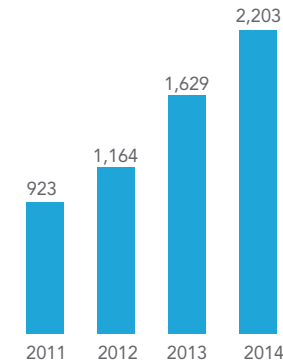
Our team also works with The Minneapolis Heart Institute Foundation to perform ongoing research related to The Heart of New Ulm Project and the design of an optimal population-based program for cardiovascular disease prevention. These activities have resulted in multiple presentations and publications at a national level.

RISK/BENEFIT OF ACETYLSALICYLIC ACID ACCORDING TO CORONARY ARTERY CALCIUM



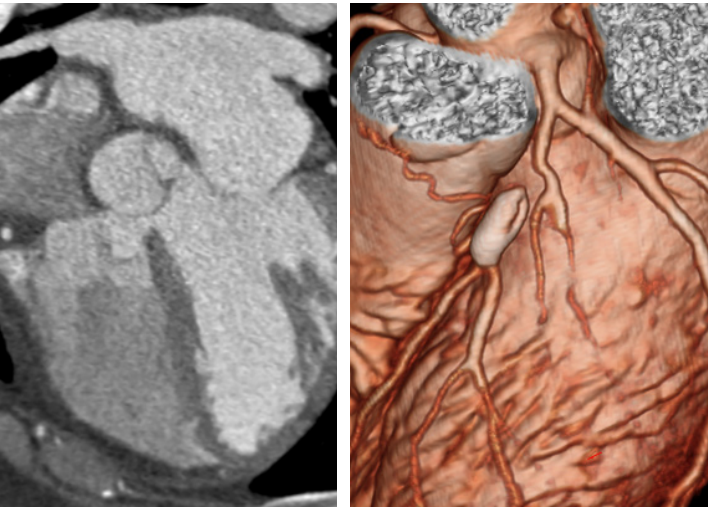
Source: Miedema MD, et al. Use of coronary artery calcium testing to guide aspirin utilization for primary prevention: Estimates from the Multi-Ethnic Study of Atherosclerosis. *Circ Cardiovasc Qual Outcomes* 2014; DOI:10.1161/CIRCOUTCOMES.113.000690.

PREVENTIVE CARDIOLOGY CLINIC VOLUME



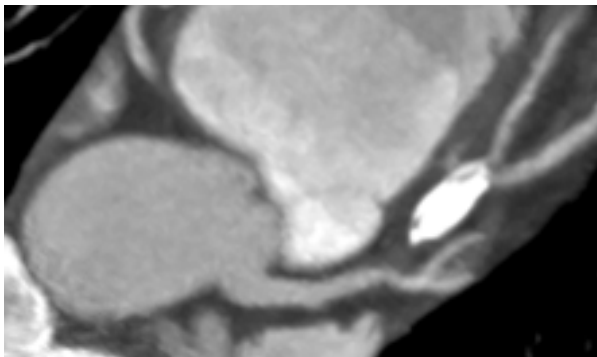
Source: Excellian Clarity Report

Advanced Cardiovascular Imaging



Above left: A membranous ventricular septal defect. The contrast (lighter color) in the left ventricle (bottom right on this picture) crosses through the defect into the right ventricle.

Above right: A three-dimensional reconstruction of an aneurysm in the left anterior descending coronary artery (large lighter colored structure). Below: A calcified plaque (bright white) is seen in an aneurysm of a patient with Kawasaki's disease. There is an occlusion of the artery proximal (to the left of the calcium in this picture) to the aneurysm.

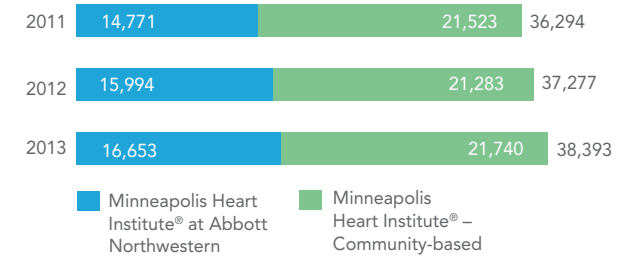


A recognized national and international leader of clinical care and research, the Advanced Cardiovascular Imaging Center offers comprehensive cardiovascular imaging services, including dedicated adult and pediatric cardiovascular CT and MRI. The integration of advanced cardiovascular imaging with subspecialty expertise has led to unique treatment approaches for vascular disease, genetic arrhythmias and heart failure.

