University of Michigan
Cardiovascular Center

2011 Annual Philanthropic Report

University of Michigan Cardiovascular Center

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HAIL

12TH IN THE NATION

HAIL

U-M CARDIOVASCULAR CENTER

TO MICHIGAN.

The University of Michigan Cardiovascular Center is honored to once again be recognized for our extraordinary medicine by *U.S. News & World Report*. That's the Michigan Difference. UofMHealth.org/heart

University of Michigan
Cardiovascular Center

From the Directors

We're building the team that's redefining cardiovascular care and research.

NOW IS THE TIME. THIS IS THE PLACE.

Now is the time

Treating and preventing cardiovascular disease remains a formidable challenge despite the significant strides made here and at other leading institutions throughout the world. Every 25 seconds, someone in this country suffers a coronary event, and nearly once a minute, one of those events takes a life. Heart disease is the leading cause of death for both men and women, accounting for one in six deaths in the U.S., and one in four deaths here in Michigan. It is estimated that as a nation we spend in excess of $500 billion on health-care services and procedures, medications, and lost productivity linked to cardiovascular disease. In Michigan alone, that number is projected to approach $17 billion. Factor in the treatment of related conditions like stroke, hypertension and aneurysms, and the costs are even higher.

This is the place

Clearly, much has been accomplished and much more work lies ahead as we turn the tables on heart and vascular disease. We are making significant strides forward as we work to realize the bold vision we declared when we opened the doors to our wonderful facility: **The University of Michigan Cardiovascular Center will be the best academic heart and vascular center in the world.**

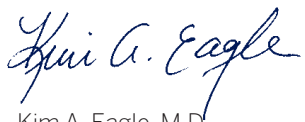
Where has our progress led us?

We encourage you to read this report and draw your own conclusions. With so much happening at our Center, deciding which projects and programs to highlight was not easy. We hope our selections give you a behind-the-scenes look at the innovation, inspiration, personalities and passion that drive this amazing place.

Teamwork

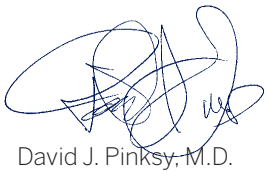
It is one of the common themes running through all of these profiles—and one of the principles fueling our continued success. From early-career scientists partnering with established experts to uncover the genetic origins of congenital heart defects, to surgical teams collaborating to perform life-saving procedures other top institutions won't even attempt, to a game-changing initiative uniting faculty, staff, patients, family members and donors to improve the quality and transparency of the care we deliver, these stories reflect a fundamental truth of this place: **Every step forward is a step we take together.**

On behalf of the faculty and staff of the Cardiovascular Center, the thousands of cardiovascular patients and families we care for each year, and the millions who will benefit from the advances pioneered here, we thank you for being part of our team. We hope you will continue to join with us as we shape the future of cardiovascular care and research at Michigan and around the world.



Kim A. Eagle, M.D.

Linda R. Larin, M.B.A.



David J. Pinksy, M.D.

Richard L. Prager, M.D.

James C. Stanley, M.D.


THE UNIVERSITY OF MICHIGAN
CARDIOVASCULAR CENTER WILL BE
THE BEST ACADEMIC HEART
AND VASCULAR CENTER
IN THE WORLD.

From the President

As president of the University of Michigan, I am delighted to share the remarkable accomplishments of this great institution and the stories of the men and women who come together to create them. An example of such excellence is found in the extraordinary work of the U-M Health System's Cardiovascular Center (CVC).

Inspiration can be found around every corner—in the outstanding efforts of the Center's faculty and staff, the courage of patients and families, and the steadfast support of committed donor partners. The CVC embodies the Michigan Difference, the spirit of innovation, collaboration, expertise and integrity that guides everything we do. Here we deliver optimal care, provided with compassion. Unrelenting curiosity fuels pioneering research. Top-ranked medical and scientific training develops the brightest minds into tomorrow's leaders and best.

We can be proud of the impact the CVC is having on cardiovascular medicine worldwide. Michigan is helping pave the way to a heart-healthy future for us all.

Sincerely,

Mary Sue Coleman

Mary Sue Coleman
President

From the Executive Vice President for Medical Affairs

Four years ago, when we opened the doors to our new Cardiovascular Center (CVC) building, we opened a new era in cardiovascular research and care at the University of Michigan; an era that emphasizes multidisciplinary collaboration and innovation across our tripartite mission, as well as national leadership in providing exemplary patient- and family-centered care.

I am pleased to note that we are seeing tremendous results, as you will see in this Annual Philanthropic Report.

I know the CVC will continue to excel as a leader among peer institutions worldwide and I thank you for your continued support of our vision.

Ora Hirsch Pescovitz
Executive Vice President for Medical Affairs

OUR VISION

The University of Michigan Cardiovascular Center will be the best academic heart and vascular center in the world.

OUR CORE VALUES

We, the staff and faculty of the Cardiovascular Center team, are committed to advancing medicine and serving humanity through living and teaching our core values of:

Respect & Compassion
We honor and care for one another as individuals.

Collaboration
We honor the synergy of team, built on trust.

Innovation
We honor individual and collective creativity.

Commitment to Excellence
We honor the intrinsic desire to be "Leaders & Best."

OUR MISSION

The University of Michigan Cardiovascular Center will be a premier center creating an understanding of cardiovascular disease across the life span, through multi-disciplinary collaboration between clinicians and scientists, to achieve:

Superior compassionate patient care

Innovative science and discovery

Excellence in education

Photo: U-M Cardiovascular Center CoreValve® Trial Team

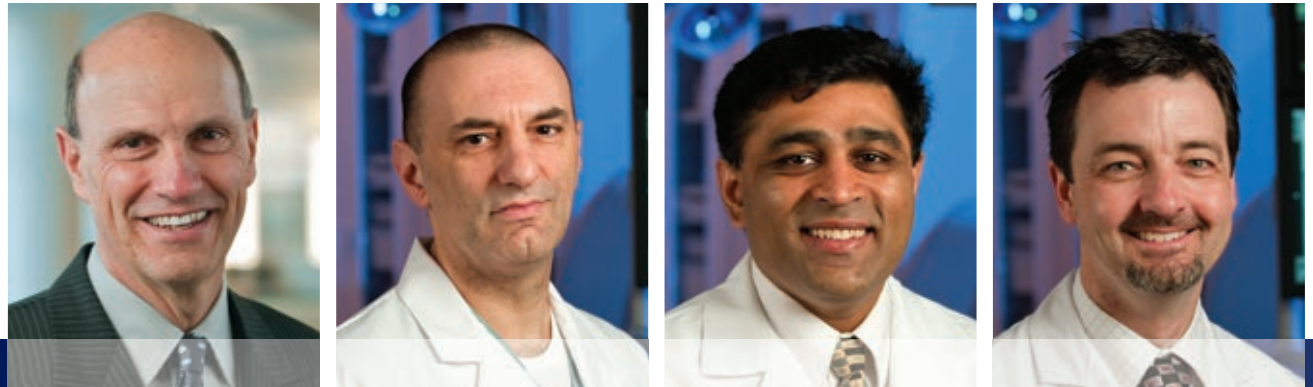
Clinical Research Update:

Testing a less invasive option for the treatment of severe aortic stenosis

Severe aortic stenosis is a narrowing of the aortic valve usually caused by a gradual buildup of calcium on the valve walls. The narrowed opening requires the heart to work harder to pump blood through the body. Over time, the heart's ability to compensate is diminished. Left untreated, severe aortic stenosis can lead to heart failure.

The condition affects roughly 100,000 people in the U.S. each year. While replacing the aortic valve is the most commonly-recommended treatment, not all patients are good candidates for open-heart surgery. Some of those patients may benefit from a new, less invasive approach currently being tested at top institutions across the country, including Michigan.

The Medtronic CoreValve® U.S. Pivotal Trial, sponsored by valve manufacturer Medtronic, is a national, randomized clinical trial to test the safety and effectiveness of a procedure called Trans-Catheter Aortic Valve Implantation (TAVI). Interventional cardiologists and cardiac surgeons partner to perform the procedure. The replacement valve is attached to a wire frame and is guided into place by the



From left to right:
G. Michael Deeb, M.D.
Stanley J. Chetcuti, M.D.
Himanshu J. Patel, M.D.
P. Michael Grossman, M.D.

surgeon using a thin, flexible catheter inserted through the groin. Once in place, the wire frame expands and the new valve opens and begins to function.

"The insult to the body of open heart surgery is just too much for very aged or fragile patients," explains G. Michael Deeb, M.D., Herbert Sloan Collegiate Professor of Cardiac Surgery. "The TAVI procedure is significantly less invasive. It takes approximately two hours to complete, versus four hours for an open-heart procedure. Hospital stays and recovery time are also reduced. Patients can take three to six months to recover from major surgery. With this procedure, that time is cut to about three weeks."

The U-M Cardiovascular Center (CVC) is one of just 40 U.S. sites selected to participate in the trial, due in large part to the Center's multidisciplinary approach and extensive experience in treating aortic disease. Over 600 surgical valve procedures are performed at the CVC each year—more than any other center in the state.

In total, about 50 patients are expected to be enrolled in the trial at the CVC, with procedures completed and data submitted to the Food and Drug Administration by early 2012. If the results are favorable, the FDA will grant approval for use in high-risk patients. If and when that happens, U-M will be among the first centers to offer TAVI, having already been trained on the procedure.

