MUNSON MEDICAL CENTER
MUNSON HEALTHCARE

Cardiovascular Perspectives

Munson Medical Center is First in Northern Michigan to Offer Patients High-Tech Heart Failure Monitoring Solution

Munson Medical Center is the first facility in northern Michigan to implant a new miniaturized, wireless monitoring sensor to manage heart failure (HF). The CardioMEMS HF System is the first FDA-approved heart failure monitoring device proven to significantly reduce hospital admissions when used by physicians to manage heart failure. This innovative, groundbreaking technology is currently only available at two other hospitals in the state and 48 other hospitals in the United States.

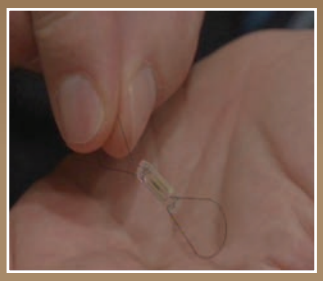
The CardioMEMS device was implanted into the first two patients at Munson Medical Center on Feb. 6 using a percutaneous approach during an outpatient procedure similar to cardiac catheterization. Both women met the criteria of having Class III chronic heart failure symptoms and had been hospitalized once or more with decompensated heart failure.

The CardioMEMS HF System features a sensor that is implanted in the pulmonary artery (PA) to directly measure PA pressure. Approximately 90 percent of patients admitted to the hospital for heart failure have pulmonary congestion, which can lead to a downward spiral of progressive cardiac deterioration and mortality.

continued on page 4

"This is a revolutionary breakthrough technology providing us an enhanced ability to treat and improve outcomes for patients living with heart failure."

Dino Recchia, MD, FACC
Chairman, Department of Cardiology
Medical Director, Webber Heart Center
Munson Medical Center



Inside:

Patient Satisfaction at Webber Heart Center Leads the Nation

Between November 2014 and January 2015, more than 340 patients surveyed reported high satisfaction with their care following hospitalization on one of the three inpatient cardiac floors in the Webber Heart Center.

Here are recent results, as reported by Press Ganey:

Question	Rank
Overall rating of the care given:	**98**th percentile
Likelihood of recommending hospital	**99**th percentile
Staff worked together to care for you	**98**th percentile

(Percentiles are based on scores compared to other hospitals in Press Ganey's large database.)

What Webber Heart Center Patients Have to Say*

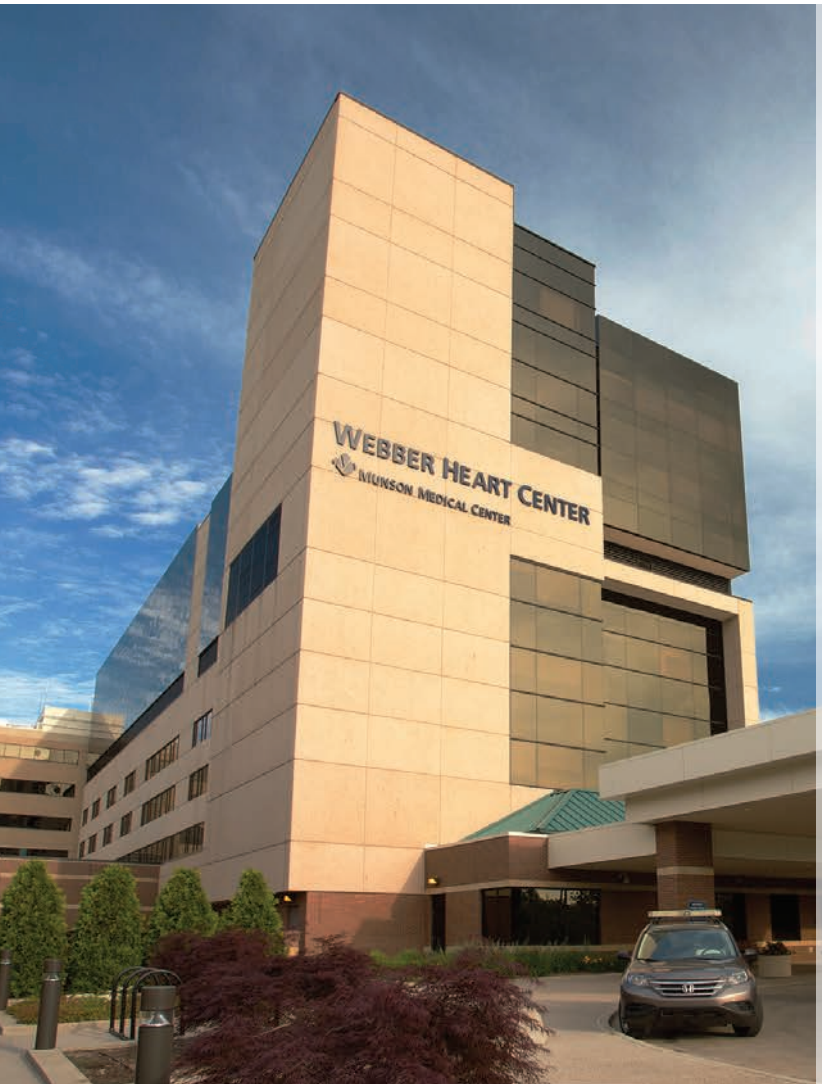
"All of the staff were very **impressive** and **well-trained**. From previous experiences at Munson, I have no problem traveling the 180 miles for the quality of care that they provide."

"The nursing staff was **outstanding**. Very **prompt** with medication and pain control. Never felt all alone or isolated."

"I was thoroughly impressed by the **professional** staff on A2 as well as all the staff I encountered during my multiple procedures - CT, MRI, TEE, Nuclear Med, lab. My medical care was A+."