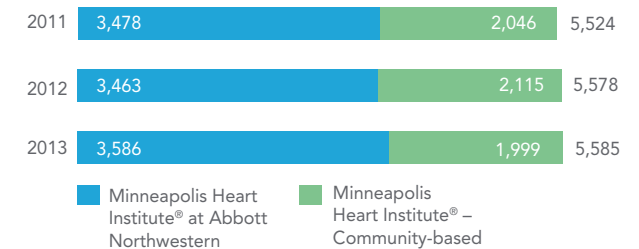
Recent advances include using CT angiography to assess patients:

- » being screened for complex valve therapies, such as transcatheter aortic valve replacement (TAVR)
- » presenting to the emergency department with chest pain for acute coronary syndrome, pulmonary embolism and aortic dissection – the “triple rule out.”
- » for carotid, aortic and peripheral arterial disease, including assessing aortic aneurysms (both before and after repair), diagnosing severe peripheral arterial disease and suitability for intervention, and assessing patients who have a history of complex aortic dissection.
- » Beyond advanced CT and MRI imaging, we also do a wide array of traditional noninvasive imaging studies.

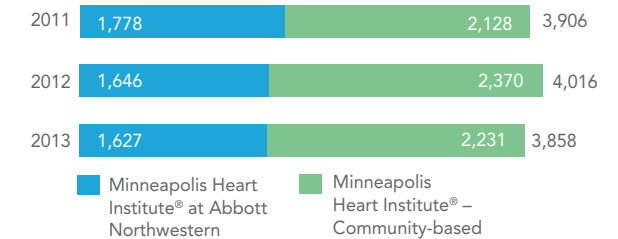
ECHOCARDIOGRAMS



VASCULAR DIAGNOSTIC TESTS



CARDIAC NUCLEAR MEDICINE PROCEDURES



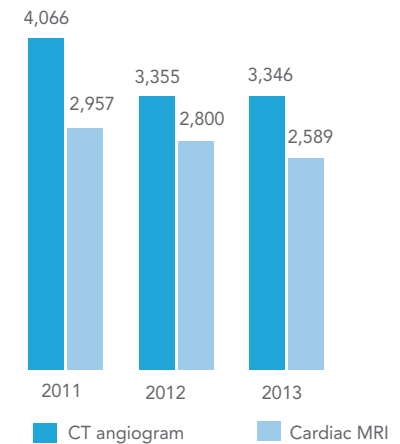
"MINNEAPOLIS HEART INSTITUTE® IS A RECOGNIZED LEADER IN ADVANCED CARDIAC IMAGING AND IN REDUCING RADIATION EXPOSURE."

MARC NEWELL, MD, NON-INVASIVE IMAGING CARDIOLOGIST

Directed by John Lesser, MD, 2013 president of the Society for Cardiovascular Computed Tomography, this center has published extensively on patient safety and reduced radiation exposure, and the role of cardiac CT in advancing the understanding of inflammatory coronary diseases of childhood, including Kawasaki's

disease. Research is also ongoing on the use of cardiac MRI to assess cardiomyopathies such as hypertrophic cardiomyopathy and Takotsubo (stress) cardiomyopathy.

ADVANCED CARDIOVASCULAR IMAGING VOLUME — ADULT PATIENTS



ADVANCED CARDIOVASCULAR IMAGING VOLUME— PEDIATRIC PATIENTS



Midwest Adult Congenital Center

Due to improved surgical survival, two-thirds of congenital heart disease patients are now adults, and the number of patients surviving to age 60 and beyond is rapidly increasing. This unique group of patients needs lifelong cardiac care.

Minneapolis Heart Institute® and the Children's Heart Clinic at Children's Hospitals and Clinics of Minnesota have joined to form the Midwest Adult Congenital Center (MACC). This center combines the expertise of pediatric and adult cardiologists and surgeons to care for adults who have had prior repair or palliation of all forms of congenital heart disease. This collaboration allows continual care for patients from the neonate to the adult.