Will TAVI eventually become the standard of care for all patients with aortic stenosis? Deeb cautions against seeing the procedure as a panacea. "As promising as it appears to be for high-risk patients, TAVI is not right for everyone suffering from aortic stenosis. Unlike a traditional valve replacement, the original valve is still there, and can continue to become calcified and cause problems over time."

Even if TAVI isn't the 'magic bullet' for treating every case of aortic stenosis, Stanley Chetcuti, M.D., the Eric J. Topol Collegiate Professor of Cardiovascular Medicine, is excited about its potential to help the most vulnerable patients. "At Michigan, we've become leaders in the care of aortic valve disease, and are now arguably one of the best sites in the country," he says. "Yet despite having the best technology and equipment, there is a small subset of patients we aren't currently able to take care of with open heart operations." Himanshu Patel, M.D., Associate Professor of Cardiac Surgery, agrees, "What we hope to find [with the CoreValve® implant] is that patients who are very sick with comorbid conditions will have an improvement in their life expectancy and quality of life," he says.

In the last five years, U-M has participated in a variety of cutting edge clinical trials. TAVI is just one of them.

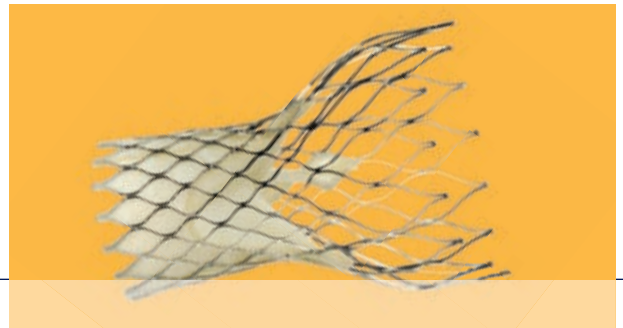


Photo: Illustration of TAVI catheter

Don's job is putting lifesaving systems in cars. Our job was putting one in him. After an aortic dissection and a pair of aneurysms, one near a transplanted kidney, Don's life was in extreme danger unless his damaged aorta was repaired. After doing extensive research (like any good engineer) and having his case reviewed by experts nationwide, Don discovered that the best doctors for his particularly delicate and complex surgery were the specialists at the U-M Cardiovascular Center. They repaired his damaged artery with a 12" replacement made from materials very similar to the air bags Don designs to save lives. The irony wasn't lost on him. Now he's in great shape and back on the job. That's the Michigan Difference. Find out more at the Cardiovascular Patient Care Center at **umcvc.org/aorta or call 877-892-6782**.

University of Michigan
Health System

A Closer Look

The University of Michigan Venous Health Program

Being 'Leaders and Best' in cardiovascular medicine means making sure every base is covered. That means being on friendly terms with every blood-carrying organ and vessel in the body. A quick tour of the body's vascular system helps illustrate just how big a job that is. Blood is circulated through the body through a network of arteries—which carry oxygen-rich blood from the heart to capillaries—where oxygen and other vital substances are extracted for use in the body's various organs and systems. Veins then return the de-oxygenated blood to the heart and lungs to be replenished. Laid end-to-end, this circulation superhighway is estimated to stretch up to 100,000 miles.

At any given moment, the venous system is carrying more than half of the body's total blood volume. Clearly, looking out for the health of veins is important—if sometimes unsung—work. The Venous Health Program was started at the U-M Cardiovascular Center (CVC) in 2009 to take on that job—addressing every aspect of vein health.

Conditions that can impact the venous system range from relatively mild, largely cosmetic problems like spider veins, to larger and painful varicose veins, to disabling and even life-threatening conditions like deep vein thrombosis (DVT), the formation of a clot in a deep vein, or pulmonary embolism, which occurs when a DVT dislodges and travels to the lungs.

The CVC's Venous Health Program is staffed with experts from vascular medicine, vascular surgery, interventional radiology and more. "Our program is unusual in that it combines a number of care providers across disciplines in a highly-integrated way," explains vascular medicine specialist James Froehlich, M.D., M.P.H. "We're not just consulting on cases, we're working side-by-side daily to provide truly collaborative care."

Photo: U-M Cardiovascular Center Venous Health Team

One of the big differences for patients: the chance to see more than one doctor at the same time. New patients are often seen by two specialists, providing a broader perspective on their conditions and often recommending treatment strategies they may not have otherwise considered. Care is coordinated by a dedicated nurse practitioner, who helps pair patients with the right care team for their specific needs.

"Other programs tend to focus on one specialty, like conditions effecting the legs, or varicose veins," says James Shields, M.D., a radiologist on the team. "Our approach touches every aspect of venous health from the toes to the heart, and even issues that occur within the upper extremities. Our partners in hematology also help with anticoagulation issues, which can be a major factor in treatment. It's a much more comprehensive, individually-tailored program than you'll find elsewhere."

Clinic data from the past two years illustrates just how high demand is for a program like this. In the 2011 fiscal year, 684 clinic visits were scheduled, resulting in 176 procedures—a year-over-year increase of 99% in clinic visits and 171% in procedures respectively. To lead vascular surgeon Thomas Wakefield, M.D., the S. Martin Lindenauer Collegiate Professor of Vascular Surgery, those numbers prove what's possible when you listen to patients and design a program around them. "Patients like the fact that they are likely to see more than one doctor at the same time. They also appreciate that our nurse practitioner is a constant in their treatment."

Ready for the most complex cases

The volume and variety of patients they see means the team regularly takes on cases other doctors might face only once in a career. "The less common venous problems can be challenging for a practitioner who doesn't see them regularly," explains Dr. Froehlich. "They're tough to diagnose, and in some cases, might be better managed with more complex therapy."

As an example, Dr. Froehlich cites a condition called May-Thurner syndrome. Unlike clots that form due to immobility or illness, this condition, more common in women, is the result of an anatomical abnormality causing compression of an important vein. Many doctors

are unfamiliar with the syndrome, but the U-M team sees these cases regularly, and can provide both a more accurate diagnosis and a more aggressive treatment strategy, including interventional radiology techniques to open the vein or dissolve the clot.

Dr. Shields shares another case in point: A 14-year-old boy recently brought to the clinic with a complete occlusion, or blockage, of his inferior vena cava, the body's largest vein, responsible for returning blood from the lower part of the body to the heart. "We were able to establish or re-establish blood flow by implanting stents in the fully-grown veins. It involved multiple procedures taking many hours to complete. Other institutions aren't so equipped to take on cases like that."

Searching for even better outcomes

CVC investigators interested in venous health are pursuing numerous basic research ideas with the potential for clinical translation. One study is looking at using biomarkers—molecular signals released into the bloodstream when a clot forms—as possible diagnostic tools. "Today, we rely primarily on ultrasound images to diagnose a clot," explains Dr. Wakefield. "But that's not always a feasible approach, and it doesn't tell the whole story. We hope these biomarkers will be able to tell us more about a patient's clot, including whether or not it is likely to resolve on its own. We're always weighing the risk of taking too conservative an approach to a clot with the increased bleeding risk that can come with more aggressive treatments. Knowing more about a clot's biological characteristics may help us assess those options."

An exciting example of the clinic research underway in venous health is TriVex™ from InaVein, L.L.C., a new technique for treating patients with a large number of varicose veins. Michigan is one of only a few academic institutions evaluating this less-invasive technique. "Large-scale removals typically take three to four hours and require 40-50 incisions. With this system, that's reduced to about an hour, and perhaps just four or five incisions."

Dr. Wakefield sums up how this special team feels about their one-of-a-kind program. "It's all about bringing new and better solutions to patients sidelined by venous disease. It's exciting to be involved in a new way of treating patients, and to be at the center of what's happening in our field."

True Blue

A legacy four generations in the making

"I guess you could say I'm 'true blue,'" says Eric Bates, humbly describing his lifelong connection to the University of Michigan. Bates was born in the Women's Hospital two months after it opened, on Valentine's Day 1950, into what has become one of the largest legacy families associated with the University of Michigan. More than 50 members of the Bates extended family have graduated from U-M—the first back in 1897—including eight with medical degrees. Dr. Bates earned his in 1976, completed his internal medicine residency and cardiology fellowship at U-M, and joined the faculty in 1981. Now, the University is proud to announce an effort to raise $500,000 to create an Endowed Collegiate Professorship in Dr. Bates' honor. (See page 52)

For Dr. Bates, the decision to study, teach, research and practice medicine at Michigan was motivated by much more than tradition. "I've always believed that to be the best, one must associate with the best," he says. "In medicine, that means Michigan."

Over the course of his career, Dr. Bates has experienced firsthand the most pivotal events in modern cardiology. While completing his fellowship, he was, as he likes to say, "at the right place at the right time," witnessing and participating in major technological breakthroughs in how heart disease is diagnosed and treated, including echocardiography, electrophysiology, and interventional cardiology. As a practicing clinician in the early 1980s, he played a key role in elevating Michigan to national prominence as one of the first medical centers to employ reperfusion therapies—emergent balloon angioplasty and clot-busting drugs—to open blocked arteries and restore blood flow. "For those of us in on the ground floor of developing, researching and teaching those interventions, it was an exciting time," he recalls. "...even more exciting was seeing them become the standard of care worldwide."

Photo: Eric R. Bates, M.D.

