



Mayo Clinic

MAGAZINE

Passion for Life

Returning to the deep
after a bout with
breast cancer



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Teamwork

Patients often use the word “finally” when they talk about Mayo Clinic. Finally, you get the answers that eluded you. Finally, you find hope. Finally, you receive exactly the care you need.

Providing expert, whole-person care at your moment of need is the reason Mayo Clinic exists. The patient-centered model sets us apart from all other health care organizations. This gold standard of care comprises unhurried, comprehensive and thoughtful examinations coupled with care and treatment tailored to your individual needs, consistent with the objective to provide care and inspire hope in all patients seen at Mayo Clinic.

This level of care requires teamwork at every step along the way — specialists working with researchers, nurses working with maintenance staff, appointment coordinators working with medical secretaries. And everybody working with the patient.

The result of this multilevel collaboration is the best care possible. This model is the heart of the Mayo Clinic patient experience.

You will see teamwork in action throughout this issue of *Mayo Clinic Magazine*. You’ll see it in the story of a teenager with a rare eye disease, whose specialists and stem cell experts are collaborating to develop a new treatment based on her cells. You’ll see it in the article on the deep-sea diver with breast cancer, who came to Mayo Clinic because our collaborative approach both reduced her risk for additional surgeries after lumpectomy and preserved her lung function after radiation. And you’ll see it in our profile of Jay Alix, a benefactor teaming up with Mayo leadership to ensure the clinic not only weathers the current health care environment but emerges as strong as ever for generations to come.

Thank you so much for being part of the Mayo Clinic team. Your support is critical to our success.

Michael Camilleri, M.D.
 Executive Dean for Development
 Atherton and Winifred W. Bean Professor
 Professor of Medicine, Pharmacology and
 Physiology, Mayo Clinic College of Medicine
 Mayo Clinic Distinguished Investigator



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Tom Brokaw Helps Celebrate 150 Years as Benefactors Ensure the Next 150



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A Big Year

It was 150 years ago that Dr. William Worrall Mayo opened his doors in Rochester, Minnesota. Since then, Mayo Clinic has built a unique practice that focuses a team of experts on one patient at a time and puts the patient's needs first.

This year also marks milestone anniversaries for Mayo Medical School and the Saint Marys and Methodist campuses of Mayo Clinic Hospital — Rochester. With continued benefactor support, we'll be here for another 150 years helping our patients and advancing medicine around the globe.

150 YEARS

1864: Dr. William Worrall Mayo opened a medical practice in Rochester, Minnesota, which evolved under his sons, Drs. William J. and Dr. Charles H. Mayo, as Mayo Clinic.

100 YEARS

1914: The name "**Mayo Clinic**" becomes official with the opening of the first building designed specifically for the unique model of integrated multispecialty group practice that the Mayo brothers and their colleagues developed.

95 YEARS

1919: The Mayo brothers and their wives donate the assets of Mayo Clinic and the majority of their life savings to establish Mayo Clinic as a not-for-profit organization.

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125 YEARS

1889: The Sisters of Saint Francis open **Saint Marys Hospital**, building upon their collaboration with the Mayo doctors, which began with their joint response to serve the survivors of a tornado that devastated Rochester six years earlier.

35 YEARS

1979: Kindness is repaid with the opening of the Baldwin Building. In 1933, a young Jesse Baldwin came to Mayo Clinic, where he had surgery but could only pay the hospital bill — \$6 per day — leaving nothing left for his outpatient charges. Mr. Baldwin later recalled with gratitude and admiration: "They told me not to worry about the bill, just pay what I could." Mr. Baldwin went on to build a successful business in industrial filter systems and, with his wife, gave back with a lead gift to establish the **Jesse A. and Fern A. Baldwin Building for Community Medicine**.

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ROCHESTER
MINNESOTA
CAMPUS



40 YEARS

1974: The Guggenheim Building opens. Named for benefactors who never were patients, the **Murry and Leonie Guggenheim Building** is dedicated "to support research and science related to human health and disease and to provide a scholarly environment for education of physicians and scientists."

THIS YEAR

2014, the year of Mayo Clinic's sesquicentennial, is a banner year in many respects. As Mayo honors 150 years of serving humanity with hope and healing, *U.S. News & World Report* names Mayo Clinic the top hospital in America and Mayo Clinic launches YOU ARE... The Campaign for Mayo Clinic, a \$3 billion campaign to create the future of medicine.

25 YEARS

1989: The main building of Rochester Methodist Hospital is named the **George Eisenberg Building**. George Eisenberg's story reads like a sequel to "Fiddler on the Roof." His family fled anti-Semitic persecution in Russia in the early 1900s. They settled in Chicago, where George's father died, leaving his mother with seven children, depending on charity to survive. He went to work at an early age and became a leader in developing pediatrics. Mr. Eisenberg generously supported many organizations, particularly Mayo Clinic, which he called "the Supreme Court of Medicine."

25 YEARS

1989: **The Charlton Building** opens, named in honor of Earle Perry Charlton, a merchandising pioneer who cofounded the F.W. Woolworth Co. Mr. Charlton's daughter, Ruth, began coming to Mayo Clinic in 1927. She lived to the age of 104 and made many gifts to Mayo, including the funds for this building.

Ruth Charlton also supported the renovation of the former Rochester Public Library — now known as the **Ruth and Frederick Mitchell Student Center of Mayo Medical School**, recognizing her first husband, Frederick Mitchell.

60 YEARS

1954: Community leaders establish **Rochester Methodist Hospital** in close proximity to the Mayo Clinic buildings in downtown Rochester. The hospital pioneers many innovations such as open-heart surgery and radial nursing units, which place patient rooms around a single nursing station.

25 YEARS

1939: The Siebens Building opens, occupying a unique place at Mayo Clinic. It stands on the oldest continuously used property at Mayo — site of the Mayo family home and 1914 building. Named for an Iowa-born entrepreneur who discovered extensive oil fields in Canada, the **Harold W. Siebens Medical Education Building** was the first building at Mayo Clinic that was funded completely by philanthropy.

40 YEARS

1974: "Take the subway to the Hilton." At Mayo Clinic — unlike New York City and other major cities — these directions do not involve an underground train that leads to a luxury hotel. Instead, the pedestrian corridor that Mayo calls a subway leads to the **Conrad N. Hilton Building for Laboratory Medicine**, which includes the Mayo Clinic Blood Donor Center and other services.

The Pioneer

A South Dakota Farmer Is First in Nation to Receive New Treatment

Ralph Johnsen was running out of options.

In 2006, local doctors diagnosed the then 72-year-old South Dakotan with renal artery stenosis in his left kidney. The condition causes arteries that carry blood to the kidney to narrow, making it

difficult for oxygen-rich blood to reach the organ. This can lead to high blood pressure and kidney damage.

Over the years since then, Ralph had three stents placed to open his affected artery and restore blood flow. But the artery had narrowed again,

and the kidney was losing function. A fourth stent wasn't an option. The only other approved treatment involved transplanting a vein from Ralph's leg to his kidney.

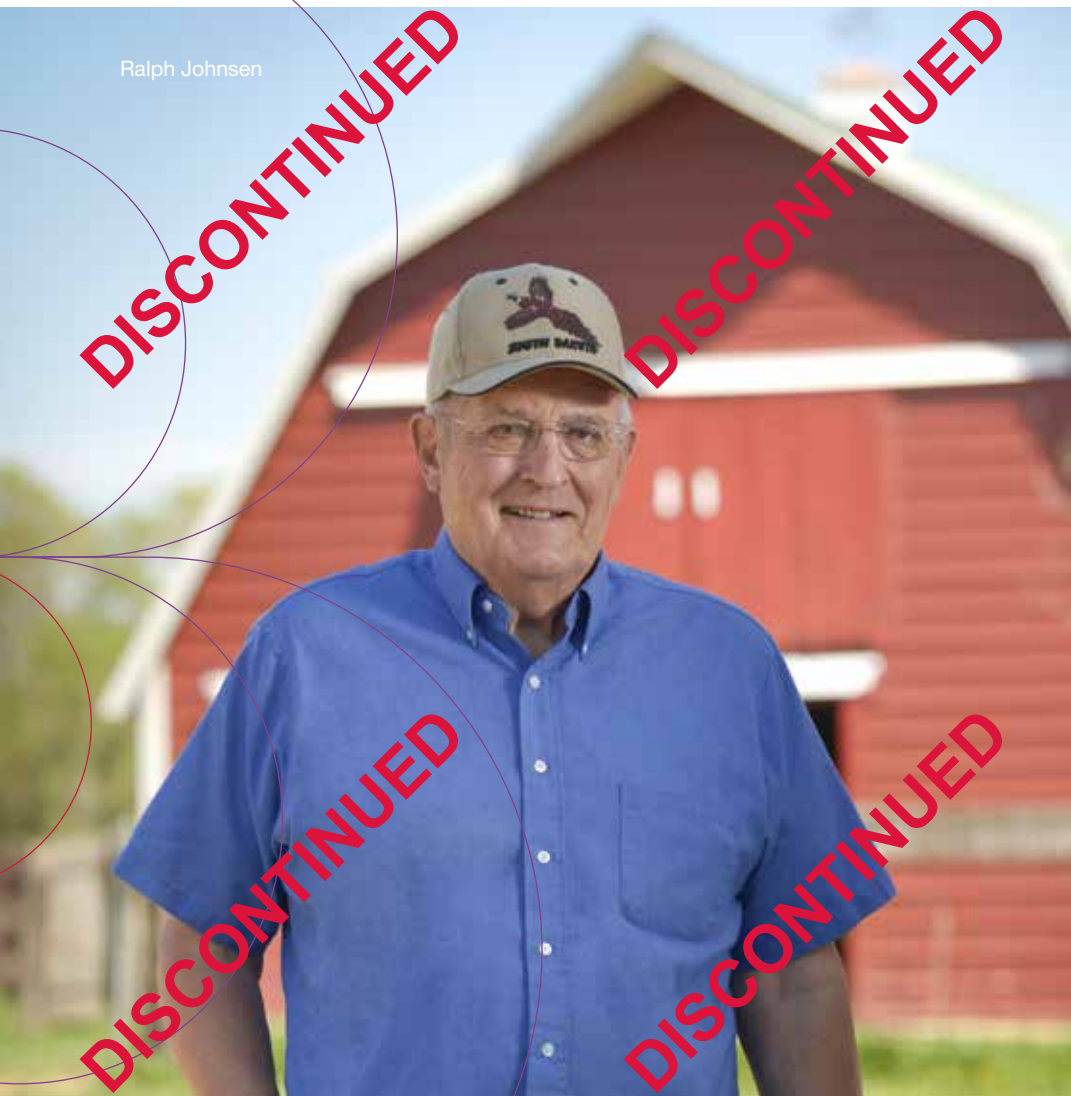
"That sounded good until they told me the mortality rate was 10 percent," he says.