Subspecialists in electrophysiology, advanced imaging, interventional cardiology, congenital and adult cardiac surgery, and heart failure management ensure that patients with these complex conditions receive optimal care. This may include:

- » medical and interventional treatment of arrhythmia
- » device placement and revision
- » transthoracic and transesophageal echocardiography
- » cardiovascular CT and MRI
- » transcatheter placement of aortic and pulmonary valves
- » aortic coarctation angioplasty and stenting
- » percutaneous stenting of coronary vessels
- » congenital and adult cardiac surgery
- » heart failure management.



“WE’RE DEALING WITH A RAPIDLY EXPANDING NEW PATIENT POPULATION: ADULTS WITH REPAIRED CONGENITAL HEART DISEASE.”

CHARLES GORNICK, MD,
CO-DIRECTOR, MIDWEST
ADULT CONGENITAL CENTER

Cardiovascular education

Fellowship training in cardiovascular disease and cardiovascular subspecialties

In 2011, Minneapolis Heart Institute® initiated a cardiovascular training program with Hennepin County Medical Center that focuses on training expert cardiology clinicians. This program is enhanced by the tremendous clinical volumes seen at both sites.

A goal of the fellowship is to instill a lifelong commitment to learning for the trainees. Minneapolis Heart Institute® faculty participate in bedside training of the fellows as well as didactic lectures held biweekly at Abbott Northwestern.

Fellows also have access to abundant clinical research opportunities. They have published numerous abstracts and 30 manuscripts in the first three years of the fellowship program.

The initial cohort of fellows has now graduated and has gone on to prestigious subspecialty fellowships at Duke University, Kaiser Permanente and Beth Israel Deaconess Hospital (Harvard Medical School).

In 2014, we launched our own valve and structural heart disease fellowship. We also participate in vascular surgery and cardiothoracic surgery fellowships, serving as the primary site with the University of Minnesota.



“Bite-sized” cardiology education online

Cardiobites is a new cardiovascular video education series for medical professionals available online at mplsheart.org/cardiobites. The short videos provide the latest, practical cardiovascular information for state-of-the-art patient care. The information is accessible anytime, anywhere on laptop, tablet or mobile phone.



Research through the Minneapolis Heart Institute Foundation



The Minneapolis Heart Institute Foundation (MHIF) has a long-standing history of supporting innovative clinical research and education. With an annual budget of \$10 million, MHIF is participating in more than 140 clinical trials (see representative list at right) supported by the National Institutes of Health and industry funding, as well as investigator-initiated research sponsored by the Foundation. More than 60 Minneapolis Heart Institute® physicians, as well as 21 research nurse coordinators participate in these research efforts. The Foundation plays a leading role in research in the United States involving stem cell therapy, hypertrophic cardiomyopathy, refractory angina and acute myocardial infarction.

OPTIMIST Program

The OPTIMIST (OPTions In Myocardial Ischemia Syndrome Therapy) Program is a pioneering clinic established in 2001. It evaluates patients with severe ischemic heart disease not amenable to further revascularization. It is the largest center of its kind in the United States, with a registry of more than 1,500 patients from across the Midwest. Patients referred to the clinic receive the latest treatments for refractory angina including:

- » stem cell and gene therapy to promote angiogenesis
- » enhanced external counterpulsation (EECP)
- » novel pharmacologic agents
- » spinal cord stimulation.

PUBLICATIONS AND PRESENTATIONS, 2014

122

Peer-reviewed publications

4

Book chapters

78

Presentations at American College of Cardiology and American Heart Association meetings

Select sampling of more than 117 currently enrolling studies

RESEARCH AREA

Stem cell

STUDY

CD34+ stem cells for refractory angina (Baxter)

Allogeneic MSCs for ischemic cardiomyopathy (Teva, Mesoblast)

Adipose-derived MSCs for ischemic cardiomyopathy (Cytori)

SDF-1 gene therapy for ischemic cardiomyopathy (Juventas)

Cardiac-derived stem cells (Capricor)

Intracoronary Biomatrix (IK-5001) to prevent left-ventricular remodeling following STEMI (Bellerophon)

Structural heart disease

SURTAVI – core valve implantation in patients with severe aortic stenosis (Medtronic)

PORTICO – Portico™ transcatheter heart valve study for patients with severe aortic stenosis (St. Jude)

Acute coronary syndromes & STEMI

COOL-ARREST – pilot study assessing the intravascular temperature management in cardiac arrest (Zoll)

Postconditioning – trial to assess if modification of reperfusion at time PCI can reduce reperfusion injury during STEMI (NHLBI)

Heart failure

REVIVE IT – HeartMate II left ventricular assist device trial

AC6 – gene therapy study to deliver adenylyl-cyclase 6 gene in patients with symptomatic congestive heart failure.