Of course, none of those advances would have been realized without extensive clinical research, and in that area, too, Dr. Bates has been instrumental in establishing Michigan as a leader. Under his guidance, U-M has grown into an international hub for large-scale clinical testing of new treatments for heart attacks, both catheter-based and pharmacological.

"It's hard to overstate the dramatic impact these advances have had on patient outcomes," says Bates. "When I began in cardiovascular medicine, a heart attack was widely considered more deadly than cancer. About one in five heart attack patients died while in the hospital, and another ten percent died within two weeks of discharge. Today, it's completely different. Survival rates are better than 95%, and patients are up and around and able to return to their regular activities within days of symptom onset."

Dr. Bates is also one of Michigan's most talented and passionate teachers. In over three decades on the faculty, he has personally trained over 200 cardiology fellows in cardiac catheterization and coronary angioplasty, a number unequalled by any faculty member in the history of the Medical School. Inspired by his example, the physicians he has trained have gone on to play leadership roles in top hospitals and private practices across the country, carrying on the U-M tradition of academic distinction and reinforcing its reputation as a global leader in cardiovascular medicine.

What advances does Dr. Bates see on the horizon in interventional cardiology? He has high hopes of seeing his colleagues use new, less invasive techniques for replacing faulty aortic valves by implanting new valves using a catheter (read more about this advance in the Clinical Research Update on page 7 of this report). "We think this new approach has great potential for some of our older, more fragile patients, who might not be good candidates for traditional surgery to replace their calcified valves," he explains. "And, like so many times before, I'm pleased to have a front row seat to watch Michigan lead the way in testing a promising new technology."

Dr. Eric Bates has lived through extraordinary times; by his own estimation, none more extraordinary than right now. "As we seek even better outcomes for patients, cardiovascular care is growing more complex," he says.

"There's also an urgent need to train the next generation of heart specialists. To me, medicine has never been more challenging, or more exciting, than right now."

Coming from a family tree that boasts four generations of Wolverines, Dr. Bates is certainly part of a proud Michigan legacy. But it is as a clinician, investigator and teacher that he continues to make that 'true blue' legacy his own, improving outcomes for heart patients everywhere, and in the process, elevating the reputation of his family's alma mater as an international center of excellence in cardiovascular care.

The leaders in heart health. Phillip Mooney knew something was wrong when simply putting on a shirt in the morning exhausted him. The diagnosis was chronic atrial fibrillation, a dangerously rapid heartbeat. Luckily, his doctor recommended the experts at the Cardiovascular Center of U-M. Our Arrhythmia Program has a world-renowned reputation as a leader in the research and treatment of heart rhythm problems. And it teams highly experienced specialists with advanced technology to ensure patients like Phil get back to a healthy, happy life. That's the Michigan Difference. **Call 877-885-8333 or visit umcvc.org/af.**

University of Michigan
Cardiovascular Center

The Preventive Cardiology and Women's Heart Programs

When you're trying to avoid a heart attack, or prevent a second event, you can't have too many people in your corner. That's the thinking behind the Preventive Cardiology Program—to make it easier for at-risk patients and prevention experts to partner for better cardiovascular health.

Since the best strategy for averting a heart attack is to address all of the risk factors that could possibly bring one on, patients of the program should expect much more than a standard check-up. In total, the program encompasses over a dozen specialty clinics and services (see box on right) at the U-M Cardiovascular Center's (CVC) Domino's Farms location. So, in addition to consulting with cardiologists specializing in preventive care, they'll also receive advice from experts in exercise physiology, nutrition, stress reduction and more.

Combining so many related programs under one umbrella is the vision of program director, Melvyn Rubenfire, M.D. A nationally-recognized expert in preventive cardiology and clinical lipidemiology, Rubenfire pioneered many of the preventive initiatives that now set Michigan apart, including the Metabolic Fitness program (MetFit)—a lifestyle intervention program designed to treat metabolic syndrome in a cardiac rehab setting. Experience has taught him the importance of coordinating all of the elements of a patient's preventive care. "MetFit is a great example of how to put all the pieces together," he explains. "Patients with this set of risk factors face up to seven times the risk of diabetes and up to three times the risk of cardiovascular

Photo: LaVishia McDonald and family with an image of her left ventricular assist device

UNDER ONE ROOF:

PREVENTIVE MEDICINE AT DOMINO'S FARMS

- Cardiac Rehabilitation
- Diagnostic Testing
- Education and Counseling
- Executive Health Program
- Exercise Consultation and Fitness Center
- General and Preventive Cardiology
- Hypertension Clinic
- Lifestyle Enrichment Action Plan (LEAP) Program
- Lipid Management and High-Risk Detection Program
- Mental Health and Coronary Disease Program
- Metabolic Fitness Program (MetFit)
- Nutrition Services
- Weight Management
- Women's Heart Program

disease. For them, lifestyle change is critical. But most have been unable to make changes on their own. Here, during weekly sessions over a six-month period, they interact with a team of experts in cardiology, exercise, and nutrition and more, all dedicated to helping them to make lasting changes."

The Preventive Cardiology Program is a hallmark of the CVC's unique approach to caring for cardiac patients. Very few institutions combine all of these services in one center. More often, at-risk patients elsewhere are seen in their doctors' offices or on-site in a hospital setting, but are essentially on their own to put together all of the pieces of an effective prevention program.

What makes the program so unique for patients also makes it an ideal training ground for health professionals interested in prevention. "The program is home to outstanding physicians and professionals in so many disciplines," notes CVC Director, Kim Eagle, M.D. "Our cardiology fellows all rotate through the program, as do outstanding individuals training in physiology, nutrition, behavioral medicine and complementary or alternative medicine."

Just for women

Heart disease kills more women than any other condition. The Women's Heart Program focuses on the specific issues faced by women at risk of cardiovascular disease. Elizabeth (Lisa) Jackson, M.D., M.P.H., is the Director of the program. "We know from large-scale research initiatives that, although both women and men encounter the same conditions—coronary heart disease, peripheral vascular disease, metabolic syndrome—the risk factors look slightly different in women than in men. The Women's Heart Program is devoted to meeting the special needs of our female patients and to increasing our knowledge of the factors that make cardiovascular disease such a threat to them."

Jackson sees the impact a comprehensive, coordinated approach has on patients. "One of the keys to helping women make lifestyle changes is to convince them that change is possible," she says. "By providing personalized, evidence-based information, we're able to show our patients the real, quantifiable results exercise, medication, nutrition and relaxation can have on managing their risk factors. That's a powerful motivator for maintaining new, healthier habits."

Photo: Melvyn Rubenfire, M.D., and Elizabeth (Lisa) Jackson, M.D., M.P.H.

Prevention research

Every aspect of cardiovascular health is addressed within the CVC's Preventive Cardiology and Women's Heart Programs. And for virtually every clinical component, there is a corresponding research initiative underway to learn more. Here are a few highlights of current basic, clinical and translational projects:

- CVC researchers are studying genetic biomarkers that could play a role in the prevention of coronary disease.
- Scientists are also focused on developing better risk assessment tools including the expanded use of calcium scoring and CT imaging.
- Another CVC research team is studying coronary blood flow in women, and how it is impacted by hormonal changes.
- CVC investigators are partnering with researchers from the Department of Psychiatry to examine how coexisting psychological conditions like depression impact a patient's likelihood of adhering to a treatment plan.
- Collaborations are also underway with the Institute for Social Research, studying disparities in cardiac rehabilitation in patients from different ethnic and socioeconomic groups.

What lies ahead

"The next step for this program is to fully integrate its research and clinical services," says Dr. Eagle. "When we can translate what we're learning about genetics, serum proteins, biomarkers, and advanced imaging into the clinic, we'll be able to provide patients with far more individualized risk profiles and treatment plans than ever before. That is our exciting future."

Heart disease kills more women than any other condition.

Photo: U-M Cardiovascular Center Women's Heart Program
From left to right:
Elizabeth (Lisa) Jackson, M.D., M.P.H., Claire S. Duvernoy, M.D., Melinda Davis, M.D., Cheryl L. Bord, N.P., M.S.N.

A life-altering heart condition doesn't have to alter your life.

Normally vibrant and energetic, Donna suddenly felt exhausted and out of breath. She was initially diagnosed with pneumonia, but when she didn't improve, she found answers at our Women's Heart Program. Donna's cardiologist explained that what she really had was Atrial Fibrillation. At the nationally recognized U-M Women's Heart Program, we know that women are different from men. That their heart symptoms differ. And that diagnosis and treatment have to be looked at holistically, examining all aspects of a woman's health. We collaborated with Donna's other U-M doctors on her blood pressure issues and diabetes to come up with a coordinated plan. Today, Donna's traveling, golfing and dancing again. Living life her way. That's the Michigan Difference. Find out more at **UofMHealth.org/womensheart or call 877-885-8444.**

University of Michigan
Cardiovascular Center

An Idea Whose Time has Come

The Cardiovascular Center's Patient and Family Centered Care Program gains momentum and attention

The Cardiovascular Center's (CVC) Patient and Family Centered Care Program (PFCC) began in 2009 in response to one of the strategic pillars of the U-M Health System: Create the ideal patient experience. CVC leadership realized that to truly embrace this vision, they needed the participation of patients and families on a level not seen before.

"We know patient care can be even better than it is today," says Linda Larin, M.B.A., Chief Administrative Officer of the CVC. "We're committed to creating a true partnership to improve patient care. It's about giving patients and families a voice in our decision-making: a seat at our table."