"I am an 89-year-old patient just this week discharged from Munson Medical Center. I'm also an RN and have seldom seen or been in a cleaner, **well-managed** hospital with a more courteous staff. I would happily recommend it to any and all!"

"The Cardiac unit is surpassed by none - **remarkable!**"



"I can't think of ONE thing that needs improvement. To me, you were **perfection**!!"

"Nothing, nothing to improve - my experience in this hospital was amazingly **wonderful**, wonderfully pleasant."

"Keep in mind how **wonderful** your staff is ALWAYS especially when you hire – you are doing a great job at finding the right people to work for you."

"ALL of the nurses and NAs while I was there were great – each one went above and beyond to be **friendly**, **courteous**, and provide great care. Love them all!"

"I am an RN and therefore hard to please. Your nurses were **fabulous!**"

"The Cardiac Unit must be **one of the country's best**."

*(*A sampling of patient comments from December 2014)*

Exciting Advances in Technology, Techniques Keep Cardiovascular Care at Forefront

Welcome to the 2015 edition of Cardiovascular Perspectives. Our expert team continues to bring many new and exciting additions to the cardiovascular services offered at the Webber Heart Center at Munson Medical Center. We are continually striving to add cutting-edge techniques and services in order to provide the highest quality cardiac care to patients in northern Michigan.

Our **interventional cardiology team** continues to advance the treatment options for patients with chronically occluded coronary arteries through the technique of CTO PCI. This technique provides a percutaneous option for revascularization for patients suffering with angina who were previously deemed inoperable. CTO PCI has provided life-changing results for this group of patients with difficult conditions.

The **peripheral vascular team** has added the newest drug-coated balloons and stents to their armamentarium of tools for managing PAD. These new options reduce the risk of restenosis, providing an increasingly durable result for endovascular treatment of PAD. Our endovascular specialists continue to add advanced limb salvage techniques, helping reduce the need for amputations.

Our **heart failure team** continues to grow and now manages more than 200 patients with complex heart failure syndromes of all varieties. We have been successful in achieving one of the lowest 30-day heart failure readmission rates in the country. We recently became only the third hospital in the state to provide access to a new implantable pulmonary artery sensor for noninvasive measurement of pulmonary artery pressures at home. The data provided by this system is linked wirelessly to the Heart Failure Clinic team, allowing early detection of impending heart failure decompensations before they fully develop.

The **structural heart team** of interventional cardiologists and cardiac surgeons continues to advance our minimally invasive valve program. This multidisciplinary team has performed more than 50 transcatheter aortic valve replacements (TAVR) with excellent results. We continue to expand our minimally invasive incisions for traditional valve surgery, leading to quicker recovery and improved cosmetic results.

Our **electrophysiology team** continues to advance our successful program for ablation of atrial fibrillation through the use of a new high-tech mapping system. This approach makes ablation of arrhythmias safer and more effective.

The **cardiac imaging team** has grown with the addition of Anna Booher, MD, who joined us from the University of Michigan. Anna is an expert in echocardiographic imaging with an emphasis on 3D echo. She is part of the advanced imaging team that works closely with the TAVR program to provide imaging support for these complex structural heart procedures.

We are excited to offer local access to specialty care for both pediatric and adult patients with congenital heart disease. Teams from Ann Arbor and Grand Rapids hold clinics at Munson Medical Center throughout the year, allowing patients to be seen locally and avoid the need for a long drive downstate. This has been very well received by patients and their families.

Finally, we invite you to attend the third annual Cardiovascular Update for Primary Care Providers in October. We received a lot of great feedback from the first two events and look forward to another successful conference this fall.

I hope you enjoy this edition of Cardiovascular Perspectives. Feel free to contact me with any questions or comments.

Sincerely,

Dino Recchia, MD, FACC
Chairman, Department of Cardiology
Medical Director, Webber Heart Center
Munson Medical Center
drecchia@mhc.net

Munson's High-tech Heart Failure Monitoring System

continued from page 1

"Research shows that pulmonary artery pressure starts to rise in these patients one to three weeks before the patient notices any change in symptoms or weight," said **Dino Recchia, MD, FACC**, director of the Munson Heart Failure Clinic, who performed the first procedures.

This new technology has been shown to reduce the rate of hospitalization for heart failure by nearly 40 percent by enabling frequent clinician monitoring without the need for additional clinic or hospital visits.