Interventional intervention

TAILOR PCI – genetic-based testing to tailor antiplatelet initiation in patients with decreased clopidogrel response following percutaneous coronary

ABSORB – clinical evaluation of Absorb™ BVS everolimus-eluting bioresorbable vascular scaffold (Abbott Vascular)

Electrophysiology

MICRA – safety and efficacy of Micra™ minimally invasive, leadless transcatheter cardiac pacemaker (Medtronic)

EVERA MRI – investigational device exemption trial of first MRI-compatible implantable cardioverter defibrillator system (Medtronic)

Prevention

CAMELLIA – study to evaluate effect of BELVIQ (losartan HCL) on incidence of major adverse cardiac events and conversion to type 2 diabetes in patients with coronary artery disease.

SPIRE – phase 3 trial to assess efficacy and safety of PCSK9 enzyme antibody for lowering LDL cholesterol (Pfizer)

Vascular

ENDOLOGIX – safety and efficacy of novel endovascular aneurysm sealing system

PACE – bone marrow-derived stem cells (ALDH-bright cells) in patients with peripheral vascular disease and claudication (NHLBI).

Hypertrophic Cardiomyopathy



Barry Maron, MD, received a lifetime achievement award for his work in hypertrophic cardiomyopathy.

Hypertrophic cardiomyopathy (HCM) is the most common genetic heart disease, the most frequent cause of sudden cardiac death in the young (including trained athletes), and can be responsible for heart failure symptoms at any age. For the last 20 years, Barry J. Maron, MD, an international expert on HCM, has directed the unique HCM Center at the Minneapolis Heart Institute Foundation.

The HCM Center has led in patient care, research and teaching related to this complex disease. As the first of its kind, it is a model in delivering patient care that involves the diverse cardiovascular disciplines of electrophysiology, interventional cardiology, echocardiography and cardiovascular magnetic resonance imaging, heart failure and transplant cardiology and surgery, genetic testing and family counseling provided through strong clinical nursing. The large HCM Center cohort includes 1,700 patients from all 50 states and 25 foreign countries whose ages range from 2 to 95 years.

The Center operates on the principle that all potential complications of HCM can be effectively treated, providing the opportunity for normal life expectancy. This focused approach has substantially improved patient outcomes. Targeted strategies include using the implantable defibrillator (ICD) to prevent sudden death (the first systematic program of its kind), surgical myectomy (in collaboration with the Mayo Clinic), heart transplant, and therapeutic hypothermia, which together have reduced HCM-related mortality to less than 1 percent per year.

**"HYPERTROPHIC
CARDIOMYOPATHY HAS TAKEN
ITS PLACE IN CONTEMPORARY
CARDIOLOGY AS A TREATABLE
DISEASE WITH LOW MORTALITY
AND CONSISTENT WITH
NORMAL LIFE EXPECTANCY."**

BARRY MARON, MD, HYPERTROPHIC
CARDIOMYOPATHY CENTER

HCM MORTALITY RATE
Deaths per year (%)

0.8%

General population

0.5%

New HCM-related mortality
 $p=0.46$

Evidence for decreased mortality for HCM patients at MHIF in the current era of management for this disease. HCM mortality (0.5%/year) is similar to, if not lower than, that for the general U.S. population (0.8%/year) matched for age and gender.

Source: Hypertrophic Cardiomyopathy Center database

Regional Cardiovascular Care



“TELEHEART IS AN INNOVATIVE STRATEGY THAT ALLOWS MORE PATIENTS TO BE SEEN CLOSER TO HOME, AND HAVE MORE ACCESS TO SUBSPECIALTY CARE. WE NEED TO TRANSFORM HOW AND WHERE WE DELIVER CARE SO WE CAN FOCUS ON PREVENTION AND CHRONIC DISEASE MANAGEMENT.”