Then Mayo Clinic's Stephen C. Textor, M.D., shared another possibility with Ralph. Dr. Textor was launching a clinical trial to test if a person's own stem cells could repair arteries and tissue damaged by renal artery stenosis. The cells he was using were both capable of creating blood vessels (angiogenic) and anti-inflammatory.

"So, the cells help repair vessels," Dr. Textor says. "And they create an anti-inflammatory response that helps recover function."

Mayo's Lilach O. Lerman, M.D., Ph.D., had already conducted large animal studies in the renovascular laboratory. They indicated that these cells were safe and capable of allowing regeneration of damaged

Ralph Johnsen



kidney tissue, but making the leap to humans is always a bit risky. Dr. Textor says about 90 percent of treatments that work in animals don't work in people.

"The reason you need clinical trials is that a large number of things that work great in animals are not effective or are too toxic in humans," Dr. Textor says. "It's a big step to go to humans."

If Ralph was interested, he could be the first patient to test the cells.

"I told him if it works on rats, then it should work on me," Ralph laughs. In May 2013, Ralph enrolled in the trial and began a journey to find out if it would.

To create the stem cells, researchers made a small incision in Ralph's belly to harvest a bit of abdominal fat. ("I told them to take more fat, but they wouldn't.") The researchers then separated out the tissue's stem cells and enhanced their ability to promote kidney function. Over the next six weeks, researchers grew the stem cells into the amount needed

for treatment and injected them into Ralph's kidney.

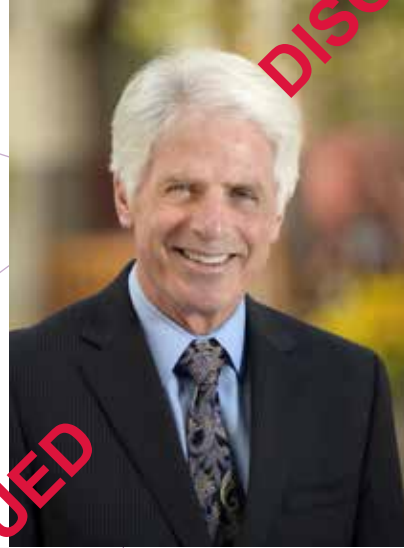
Because the cells are taken from Ralph himself, there are no rejection issues.

If the treatment successfully restores blood flow to the kidneys, it could have implications in other forms of kidney problems, as well as diseases of the lung, heart and liver, where constricted blood vessels play a major role.

The first studies in human volunteers were conducted with the support of Mayo Center for Regenerative Medicine. The results indicated excellent safety and tolerability of stem cell infusion and provided "proof of concept" data sufficient for the National Institutes of Health to provide funding for a five-year study beginning in 2014.

"It's a big commitment and demands a great deal of patience from participants," Dr. Textor says. But the rewards could be huge.

"Think of the possibilities if this works," Ralph says. "It could keep people from having to go through the



"It's a big commitment and demands a great deal of patience from participants."

— Stephen C. Textor, M.D.

ordeal of dialysis. And think of the money it could save Medicare and other insurance companies. The country needs more Dr. Textors. I am so grateful to him and his team for performing this research and allowing me to be the first one to participate."

"Mr. Johnsen, he's a pioneer," Dr. Textor says. "He's a pathfinder. ■"

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Despite a diagnosis of breast cancer,
deep-sea diver Sue Phillips plans to be



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... oh, and get back swimming with the sharks.

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Sue with her health care team (left to right);
Judy C. Boughey, M.D., A. Petersen, M.D.,
and Sandhya Pruthi, M.D.





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Ask Sue Phillip about the ocean and her eyes light up. "Scuba diving can be a wild, unbelievable adrenaline rush. But other times, it can be completely meditative," she says.

"You just hear the sound of the ocean and your own breathing."

During a typical adventure, the retired grandmother of two lives aboard a 140-foot diving boat with a couple dozen friends from around the world, spending six hours each day underwater. In the roughest conditions, the current swirls in seven different directions as the divers keep an eye open for hammerhead sharks. But on a quiet day, the group may glide among a school of 20-foot Pacific manta rays, close enough to make eye contact, swim in one's shadow, even tickle its belly with exhaled bubbles.

Sue started deep-sea diving 15 years ago and has since recorded more than 1,000 dives in the

world's most ecologically diverse and untouched waters — the Solomon Islands, Papua New Guinea, and Cocos Islands near Costa Rica are a few favorites. In January 2014, Sue was diving in the Soccoros, a group of islands south of Baja California, when she first sensed something was wrong.

Throughout the trip, Sue noticed her left nipple gradually becoming dry and flaky. She figured it was a result of repeatedly peeling herself out of her wetsuit. Her right nipple, however, remained unaffected. That was a red flag.

With three sisters diagnosed with breast cancer, Sue is vigilant about her health, alternating MRIs with mammograms every six months. Her last clear MRI was in November 2013. When she returned home that January, her local doctors prescribed one cream after another to relieve the



All diving photographs courtesy
of Sue Phillips.



rash. Eventually, it disappeared. In April, Sue had another mammogram — all clear.

“So I was thinking ‘I’m OK,’” she says. “But then in May the dryness came back.”

Frustrated, Sue returned to her doctor. “I said, ‘We’ve fussed around with this for five months now — I’d like a biopsy.’ My doctor called me on Friday that week and said, ‘Sue, I’m so sorry, but you have Paget’s disease.’”

A Saving Grace

Sue considers her diagnosis of Paget’s disease “a saving grace.” Often confused with common dermatitis, Paget’s disease first manifests as flaky or scaly skin around the nipple and eventually spreads to the areola. But unlike dermatitis, the cause is not a skin irritant or allergen. It’s an underlying breast cancer.

Had it not been for Paget’s visible symptoms, Sue may not have discovered her breast cancer until a more advanced stage.

Just days after diagnosis, Sue was sitting in an exam room with Sandhya Pruthi, M.D., at the Mayo Clinic Breast Diagnostic Clinic in Rochester, Minnesota. Having confirmed the diagnosis, Dr. Pruthi could tell Sue had a lot on her mind.

“Most patients have already received a positive result on a biopsy by the time they come to the Breast Diagnostic Clinic,” Dr. Pruthi says. “So they come to us with a higher level of anxiety, and I would say they are even overwhelmed. They’re getting a lot of input from family members, the Internet and other sources, and that likely escalates their anxiety.”





Sue's Plan

Sue had one goal for her treatment: returning to her normal, active life.

After a thorough round of imaging and lab tests, she learned that in addition to Paget's disease she had two tumors in her left breast, one pre-cancerous and the other invasive and aggressive. Luckily, both tumors were early stage.

Like many women, Sue then faced a tough choice between lumpectomy and mastectomy to remove these tumors.

"Two of my sisters underwent lumpectomies, only to both need reoperations after discovering not all of the cancer was removed in their initial surgeries," Sue says. "Another sister chose a double mastectomy and later regretted being so aggressive."

A multidisciplinary team of experts — a breast clinic provider, a breast surgeon, a medical oncologist, a radiation oncologist and numerous midlevel providers — helped ease Sue's fears. Together, they developed a plan to achieve not only the best medical outcomes but also Sue's goals for life.

This comprehensive, whole-person approach, Dr. Pruthi says, is Mayo Clinic's defining difference when it comes to cancer care.

"Once that plan has been presented to the patient, you can see an amazing sense of relief — that sense that someone is now helping her navigate what was a very scary situation, and she has a plan. And now integration with all the right people is out of her hands, and it's in ours."



BRIDGING THE DEEP

By using hand signals, scuba divers demonstrate the fundamentals of good communication, something that impacts safety and a positive experience whether you are under 50 feet of water or in a patient examination room.

Sue Phillips says clear conversations with Mayo Clinic doctors are helping her return to normal life and to the sea.