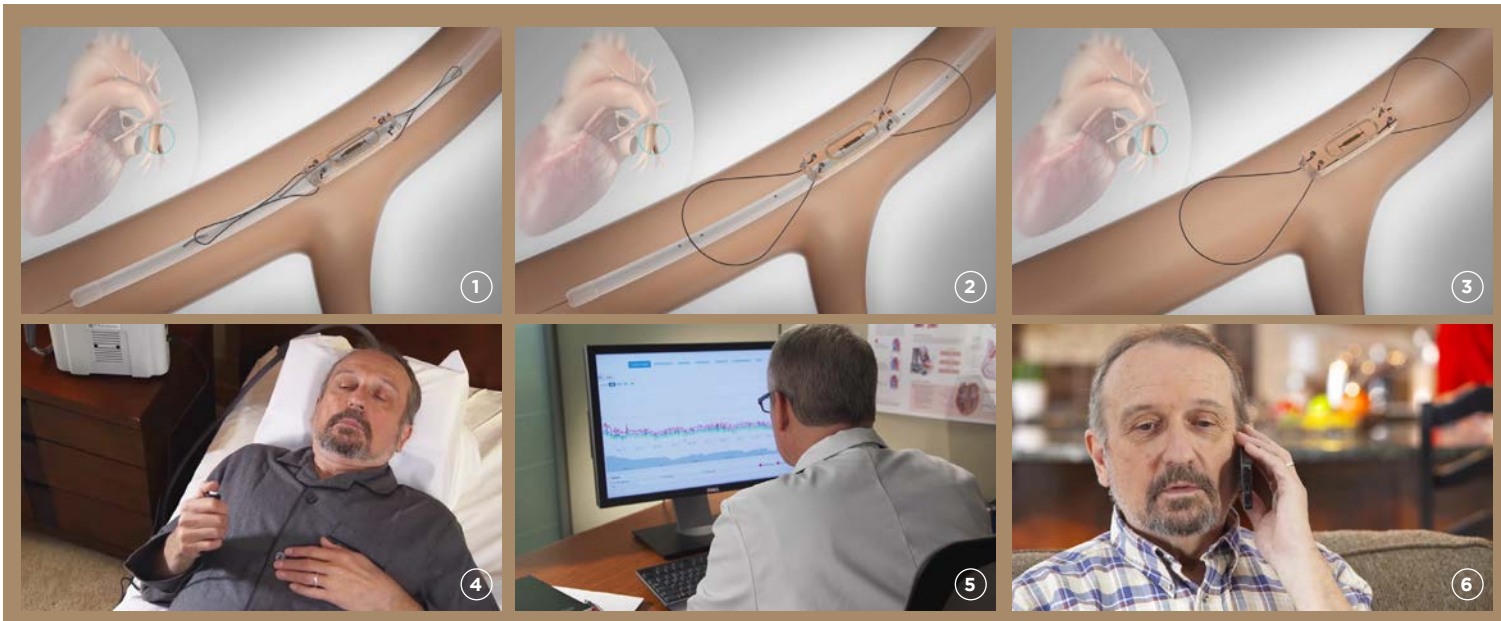
"The device allows us to monitor these pressures on a daily basis and transmits those pressures to our Heart Failure Clinic team over the internet," Recchia said. "We can then act on the information by managing medications and other treatment options before the patient ever experiences any worsening in their condition and prevent hospitalization and improve quality of life."

Daily sensor readings are transmitted from the patient's home as the patient reclines on a special pillow with an antenna. The patient presses a button on a portable electronic unit and PA pressure is noninvasively measured and sent electronically to a website that can be viewed by a physician from any device with internet access. If a patient has readings outside of set parameters, an alert also can be sent to the clinician's smartphone.

Two days after the first patient was implanted at Munson Medical Center, Recchia received an alert on his smartphone that one of the patients had a significant increase in her PA pressures. He contacted her and found she had eaten a meal with a high sodium content the night before but was feeling fine. He increased her diuretic dose and her PA pressures returned to baseline over the next 48 hours. "This is a real example of averting a problem before it ever had time to develop into something more serious. This type of advancement in real time physiologic monitoring of patients is a game changer for patients with difficult to manage heart failure," he said.

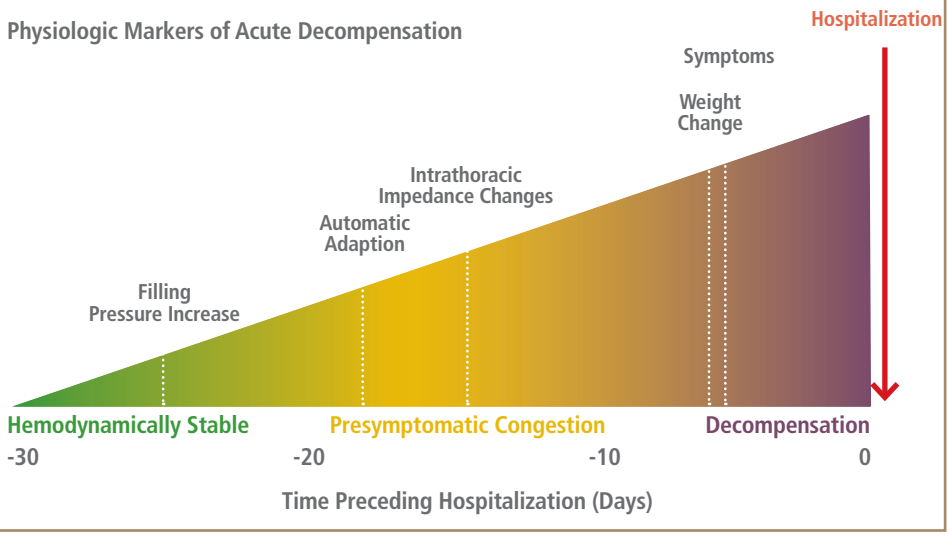
More than 5 million Americans are affected by a growing epidemic of heart failure. Each year more than 600,000 new cases of heart failure are diagnosed, leading to frequent hospitalizations, a reduced quality of life, and premature death. "Treating heart failure effectively requires a team approach like the one used in the Munson Heart Failure Clinic," Recchia said. "The addition of this cutting edge technology to the services offered has broad benefits to patients and the health care community."

"Munson Healthcare is committed to improving patient care and investing in innovative medical technology such as the CardioMEMS HF System," said Alfred E. Pilong, Jr., president of Munson Medical Center and senior vice president of hospital operations Munson Healthcare. "As a growing regional health care system, we feel it is part of our mission to invest in economically responsible solutions for successful patient outcomes in the diagnosis and treatment of heart failure."