MARC NEWELL, MD, DIRECTOR,
TELEHEART

Minneapolis Heart Institute® has established a regional system of cardiovascular care that allows most patients to receive the majority of their care close to home. Six cardiology hubs in Baxter, Crosby, Edina, Plymouth, Shakopee and Waconia offer full-time providers, consultations with subspecialists and diagnostic services. Cardiology consultation and cardiac diagnostic services are available in 32 communities throughout Minnesota and western Wisconsin. Advanced diagnostic and treatment services for tertiary and quaternary care are provided at Abbott Northwestern Hospital. This regional network approach helps Minneapolis Heart Institute® deliver the right care, at the right time, in the right place.

Improving access to specialty consultation

Minneapolis Heart Institute® has long recognized the importance of outreach and collaboration to ensure that patients throughout the region have access to the best possible cardiovascular care. Two new initiatives highlight this commitment.

TeleHeart

This is the first program of its kind in Minnesota and one of the first such programs in the country. A local or Minneapolis Heart Institute® nurse practitioner provides on-site cardiovascular clinic visits, supplemented with bedside cardiac ultrasound imaging, and followed by direct patient-to-cardiologist consultation via digital

“SOMETIMES IT’S THE LOW TECH IDEAS THAT CAN BE THE MOST HELPFUL. CARDIOLOGY CURBSIDE PROVIDES ONE NUMBER ANSWERED BY A LIVE PERSON. IT’S A SIMPLE IDEA, BUT A GAME CHANGER.”

DAVID HURRELL, MD, NON-INVASIVE
IMAGING CARDIOLOGIST

video conferencing. This innovative program provides patients in New Ulm, Cambridge, Olivia and Faribault with a real time, remote face-to-face health care interaction, giving them faster access to specialty consultation. This has allowed sites to decrease their patient wait times and increase their service levels dramatically. This program plans rapid expansion to additional partner communities.

Cardiology Curbside

This gives providers an easy way to quickly access cardiology experts. Providers simply call 612-863-8800 to talk immediately with a cardiologist. Providers use Cardiology Curbside to discuss next steps for evaluation or treatment of any inpatient or outpatient concern, medical management, testing, EKG review, or even a second opinion on the chosen evaluation path. Cardiology Curbside is available Monday-Friday, 7:30 a.m-5 p.m.

Regional Cardiovascular Care

Expanding regional services, enhancing facilities

- » A new outpatient cardiovascular center has opened in Baxter, Minn., bringing expanded consultative and diagnostic services and state-of-art cardiovascular care to northern Minnesota
- » Newly remodeled and expanded clinic space opened at Abbott Northwestern – WestHealth in Plymouth
- » Vascular care, electrophysiology, advanced heart failure and cardiovascular prevention consultations are now available at many Minneapolis Heart Institute® metropolitan locations, in addition to traditional consultative and diagnostic services.

2014 OUTPATIENT VISITS

CARDIOLOGY – Full-service locations

15,701 Minneapolis

5,407 Edina

3,235 Plymouth

2,184 Shakopee

2,259 Waconia

1,730 Chaska

2,810 Baxter

2,108 Crosby

12,764 CARDIOLOGY – Community partner locations

48,198 Total

3,205 VASCULAR – Full-service locations

1,373 VASCULAR – Community partner locations

4,578 Total

1,081 CARDIOTHORACIC – Full-service locations

93 TeleHeart consultations*

*TeleHeart launched in 2014 at Cambridge, Faribault, New Ulm, Olivia.
Source: Cadence Scheduling System

2014 OUTPATIENT SATISFACTION SURVEY*

Would you recommend this doctor's office to your friends and family?

4,450

Surveys returned

93.83%

"Definitely yes"

90th

Percentile

*Reflects patient surveys from all Minneapolis Heart Institute® clinic locations.

Source: Clinician and Group Consumer Assessment of Healthcare Providers Survey

Abbott Northwestern Hospital



Abbott Northwestern's 128-bed Heart Hospital supports Minneapolis Heart Institute's comprehensive, quaternary services. It includes:

- » 32 cardiovascular critical care beds
- » 96 telemetry beds
- » remote cardiac monitoring systems for patients throughout the hospital with primary conditions beyond those that are cardiovascular-related.