Although Sue was clear she wanted to preserve her breasts, Dr. Pruthi and Sue's breast surgeon, Judy C. Boughey, M.D., sensed Sue's family members' experience made her uncertain when it came to lumpectomy.

To help Sue make an informed decision, they explained a unique approach used at Mayo Clinic, called frozen section margin analysis. While Sue was in surgery, Dr. Boughey would remove the breast tumor with a small rim of surrounding tissue, also referred to as the margins. Dr. Boughey would then immediately take this sample to an on-site pathologist who would evaluate the margins while Sue was asleep in surgery. If the margins were clear, the surgical team would prepare Sue for recovery. If any of the margins tested positive for cancer, Dr. Boughey would remove additional tissue and repeat the process until she obtained clear margins.

In a recent study, researchers found that the frozen section margin analysis practice reduces the need for breast lumpectomy reoperation at Mayo Clinic's campus in Rochester to just 3.6 percent, compared to an average 13.2 percent in a national cohort of patients.

"A second operation is never a minor undertaking for a patient," Dr. Boughey says. "Our rates for reoperation are so low that the whole patient experience is shorter in most cases. It's just one operation, and then the patient can move on to radiation and medical therapy. There are

A-OK



Going to the surface



Buddy up



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benefits for the cosmetic outcome as well, with less tissue being removed and lower chances for infection."

In her consultations with radiation oncologist Ivy A. Petersen, M.D., Sue noticed a similar individualized approach, especially when she brought up her passion for scuba diving.

"It was really important to me, since I need radiation on my left breast near my heart and lungs, that this is a consideration," she says.

"Dr. Petersen was so sensitive to this, telling me about

special radiation techniques that will protect the lungs and heart, so I can properly and safely breathe at deep depths."

Dr. Petersen's commitment to achieving Sue's goal convinced her to have all 20 radiation treatments at Mayo Clinic in Rochester, despite the 90-minute commute from her home in Eden Prairie, Minnesota, a suburb of the Twin Cities. But that level of care went beyond the exam room when Dr. Petersen consulted about Sue's case with three other pulmonary experts, including one who is a scuba diver himself.

"We're not here to treat a breast cancer, we're here to treat a patient," Dr. Petersen says.



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PROVING WHAT WORKS

Elizabeth B. Habermann, Ph.D., a health services researcher, was sitting in Dr. Boughey's office when she received a text. It was a post-surgery update from a friend's breast lumpectomy, which was performed at a different institution.

She read the text to Dr. Boughey: "They think they got it all."

In the conversation that followed, Dr. Habermann remembers how Dr. Boughey pointed to Mayo Clinic's unique frozen section margin analysis practice as the difference between a surgeon thinking all the cancer has been removed and knowing it while the patient is still in the operating room.

The scientist and surgeon formed a relationship when Dr. Habermann first joined the Mayo Clinic Robert D. and Patricia E. Kern Center for the Science of Health Care Delivery, which applies data analysis and engineering principles to continuously improve the quality, affordability, and safety of care.

As the Robert D. and Patricia E. Kern Scientific Director for Surgical Outcomes, Dr. Habermann

works to validate best practices in surgical care. Dr. Boughey knew firsthand how frozen section margin analysis impacted her care every day but wanted to understand its effectiveness on a broader level.

Looking back at 30-day patient outcomes, Dr. Habermann and Dr. Boughey found the rate for reoperation after lumpectomy for breast cancer at Mayo Clinic in Rochester, Minnesota, was just 3.6 percent, while nationally the rate was 13.2 percent, based on data from a national cohort.

For Mayo patients, the long-term advantage of frozen section margin analysis is invaluable: one operation, one recovery, one absence from work. But according to Dr. Habermann, Mayo Clinic has a responsibility to scientifically demonstrate how these distinctive practices help Mayo raise the standard of care.

"We believe that Mayo offers a high quality surgical experience for patients who come here from all over the world," she says. "And we need to prove it."

An Unfolding Story

When Sue awoke from her lumpectomy procedure in June 2014, the result of the team's careful planning was clear — literally. Clear margins, five clear lymph nodes from a sentinel biopsy procedure, minimal removal of tissue, and an excellent cosmetic result. A couple weeks after surgery, she was back to walking five miles a day.

Sue continued chemotherapy sessions through the fall and started radiation treatment at the end of 2014. Looking back, she appreciates how her outlook has evolved along the journey.

"For many women, as the story is unfolding, it's bad news, then more bad news, and then more bad news, which is how my story began," Sue says. "But then you start to see the good. If I could do this with minimal or no reconstruction, that would be very positive. I'm 61 years old, and I just don't want two years of reconstruction and infection. I want to go back to living a normal life as soon as possible and be realistic about what the future holds for me."

It's a future she plans to enjoy from all corners of the earth, above sea level and below. ■

Holding on Tight

For Those Afflicted With Lewy Body Dementia, and Their Loved Ones, Life Is a Roller Coaster Ride

Editor's note: First described in the 1960s, Lewy body dementia wasn't recognized as a distinct disease until the 1980s. It combines features of two highly recognizable diseases — Alzheimer's and Parkinson's.

Stuart Ten Broeck has had Lewy body dementia for several years. His wife, Judy, cares for him at their Florida ranch. Judy shared her perspective on the disease and their journey together.

As a former Marine and sheriff's deputy, Stu was accustomed to being calm in a crisis, so it was atypical when he suddenly developed a severe anxiety disorder with vivid nightmares. It was several years later that any malady of the brain was diagnosed.

First were the isolated episodes of impaired judgment. One morning, Stu woke up early, fully capable of running the tractor on our 20-acre ranch for hours — until he drove it into the pond. He sternly responded to my panic by stating in denial, "It is OK, Judy, everyone drives a tractor into the pond now and then."

This disease strains relationships with family and friends, as well. Although Stu loved to dine out, it became increasingly difficult to do so. His visual deficits might cause him to dump his coleslaw, instead of sugar, into his ice tea glass. More than once, he would attempt to snatch a steak from someone's plate, convinced that they had stolen it from him. He was still so highly functional at this stage that sometimes it seemed like bad behavior rather the disease.

The delusions and hallucinations appeared suddenly after a lengthy bout of pneumonia. Amazingly, when Stu was delusional his deficits would leave him, and he was able to articulate and move easily again.

Sadly, his renewed capabilities often put him and others in danger. When delusional, he usually became a police officer again, trying to corral in the undesirables, which could be anyone in the room at the time. More often than not, I was his "felon" on the run.

This was a very fearful time for me. Dr. Tanis Ferman from Mayo Clinic gave me valued advice years ago: "Don't let fear or guilt drive you" on this journey. Her words have guided me through many difficult episodes. Stu is now in later stage Lewy body dementia, and there is no treatment available. He is bedridden and has the capacity of a 3-month-old.

So, is there any victory in this journey? Amazingly, yes. Stu now humbly trusts me every day to decipher reality for him. This anxious man successfully turns to God for peace. His fearful delusions are short-lived and few, while moments of laughter are more common. Though rarely able to speak, he still calls me to his bedside with kissing noises, making me giggle every time.

There has been victory in this journey for me, as well. I have learned not to focus on the sadness, but embrace the moments of joy that come every day while caring for him at home. Although I did not think it was possible, God has given me a deep love for this frail, demented man, and that makes the long suffering all worthwhile.



Stu and Judy Ten Broeck celebrating 30 years of marriage.

Creating a Better Future

“Lewy body dementia is the worst of both possible worlds — it has the motor problems of Parkinson’s disease with the cognitive problems of Alzheimer’s disease,” says Dennis W. Dickson, M.D., director of the new Mayo Clinic Dorothy and Harry T. Mangurian Jr. Lewy Body Dementia Program.

The program, based at Mayo Clinic in Jacksonville, Florida, launched this year with a \$5.75 million gift from the Harry T. Mangurian Jr. Foundation and is one of few in the world dedicated to finding answers and treatments for the disease.

Dr. Dickson says many patients like Stuart Ten Broeck experience hallucinations and delusions.

“They will see things that aren’t there — small animals, small children,” says Dr. Dickson, who is also the Robert E. Jacoby Professor of Alzheimer’s Research. “They will, for example, deny that their spouse is their spouse — ‘You look like my wife, but you’re not my wife. You’re an imposter.’”

The program’s goal is to find both the cause of the disease and existing and new medications that will help these patients. For instance, the Mangurian Foundation’s gift also supports a

brain bank on Mayo’s Jacksonville campus that houses 1,000 donated organs of deceased patients confirmed to have had Lewy body dementia.

This resource helped Mayo contribute to the first genome-wide association study, which found new genetic risk factors. Mayo Clinic also discovered a Lewy body dementia gene within the last year that runs in some families.

The Mangurian Foundation was inspired to make the gift because of someone close. The late Harry T. Mangurian Jr., who established the foundation, was a developer in Fort Lauderdale, Florida, and Rochester, New York. He owned the NBA’s Boston Celtics and was integral in bringing the NFL to Tampa, Florida. His wife, Dorothy Mangurian, is fighting Lewy body dementia.