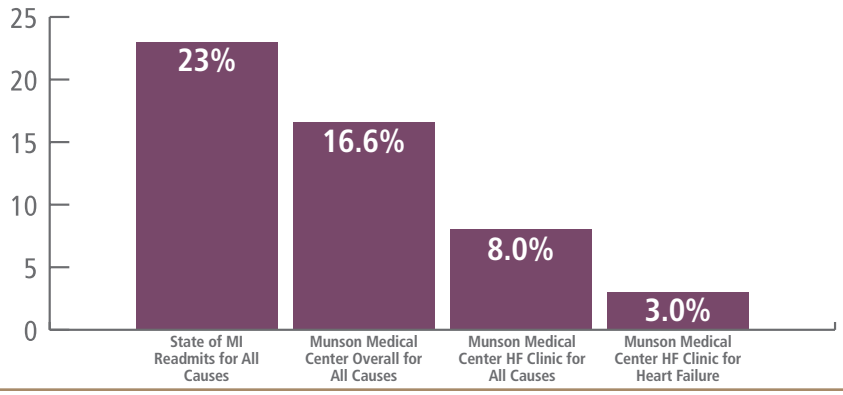


1-3 A sensor, no bigger than the size of a dime, is implanted through a vein in the leg, similar to a heart catheterization procedure. **4** Once the sensor is implanted, the patient is able to take readings of pulmonary artery pressure at home. **5** Taking and sending readings takes just a few minutes and are sent to a secure website, accessed by the physician. Changes in pulmonary artery pressure are good indicators of worsening heart failure even before the patient experiences symptoms. **6** With the information obtained by the MEMS Sensor, the physician is able to adjust medications, reducing chances of ending up in the hospital. The CardioMEMS sensor is designed to last the lifetime of the patient and does not require batteries. There is no pain or sensation for the patient during the readings.

Time Course Decompensation

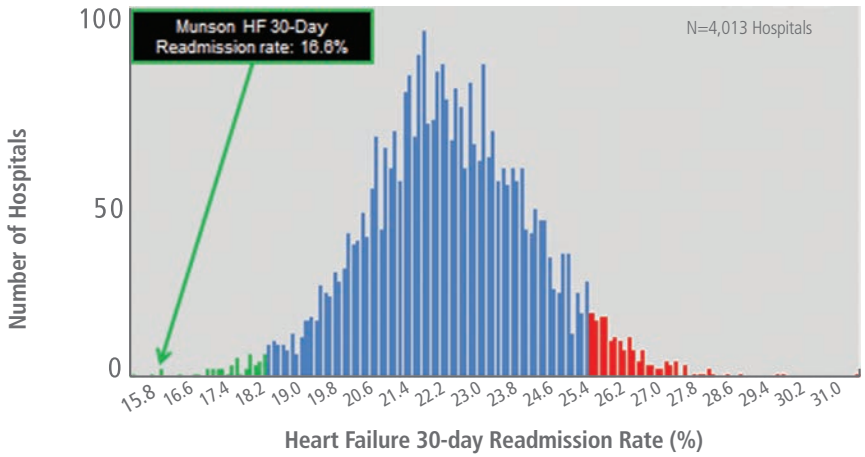


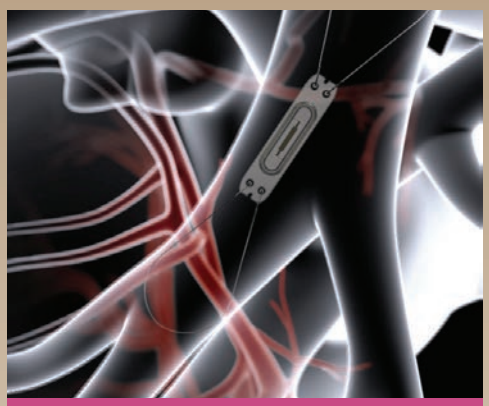
30-day Readmission Rate



Distribution of U.S. Hospital Performance

Medicare Discharges July 2010 - June 2013, published on *Hospital Compare*





Save the Date:
October 10, 2015

Cardiovascular Update for Primary Care Providers

The third annual Cardiovascular Update for Primary Care Providers will give primary care, emergency medicine, hospital medicine physicians, PA/NPs, and nurses practical tools and resources, including the most current developments in the diagnosis, treatment, and management of cardiovascular disease.

There is no charge to attend.
A full conference brochure with agenda will be mailed soon.

munsonhealthcare.org/cardiovascularupdate2015

Location:
Grand Traverse Resort
100 Grand Traverse Village Blvd.
Acme, MI 49610

New Drug Coated Balloons and Stents Reduce Restenosis in Peripheral Artery Disease

Endovascular specialists at Munson Medical Center are among the first to use new FDA-approved drug coated angioplasty balloons and stents to prevent restenosis in patients with Peripheral Artery Disease (PAD).

Munson specialists began using COOK Zilver PTX drug coated stents (DCS) and Bard Lutonix® 035 drug coated balloons (DCB) as soon as they became commercially available a few months ago. Both devices are coated with a therapeutic dose of the chemotherapy drug paclitaxel.

Restenosis rates can exceed 50 percent with conventional angioplasty and stenting in the treatment of arterial disease in the legs. The development of drug eluting stents for the treatment of coronary artery blockages has reduced restenosis rates from 30 percent to 5 - 7 percent. That same technology is now available in the treatment of leg artery blockages.

"Restenosis is a biologic process in which scar tissue forms after angioplasty and/or stenting of an artery," said Interventional Cardiologist and Endovascular Specialist **Roberto Corpus, MD, FACC**. "Scar tissue cells are induced by arterial injury from the procedure to open narrowed arteries. When a drug coated balloon or stent is deployed in the artery, the drug is released into the arterial wall, thus inhibiting the biologic process which causes restenosis."

Use of drug coated balloons to treat blockages in the arteries of the thigh and behind the knee results in a 39 percent reduction in restenosis, compared to standard angioplasty. At one year, the patency rate after using drug coated balloons was 73.5 percent, compared to 56.8 percent with conventional angioplasty alone. "It's not perfect, but it is significantly better," Corpus said.