One way to make sure patients are heard is to put one at the head of that table. The CVC asked two-time heart transplant recipient Erik Morganroth to co-chair the Patient and Family Advisory Committee (PFAC), along with CVC Director Richard Prager, M.D. "There's very little I didn't experience as a patient here," says Morganroth. "Prior to my first transplant, I was on a machine to keep my heart pumping for 34 days—longer than anyone in the world at the time. I know this place as well as anyone." Another PFAC volunteer is Bonnie Davis, who represents the voice of the family member. Again, it's hard to imagine anyone better qualified. "My husband Ralph (featured in the UMHS "Victors" ad campaign) was hospitalized for nearly a year," she recalls, "including more than three months in the ICU." "For one extended stretch, all of his major organs—heart, lung, liver and kidney—were in total failure. Clearly, it was up to me to oversee his care." The experience and insight of these and other committed volunteers is the driving force behind this timely initiative.

A little more than a year into the program, the PFAC is making remarkable progress on their ambitious "to do" list. Their top priorities: raise awareness of the program

Photo: Hitinder Gurm, M.D., with a U-M Cardiovascular Center patient

among all caregivers, patients and families, initiate training for faculty and staff, and pilot a series of tools to facilitate better communication between patients, families and their care providers.

Empowering patients and families

Both Erik Morganroth and Bonnie Davis feel strongly that patients will best learn to speak up if their caregivers get the conversation started. "The one thing that will promote patient and family involvement most is to solicit their feedback, rather than expecting them to initiate the dialog," says Davis. "They need to know that everyone has a role to play in patient care." Morganroth agrees, "The education, signage, and other tools we're developing are a great start. They're all intended to 'break-the-ice' and make patients and family members more comfortable sharing their ideas and concerns."

Educating (and re-educating) faculty, staff and students

One of the biggest challenges is to get every member of the healthcare team thinking in a new way about the role of patients and family members in decision-making. For that, the PFAC is creating and refining a portfolio of educational interventions designed to connect with everyone from the most experienced clinician to the greenest first-year medical student.

Elizabeth (Elsie) Nolan, M.S., R.N., Director of the CVC's Patient Education Program and Mardigian Wellness Resource Center, leads the Patient and Family Centered Care Committee and serves on the PFAC. "We've learned that we need to provide targeted education about practicing patient- and family-centered care," she says.

> "Even more importantly, we need to put what we learn into practice, so patients and families see that it's the way we deliver care every day, not a theory or a passing fad."

Another committee member, interventional radiologist James Shields, M.D., sees the move toward patient- and family-centered care as nothing less than a revolution. "It's a whole cultural change—not unlike when patients and families began turning to the internet for health information. It used to be that doctors talked and patients listened. Now, it's a real conversation."

Nolan agrees. "It's been wonderful to see how engaged everyone is in the conversation—patients, families, faculty and staff. It shows just how important patient- and family-centered care is to those we serve, to the CVC and to the whole Health System."

Looking forward

In its third year, the CVC expanded the PFCC symposium to include participants from across the Health System. Larin says, "The team has big plans for the year ahead.

In the fall of 2012, with the support of a generous donor, we will host the National Institute for Patient- and Family-Centered Care Conference in Ann Arbor, which is a chance to showcase our progress to date before a national audience." The program will also receive international recognition in 2012. Three CVC presentations will be part of the International Conference on Patient- and Family-Centered Care to be held in June, in Washington, D.C.

Members of the PFAC have been enlisted to advise other areas of the Health System on their efforts to embrace patient- and family-centered care. Their opinions have been sought by those evaluating everything from architectural plans for future in-patient care areas, to changes in patient menus and food service, to the design of tomorrow's hospital gowns.

Clear metrics have been established for the program, and as time goes on, more information will be available to assess the impact the program is having on not only patient, staff and faculty satisfaction, but safety, medical errors, length of hospital stays and more.

A big step toward realizing those goals is getting the whole organization to embrace the concept of patient- and family-centered care. PFAC Co-Chair Erik Morganroth believes that's happened. "It's clear that the entire hierarchy of the hospital believes in their hearts—no pun intended—that results will be better, fewer mistakes will be made, and patients will be more satisfied."

Photo: D. Dan and Betty Kahn Reception Area at the U-M Cardiovascular Center

Donor's Vision Spurs Development of PFCC Program

From the start, donors interested in seeing the CVC reach its full potential found their own creative ways to lend their support to the initiative.

"I've always liked the idea of doing whatever we can to 'surprise and delight' our patients—and each other, for that matter," says Cardiovascular Center (CVC) National Advisory Board member, Ken Whipple, Chairman of Korn Ferry International. His initial involvement included sponsoring a core group of patients, family members, faculty and staff to attend a national conference on the topic. Ken and Kimberly Whipple, in partnership with other patient advocates, Michigan Governor Rick Snyder and his wife Sue, funded the production of a video featuring patients and families sharing their experiences; the video is being used not only at the CVC, but also as part of the U-M Health System's Service Excellence Program. This inspirational video, told from the point of view of patients and families, won the 2011 National CINE Golden Eagle Award, which recognizes excellence in film, television and news media production. The involvement of donors like Ken Whipple has helped the PFCC program gain momentum. "Programs like PFCC give us both a competitive edge and result in better clinical outcomes," says Whipple. "And of course, that's the way the whole world is moving, particularly in health care."

Photo: Dr. Kim Eagle congratulates Ken Whipple, holding the 2011 CINE Golden Eagle Award.

"Nothing About Me, Without Me"

Tools to help patients and families advocate for themselves

- **The "Dear Doctor" Notepad** – a simple yet innovative idea pioneered in 2009 by two U-M medical students. 'Dear Doctor' notepads are available in all CVC in-patient rooms, encouraging patients and families to jot down questions and concerns for discussion with their doctors. The PFAC imprinted the pads with their endorsement to increase awareness of the program and was funded through the Health System's Fostering Innovation Grant (FIG) awards program.
- **The "Get to Know Me" Poster** – an easy-to-use template for patients and family members to create their own descriptive profiles, featuring room for photos and personal information about family members, likes and dislikes, fears and concerns, hobbies, and more.
- **The "Wish I Would Have Known" List** – a compilation of the experiences of former patients to give new patients and families "insider information" about CVC services and amenities.

Extending an Amazing Life

An experimental procedure is helping Lola Taubman write the next chapter

"How far back do you want me to go?" asks Lola Taubman, when asked to sum up her life. At eighty-four, she has much to recount, from her youth in Czechoslovakia, to the horrors of the Holocaust, to the joys of being a wife, mother and grandmother. The most recent chapter in her remarkable story: participating in the Medtronic CoreValve® U.S. Pivotal Trial, a national clinical trial underway at U-M and other top U.S. hospitals to test the safety and effectiveness of a new, less invasive approach to replacing the aortic valve.

The procedure, called Trans-Catheter Aortic Valve Implantation or TAVI, is thought to be a promising option for patients with aortic stenosis who, because of age or frailty, may not be good candidates for traditional open-heart surgery. (Read all about the procedure, in the Clinical Research Update on page 7.)

"I am a survivor."

Born May 5, 1927, in the village of Szolyva in eastern Czechoslovakia, Taubman, then Lola Goldstein, was the oldest of four children, and the only daughter born to Maximilian and Zsenka Goldstein. Family life for the Goldsteins changed abruptly in 1942, when the Nazis moved into their village. In 1944, the family was relocated, first to the ghetto at Munkacs, and from there, to Auschwitz. At the gate, Lola was separated from her parents and brothers. "We didn't say goodbye because we thought we were going to stay together," she remembers. She would never see them again. Lola was the only member of her immediate family to survive Auschwitz. She would be transferred to several other camps before finally being liberated in 1945, and eventually emigrating to the U.S. in 1949.

After an ocean crossing marked by extremely rough weather, one of the first sights that greeted Lola Goldstein from the window of the ship was the Statue of Liberty, an apt symbol of the new life that awaited her. She settled first with relatives in New York and found employment with an import/export business. "Fortunately, I had learned English in high school," she recalls, "although it took a while to understand American slang." Two-and-a-half years later, the opportunity arose to move again, this time to connect with relatives living in Detroit. She jumped at the chance. "New York was just too much for me," she recalls. "Once, I passed out on the train and people stepped right over me!"

In Detroit, she worked in interior design before meeting her husband, Samuel Taubman. The couple married in 1954, raised three children in Michigan and later moved to Florida. Samuel Taubman died in 2004, and the following year Lola Taubman returned to Michigan and settled in Ann Arbor.

"Ready for anything."

"My heart troubles began in Florida, and grew worse as the years went on," says Taubman. "My U-M doctor, Dr. Kim Eagle, told me I'd eventually need surgery. My first reaction was 'not me!' Thankfully, I was able to qualify for this new procedure [TAVI], instead of open-heart surgery." Indeed, her strength, stamina and overall health, which had been nothing short of remarkable in recent years, were declining rapidly. Atrial fibrillation was causing severe shortness of breath, which, along with the effects of medications intended to manage it, were keeping her from enjoying the quality-of-life she had known.

Although she was ready to sign on for the trial procedure, Taubman would have to wait several weeks before doctors were comfortable proceeding. "They wanted to make sure I wasn't too sick, or too well," she says. Although she was anxious to have the operation, she understood the need to be patient. "After all," she states, "it took four years after the liberation for me to be able to come to this country. I'm used to waiting."