“The story regarding Stuart Ten Broeck is similar to what I and the caregivers have experienced with Dorothy,” says Gordon Latz, a vice president of the Mangurian Foundation. “We at the Harry T. Mangurian Jr. Foundation are dedicated to supporting research seeking a cure to this disease and are proud of partnering with Mayo Clinic in this ongoing effort.” ■



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SEEING HOPE

A Girl and Her Family Glimpse a Better Future

The first thing the Arndts want you to know about them is their strong faith in God. They say it's gotten them through some very tough times — mother Tara's two bouts of cancer (one melanoma, one Hodgkin lymphoma), daughter Kelly's head wound that sent her to the emergency room in an ambulance; and daughter Madison's fight with H1N1 flu, which had killed several children in their home state of Minnesota that year.

They knew their faith would see them through another trial two years ago, but Mom and Dad were worried. Doctors at Mayo Clinic noticed lesions on Madison's eye, and the 11-year-old's vision was getting worse. Her sight had never been great — she'd gotten her first eyeglasses at age 4, starting with a +3 prescription. Then at age 6, local doctors saw scarring on both eyes and referred her to Mayo.

In the years between 6 and 11, Mayo Clinic worked with Madison and her parents, and Madison's vision remained fairly stable.

But these new lesions worried Mayo Clinic

ophthalmologist Jose S. Pulido, M.D., as did the inflammation in her eyes.

Mayo Clinic doctors placed a steroid implant, but soon Madison had headaches and blurry vision. Her eye pressures were extremely high at 43 (normal eye pressure ranges from 12 to 22), which Dr. Pulido relieved through a prescription of four eyedrops and a pill. And even though Dr. Pulido was doing everything he and colleagues could to control Madison's symptoms, the future frightened her family.

"We worried about the unknown," Tara says. "That was the scary part — is she going

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We worried about the unknown. That was the scary part — is she going to go blind?"

— Tara Arndt



Madison and Tara Arndt

to go blind? As a parent, you just want to know what's wrong. Let's get this fixed."

Doctors were determined to provide answers to Madison's family. They performed more tests — visual field, blood, urine, DNA — and discovered Madison has a rare recessive form of the already rare Best disease, an inherited form of macular degeneration. A recessive form of the disease means both her mom and dad, Sean, carry a mutation in the gene that causes the disease, and Madison inherited them both.

Best disease affects the macula, which is part of the retina. Usually the disease doesn't impair vision until later in life, which made Madison's early onset tough to detect. And her even rarer recessive form makes it just as difficult to predict how the disease will progress, though doctors believe she'll never go totally blind. However, legal blindness is a real possibility, and there is currently no treatment to prevent it.

The news shocked the Arndts and scared Madison, who began to cry as they left the doctor's office after the diagnosis. Her mom gently joked that God gave Madison the Best eye disease there was, and then reminded

her that God had a plan for her. Perhaps her suffering would help others.

A year later, the Arndts would find out how right Mom was.

A New Optimism

In August 2013, during Madison's routine checkup at Mayo Clinic, Dr. Pulido entered the exam room very excited. Mayo Clinic had just hired Alan D. Marmorstein, Ph.D., one of the world's experts on Best disease. And Dr. Marmorstein wanted to apply the power of Mayo to develop an innovative stem cell treatment to help Madison. If successful, the treatment could help people around the world with Best disease.

Dr. Marmorstein has worked on Best disease since 1998, when the gene that causes the disease was discovered. He came to Mayo Clinic because he believes bioengineered stem cells might halt the disease's progression, or even cure it, but the institution he was at previously didn't have such capability. Mayo Clinic and its Center for Regenerative Medicine do.

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The Center for Regenerative Medicine is conducting several stem cell clinical trials. The experts are perfecting the viability of stem cells taken from adult fat tissue as well as pioneering methods to convert skin cells into bioengineered stem cells, then differentiating them into other cells. One research group converted skin cells into functioning heart tissue that beats in the petri dish.

What's more, the center houses the Regenerative Medicine Biotrust, which would enable Dr. Marmorstein to test a number of possible treatments at once.

As soon as he arrived at Mayo, Dr. Marmorstein partnered with the Biotrust to develop a regenerative medicine protocol focused on Best disease. Biotrust experts would do a bulk of early work required to use cells as therapy — take biopsies from patients, convert the biopsies into bioengineered stem cells, and validate and store the cells — as well as train his staff in how to handle and apply these specialized cells.

"We went from being experts in Best disease to being able to apply stem cells to Best because of the assistance of the Biotrust experts," Dr. Marmorstein says. "I can't emphasize how critical they have been for this work. If you start



Jose Pulido, M.D.

Helping Others as He's Been Helped

Gene Wood has an inkling of what it's like to be blind. A few years ago, while traveling in China, his right eye began bothering him. At first he thought it was just a bit of pollution, but then he began seeing sparks. He knew something was seriously wrong.

He booked an emergency trip home and came to Mayo Clinic in Rochester, Minnesota, where doctors surgically fixed a detached retina.

This wasn't the first time Mayo doctors helped heal Gene, nor the last. About 20 years ago, Mayo orthodontists corrected a problem with an implant. Years later, cardiology helped him with a heart problem. Most recently, doctors injected platelet rich plasma to heal his thumb and are using stem cells to preserve cartilage in his knee.

To ensure others receive such help, Gene supports Mayo's researchers and their mission to give patients the best options possible.

"Doctors that I talk to here, they really believe in what they're doing," Gene says. "They must, or they probably wouldn't be here. They seem to have an internal drive to do good."

One of the many areas Gene supports is the work of Alan Marmorstein, Ph.D., who says the support has been essential to developing stem cell treatments for Madison.

"Gene Wood's grant made a huge difference because it helped us get things going," Dr. Marmorstein says. "If we could endow this work, we could speed up the time it gets to Madison. And of course there are 30,000 other people with the disease."

doing this on your own, it'll take years. But they took what would have been a very steep learning curve and made it a very shallow one. We've been able to accomplish in a year what would have taken five years anyplace else."

A Permanent Fix

On Valentine's Day, Madison and her mom traveled to Mayo Clinic in Rochester, Minnesota to give blood and skin samples. Soon Dad donated, too.





"The best approach may well be to replace her RPE cells with new ones in which we have restored the gene."

— Alan Marmorstein, Ph.D.

The Biotech Trust converted Madison's skin samples into bioengineered stem cells and is now helping Dr. Marmorstein and colleagues convert those cells into functioning retinal pigment epithelium (RPE) cells, the cells affected by Best disease.

Because these cells are alive, the team will be able to test, in the petri dish, a number of solutions for Madison before ever treating her. The first solution the team will try is gene therapy, which is already being performed in other eye diseases. The team will also use the cells to test a whole host of drugs that show promise but are not approved by the Food and Drug Administration for this disease.

However, both of these approaches have drawbacks. Gene therapy might lead to the

unregulated expression of the protein involved in the disease, and medications always carry the risk of side effects.

Dr. Marmorstein believes the most effective solution may be to remove Madison's damaged RPE cells and replace them with RPE cells bioengineered from her skin cells. It would be a permanent fix with no side effects since Madison will be treated with her own cells.

"Gene therapy doesn't remove the bad protein, and finding a drug would mean Madison would be on that drug the rest of her life," Dr. Marmorstein says. "The best approach may well be to replace her RPE cells with new ones in which we have restored the gene."

While Dr. Marmorstein develops these treatments, Madison and her family continue to work with Dr. Pulido to control the symptoms as best they can, and the Arnolds' lives go on. Madison dances on the high school dance squad, plays flute in the junior high band, goes to football games and dances with friends, and reads whatever she gets her hands on. The family goes fishing when they can. And though Madison is still only 13, they are beginning to think about college. (Madison is considering animal medicine, but doesn't like the idea of giving shots.)

Whatever comes their way, the family is confident that God will see them through and Madison will get the help she needs.

"The future always brings more technology, and I know our prayers are being answered, and we believe Mayo will help stop Madison's disease from progressing," Tara says. "That gives us hope for her future." ■

We Have a Date

Benefactors Help Mayo Medical School Become Reality in Arizona



Visionary benefactors are making Mayo Medical School in Arizona a reality. And thanks to their commitment and generosity, classes will begin on the new campus in fall of 2017.

The Arizona campus will double Mayo Medical School's student body and create a single, integrated curriculum at Mayo sites across the nation.

Built on a robust technological platform, this learning model supports a more personalized learning experience in which students benefit from independence

in time, pace, repetition and pattern of learning as they prepare for classroom interaction. The school will incorporate tools that will help doctors-in-training see how their approaches to care fit into the larger health care system. Mayo believes this understanding will help doctors improve how care is delivered, not just to their individual patients, but to all patients.

"We are not only expanding our footprint," notes Sherine Gabriel, M.D., Mayo Medical School dean and William

J. and Charles H. Mayo Professor. "Our school's vision will set a new standard for medical education content and delivery that will not only prepare our students to be knowledgeable and caring physicians, but also leaders in improving health care delivery." ■

"Our school's vision will set a new standard for medical education."

— Sherine Gabriel, M.D.,
Mayo Medical School dean





“If you view it through the idea that there’s a purpose in life beyond me and what I want, this makes sense. Life is not just about me.”

— Pediatrician Phil Fischer, M.D.

Life Is Not Just About Me

Mayo Clinic Doctor Gives of His Body to Help a Stranger

Pediatrician Phil Fischer, M.D., readily admits it was a weird, crazy idea.