Use of paclitaxel coated stents results in a 41 percent reduction in restenosis compared to conventional angioplasty and stenting, and a 48 percent reduction in the need for repeat procedures. The five-year patency rate of drug-coated stents is 66.4 percent, compared to 43.4 percent for angioplasty and stenting.

"This medication was proven to be safe and efficacious in large scale trials with no increased risk to patients," Corpus said. "It's another tool in our armamentarium and gives patients better options for staying symptom free. Because leg arteries are longer and larger, blood flows through them more slowly, resulting in higher restenosis rates than in coronary arteries. This technology gives patients a longer term of treatment effect - they do better, walk longer, and have a better quality of life."

Drug Coated Balloons Get Reimbursement Boost

In February, the Centers for Medicare and Medicaid Services (CMS) approved a transitional pass-through payment for drug-coated balloons that went into effect on April 1, 2015. This payment approval follows a unanimous favorable recommendation from the FDA's Circulatory Systems Devices Advisory Panel, which voted 9 to 0 on each question of safety, efficacy, and benefit/risk for the Lutonix® device used at Munson Medical Center, which was the first FDA approved DCB.

The payment is intended to cover the additional costs that a hospital bears to treat Medicare patients in an outpatient setting. The decision removes a potential barrier to patient access to this new medical device. The supplemental reimbursement provision will remain in effect for two to three years. A similar supplemental payment to hospitals that treat Medicare beneficiaries with the device on an inpatient basis is under review by CMS with a ruling expected sometime this summer.

PAD affects an estimated 8 - 12 million people in the United States, according to the National Heart Lung and Blood Institute. It most commonly affects arteries in the legs, and greatly increases risk of a sudden heart attack or stroke when present in the upper leg. Without proper treatment, 30 percent of people with PAD are likely to die within five years from a PAD-related heart attack or stroke.

Drug coated balloons and stents are more expensive and not used in all procedures, Corpus said. Candidates for the paclitaxel coated balloons and stents include those with repeated episodes of blockage and failed previous therapies, and those at high risk for blockages, such as patients with diabetes, renal failure, or complicated anatomy.

Patients with symptoms of claudication, or serious complications including skin ulcers or gangrene, should be promptly evaluated. "Too often we get to these patients too late and we can't salvage a limb," Corpus said. "Patients with leg pain upon exertion should be evaluated early through diagnostic ultrasounds, CTs, and MRI."

Munson Medical Center Endovascular Specialists

Todd R. Adams, DO
Roberto A. Corpus, MD, FACC
James M. Fox, MD, FACC
John E. Raftery, MD, FACC
Nicklaus K. Slocum, MD

For more information or to make a referral, call **(231) 935-5800.**

Chronic Total Occlusion Intervention is Good Option for Angina Relief, Failed Bypass Grafts

If your patient has daily angina, a failed coronary bypass graft, and has been told by a cardiologist that nothing more can be done, Interventional Cardiologist **Kevin J. Clayton, DO, FACC**, would like you to ask one more question: "Could this patient be helped by recanalization of his/her chronic total occlusion?"

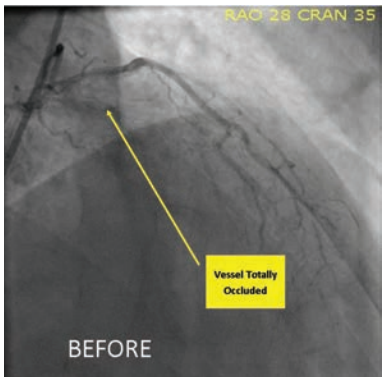
During the past six years, Clayton has performed more than 150 specialized percutaneous procedures to open chronic total occlusions (CTO). In many cases, patients had been told their only options were to live with their symptoms or undergo a second or third open heart surgery. "These are the most grateful, most thankful patients because their symptoms are resolved immediately and you've prevented them from having another open heart surgery," he said.

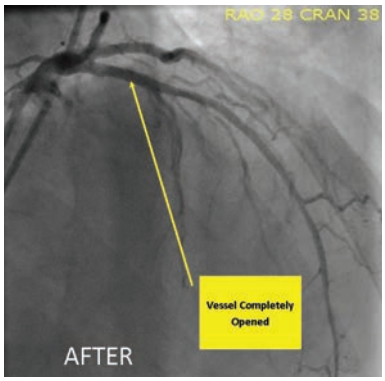
Clayton is one of just a few interventional cardiologists in Michigan with the training to perform this challenging, lengthy procedure. Coronary chronic total occlusions are encountered in up to one third of patients referred for coronary angiography. New technology and evolving techniques are allowing for success with a larger variety of CTOs.

"The protocol is now more refined in terms of the products and techniques we use," Clayton said. "New devices such as the Stingray™ System and CrossBoss™ catheter are being used to bridge CTOs via the true lumen or subintimal pathways, allowing us to safely treat complex lesions with increased access and efficiency."

Once the CTO is successfully crossed, a series of careful balloon dilatations is performed with gradually increasing balloon diameters until the lumen is large enough for placement of an intracoronary stent.

CTO intervention carries higher risk than normal angioplasty and stenting. "These are the sickest patients, and there is risk to the patient of coronary perforation or contrast induced kidney failure," Clayton said. CTO intervention attempted in the catheterization lab at the Webber Heart Center has about an 80 percent success rate.





Clayton looks for two things when considering CTO intervention for a patient: 1) The patient must be compliant to medical therapy, and 2) there must be a careful review of coronary angiogram to define appropriate routes to achieve a successful CTO intervention.

Opinions will vary widely on what qualifies as a potentially successful route, Clayton said. "If I displayed an angiogram of a chronically occluded coronary artery in front of 100 interventional cardiologists, 90 of them might say you couldn't open it."