Finally, the medical team of Michael Deeb, Stanley Chetcuti, and Himanshu Patel gave her the 'green light', performing the valve replacement on July 22, 2011. "People can't believe it when I tell them what they did," says Taubman. "They go in [with a catheter] through one leg and up into the heart, and push the valve to the side. Then they go in through the other leg and put the new valve in its place. The old one's still there, it's just not working anymore."

At the time, Taubman was the tenth patient to participate in the TAVI trial at Michigan. Was she reluctant to undergo an experimental procedure? "Not at all," she says. "I had waited so long, and was feeling worse and worse, so I was ready for anything." Not surprisingly, the strength and determination that helped Lola Taubman through so much in the past was still hard at work. Two days after surgery, she was out of bed and taking a few steps. "Everyone applauded," she recalls.

Unfortunately, some setbacks and complications kept Taubman hospitalized at U-M and in an inpatient rehabilitation facility for several more months after the procedure. But now that she's home, she can tell the difference the valve is making. "Before, I had no energy at all. Today, I feel pretty good," she reports. For someone known for her energy, enthusiasm and drive, one of Taubman's new challenges is learning to listen to her body, and to pace herself. "I've overdone it a couple of times, trying to do too much. I have to remember to be careful doing physical things."

Lola's new heart valve has made a positive difference in her quality of life, and for that, she is grateful. By choosing to participate in the trial of an experimental procedure, she has helped to advance scientific knowledge that will aid untold thousands of heart patients for years to come. For that, and for the example she sets for how to survive—and thrive—we can all be grateful.

On June 9, the gala honoring Alfred Taubman and his philanthropic legacy was held at the A. Alfred Taubman Biomedical Science Research Building in Ann Arbor. The event included a reception, dinner, and special program. *Photo:* Lola, Julie and Theo Taubman

Photograph by Christine M.J. Hathaway for Hour Detroit Magazine

A Passion for Life's Possibilities

"I must tell you about something that happened here recently."

A conversation with Dr. Edward Bove, the Helen and Marvin Kirsch Professor of Cardiac Surgery, is a window into the rigors and the wonders of practicing medicine. He has one of the most in-demand, high-stakes jobs in the world—operating on the tiniest newborn hearts to correct perilous birth defects. Yet despite his daily heroics in the operating room, he always finds time to celebrate the victories, to credit his remarkable team, and to recount the stories of the courageous patients and families whose lives intersect with his.

"A young man made an appointment to see me. He had recently graduated from Michigan, and was about to cross the country to begin a job with Microsoft—the opportunity of a lifetime for a young engineer. Turns out, I had operated on him when he was just two days old—performing an arterial switch—one of the most complicated procedures we do here. I didn't recall his name, but he knew mine, his parents had recounted the tale to him so many times. Before embarking on the next chapter in his life, he wanted to meet me and say thanks. Moments like that make it all worthwhile."

Those encounters are happening more frequently these days, as Bove's young patients mature and become curious about the scars on their chests. But such meetings were unimaginable at the start of his career. In the 1970s, there were virtually no reliable surgical options to save these fragile newborns. Facing a frightening diagnosis like hypoplastic left heart syndrome (HLHS), parents had little choice but to say goodbye to their babies just hours or days after saying hello. Despite such daunting odds, Bove chose to specialize in pediatric cardiac surgery, motivated to "follow his fascination" by his first encounter with an infant patient who actually survived a corrective procedure.

Photo: Edward Bove, M.D.

That baby, and every baby since, inspired him to devote his life to finding ways to giving these special children a fighting chance at realizing life's possibilities. Today, Dr. Bove heads the U-M Department of Cardiac Surgery and is Co-Director of the Michigan Congenital Heart Center.

The tiniest hearts, in the most capable hands

About one in 100 babies in the industrialized world is born with one or more congenital heart defects, problems the heart simply can't outgrow. Due in large part to the skill, dedication and innovation of Dr. Bove and the remarkable team at the U-M Congenital Heart Center, babies born today with these defects face a much more promising future. Just a decade ago, the team performed two to three procedures weekly. Now, they commonly perform three to four each day—850-900 each year—on babies from around the state, the nation and the world.

That volume means that on a regular basis, surgeons at Michigan take on cases other heart surgeons might encounter only a few times in their careers. That familiarity helps to explain why survival rates for patients treated at Michigan now exceed 97%. Here, rare cases are almost routine, and extraordinary outcomes, practically ordinary.

But to Ed Bove, their stories are anything but ordinary. "Let me show you what arrived in the mail today," he says, reaching for a small card on his desk. He proudly shares a photo of a smiling toddler. "Isn't she gorgeous? We corrected her hypoplastic left heart syndrome when she was just a few days old. The relationships we build with families mean so much to us—when you give someone their child back, you create a very special bond."

Training tomorrow's leaders

Since 1985, Ed Bove has shared his skills with others, playing a key role in training hundreds of surgeons in the delicate procedures that correct heart defects in newborns. Among our most talented and passionate teachers, Bove was instrumental in establishing one of the few board-approved congenital heart training programs in the U.S. at Michigan. Doctors trained here go on to play leadership roles around the country and around the world, giving even more parents access to the very best outcomes for their babies, and reinforcing Michigan's reputation as a global leader in congenital heart surgery.

And, just as parents maintain a bond with Bove, the doctors who train with him continue to keep in touch. "Out in the hall," he says, gesturing toward the door, "are photos of each of the surgical fellows who have trained here. I just had an email from one of them, now working in Taiwan. He's accomplishing great things, but he made sure to tell me how much he misses those days in Ann Arbor."

Recognizing and celebrating the potential in others

In his 25-plus year career at U-M, Edward Bove has had a profound impact on the field of pediatric cardiac surgery. A desire to bring out the best in others has fueled his remarkable career. That, and a lifetime of wonderful stories. He can't resist sharing one more. "Not long ago I met another former patient, Tyler Brennan from Danville, Illinois. I operated on him at birth to correct HLHS, an otherwise 100% fatal condition. Now a healthy teenager, he's a star on his high school baseball team and is being recruited to play college baseball. After almost a thousand babies, what a thrill to come face-to-face with one as a healthy, vibrant young man."

Photo: Edward Bove, M.D., and Tyler Brennan

The University of Michigan Medical School is honoring Dr. Bove with an Endowed Professorship. Please visit page 53 to see how you can participate in this campaign.

Photo: Tyler Brennan

Project Healthy Schools celebrates its 8th year!

Project Healthy Schools (PHS) is a community-University of Michigan collaboration that provides middle-school-based programming to reduce childhood obesity and its long-term health risks. The program encourages healthy habits through education, environmental change and measurement. PHS' participants show significant and lasting improvements in health behavior and heart disease risk factors.

The alarming increase of childhood obesity and other preventable cardiovascular risk factors compelled Kim Eagle, M.D., University of Michigan Cardiovascular Center (CVC) Director and Albion Water Hewlett Professor of Internal Medicine, to initiate Project Healthy Schools. This school year marks the 8th year that PHS has been encouraging healthy habits in youth through education, environmental change and measurement. PHS has grown into a multifaceted program and is ready to expand to more middle-school students, especially those students in lower income and more diverse communities. The program is currently in 20 schools throughout Southeast Michigan including the public school districts of Ann Arbor, Ypsilanti, Willow Run, Owosso, Corunna, Ovid-Elsie, Perry, Laingsburg, Royal Oak, Harper Woods and select charter schools in Detroit. What distinguishes

PHS GOALS

1. Eat more fruits and vegetables
2. Make better beverage choices
3. Perform at least 150 minutes of exercise each week
4. Eat less fast and fatty foods
5. Spend less time in front of a screen

Photo: 6th grade students of University Preparatory Science and Math (UPSM) Academy Middle School, during the "Seed to Fork" summer cooking program. These students harvested vegetables and herbs from the Community Garden in order to prepare a lunch meal at the Detroit Science Center kitchen.

Photo: Charles Wang and Luke Giordano

Photo: Evie VanDeWege & Kaylie Bullock

Project Healthy Schools from other similar programs is its evaluation of results, significant community partnerships, and strong team of experts. In addition, the hands-on learning activities and socio-ecological model, which engages the entire school community in this effort, makes it a very effective, sustainable approach to impacting children's health.

PHS moving forward

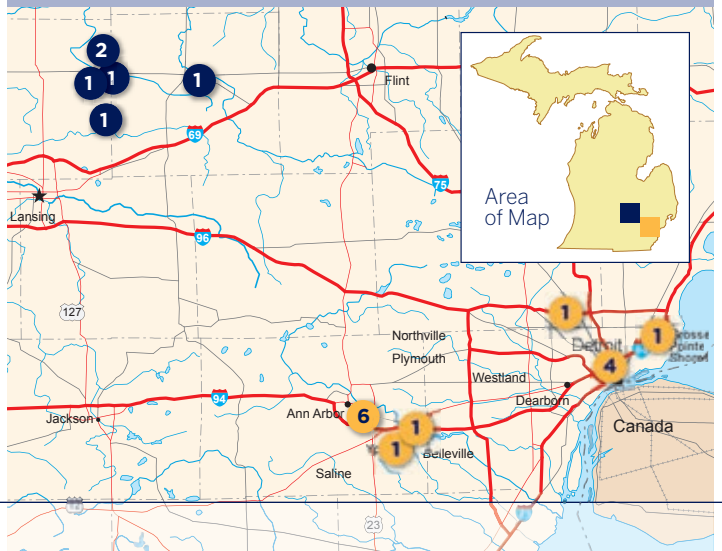
During the coming four years, PHS will undertake and assess in-school programs for sixth-graders at 20 additional middle schools. This expansion will accomplish several things:

- It will educate and enable an additional 2,400 sixth graders to improve their healthy eating and physical activity.
- It will create healthier school environments.
- It will field-test the curriculum and tool-kit that PHS offers to school leadership and staff.
- It will refine the community-based measures that can enhance the project (farm to school, parental engagement, after-school activities, etc.).