He was doing pediatric rounds with residents and medical students, talking about a patient's kidney failure. A student joked that if a fellow student gave a kidney, he would get a better grade. Dr. Fischer began to laugh but realized it wasn't funny — why wasn't he himself giving a kidney? The doctor volunteered his time at church. He traveled to low-resource countries to help others. How was this different?

"That was my moment where it became personal," Dr. Fischer says. "I don't know why it stuck. But somehow it stuck."

He talked to colleagues and his wife. All were supportive. He knew there were risks, but not any more than riding in a car. He also knew, statistically, that people who donate kidneys lived longer than those who didn't — not because it's beneficial, but because candidates have to be very healthy to donate. And he also had some extra vacation built up.

Unfortunately he wasn't a match for the pediatric patient, but there are more than 80,000 people waiting for a kidney, 4,500 of whom will die this year still waiting.

Soon Dr. Fischer found himself going through the thorough selection process — blood work, physicals, psychological exams, and so on. After he passed all with flying colors, doctors removed his kidney laparoscopically, a minimally invasive technique that reduces recovery time.

"In principle, it's not any different than giving blood," Dr. Fischer says, though others may argue the point. (Ironically, Dr. Fischer can't give blood because his philanthropic work in developing countries puts him at high risk of malaria.)

Dr. Fischer was home the day after surgery. Within about a week he was walking a mile or so. The pain was "not a big deal; I might have taken some pills in the hospital, but none at home." At about two weeks, his recovery stalled a bit. Physician friends told him it

would take nearly six weeks for his body to get used to functioning on one kidney, but he thought he might be different. He wasn't.

For the first few months, Dr. Fischer didn't talk about his donation. He knew it was odd and didn't want to confuse the motivation behind it — he did it to help another, not for attention. But his doctors and pastor urged him to tell others. They said his story could inspire others to do the same.

Dr. Fischer believes in the Purpose Driven Life, whose key tenet is, "It's not about you."

"If you view it through the idea that there's a purpose in life beyond me and what I want, this makes sense," he says. "Life is not just about me."

To date, five Mayo Clinic employees have donated a kidney. As Dr. Fischer's story spread, the Mayo Clinic William J. von Liebig Center for Transplantation received numerous more inquiries from employees. ■

To learn more about our live donor program visit www.mayoclinic.org/transplant-center.

Out of Chaos Comes Order

Revolutionizing How We Understand the Trillions of Bugs in You Right Now

Mayo Clinic researcher Nicholas Chia, Ph.D., is hard to pigeonhole. Is he a physicist? He has a doctorate but doesn't work in physics. Is he a microbiologist? He works in the field every day but never formally studied biology after high school. Is he a surgeon? He holds an appointment in experimental surgery but will never pick up a scalpel.



Nicholas Chia, Ph.D.

So what is the physicist-turned-microbiologist doing at Mayo Clinic? He's applying his unusual perspective to microbes — or more appropriately, the relationships microbes have with each other and your body. Yes, the teeny ones

living on and in you right now. And, there are a lot of them to study.

"You have trillions of these bugs, and they may be present in any number of combinations, but some of those different combinations share traits that lead to disease progression," says Dr. Chia, associate director of the Mayo Clinic Center for Individualized Medicine's Microbiome Program. "That's what we need to understand." Dr. Chia's unique ability to see patterns in large systems led him from theoretical physics to microbiology. That, and a strong push from his mentor Nigel Goldenfeld, Ph.D., a professor at the University of Illinois at Urbana-Champaign who enlisted Dr. Chia to apply his skill in statistical analysis to microbes.

"He told me, 'Change how biology is done,'" Dr. Chia said. "I've taken him seriously."

Find the Pattern

The microbes in and on your skin, eyes, gastrointestinal tract and elsewhere interact with each other, forming connections and patterns.

But finding these patterns isn't a simple task, as the complexities multiply almost as fast as the microbes themselves.

The human gastrointestinal tract features over 100 different microbes and more than 5,000 microbe-to-microbe interactions to study.

To find answers in this complex system, Dr. Chia focuses less on the individual kinds of microbes themselves and more on how they work in certain combinations with other microbes and your own cells. This is where his background in physics comes in handy, allowing him to create new data models explaining these interactions.

"Scientists from outside traditional medical fields, like Nick Chia, bring expertise on how to handle complex systems like those found in the microbiome," says Gianrico Farrugia, M.D., director of the Mayo Clinic Center for Individualized Medicine. "His work helps make the data discovered useful to medical providers and is essential for Mayo Clinic to continue to deliver high-value care."

Dictating the Beat

Funded by the Center for Individualized Medicine, Dr. Chia is on the forefront of research showing that microbial behavior can be accurately predicted without studying every interaction.

To help explain the concept, Dr. Chia says imagine a rock concert. The performers on the stage can dictate the beat that the crowd will move to. At a certain point, the band leader can incite the crowd with a high-energy anthem or take steps to ease the emotional atmosphere through slower songs. All of these interactions are coordinated by the people leading the crowd — in this case, the performers. It is no surprise that a crowd at a rock concert will move to the same beat.

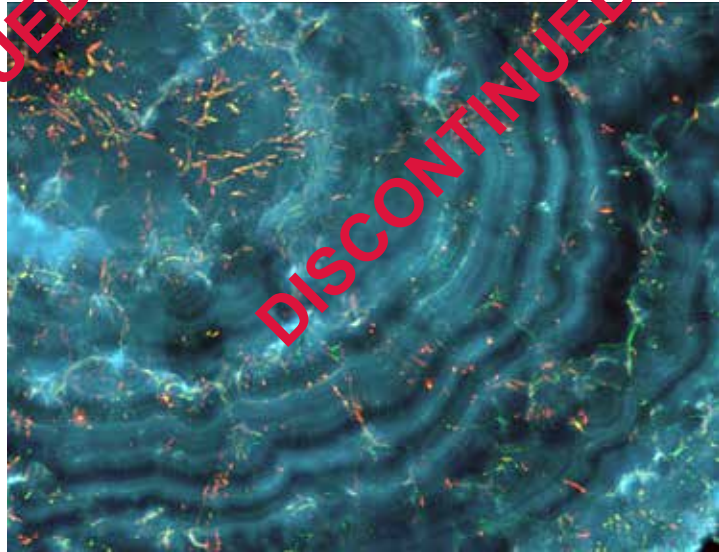
But what happens when a fight breaks out? The reactions of individuals in the crowd are no longer dictated by the music. To the casual observer, the reactions seem random and unpredictable, but study enough of such situations and patterns will emerge — most of the people around the fight will move away, some will move closer, and others will join in. When the balance of our microbes gets

out of whack, the result can be similar chaos. Finding the patterns amid the turmoil is essential to fixing the problem.

With the help of benefactors, Dr. Chia's work is opening new areas of research. For instance, when he examined the microbe of the uterus with colleagues who specialize in endometrial cancer, they made a groundbreaking discovery.

"We found in cancer cases there were certain microbes that were almost perfectly associated with endometrial cancer and not present in benign hysterectomies," says Dr. Chia, who hopes the research leads to a screening test to more accurately predict early stages of endometrial cancer, thereby giving physicians critical information to tailor treatments. "We would've never been able to explore this without philanthropy."

Along with John K. DiBaise, M.D., also of Mayo Clinic, Dr. Chia is applying his ideas to understand how proton pump inhibitors cause less diversity in gut bacteria. The imbalance puts people at increased risk of infections such as *Clostridium difficile* and pneumonia, as well as vitamin deficiencies and bone fractures.



Dr. Chia is also creating art out of medicine. With colleagues at the University of Illinois at Urbana-Champaign, Dr. Chia helped create this microscopic view of a kidney stone after it was treated with fluorescent probes to identify bacteria (green) and fungi (red).

"Evidence has been mounting for years that long-term use of proton pump inhibitors poses increased risks of a variety of secondary medical conditions, but we have never really understood why," says Dr. DiBaise. "What this study does for the first time is demonstrate a possible explanation for these side effects."

It's exactly the type of understanding Dr. Chia is bringing to areas we once thought were random and unknowable.

"That's the goal," Dr. Chia says. "Take what I have learned and move it into science. It's a different way to look at things." ■



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THE COMPANY DOCTOR

Jay Alix Helped Heal
General Motors During Its Darkest Days
— Now He's Protecting Mayo Clinic

Jay Alix still remembers the business advice his dad gave him more than 40 years ago.

Jay was about 12 and working alone one night in the family's Shell station. A customer came in with a flat tire and needed a new one right away. Jay had changed countless tires, but he had never written up the bill of sale. How much was the tire? Did we charge to take the old one off? Put the new one on? How much tax?

He called his dad to ask what he should do. His dad gave him a loud two-word answer — “sell it!” — then hung up.

“He was probably laughing on the other end,” Jay remembers fondly. “But the point was ‘make the sale — and get the job done!’ ”

Jay took the lesson into the only business school he applied to — the Wharton School of the University of Pennsylvania — then on to Rutgers University, where he earned an MBA, and into his own business, Jay Alix & Associates P.C., a corporate turnaround firm he founded in 1981, just a year out of school.

Within three years, Jay Alix & Associates, now AlixPartners, was helping creditors of the DeLorean Motor Company recover \$100 million in assets. The year he turned 31, he was turning around Phoenix Steel Corp., the oldest steel company in the country. Soon more national and international brands started knocking — Unisys, National Car Rental, Zenith, DirectTV, Kodak and countless others.