Even so, it is an option worth considering for some patients. "If we can open up the CTO, we can prevent an open heart surgery," he said. "Primary care physicians need to have a high level of inquiry when treating their patients with obvious ischemia who have lost a bypass graft to an occluded vessel. These patients may benefit from having the patient's cardiologist review the case with a CTO operator."

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PCI Outcomes

Percutaneous Coronary Intervention: *Volumes (October 2013 through September 2014), 1,032*

Complication Rates	Munson Medical Center compared to like hospitals in the United States
In-hospital risk-adjusted mortality rate	19 percent lower
Peri-procedural MI	37 percent lower
Emergent CABG	50 percent lower
Coronary perforation	50 percent lower
Renal failure requiring dialysis	60 percent lower

Data source: National Cardiovascular Data Registry

Structural Heart Clinic Adopts Latest Innovations in TAVR Procedures

More patients are experiencing improved results at Munson Medical Center with adoption of the next generation transcatheter aortic valve replacement (TAVR) device.

Edwards Lifesciences Corporation received Unites States Food and Drug Administration (FDA) approval in summer 2014 for its Edwards SAPIEN XT transcatheter aortic heart valve. The improved valve comes in three sizes – 23 mm, 26mm, and 29mm – and can be used for patients with a large native annulus, which allows for the treatment of more patients. Munson's Structural Heart Clinic was among the first sites in the country to offer this new technology.

"Since July 2014 we have been utilizing the second generation Edwards Sapien XT device," said Interventional Cardiologist and Structural Heart Specialist **Nicklaus Slocum, MD**, medical director of the Structural Heart Clinic and one of the physicians performing the procedure. "This device comes in more sizes and is more deliverable than its predecessor. This allows us to treat more patients and to do so in a more non-invasive fashion. We have seen immediate improvement as the procedure is better tolerated by our patients. This is a good example of what we can expect in the future in this area of cardiology – further advances in technology bringing safer and better procedures to more patients."

Munson Medical Center has offered TAVR for patients suffering from severe, symptomatic native aortic valve stenosis since September 2012. Without replacement of the aortic valve, this disease is life-threatening. Previous studies have shown that 50 percent of patients will not survive more than an average of two years after the onset of symptoms.

During the past year, the Structural Heart Clinic has increased its TAVR case load by 50 percent. Since its inception, the structural heart team at Munson Medical Center has evaluated more than 240 patients for high risk valvular heart disease. This is done in a multidisciplinary format using specialists and imaging procedures that cross multiple modalities of cardiovascular care. Many patients have been evaluated and ultimately underwent open surgical valve replacement as well.

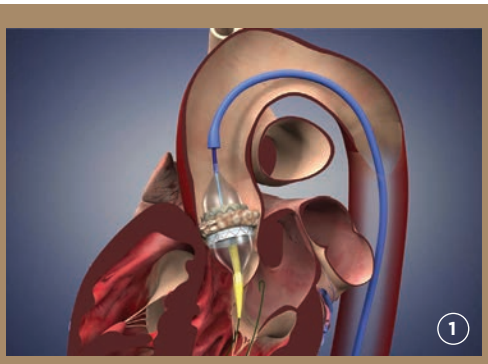
In the last two years, the structural heart team also began performing TAVR via direct apical and direct aortic approaches, in addition to transfemoral. These new routes involve very small chest wall incisions to deliver the transcatheter aortic valves, and do not require sternotomy. "These alternative access points have opened this procedure up to patients with peripheral vascular disease or just small peripheral arteries. They have been well tolerated and really help us to treat more patients who otherwise would not be candidates," Slocum said.

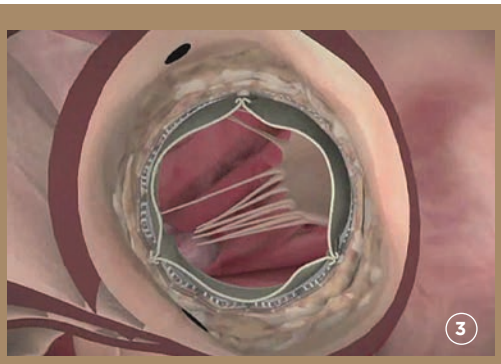
"The structural heart team continues to move forward," Slocum said. "I am very fortunate to work with a group of individuals dedicated to perfection and delivery of care. It is an exciting time to be involved in this area as the future promises refinement and expansion of our current techniques and the coming of new procedures which we will be proud to offer the residents of our region."

For more information or to make a referral, contact Deb Provost, Structural Heart Clinic coordinator, at **(231) 935-6446** or **(231) 318-8601**.

Structural Heart Clinic Physicians

Anna M. Booher, MD, FACC | *Non-invasive Cardiologist*
James M. Fox, MD, FACC | *Interventional Cardiologist*
Anne M. Hepner, MD, FACC | *Non-invasive Cardiologist*
Shelly C. Lall, MD | *Cardiothoracic Surgeon*
Nicklaus K. Slocum, MD, FACC | *Interventional Cardiologist*
Mack C. Stirling, MD | *Cardiothoracic Surgeon*





1 The sheath is placed in the apex of the heart. 2 - 3 The deployed valve opens wide allowing blood to flow unobstructed.

3-D Echocardiogaphy Directs Structural Heart Disease Care

Anna M. Booher, MD, FACC, was accustomed to working in a top-flight cardiology program as a faculty member at the University of Michigan, where she completed fellowships in Cardiovascular Medicine and Echocardiography. Six months after joining the cardiovascular medicine team at Munson Medical Center, she is equally impressed with the comprehensive cardiac care delivered in northern Michigan.