By 2015, PHS will have established a community engagement advisory board, expanded throughout Detroit, and developed strategies for larger replication so that this intervention can be implemented easily in any middle school across the nation.

NUMBER OF PHS LOCATIONS BY CITY

Shiawassee Region		SE Michigan Region	
Corunna	1	Ann Arbor	6
Laingsburg	1	Detroit	4
Ovid-Elsie	1	Harper Woods	1
Owosso	2	Royal Oak	1
Perry	1	Willow Run	1
		Ypsilanti	1

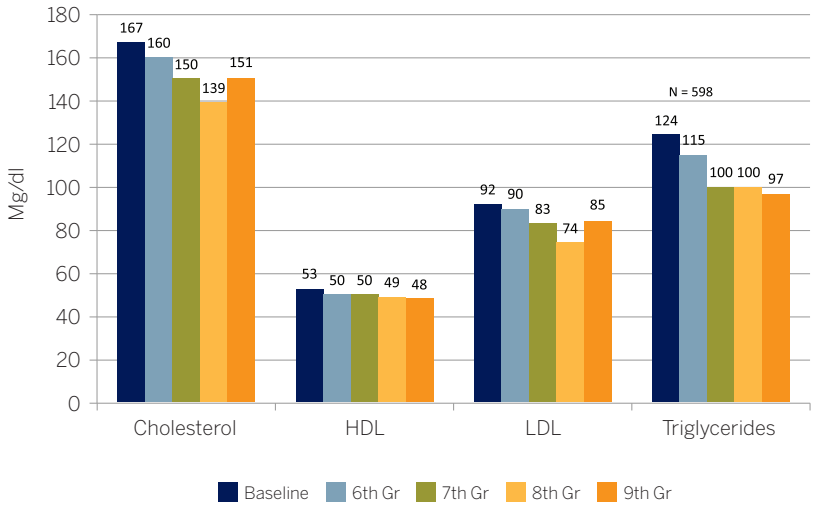


2012 and beyond

- PHS expects to exceed its four schools per year expansion goal. A significant and continued partnership with the Connections for Cardiovascular Health AstraZeneca Healthcare Foundation will fund the addition of two new Detroit schools.
- Thanks to the support of The Bob and Ellen Thompson Foundation—PHS has expanded the program into three Detroit Charter Schools: University Prep Academy, University Prep Science and Math Academy and the Henry Ford Academy.
- Project Healthy Schools' strategy of partnering with health systems to reach more children is turning out to be a key model for program expansion. Thanks to the UMHS leadership of Robert Kelch, M.D.; Ora Pescovitz, M.D.; Doug Strong and James Woolliscroft, M.D., who provided funding for the first PHS programs in the Ann Arbor schools and beyond, the University of Michigan Health System has set an example which other health systems now are embracing. At least two more health systems are expected to contract to implement PHS in their service areas.
- PHS will successfully support its wellness champs in the six Ann Arbor schools, insuring the program sustainability in the Ann Arbor district with PHS as consultants.
- PHS will continue to share its research and lessons learned with the academic community through conference presentations and journal articles.

"Studies have clearly shown that students who have healthier nutrition and more physical activity perform better in the classroom. They are establishing behaviors now that may last their lifetime. We want to promote helping these kids be the most successful kids they can, and I'm very proud that the University of Michigan has been such a big force in helping us make this happen," says Eagle. "Prevention is the future."

Baseline and 4-Year Follow Up in 5 AAPS



Making a big **Michigan Difference**, one small patient at a time.

Imagine a three-month old with soaring high blood pressure and heart failure. A pre-schooler whose high blood pressure caused a stroke. An adolescent in heart failure due to hypertension. These conditions are very rare in children. Rarer still are physicians with enough skill and experience to undertake the complex procedures required to correct them. Fortunately for families facing these dire diagnoses, there is an option.

"Go to Ann Arbor."

Renovascular hypertension. Abdominal aortic coarctation. These two life-threatening cardiovascular conditions, almost exclusively reserved for children, both involve occlusion or narrowing of arteries, either the aorta as it enters the abdomen, or its branches feeding blood to the kidneys. In either case, the effect is much the same: just as water pressure in a garden hose increases if you step on it, the blood pressure in these children becomes severely elevated.

Often, the result of genetic factors is not fully understood, these diseases are too severe for tiny bodies to outgrow, too rare for most clinicians to properly diagnose, and too risky for most surgeons to even consider attempting to repair. For over four decades, the nation's top pediatric specialists have referred parents from every corner of the U.S. and virtually every continent in the world to the University of Michigan for their little ones to receive lifesaving care available nowhere else.

About the team

The team delivering that care is made up of lead vascular surgeon James Stanley, M.D., University of Michigan Cardiovascular Center (CVC) Director and Marian and David Handleman Research Professor of Vascular Surgery, vascular surgeons Jonathan Eliason, M.D., and Enrique Criado, M.D., John R. Pfeifer Collegiate Professor of Vascular Surgery, and interventional radiologist Kyung Cho, M.D., William Martel Collegiate

Photo: Jennifer Hirsch, M.D., and patient, Bernie

Professor of Radiology. The care provided by the CVC team is backed up by an extraordinary group of pediatric nephrologists, intensivists, and anesthesiologists. Stanley is arguably the world's foremost authority on pediatric diseases of the aorta and renal arteries and their surgical treatment, having successfully performed over 200 of these delicate procedures since his tenure at the University of Michigan Medical School began in 1972.

For most of those years, he has relied on Cho for both diagnostic angiography and vascular interventions. Cho has worked alongside Stanley since 1977, performing all of the team's angiographic procedures. "Before they can operate, the surgeons need vascular 'road mapping,'" explains Cho. "Our angiographic images produce very precise maps." Stanley is quick to praise Cho's technical expertise in the catheter-based angiography and interventional procedures. "It's amazing to see how effectively and safely he navigates inside the tiniest arteries," Stanley says. "He's an artist with an angiographic catheter."

Eliason joined the team 30 years later, and now operates in seamless coordination with Stanley. "It's almost like having four hands instead of two," says Eliason. "Each of us knows what the other's hands will do; there are very few surprises."

Stanley describes their practice as "both big and small." At less than 20 procedures a year, it's small as a percentage of U-M's overall volume of cardiac and vascular surgery, but huge when compared to the number of cases like these seen anywhere else. "Together," he notes, "we have taken care of more pediatric patients with abdominal aortic and renal artery disease than anyone in the world."

"Together, we have taken care of more pediatric patients with abdominal aortic and renal artery disease than anyone in the world."

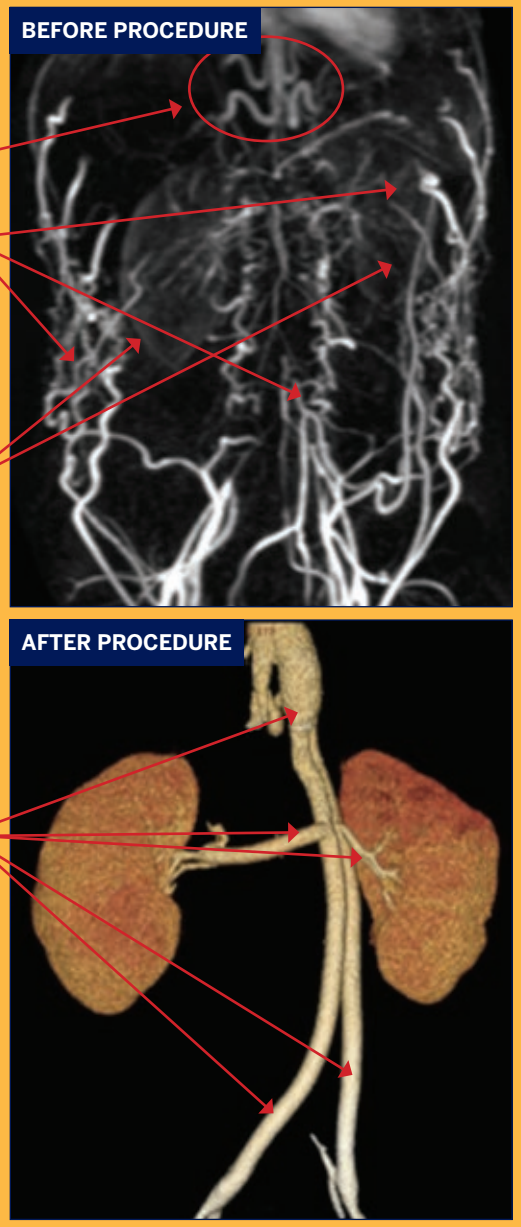
From left to right:
Kyung Cho, M.D.
Jonathan Eliason, M.D.
Enrique Criado, M.D.
James Stanley, M.D.

CASE STUDY

In a most extreme case, a young girl was brought to U-M with severely restricted blood flow caused not because her aorta was narrowed, but because it was not there at all. The dramatic image [on the right/above] shows how her body tried to compensate for the defect.