But his biggest challenge began in 2008, when General Motors Co. (GM) teetered on the edge of bankruptcy, threatening to take the country's economy with it.

Facing the Abyss

By 2008, Jay had experienced full cycles of business, career, family and life. Just as his firm was hitting its full stride in the late '80s, Jay married his college sweetheart, Maryanne Hanson. They had two kids and remained close to Maryanne's roots in Michigan.

But in 2000, Maryanne died. For a while, Jay tried to concentrate on both the business and his daughters, who were just 6 and 9 at the time. But he soon realized what was most important and sold control of what was now a growing global company.

"I saw that I could lead the company globally, but I would have no relationship with my kids," he says. "I had great help from nanies, friends and family, but I realized if I'm away, my kids wouldn't have a parent at home."

"I did both daddy duties and mommy duties myself — morning breakfast, morning drive, doctors' appointments, violin lessons. I was the soccer mom of their classes. I gained a great appreciation for single parents."

As the girls grew older and became more independent, Jay began doing pro bono consulting, a bit here and there, though when the economy crashed in 2008, he was still firmly retired. But when he surveyed the crash's economic damage — Lehman Brothers, Merrill Lynch, AIG, Citibank were all gone or in deep trouble — he saw the next big institution teetering.

GM was America's largest automaker. During the crisis, *The Economist* reported GM employed 235,000 people directly and provided health care and retirement benefits to nearly 500,000 more. It employed millions of Americans indirectly by spending about \$50 billion a year on parts and services from nearly 12,000 vendors.

A loss of the largest player in one of America's largest industries would likely have turned the economic crash into a decade-long depression. And it didn't look good for the company or the industry.

At the time of the crash, GM estimated its worth at \$25 billion, but soon its market value was merely \$450 million. With over \$170 billion in liabilities, it was poised to be the largest industrial meltdown in history, taking the entire auto industry with it along with the future of the American economy.

Corporate Surgery

The Sunday before Thanksgiving in 2008, Jay called GM CEO Rick Wagoner early in the morning. He had worked with the CEO a few times over the years, including when Jay led a turnaround as CEO of GM's National

Car Rental division for two years. He told Wagoner he had an idea that could save GM.

Three hours later, Jay was in Wagoner's living room.

Wagoner didn't think GM could survive a bankruptcy. It would drive away customers and tie up assets for far too long. Jay agreed, but qualified it — GM couldn't survive a "normal" bankruptcy. Jay's years of experience told him there was another way, a new way.

As Jay described the proposal in a 2013 *Forbes* article recounting the meeting:

"GM split into two very separate parts before filing: 'NewCo,' a new company with a clean balance sheet, taking on GM's best brands and operations, and 'OldCo' the leftover GM with most of the liabilities. All of the operational restructuring to make the new company profitable would also occur before a bankruptcy filing, so GM could go through bankruptcy in a matter of days — not months or years with creditors and other litigants fighting over the corporate carcass while the revenue line crashes."

Wagoner was impressed but still a bit skeptical. After discussing Jay's idea with board members, he invited Jay to come to GM to work on his plan, making it clear that it would be only one of many options in development.

Through the next four months Jay fought for the plan through bureaucratic battles, political wrangling, setbacks and phase changes. But it worked. By the time President Obama announced Wagoner's resignation, the administration had agreed to Jay's plan. Supporting the OldCo/NewCo split and subsequent spin off, the government also backed NewCo with \$45 billion of taxpayer funding.

On June 1, 2009, GM filed for the largest industrial bankruptcy in American history.



Alix, below, learned critical business lessons from his dad, left, as the two worked together at the family's Shell station.



It emerged from bankruptcy protection just 40 days later. Jay's plan proved to be an "elegant solution," a phrase and concept that Jay has brought to many corporate turnarounds.

Health Care in Crisis

Jay sees a crisis of a different sort looming for the U.S. health care system. It won't come as dramatically or as quickly, but it's just as threatening. At the problem's heart is our "third-party payer" system.

Usually, when making a purchasing decision, an individual or company weighs three competing needs — time, quality and cost. One person might want a product or service as quickly as possible, regardless of cost or quality. Another might want the best quality available.

and cost is no object. Another might consider only getting the lowest cost and will sacrifice speed or quality

“Our health care system throws this tri-variable equation out of whack,” he says. One party, the patient, understandably, wants the best possible care delivered as quickly as possible. But he or she isn’t necessarily paying the bill. The party paying the bill, the insurance company or government agency (Medicare, Medicaid, others), just as understandably wants to pay as little as possible and is less sensitive to time delays and patient quality measures.

systemic problem that goes beyond Mayo. Over the next five years, all major health care centers, including Mayo Clinic, anticipate a 20 to 40 percent reduction in reimbursement.

“Dozens of other major medical institutions are in the same boat as we are,” Jay says. “If revenue is in trouble, the institution is in trouble. If that happens, doctors and allied professionals won’t be able to practice as they’d like to. This would be a pernicious thing that could destroy the Mayo Clinic Model of Care as well as the brand. If we don’t preserve or augment the revenue line, we’ll not be able to

“Dozens of other major medical institutions are in the same boat as we are. If revenue is in trouble, the institution is in trouble. If that happens, doctors and allied professionals won’t be able to practice as they’d like to. This would be a pernicious thing that could destroy the Mayo Clinic Model of Care as well as the brand. If we don’t preserve or augment the revenue line, we’ll not be able to sustain the institution.” — Jay Alix

Care providers are caught in the middle. If they concentrate only on providing the highest quality and speed, they’ll go bankrupt as the payer won’t pay the cost of that service level. But if the provider manages the care to reimbursement level alone, the quality of care and timeliness suffer. This downward financial pressure on time and quality is constant and shows every sign of increasing in the future. At the same time, the Affordable Care Act is adding millions of people to the system.

Jay fears how this situation will impact the Mayo Clinic Model of Care. He says Mayo leadership has done an extraordinary job getting ahead of the problem, becoming more cost efficient where possible without affecting the patient experience, but this is a national,

sustain the institution.”

Luckily, Jay volunteered a lot of his time over the last few years and diagnosed Mayo’s challenges, and has now designed an elegant solution for Mayo.

An Elegant Solution

Jay became familiar with Mayo Clinic before he was ever a patient. When he started his company in the early ‘80s, he studied the business models of service companies that led their industries. Mayo impressed him most.

“The very core of Mayo became the very model of my company,” he says. Then when Jay became a patient in 1994, he experienced the Mayo Clinic Model of Care firsthand.

“The idea that I could fly in and be seen by

half a dozen doctors and another half a dozen specialists in a few days was amazing,” he says. “No where else does that happen. Other places you go in and it takes a month and a half, and they let you go with unanswered questions, saying ‘it’s probably OK.’ ”

Meeting with hundreds of people at all Mayo campuses, Jay has been working with Mayo leaders to design multiple integrated solutions to make sure this care model survives the looming crisis and remains for generations to come.

With a focus on Dr. Richard Emslander’s practice as a model, Jay conceived of and designed the Mayo Endowed Clinician pilot project in 2011 intended to mimic an endowed clinical practice. Jay then led the funding effort and helped provide oversight and support for Mayo’s leaders to roll out the project, starting with eight physicians. Usually, endowments support research, so scientists can find the next cure, or education to train the next generation of physicians. An endowment to support the practice, to offset reimbursement cuts, was an innovative idea, but one with many complications and complexities to work out. Working with a large team inside Mayo, Jay set out to tackle the problem.

The project was designed to preserve physicians’ time so they could devote their schedules to the highest levels of care and work on the most difficult diagnostic cases, emphasizing a thorough care plan and flexible schedule to build close relationships with their patients. The project focused both on ensuring that physicians continue to have the necessary time with patients — an unhurried exam being essential for appropriate diagnosis and treatment — and on increasing the quality of care and outcomes for each patient.

Jay recognized and helped the Mayo staff see that the cumulative financial pressures

facing the health care industry would have the compromising effect of making Mayo move in the direction of decreased diagnosis time and commoditized medicine. For Mayo to remain true to its historic mission, values and guiding principles, the institution needed strategic planning that looked 50 to 100 years into the future. What was required was a bold strategy that ensured that Mayo Clinic could free up its greatest resource, its people, to do what they do best — serve the needs of the patient. The Endowed Clinician Program, now embraced by Mayo, is the embodiment of that elegant solution.

After a trial period of clinical testing, Mayo Clinic surveyed the stakeholders. They ranked the pilot program No. 1 in patient satisfaction, physician satisfaction and overall quality of care within Mayo Clinic when compared with similar patient care sections.

The project Jay designed and helped manage was so successful that leadership made endowing physicians and integrated teams of health care professionals a top priority. It is integral to CARE ... The Campaign for Mayo Clinic, whose goal is to raise \$3 billion for Mayo by 2018.

“As long as we stay ahead of the wave, Mayo will remain strong,” Jay says. “Mayo still has great strength and stability. Mayo represents the way medicine should be done. Mayo is the North Star of medicine — it is true north. Other health care institutions look to Mayo for how health care should be done and copy it. If we lost Mayo, we would lose true north.”

Jay is confident that the Endowed Clinician Program along with Mayo’s committed, passionate benefactors will never let that happen. Jay’s advice? “The Endowed Clinician Program is an elegant solution whose time has come, and working together we can ‘sell it — and get the job done!’ ” ■

Accentuate the Positive

After a Mayo Visit, Nancy Trask Is Living a Healthier Life

Nancy Trask remembers how quickly her outlook on life changed. She was on her way to visit her mother, who was just admitted to the hospital for complications of diabetes. On the way, she looked at individuals she was passing and thought, “I wish you well.”