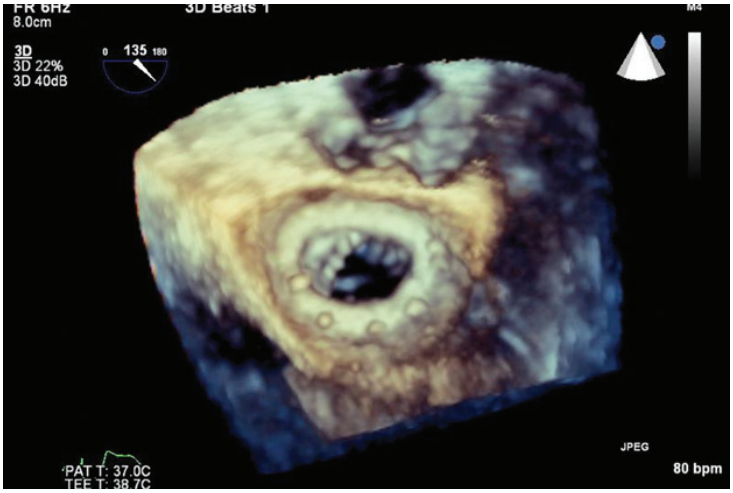
"As a regional hospital, Munson Medical Center offers a very high level of care in northern Michigan," she said. "There is very little we can't offer our patients here in cardiovascular care and specialized procedures. The equipment, the facility, and the medical team are all first class. Most cardiovascular conditions can be managed locally. It's important for patients to be able to get great care close to home."

Booher is part of the Structural Heart Clinic team tasked with advanced imaging for cardiac patients using the latest 3-D technology housed in Munson's Cardiac Diagnostic Suite. She has extensive experience in cardiac imaging, with particular interests including valvular heart disease and diseases of the aorta.

Three-dimensional echocardiography has become an important tool in the evaluation of patients with valvular heart disease. All data is acquired in high-resolution digital format allowing for in-depth, accurate analysis.

"Three-dimensional echo imaging can provide important data that directs patient care in the realm of structural heart disease," Booher said. "It has revolutionized preoperative planning for complex mitral valve surgery and paraprosthetic leak closures. It can provide additional information in selecting the right procedure and valve size for transcathether aortic valve replacements. Finally, 3-D imaging offers a more objective measurement in the assessment of LV ejection fraction."

"We have a lot of resources and expertise to offer patients in northern Michigan," Booher added. "I think our core group of imaging physicians is well trained and very thoughtful in the care they deliver. In addition to the physicians being quite knowledgeable, the nurses and technologists in the echo lab have expertise that is remarkable and critically important to our ability to offer a high level of care."



This view, created by using 3-D EnSite NavX™ navigation and visualization technology, shows the status, post repair, of the mitral valve with the annulus ring in place.

Services offered in the Cardiac Diagnostic Suite include:

- Two-dimensional transthoracic and transesophageal echocardiography
- Three-dimensional transthoracic and transesophageal echocardiography
- Exercise and pharmacologic stress echocardiography
- Exercise and pharmacologic stress nuclear perfusion studies
- ECG and holter monitoring services
- Cardiopulmonary exercise testing
- Ambulatory blood pressure monitoring

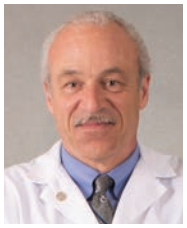
The echocardiography laboratory has been accredited by Intersocietal Commission for the Accreditation of Echocardiography Laboratories (ICAEL) since 2001. This accreditation is only granted to laboratories that can objectively demonstrate consistently high quality echocardiographic examinations and interpretations. Many Traverse Heart & Vascular cardiologists hold additional board certification in all aspects of echocardiography, guaranteeing that patients receive the highest quality echo services available.

Munson's Advanced Cardiac Imaging Physicians

Todd R. Adams, DO
Daniel L. Bonifacio, DO, FACC
Anna M. Booher, MD, FACC
Mark A. Elliott, MD, FACC
James M. Fox, MD, FACC
Anne M. Hepner, MD, FACC
Steven T. Mast, MD, FACC
Anthony B. Ochoa, MD, FACC
Dino Recchia, MD, FACC
John A. Varner, DO

Cardiac Surgeons Perform Comprehensive Therapeutic Procedures at Munson Medical Center

The Cardiothoracic Surgical Team at Munson Medical Center Includes:


Daniel H. Drake, MD


Shelly C. Lall, MD


R. Glade Smith, MD


Mack C. Stirling, MD

Cardiac Procedures

- Coronary Artery Bypass Grafting
- Aortic Valve Repair/Replacement
- Aortic Valve Repair/Replacement - Minimally invasive
- Mitral Valve Repair/Replacement
- Mitral Valve Repair/Replacement - Minimally invasive
- Tricuspid Valve Repair/Replacement
- Aortic Root Repair/Replacement
- Pulmonary Valve Replacement
- Aortic Aneurism Repair (ascending as well as descending)
- Reconstruction of transverse arch with circulatory arrest
- Atrial Septal Defect Repair/Ventricular Septal Defect Repair
- Septal Myectomy
- Cardiac tumor excision
- Left Ventricular Aneurism Repair
- MAZE procedures for atrial fibrillation
- Ligation of Left Atrial Appendage

Thoracic Procedures

- Lobectomy via Thoracotomy
- Lobectomy via VATS (thoracoscopic)
- Esophagectomy
- Esophageal perforation repairs
- Esophageal diverticulectomy and myotomy
- Chest wall resection/reconstruction
- Anti-reflux procedures
- Pleural decortications
- Pleural and Lung biopsy via VATS (thoracoscopic)
- Mediastinoscopy
- Diaphragm plication
- Thymectomy

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Patients experience immediate relief of their symptoms following the procedure and are maintained on a regimen of dual antiplatelet therapy for a minimum of one year. The restenosis rate after CTO intervention is under 12 percent.