"The aorta should connect with the two main iliac arteries in the pelvis, but hers didn't," notes Eliason, who assisted Stanley in the eight-plus hour surgery. "Her body tried to adapt to low blood flow by recruiting and enlarging neighboring pathways. That compensation did a pretty good job of keeping her alive, but it couldn't control blood pressure over time."

The image [on the right/below] shows the end result. "We completely rebuilt an aorta for her, connecting it to the vessels leading into her kidneys," says Stanley. "Today, she's thriving. I just signed a release for her to go out for the swim team."



“Did you eat breakfast this morning?”

The team has a number of options to correct narrowing in the abdominal aorta or renal arteries. None of them are quick. Surgery can take five or more hours, with some procedures taking up to ten hours. “That’s why around here you’ll always hear someone ask ‘did you eat breakfast this morning?’” says Eliason.

It is difficult to picture just how small these blood vessels are, let alone how tiny they become when occluded. A healthy renal artery in a toddler might be the diameter of a cooked piece of spaghetti, and an occlusion within it might be as small as the sharpened tip of a pencil. In some cases, the best approach is to reconstruct the artery after removing its narrowed segment. In other cases, bypasses are performed around the obstruction.

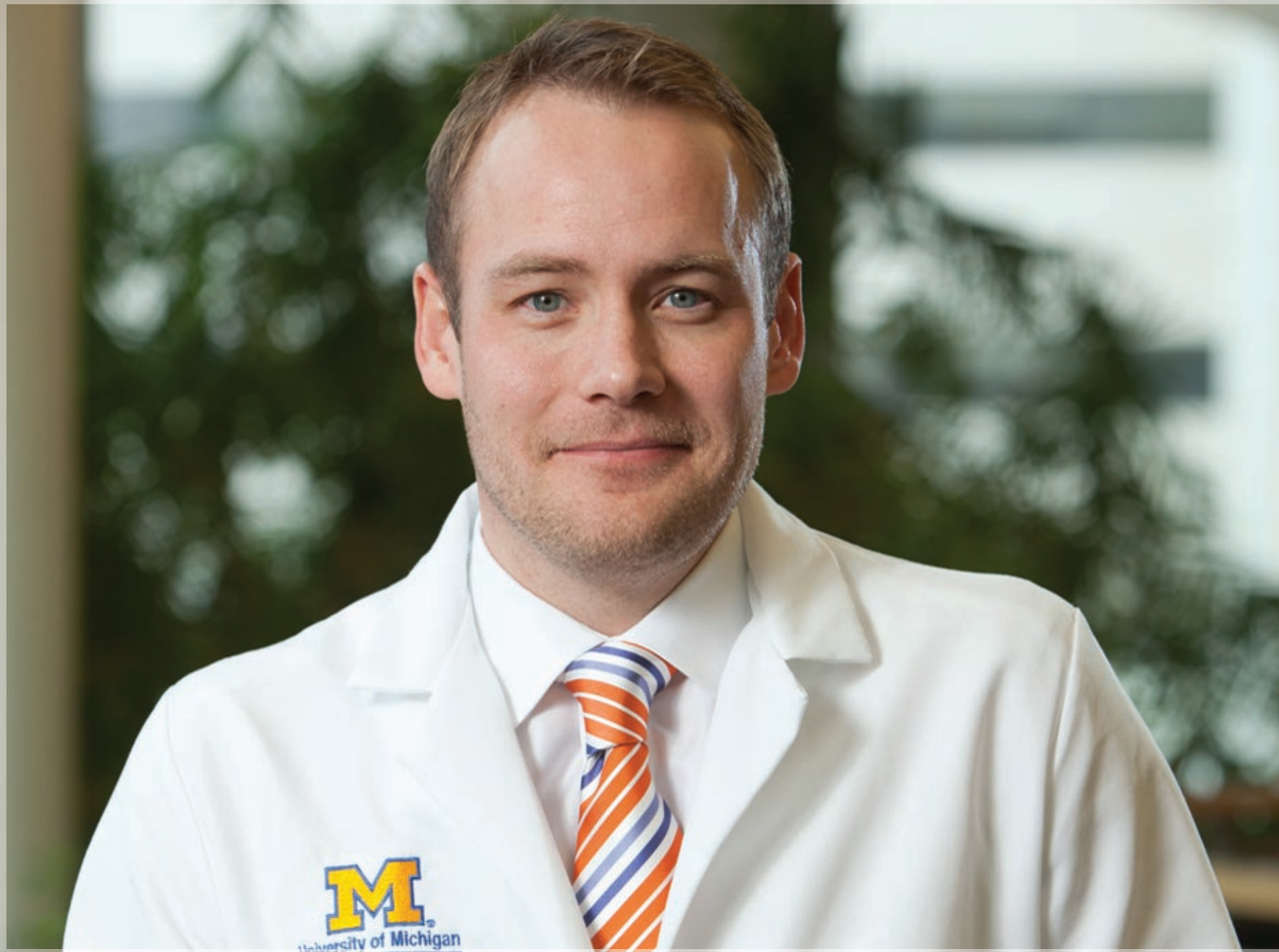
In every instance, the operating site is tiny, and the stakes are huge. But with experience comes confidence, and this team puts everything on the line for every patient. “Children can’t tolerate hypertension,” notes Cho. “We have to go all out to prevent a stroke or heart failure.”

Surgery can take five or more hours, with some procedures taking up to ten hours.

Photo: Jake Zangara with Dr. Stanley

Dr. Stanley with one of his smallest patients. Jake Zangara was three months old and weighed only 11 pounds when he underwent successful revascularization of his kidneys. He is now a healthy 6-year-old thanks to the Michigan team.

Photo: Norman F. Levy Atrium Gardens


University of Michigan
Department of Pediatrics

Cracking the Code

Searching for the genetic origins of heart defects

Congenital heart defects are the most common type of birth defect, impacting about one in 100 live births. Babies born with severe defects such as hypoplastic left heart syndrome (HLHS) face the greatest risk. Advances in surgical and medical care—many of them pioneered here at Michigan—have greatly improved the outcomes for these vulnerable patients, but research indicates that survival rates have plateaued in recent years.

To make further improvements, many more questions must be answered about what causes these defects. 2012 Heart of a Champion award-winner, Thor Thorsson, M.D., is the right person to ask these questions, and Michigan is the right place to answer them.

From Reykjavik to Ann Arbor

Genetics have always interested Thor Thorsson, a Pediatric Cardiology Fellow and Clinical Lecturer in the U-M Department of Pediatrics and Communicable Diseases. Although born in the U.S., he was raised and educated in Iceland, a hub of international expertise in human genetics. Thanks in part to the country's proclivity for genealogy (most Icelanders can trace their ancestry back three centuries or more), Iceland is an ideal place to conduct large-scale genetic research. And in the 1990s and 2000s, Iceland made major contributions to the sequencing of the human genome.

After working during medical school in a genetic research lab in Reykjavik, Thorsson returned stateside to finish his medical training at the University of Connecticut. There, he chose to specialize in pediatric cardiology. But Thorsson never lost his curiosity about the mysteries of human genetics, and began to look for ways to combine his two passions. That opportunity came in 2008, when he was "fortunate, lucky and grateful" to be given the opportunity to practice and further his studies at Michigan.

Photo: Thor Thorsson, M.D.

Thorsson is the 2012 recipient of the Heart of a Champion Award, an honor that will help fund an innovative research project to better understand the genetic roots of congenital heart defects.

"I'm so honored to receive this award and so excited to pursue this project," says Thorsson, whose research will zero in on a particular class of heart lesions characterized as severe left ventricular outflow tract obstructive, or LVOTO. These lesions, the most serious of which is hypoplastic left heart syndrome (HLHS), account for nearly a quarter of all neonatal deaths from congenital cardiac defects. "If we can crack the genetic code of defects like HLHS, we'll be one important step closer to developing targeted strategies to improve outcomes for these high-risk patients."

The patients. The expertise. The technology. Only at Michigan.

The process of pinpointing specific genes responsible for these or any hereditary conditions is a complex one, requiring an understanding of gene sequencing technology, advanced mathematics and bioinformatics. But before Thorsson could put any of those tools to work, he had to find the right candidates to study. This too was no easy task. To begin with, HLHS and related conditions are rare, accounting for no more than 20% of congenital heart defects. Another challenge: the study needed to focus on families with one or more affected siblings, but no other family history of defects. "Siblings with related conditions provide an ideal base for study," notes Thorsson. "By identifying siblings with related heart abnormalities, we increase the likelihood that the defects occur because of a specific mutation or mutations, rather than by chance. Lightning doesn't typically strike twice."

Michigan proved the right place to find these rare subjects. Thorsson and his colleagues spent several years building a registry of information and genetic samples from patients operated on here. They identified several families in which two siblings have severe LVOTO defects. "Only a destination center like Michigan treats a large enough volume of these patients to make such an analysis possible," Thorsson says.

As primary investigator, Thorsson has put together a 'dream team' to pull it off. Guidance in gene sequencing will be offered by two of the top experts in the field, U-M professors Friedhelm Hildebrandt, M.D., and Edgar Otto, Ph.D., who together have used a similar approach to identify the genes involved in certain renal disorders. Much of the computational work will take place in the Hildebrandt lab, utilizing technology called total exome capture and massively parallel sequencing. Once again, Michigan provided an unbeatable base of operations—the

technology was developed by Drs. Hildebrandt and Otto here at the University.