It was part of a stress and resiliency management exercise given to her that day by Mayo Clinic’s Healthy Living Program.

“It was hard because my mom was possibly facing surgery,” Nancy says. “But rather than thinking ‘How’s she going to be when I get there?’ ‘Is my dad OK?’ and all of those pressure feelings, I’m walking down the sidewalk and I’m wishing you well. I’m looking at people, and I’m thinking of gratitude for them and happy, really good thoughts. My whole energy in going in my mom’s hospital room was so different. And it just felt so positive rather than negative.”

Nancy was a bit apprehensive about visiting the Healthy Living Program and participating in the Healthy Living Plan because she worried others would judge her. But she had seen her mom’s long battle with health problems exacerbated by bad health choices and knew something had to change.

“I love my mom, but I don’t want that path,” she says. “I don’t want to follow that health path.”

Nancy’s apprehension remained through her pre-visit online assessment, which, in Minnesota-nice fashion, she says was “a little bit challenging.” It was uncomfortable for her to assess her current habits and wanting to think about the work in front of her. But the team from the program helped her understand that habits can be changed, and they set realistic goals with Nancy.

“The compassionate way that the physician, my trainer and my personal wellness coach all talked to me made me feel that I’m not a failure,” Nancy says. “They concentrate on what is it you want to accomplish. Here’s your baseline. We’re going to climb this mountain together and how do you want to get there? What is it you want to do? What is it you want to accomplish?”

Over the course of the program, Nancy participated in sessions on physical activity, nutrition and



Nancy Trask



residency and partnered with her personal wellness coach. There was a comprehensive physical assessment that included blood work and strength and mobility measurements, which the staff used to create an individualized wellness plan. She cooked with an executive wellness chef to learn how to cook healthy, satisfying meals.

She also took advantage of large-group meditation rooms and individual reflection rooms.

It all added up to a new, healthier approach to life.

“I intend to be the Healthy Living poster child,” Nancy laughs. “The person that I came in with and the one I am today, just three days later, are very different. I like me, but there are parts of my life that

I don’t like. And I want to be healthy, and I want to change those. This gave me all the tools and resources to do that in a very positive way.

“In a way, that makes me feel so empowered and so ready to meet those challenges that I have in my life, that everyone has,” she continues, then breaks into a big laugh, “It’s killer. It is. It’s like WOW!” ■

Life Is Good

An Inspired Benefactor Helps the Helpers

“Mayo Clinic saved my life many times,” says Dan Abraham, founder of Slimfast. “(Mayo) then helped me to improve my health and performance dramatically. I was so grateful to Mayo and its staff that I wanted to do something to express my thanks.”

To help those who helped him and his family, Dan gave a gift to establish the Dan Abraham Healthy Living Center, a wellness facility for Mayo Clinic staff. In 1998, he helped open a second facility. Then in 2007, he and his wife, Ewa, gave Mayo Clinic employees a three-story state-of-the-art facility with exercise equipment, wellness classes, workout rooms and a pool.

The Dan Abraham Healthy Living Center is a model for how people can enjoy a positive lifestyle that incorporates the best practices of exercise and nutrition. By conducting research and education on healthy living, the center ultimately helps people throughout the United States and around the world.

“Ewa and I are inspired and energized by the Mayo employees whose lives have been helped by participating in the center,” Dan says. “This healthy living center is my gift to the Mayo people so you can continue to be the best in serving others.”

This year, the Abrahams supported a five-story expansion of the Dan Abraham Healthy Living Center to include a new sports medicine program and the Healthy Living Program, which is open to the public.

“Now we are embarked on an even greater course — healthy living programs for all patients who come to Mayo Clinic and, eventually, for all Americans,” he says. “Our goal is to help improve the quality of life and reduce health care costs in the United States.

This innovative center will help make America stronger and more competitive by helping people enjoy greater health and longer life expectancy.” ■



Turning 50 Just Got Better

New Test Could End Need for Screening Colonoscopy

There are distinct benefits of turning 50 years old — you qualify for senior discounts; you have a reason for forgetting things; you get to use the excuse “I’m just set in my ways.” However, the American Cancer Association’s recommendation to start having a periodic colonoscopy isn’t one of them.

Beginning at age 50, both men and women at average risk of developing colorectal cancer should undergo screening for colon cancer. For most, this means a colonoscopy. However, 23 million Americans between the ages of 50 and 75 aren’t getting screened as recommended. As a result, colorectal cancer remains the second-leading cancer killer in the United States.

But a new screening test developed at the Mayo Clinic Cancer Center just turned the odds in favor of survival.

Cologuard offers average-risk people 50 years and older an easy-to-use screening test they can do at home. Available by prescription, the test is noninvasive, requires no preparation, and no medication or diet restrictions.

“Low screening rates have long contributed to low survival rates for colorectal cancer, with more than 60 percent of all cases not detected until late stages of the disease,” says David A. Ahlquist, M.D., the Carol M. Gattton Professor of Digestive Diseases Research Honoring Peter Carryer, M.D., and coinventor of the test. “I am hopeful that the test’s high accuracy and convenience will result in improved detection and survival rates for colorectal cancer.”

Every day the lining of your colon naturally sheds cells, which are passed with the stool. Cologuard detects tumor-specific DNA changes in these shed cells along with hemoglobin in cancerous and precancerous lesions that pose the greatest risk of progressing to cancer.

The test consists of a kit mailed directly to the patient, who collects a sample and sends it back in a prepaid mailer. Results are usually available within two weeks. A positive result requires a diagnostic colonoscopy to check for polyps or cancer.





David A. Ahlquist, M.D.

In a clinical trial involving 10,000 patients, Cologuard, which was developed in collaboration with Exact Sciences Corp., detected 94 percent of the earliest and most curable stages of colorectal cancer, which is a detection rate similar to that reported for colonoscopy. And Cologuard detected 69 percent of polyps at greatest risk of progressing to cancer, that is, those with high-grade dysplasia.

In short, Cologuard significantly improves early detection of colon cancer — a critical step in beating this disease. ■



The test consists of a kit mailed directly to the patient, who collects a sample and sends it back in a prepaid mailer.

“I am hopeful that the test’s high accuracy and convenience will result in improved detection and survival rates for colorectal cancer.”

— David A. Ahlquist, M.D.



ONE SURGEON, FOUR TEAMS, FOUR LIVES CHANGED

ATYPICAL DAY



The feet of Joseph A. Dearani, M.D., decelerate as he meets his team for a briefing before an 8 a.m. heart surgery, but his hand movements and vocals are succinct and precise.

The operating room, prepped by a team of surgical staff and nurses, is filled with IV bags on hooks, circular lights the size of truck tires and trays of surgical instruments — retractors that look like long forks with bent tines, forceps in the shape of giant tweezers and something that looks a bit like a whisk.

Dr. Dearani looks around at all assembled — nurses, anesthesiologist, nurse anesthetist, cardiologist, resident, perfusionists and surgical technicians — and asks, “Does everyone agree that we should proceed?”

“Yes,” they reply.

“Ten blades,” Dr. Dearani requests.

And with the knife passed from surgical technician to surgeon, the operation begins.

Quiet jazz standards fill the room, matching the surgeon’s graceful rhythms. Small bits of hazy smoke from the cauterization swirl up next to his face, which is nearly hidden behind a mask and surgical spectacles that look like small binoculars mounted to eyeglasses, topped with a miner’s headlamp. Four caregivers in blue surgical garb stand around him, some with similar headgear, some with regular glasses, others with clear plastic face protectors.

For the next three hours, the soft music accompanies the team as specialists seamlessly pass surgical instruments back and forth, anticipating the surgeon’s next moves.

The patient, a sculptor, came to Mayo with shortness of breath and irregular heartbeats. A congenitally linked condition that enlarged his heart and thickened its walls was shortening the life of the 60-year-old artist. This operation, called a septal myectomy, will reduce the heart muscle’s thickness and give him his energy — his life — back.



Heart Stopping

About a half-hour in, the team stops the heart — one of the most dramatic feats in all of surgery.

Mayo Clinic pioneered heart surgery using the heart-lung bypass machine. Its surgeons were some of the first in the country to perform “open-heart” procedures, and its researchers and engineers built the first commercial heart-lung machine, which was the size of a chest freezer.

In Dr. Dearani’s operating room, two perfusionists monitor a modern heart-lung machine, which reroutes the blood and oxygenates



it while the heart is stopped. The compact machine pushes the artist's blood through a spaghetti-like freeway of tubes and reservoirs that look like they are part of a home water-filtration unit.

The perfusion specialists constantly call out numbers to the surgeon.

The once forceful, pinkish heart, earlier positioned near the front of the chest wall while beating and making that distinct "da doo, da doo" sound, now rests much smaller and deeper in the protective hole. Looking down on the heart, there is very slight, unnerving movement. The heart rate monitor shows a big

zero and lies flat, which would indicate death in other circumstances. It remains that way for 20 minutes while the surgeon efficiently and precisely cuts away excess, abnormally thickened muscle.