In addition to advanced technology, specialized procedure areas, innovative research and demonstrable outcomes, Minneapolis Heart Institute at Abbott Northwestern Hospital excels because of the exceptional care provided by a multidisciplinary team. The American Nurses Credentialing Center (ANCC) recently redesignated Abbott Northwestern as a Magnet hospital, the second time it has achieved this status. Many caregivers in nursing and other disciplines have advanced training and experience allowing them to provide excellent care to patient with a range of complex conditions.

The cardiovascular care team includes:

- » cardiac rehabilitation specialists
- » chaplains
- » dietitians
- » integrative health practitioners
- » nurses
- » palliative care staff
- » pharmacists
- » physician assistants
- » physicians
- » respiratory therapists
- » social workers.

MINNEAPOLIS HEART INSTITUTE® AT ABBOTT NORTHWESTERN HOSPITAL HAS INVESTED IN THE PEOPLE, SYSTEMS AND TECHNOLOGY THAT HELP IT SET THE PACE FOR CARDIOVASCULAR INNOVATION AND CARE.

CARDIOVASCULAR INPATIENT SATISFACTION SURVEY

Using any number from 0 to 10 where 10 is the best possible hospital stay, what number would you use to rate this hospital during your stay?

| | | |
|------------------|------------------------|-------------|
| 2,380 | 82.11% | 90th |
| Surveys returned | Percent rating 9 or 10 | Percentile |

Would you recommend this hospital to your friends and family?

| | | |
|------------------|------------------|-------------|
| 2,380 | 86.36% | 95th |
| Surveys returned | "Definitely yes" | Percentile |

Source: Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS)

Awards and recognition



» The 2014 *US News & World Report* Best Hospitals listing ranked Minneapolis Heart Institute® at Abbott Northwestern Hospital in the top 30 nationally and first in the Twin Cities for cardiology services and heart surgery.

» The American Nurses Credentialing Center (ANCC) again granted Magnet Recognition Program™ status to Abbott Northwestern in 2014. The hospital received its original designation in 2009. This achievement is reached by fewer than seven percent of all hospitals worldwide.

» Minneapolis Heart Institute® – Baxter ranked number one for cardiology clinics and received the highest composite scores for patient experience overall by MN Community Measurement in partnership with the Minnesota Health Department.

» The Heart of New Ulm (HONU) Project and New Ulm Medical Center, part of Allina Health, received one of five 2014 NOVA Awards from the American Hospital Association (AHA). The award recognizes hospitals and health systems for their collaborative efforts toward improving community health. The HONU Project is led by Minneapolis Heart Institute® physicians and directed by the Minneapolis Heart Institute Foundation. The population health research conducted for the purposes of cardiovascular disease prevention has been presented at many national conferences and published in several publications. The HONU Project has become a true model of improving the health of a community through effective health initiatives.

» Minneapolis St. Paul Magazine recognized 23 Minneapolis Heart Institute® physicians in their 2014 Top Doctors issue.

» Barry J. Maron, MD received a lifetime achievement award from the Minneapolis Heart Institute Foundation for his research and work in hypertrophic cardiomyopathy for more than 40 years. The Foundation also named its clinical center of distinction in his honor, The Barry J. Maron MD Hypertrophic Cardiomyopathy Center. He was also honored in New Delhi, India, with the Coeur d'Or (Heart of Gold) Award for his philanthropic work in cardiovascular medicine. A second center in his name, the Barry J. Maron Hypertrophic Cardiomyopathy Center, was unveiled at Kalra Hospital and SRCNC in New Delhi.

One Call Transfer Center

Abbott Northwestern Hospital

Any patient. Any time.

Cardiovascular transfers: 612-863-3911

All other transfers: 612-863-1000

Fax: 888-764-8218



MINNEAPOLIS
HEART
INSTITUTE®

Allina Health 

ABBOTT
NORTHWESTERN
HOSPITAL

To learn more about
Abbott Northwestern Hospital,
visit allinahealth.org/abbottnorthwestern
or call 612-863-4000.