Thorsson will also work closely with Mark Russell, M.D., Associate Professor of Pediatrics, an international expert in the genetic causes of heart disease. If successful in this step, they hope to conduct further studies of the gene or genes they find.

The study is a fine example of the kind of innovation and cross-collaboration Bo Schembechler wanted to reward with the Heart of a Champion Research Fund. "As an early-career investigator, it's a thrill to have this project recognized and supported in such a big way," says Thorsson. "We have lots of work ahead of us, but thanks in great part to this funding, I believe our chances of success are very high."

ABOUT THE HEART OF A CHAMPION RESEARCH FUND

Whether leading the Wolverines to 194 wins on the football field or waging his own 37-year battle with cardiovascular disease, Glenn E. "Bo" Schembechler personified the word "champion." Recognizing that scientific advances allowed him to live a longer, healthier life, Bo and his wife Cathy established the Bo Schembechler Heart of a Champion Research Fund in 2006. Their vision: to support research that pushes the boundaries of current thought in cardiovascular disorders. Understanding the importance of teamwork, Bo also felt strongly that the fund should support collaborative research efforts, bringing together varied disciplines to see cardiovascular challenges in new ways.

The Heart of a Champion Research Fund is a fitting legacy for such a remarkable man. Moreover, it provides a unique opportunity for others to make a **"Michigan Difference."** From making groundbreaking research possible to attracting the "leaders and best" to Michigan, the Heart of a Champion Research Fund has the potential to revolutionize cardiovascular medicine.

www.umcvc.org/heartofachampion


Link to

Vital Statistics*

55,874	total clinic visits
7,267	total inpatient discharges with observations
5,774	total electrophysiology procedures
5,535	total interventional cardiology procedures
973	total open vascular surgery cases
917	total open heart surgeries
373	total endovascular surgery cases
64	total ventricular assist devices
28	total heart transplants

Interventional Cardiology: A specialized area of cardiology that treats heart disease with catheters to improve blood flow.

Electrophysiology: The branch of cardiology that studies the electrical impulses in the heart.

Endovascular: A surgical procedure in which a catheter containing medications or a miniature device (stent, graph, etc.) is inserted percutaneously into a blood vessel for the treatment of vascular disease.

Ventricular Assist Device (VAD): a mechanical circulatory device that is used to partially or completely replace the function of a failing heart. Some VADs are intended for short term use, typically for patients recovering from heart attacks or heart surgery, while others are intended for long term use (months to years and in some cases for life), typically for patients suffering from congestive heart failure.

* Data reflects the 7/1/10–6/30/11 time period for the adult patient population.

Photo: Main corridor linking U-M Cardiovascular Center to University Hospital

Cardiovascular Center Investment Opportunities

Aortic Program
The nationally ranked University of Michigan Cardiovascular Center (CVC) is among 40 sites in the nation selected for the Medtronic CoreValve® U.S. Pivotal trial, a study that will examine an alternative to open heart surgery for patients with severe aortic stenosis.

About 100,000 Americans, most of them over the age of 70, are diagnosed with severe aortic stenosis each year, but one-third of patients, because of age or frail health, are considered too high-risk for traditional surgery. Through this study, the U-M CVC is investigating a minimally invasive procedure for patients diagnosed with this condition.

In the heart valve trial, surgeons and interventional cardiologists work together to perform the procedure called Trans-Catheter Aortic Valve Implantation (TAVI). It allows access to the diseased aortic valve via an artery (usually in the leg), rather than through open surgery. This study will attempt to answer the question: Is this technology safe and does it improve the patient's quality of life? (See page 7)

Venous Health Program
The Venous Health Program at the University of Michigan Cardiovascular Center is a single, all-inclusive resource for the treatment of venous disease. This program brings together established and experienced vascular surgeons, vascular medicine specialists, interventional radiologists, family practitioners and nurse practitioners to provide seamless multidisciplinary care personalized for each patient.

Any patient with venous disease can be seen in the program. Whether it is a mild, cosmetic venous problem or a limb-threatening, disabling condition, the Venous Health Program offers comprehensive care in a multi-specialist environment. Through the Venous Health Program, patients have access to the most up-to-date medications and treatments available. This is in no small part due to the very active research environment fostered at U-M. (See page 11)

Eric Bates Endowed Collegiate Professorship in Cardiovascular Medicine
Eric Bates, M.D., was one of the early cardiologists performing coronary angioplasty in Michigan. He is also one of a small group of individuals who participated in the landmark clinical trials—many led by U-M faculty—that transformed the way we care for patients with acute myocardial infarction worldwide. In addition, Dr. Bates has been the consummate "Professor," teaching countless fellows and faculty the art and science of cardiac catheterization and coronary angioplasty during his more than three decades at U-M.

The Eric R. Bates Endowed Collegiate Professorship in Cardiovascular Medicine is an opportunity for us to recognize

the accomplishments of Dr. Bates and to ensure future patients, scientists and students benefit from his legacy. This endowed collegiate professorship is a fitting honor to continue his legacy and recognize his lasting impact on the field of cardiology and his commitment to the University of Michigan.

Not only will the professorship recognize Eric and his contributions to U-M in perpetuity, it will also provide an invaluable tool to attract the best and the brightest to our institution. Recruitment and retention of top talent is a constant challenge in the competitive world of academic medicine; endowed professorships, however, are proven tools for success. (See page 15)

Women's Heart Program

Because heart disease kills more women than any other condition, the U-M Women's Heart Program focuses on helping women, who have survived a heart-related crisis or those who face a major risk of having one in the future, identify, evaluate, and reduce cardiovascular risk factors through preventive strategies, early detection, and specialized treatment.

The U-M Cardiovascular Center's Women's Heart Program provides on-site, state-of-the-art diagnostic, therapeutic, and surgical services in a caring and compassionate way specifically designed to address the unique cardiovascular needs and concerns of women. (See page 19)

Edward Bove Endowed Professorship in Cardiac Surgery

Ed Bove, M.D., is a world-renowned expert in the treatment of hypoplastic left heart syndrome—a condition where babies are born with the left side of the heart too small to be able to pump blood. Even as late as the 1990s, death from this congenital defect was certain. The only thing that a physician could do was to diagnose the illness and then inform the parents that their child was going to die. Today, 9 in 10 babies who arrive at U-M with this defect survive. Additionally, Dr. Bove has trained countless residents, fellows and physicians around the world to perform this life-saving surgery.

The Edward Bove Endowed Professorship in Cardiac Surgery is an opportunity for us to recognize the accomplishments of Dr. Bove and to ensure that the tiniest hearts of the future benefit from his legacy. This endowed professorship will honor Dr. Bove's accomplishments and will ensure that future generations of pediatric heart surgeons are trained to his high level of success and excellence. (See page 33)

Project Healthy Schools

Project Healthy Schools (PHS) is a community-University of Michigan Health System (UMHS) collaboration that provides a school-based program to reduce childhood obesity and its long-term health risks. Focusing primarily on sixth grade students, PHS aims to stem the tide of this epidemic by teaching youth

healthy habits; developing healthy school environments; and creating an infrastructure that supports program sustainability and replicability.

Research shows that healthy youth who continue to practice healthy lifestyles will grow into healthy adults with fewer risk factors for cardiovascular disease, diabetes and other chronic illness. Project Healthy Schools is one of the few school-based programs that have demonstrated significant improvements in both health behavior and cardiovascular risk factors. (See page 37)

Renal Arterial Disease Program

U-M has been a leader in the surgical treatment of renal artery disease since the 1960s; in particular, the University of Michigan Cardiovascular Center is an internationally recognized center for the care of this complex condition attracting patients from all over the globe. The University of Michigan also leads the way in research efforts to improve the understanding and treatment of renal artery disease and to shape the surgical strategies and therapies of tomorrow. It has a particular impact on those who will inherit our future, the children.

At U-M, treatment is focused around a multidisciplinary approach and includes specialists from nephrology, interventional radiology, intensive care and vascular surgery. This means multiple specialists can be seen in a single visit and treatment strategies are a coordinated effort between every physician involved a patient's care. (See page 41)

Heart of a Champion Research Fund

Bo Schembechler put his heart into everything he pursued, whether leading the Wolverines to 194 wins on the football field or waging his own 37-year battle with cardiovascular disease. Coach Schembechler recognized that scientific advances in medicine allowed him to live a longer, healthier life. Bo and his wife Cathy established the Bo Schembechler Heart of a Champion Research Fund in 2006 to target investment in early-career research activities of University of Michigan faculty who are pushing the boundaries of current thought in prevention, diagnosis, and therapy of cardiovascular disorders. The fund also seeks to support scientific teamwork where investigators of different disciplines are working together at key interfaces of knowledge to bring about a major breakthrough in the treatment of patients with cardiovascular disease.

The Heart of a Champion Research Fund is a fitting legacy for such a remarkable man. From making groundbreaking research possible, to attracting the leaders and best to Michigan, the Heart of a Champion Research Fund has the potential to revolutionize cardiovascular medicine. In line with something Bo once famously said, "Those who stay will be champions"—those who give will be, too. (See page 47)

Your gift to the U-M Cardiovascular Center will help shape patient care, scientific research and medical education for generations to come. To understand how your generosity will make a Michigan Difference in advancing cardiovascular understanding and cures, please contact our development staff at **(734) 615-3657**.
www.umcvc.org/giving

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