As Dr. Dearani works, he calls out numbers, accurate measurements critical for the operation to succeed. A sliver off and the patient could suffer complications. At one point, it's clear Dr. Dearani is not getting the number he needs, intonating a vigilant numeral. The echoing between team members becomes more intense, reinforcing the team's syncopation.

To a layperson, the numbers are meaningless. But to this team they are a precise form of communication — when Dr. Dearani motions to transfer the blood back to the heart, the number "1" flashes on the monitor, and the team calls it out to Dr. Dearani, then "5," then "50," and so on, up to approximately "100." The patient is safely separated from the heart-lung machine.

"Da doo, da doo" fills the room again.

A cardiologist and Dr. Dearani assess the characteristics of the muscle resection on the echocardiogram, measuring the pressure difference (gradient) between the inside chamber of the heart and the aorta, leaving the heart on a screen that looks like sonar equipment. The preoperative gradient was 124 millimeters of mercury (mmHg) — the post-repair gradient is now 5 mmHg, an ideal result says the cardiologist. A debriefing is performed, and chest closure begins.





More Lives Touched

Throughout the day, Dr. Dearani performs three more operations, each as intense as the first, and each as uneventful, thanks to these coordinated teams. To the jazzy classic rock of Steely Dan, he works with a team to free a patient's esophagus and trachea from an aorta that has a congenital malformation creating a ring that effectively strangles her. To Stan Getz's "Body and Soul," he works to repair a child's heart valve, using sutures finer than a seamstress' stitches on a Venetian lace wedding gown.

The fourth operation is an attempt to wean a baby off EMCO, a portable heart-lung machine, which is aiding poor heart function and breathing. Unfortunately the baby has a cardiomyopathy and a heart that remains too weak — he will stay connected to the device while awaiting a heart transplant. A cardiac



transplant team will work with the family while the baby waits for a suitable donor.

For Dr. Dearani and his teams, it was a typical day — lives touched, lives saved. For the patients, it was anything but typical. Each experienced how hard life is with a heart condition, but these teams and the great advances in medical technology are helping them overcome their conditions to reclaim their lives. ■

BECAUSE OF YOU

Giving Back to Help Patients Inspires a \$100,000 Gift

How much do Mayo Clinic employees believe in their mission? Within two weeks after the launch of Because of You, an employee-giving campaign, 2,178 of them had made one-time gifts or enrolled in payroll deductions.

Benefactors Richard and Joan Stark challenged Mayo employees that if 2,000 participated they would donate \$100,000 to Mayo Clinic.

"Mayo Clinic has provided exceptional care to members of my family over the years, and recently we have been trying to return some of that

generosity by gifting some of my good fortune back to the clinic," Richard says. "We can't think of a more exceptional medical facility in the world than Mayo Clinic. It is advancing the cause of all of humanity, and on a personal level it has meant so much to us.

"Congratulations to everyone on making the goal. It is a great testament to the goodness and dedication of the staff." ■



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“As a nurse, I see people who’ve been told by other institutions that their life is not going to be saved, and Mayo saves them. Patients tell me that they didn’t have any hope, but when they come to Mayo, that changes. Some people are in desperate situations, and we should all feel very fortunate that we are on the giving end instead of the receiving end. That is why Because of You was an opportunity to help.”

— Macbeth D. Torno, R.N.,
Anticoagulation Unit



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“My husband and I are so grateful to Mayo Clinic for so many reasons. My donation feels a pittance in comparison to all Mayo has offered us, but one thing I have come to realize about fundraising through my own personal experiences with it is that truly every single dollar given — even if only one dollar — is valued and adds up.”

— Karen L. Nick,
Human Resources



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“Before I came to Mayo, my family needed financial assistance with our medical bills. The Poverello Fund helped us during a difficult time. We were most grateful, and I promised to one day pay back what was gifted to us. Although we can’t make a huge contribution, a little from each paycheck will add up over time to help others in need. It feels good to pay it back ... and better to pay it forward.”

— Ryan R. Ledebuhr,
Creative Media

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Everyone from Cirque du Soleil to Barbara Bush

Tom Brokaw Helps Celebrate 150 Years as Benefactors Ensure the Next 150

A storm is brewing. A couple pushing a baby buggy try to keep their child dry as thunder peals and a thick fog descends. The street life

around the family becomes chaotic. Kids run for cover. Umbrellas flip inside out. Men and women cower as a man in black emerges among them. He raises his hands to the sky and twists like a dark flower in the wind, summoning the storm to the ground.

This is the first performance of Mayo Clinic's Sesquicentennial Signature Event, an acrobatic interpretation of Mayo Clinic's origins when Rochester, Minnesota, was decimated by a tornado. It was one of several stories told May 9 — which also included Garrison Keillor's tale of a drive to Mayo Clinic amid a snowstorm and Princess Aisha bint Al Hussein of Jordan remembering her father, King Hussein bin Talal, reading to Mayo's pediatric patients.

More than 4,000 people gathered at the Mayo Civic Center in Rochester for the event, hosted by Tom Brokaw, that was billed as "a moment in time like none other in Mayo Clinic's history." It also included a salute to the U.S. armed forces and video greetings from luminaries including the Dalai Lama, Ken Burns and Barbara Bush.

As Tom Brokaw said, "You have this mix from the Minnesota marching band to Cirque du Soleil — that's a pretty big range. We have notes from everyone from Nancy Reagan to Bono, people who have come through here. That tells a lot about Mayo Clinic in the hearts and in the minds — not just of the people of Minnesota — but of people across the world."

Preceding the event, Mayo Clinic publicly launched YOU ARE ... The Campaign for Mayo Clinic. The \$3 billion campaign is the largest fund-raising initiative in Mayo Clinic history.

Former Netscape president and CEO and Mayo Clinic Board of Trustees emeritus chair James L. Barksdale,



Acrobats perform an interpretation of the tornado that decimated Rochester, Minnesota in 1883.



Campaign chair James L. Barksdale

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TOP Cirque du Soleil performed their mix of artistry and acrobatics amid dream-like snowflakes.

BOTTOM The opening number included dance and marching bands from the University of Minnesota and Rochester, Minnesota area high schools.

Who serves as campaign chair, formally announced the campaign as members of the Honors Choirs of Southeast Minnesota joined him onstage.

The Sesquicentennial Signature Event was made possible with the generous support of Mayo Clinic benefactors Lawrence and Marilyn Matteson of Moline, Illinois. ■





We Might Not Be Here Today

As most fortunate firsthand recipients of the world-class medical care at Mayo Clinic in Jacksonville, Florida, we are pleased to make a donation to your ongoing work.

At a time in our society when cookie cutter solutions to medical care are all too prevalent, we are thrilled to be able to support the innovative Mayo Clinic research and patient care model/experience that is helping to change the face of medicine in the United States.

We know firsthand of your great work for ourselves and with our family members, and we feel strongly that we and others might not be here today were it not for the level of innovative care and the depth of concern for the whole patient that we experience every time we walk through your doors.

We are eternally grateful to Mayo Clinic's vision and tireless practitioners who make these small and large miracles happen for us every day. We hope that our donation will help continue the amazing transformation you are making to medicine and health care delivery in the United States.

William P. and Erma K. Portman
Georgia
Major Benefactors

Thank You Gifts of all sizes strengthen health care for people everywhere. Mayo Clinic is deeply grateful for each gift and finds inspiration in your support.

MAKING AN IMPACT

Cumulative Philanthropy

Mayo Clinic recognizes each benefactor for philanthropic giving of \$100,000 to \$10 million or more in the Hall of Benefactors at Mayo Clinic in Rochester, Minnesota. We also recognize those who support our work in Florida and Arizona in the Hall of Benefactors on the respective campuses.

RECOGNITION LEVELS

- Philanthropic Partners \$10 million or more
- Principal Benefactors \$1 million to \$9,999,999
- Major Benefactors \$100,000 to \$999,999

LEAVING THE WORLD A BETTER PLACE

Planned Giving

Committed benefactors who want to make a difference and provide a legacy of philanthropy can do so through planned gifts. Benefactors who support Mayo Clinic through a bequest in their will or another type of planned gift become members of The Mayo Legacy. Mayo Clinic recognizes these members in electronic recognition kiosks in the Halls of Benefactors at all Mayo Clinic campuses.

Alumni Philanthropy

Having seen and felt the direct impact of philanthropy, Mayo Clinic alumni know the difference it makes better than anyone. Many become benefactors of Mayo to help maintain the highest quality of patient care, research and education. Mayo Clinic recognizes their generosity in electronic recognition kiosks in the Halls of Benefactors at all Mayo Clinic campuses.

RECOGNITION LEVELS

- Mayo Alumni Laureates \$100,000 or more
- Doctors Mayo Society \$10,000 or more; bequest of \$25,000 or more
- Edith Graham Mayo Society \$1,000 (Mayo School of Health Sciences)

For more information about philanthropy at Mayo Clinic, please call 1-800-297-1185 (toll-free) or visit www.mayoclinic.org/development.

GIVING BACK

Annual Giving

Some benefactors choose to support Mayo Clinic's work with yearly gifts, and Mayo Clinic recognizes them in electronic displays at Mayo Clinic's campuses in Minnesota, Florida and Arizona. Six levels honor benefactors for annual philanthropy of \$1,000 to \$99,999.

RECOGNITION LEVELS

- Mayo Leadership Circle \$50,000 to \$99,999
- Mayo Ambassadors \$25,000 to \$49,999
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