Providers and leadership



General cardiology

Richard Bae, MD
Durand Burns, MD
Alex Campbell, MD
Matthew Chu, MD
Timothy Dirks, MD
Björn Flygenring, MD
Elizabeth Grey, MD
Kevin Harris, MD
Robert Hauser, MD
William Hession, MD
Mark Houghland, MD
David Hurrell, MD
Desmond Jay, MD
Casey Lawler, MD
John Lesser, MD
David Lin, MD
James Madison, MD
Marc Newell, MD
Maria-Teresa Olivari, MD
Quirino Orlandi, MD
Luis Pagan-Carlo, MD
Robert Schwartz, MD
Scott Sharkey, MD
Peter Stokman, MD
Craig Strauss, MD, MPH
Norma Thiessen, MD

Cardiovascular internal medicine

John Bernhardson, MD, MBA
James Furda, MD

Cardiovascular disease prevention

Michael Miedema, MD, MPH
Thomas Knickelbine, MD
Terrence Longe, MD

Interventional cardiology

M. Nicholas Burke, MD
Ivan Chavez, MD
Timothy Henry, MD
Daniel Lips, MD
Michael Mooney, MD
Wesley Pedersen, MD
Anil Poulouse, MD
Paul Sorajja, MD
Jay Traverse, MD
Yale Wang, MD

Heart rhythm management

Raed Abdelhadi, MD
JoEllyn Abraham, MD
Adrian Almquist, MD
Charles Gornick, MD
William Katsiyannis, MD
Daniel Melby, MD
Jay Sengupta, MD
Chuen Tang, MD

Advanced heart failure

Mosi Bennett, MD, PhD
Barry Cabuay, MD
Kasia Hryniewicz, MD
Michael Samara, MD
Peter Zimbwa, MD, MSc, PhD

Cardiac, thoracic & transplant surgery

Domenico Calcaterra, MD
Frazier Eales, MD
Robert Saeid Farivar, MD, PhD
Thomas Flavin, MD
Vib R. Kshetry, MD
Benjamin Sun, MD

Vascular & endovascular surgery

Peter Alden, MD
Jason Alexander, MD
Andrew Cragg, MD
Jesse Manunga, MD
Nedaa Skeik, MD
Elliot Stephenson, MD
Timothy M. Sullivan, MD
Jessica Titus, MD

Nurse practitioners & physician assistants

Connie Baumgard, MSN, RN, FNP
Erica Baumann, PA
Amy Berggren, NP
Brittany Bradley, PA
Denise Carter, NP, MS
Mary Collier, NP
Jenna Dahl, NP
Joseph Dauwalter, PA-C
Troy Decker, PA
Sarah Farthing, NP
Teresa French, NP
Morgan Fulmer, PA
Amanda Greene, NP
Ty Harrison, PA
Rebecca Heimark, PA
Tara Helfritz, RN, MSN, ACNP
Anne Hendrickson, PA
Elizabeth Hoffman, PA
Janet Holfoth, PA
Elizabeth Hunt, MSN, FNP
Danielle Johnson, PA
Jody Juntunen, NP
Kathleen Klardie, NP
Ashley Korbelt, PA-C
Nicole Larson, NP

Tamara Langeberg, CNP
Deb Lindgren-Clendenen, NP
Lise Lunde, NP
Christy Maxfield, NP
David McCrone, PA
Gina McCrone, PA
Karin Newell, NP
Sandy Oberembt, PA
Roxanne Ricci, NP
Andra Sawh, NP
Lynelle Schneider, PA
Anah Sellers, PA-C
Donna Skoog, CNP
Lynn Stoneberg, NP
Laurie Sublett, CNP
Michelle Vanhove, NP
Julie Wagner, NP
Arielle Webb, PA
Philip Weber, PA
Leah Wojciechowski, PA

Operations leadership

Tom Talley
chief operating officer

Ben Bache-Wiig, MD
president, Abbott Northwestern Hospital

Beth Cairns, BSN, MA
director, Cardiovascular Procedures, Diagnostics, Heart Hospital Clinic, Vascular and Endovascular Surgery, and Cardiovascular Programs

Andrea Berg
director, Strategy and Business Development

David Hildebrandt, RN, BSN, EMTP
director, Cardiovascular Emergency Services and Cardiovascular Lab

Frances Hoffman, MSN, CNP
director, Advanced Heart Failure and Transplant

Louise Jacobs, BAN, MS
director, Cardiovascular Inpatient Nursing

Terry Graner, DNP, RN, NEA-BC, CENP
vice president, clinical operations for Surgical and Perioperative Surgery



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» Free, fast cardiology advice for providers.