Clayton decided to pursue CTO training through a proctored course with a CTO operator after reading about the procedure. Today, only about 1 percent of interventional cardiologists in the United States perform CTO intervention – in part because the procedure carries increased risk and it is time consuming. While other interventions may take 30 minutes, a CTO procedure can take up to three hours and requires a high degree of patience on the part of the CTO operator. However, more CTO operators may be coming onboard.

"What's happening in the country is a push among interventionalists to train a sub-group who will achieve a higher level of skill set, and those will be the individuals doing CTO."

Munson Interventional Cardiologists with CTO Training

John N. Beattie, MD, FACC
Kevin J. Clayton, DO, FACC

Pediatric and Adult Congenital Clinics Held in Northern Michigan

In collaboration with Munson Healthcare, four pediatric cardiologists travel to northern Michigan to hold regular specialty clinics so children and adults with congenital heart disease in the region do not have to travel far for specialty care.

Adult Congenital Heart Program Clinic

University of Michigan Congenital Cardiology has held pediatric clinics in Traverse City since 1978. The Adult Congenital Heart Program formally joined this outreach two years ago. With advances in surgery and medicine more than 20 years ago, the number of adults living with a congenital heart condition now exceeds the number of children with such a condition.

U-M pediatric cardiologist **Mark D. Norris, MD**, sees adult patients every 3 - 4 months at Munson Medical Center, including working with Munson sonographers who perform ultrasound echocardiograms for these individuals. Adult patients also are seen as needed in Ann Arbor, usually within two weeks.

"Any heart condition that was present in childhood, even if discovered as an adult, is appropriate for our clinic," Norris said. "Individuals with congenital heart conditions, including those requiring heart surgery during childhood, should be seen at least intermittently by a congenital heart specialist, even if that person feels fine. Specific conditions include tetralogy of Fallot, coarctation of the aorta, and transposition of the great arteries. This is supported by the American Heart Association guidelines for Adult Congenital Heart Disease. In addition to routine follow-up, pre-pregnancy counseling, and cardiac care during pregnancy are included in this clinic."

Norris cross-trained in both pediatric and adult internal medicine, followed by congenital cardiology training, to serve in this role.

"The ability of the medical team, including the congenital surgeons, to improve the outcomes and quality of life for individuals born with heart conditions has never been better and is continually improving," he added. "I find great fulfillment in contributing to the continuum of care across the age spectrum."

For more information, contact Norris at **(734) 936-6266**, the Adult Congenital Heart Program at **(877) 720-3983**, or go to **umcvc.org/medical-services/congenital-heart-disease**.

Pediatric Clinics

Catherine L. Webb, MD, a pediatric cardiologist from University of Michigan, holds monthly pediatric cardiology clinics at the Munson Healthcare Specialty Clinic in Traverse City, usually on the fourth Thursday of the month. Webb also collaborates in the care of adults with congenital heart disease. Webb completed her residency in pediatrics and her pediatric cardiology fellowship at the University of Michigan Health System.

McDonald Dick, II, MD, a U-M pediatric cardiologist who started outreach pediatric cardiology clinics in Traverse City 37 years ago, continues to see patients at the Specialty Clinic about three times a year.

Contact Information

- For U-M pediatric cardiology appointments at the Specialty Clinic in Traverse City, call **(231) 935-8125**.
- For UMHS emergency pediatric cardiology consultation at any time, call the UMHS paging at **(734) 936-4000** and ask for the pediatric cardiology consult fellow on call.

Kim Lee, MD, FACC, a pediatric cardiologist from Helen DeVos Children's Hospital in Grand Rapids with more than 24 years of experience, specializes in diagnosing and treating cardiovascular issues affecting children of all ages. He holds a monthly specialty clinic in the Cardiac Diagnostic Suite at Munson Medical Center, usually on the third Thursday of the month. For consultation or to make a referral, contact Helen DeVos Children's Hospital at **(616) 267-9150**.

Traverse Heart & Vascular

A Service of Munson Medical Center

1200 Sixth Street, Ste. 200
Traverse City, MI 49684

Meet the Webber Heart Center Team

The Webber Heart Center team provides preventive, interventional, and ongoing comprehensive care for patients with cardiac conditions.

Cardiothoracic Surgeons of Grand Traverse

(231) 935-5730

Daniel H. Drake, MD
Shelly C. Lall, MD
R. Glade Smith, MD
Mack C. Stirling, MD

Traverse Heart & Vascular

1-800-637-4033

Todd R. Adams, DO
John N. Beattie, MD, FACC
Daniel L. Bonifacio, DO, FACC
Anna M. Booher, MD
Kevin J. Clayton, DO, FACC
Roberto A. Corpus, MD, FACC, FSCAI
Mark A. Elliott, MD, FACC
James Martin Fox, MD, FACC
Anne M. Hepner, MD, FACC
Brian D. Jaffe, MD, FACC
Robert Kennedy, MD
Steven T. Mast, MD, FACC
M.R.S. Nair, MD, FACC
Anthony B. Ochoa, MD, FACC
John E. Raftery, MD, FACC
Dino Recchia, MD, FACC
Michael E. Schulte, MD, FACC
Nicklaus K. Slocum, MD
Mark S. Smith, MD, FACC
John A. Varner, DO

How to Refer Patients

To refer patients for consultation, specialized care, or for a physician consult, please contact a physician at the numbers noted here. For 24/7 hospital transfers, please call **1-800-468-6766**.

Traverse Heart & Vascular clinic locations:
Alpena, Cadillac, Charlevoix, Frankfort, Gaylord, Grayling, Kalkaska, Manistee, Prudenville, Sault Ste. Marie, and Traverse City