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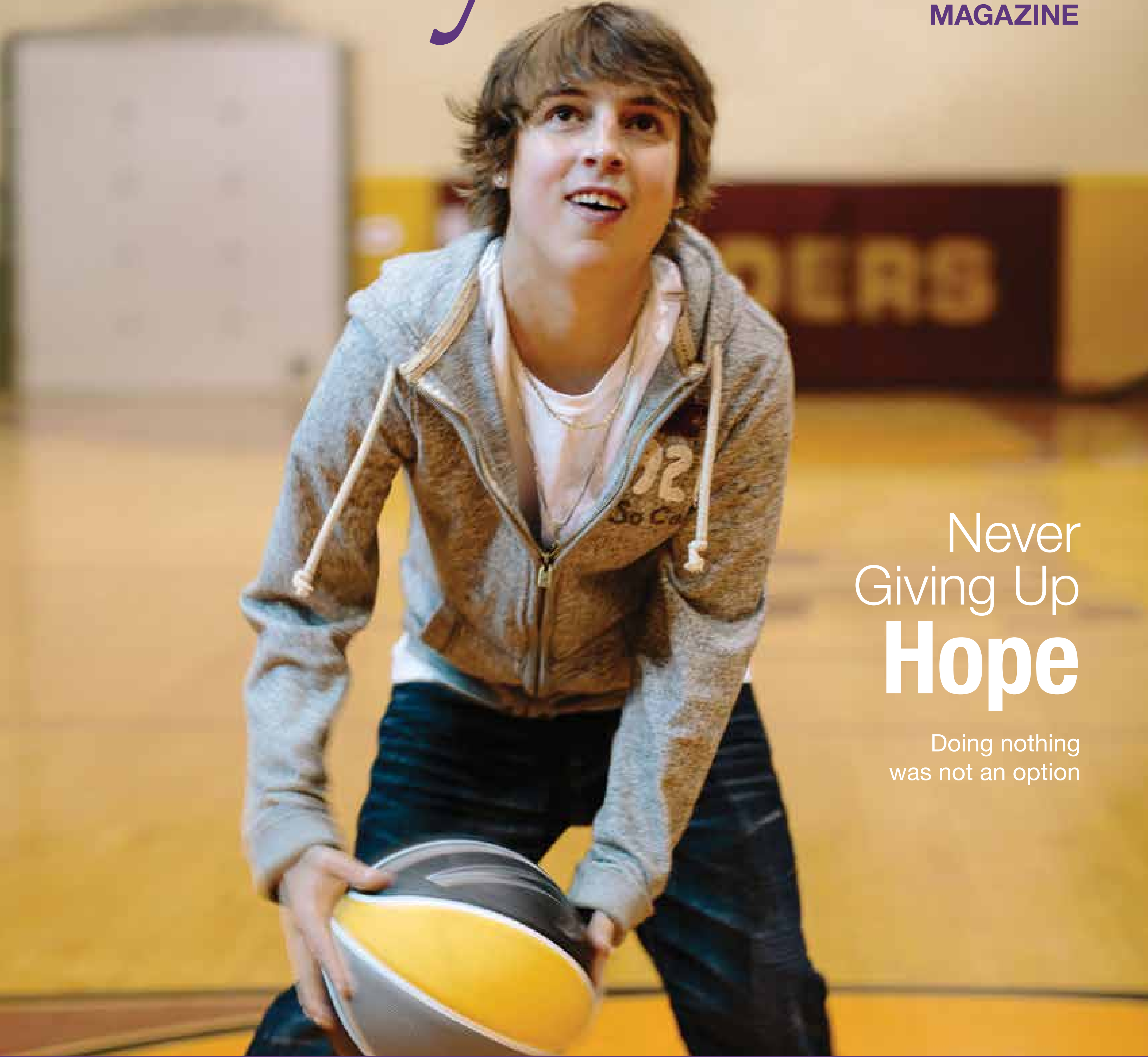

Never Giving Up Hope

Doing nothing
was not an option

2012 ISSUE 2

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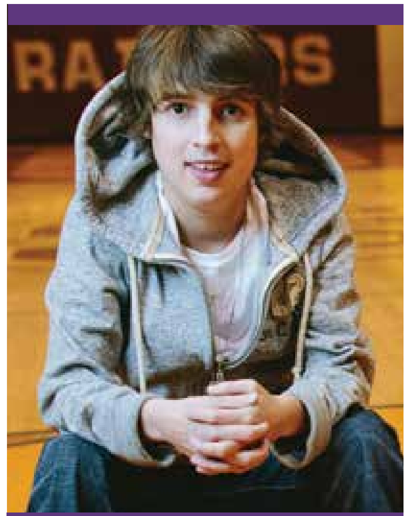

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In this issue:

The Future of Health Care is at Mayo Clinic

Mayo Clinic is at a crossroads. In fact, all of health care is.

Today, we are applying scientific discoveries of the last decade to defeat diseases that once left us helpless. For instance, it's now possible to sequence a patient's entire genome in a day, enabling doctors to quickly build molecularly targeted treatments based on an individual's DNA. We can replace damaged cells with healthy cells grown in the lab. And patients can consult specialists from anywhere in the world through videoconference and online.

In this issue of *Mayo Clinic Magazine,* you will read how Mayo focuses technologies to shape the future of health care. Already, we drive information derived from our genome into clinical care, as you will read in the story about the Center for Individualized Medicine's Clinomics Program. Through the Center for Regenerative Medicine, we established an innovative consult service to answer patients' questions about stem cell treatments that might work for them. And we are focusing on increasing quality of care while reducing cost through the Center for the Science of Health Care Delivery.

These three centers are driving brilliant discoveries (like how we can intervene in the aging process by removing aging [senescent] cells) and applying new science to patient care, as highlighted in the article on Breast Cancer Genome-Guided Therapy Study that is using mouse "avatars" to ensure safer treatments for breast cancer patients.

In the Mount Everest story, you will read about Mayo Clinic scientists literally going to the top of the world, at great peril and discomfort to themselves, to conduct research only possible in this inhospitable environment. Their quest to understand the body in high altitudes will advance cardiac care for our patients.

Finally, you'll learn about a researcher who is working with teams all over the country, including NASA scientists, to change the trajectory of melanoma, which is becoming increasingly common among young people.

Each of these projects was possible only because of Mayo's committed benefactors. It is their generous support that gives Mayo Clinic the foundation it needs to shape the future of medicine.

Thank you, and enjoy this issue of *Mayo Clinic Magazine*.

Michael Camilleri

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

Top 10

Discovery of the Year

There's a reason the journal *Science* called the Kogod Center's work in senescent cells, which was published in *Nature*, one of the top 10 discoveries in 2011: It holds promise to delay age-related diseases.

> "...no one could ever figure out how to target and eliminate them. Until now."

To maintain health, most cells continually divide to replace old and damaged tissue. But eventually cells age and stop dividing. This state is called senescence. The body regularly clears out senescent cells, but as we age, the immune system becomes less effective at "keeping house" and senescent cells accumulate.

For decades, scientists suspected that senescent cells caused common aging problems—cataracts, muscle loss, weakness—but no one could ever figure out how to target and eliminate them. Until now.

In what *The New York Times* called "a delicate feat of genetic engineering," scientists in the Robert and Arlene Kogod Center on Aging engineered mice senescent cells to harbor a molecule that was only turned on in the presence of a drug that has no effect on normal cells. The drug was then able to find the senescent cells and kill them.

The researchers found that lifelong elimination of senescent cells delayed the onset of age-related disorders in the mice. More important, they showed that removing these cells later in life could slow the progression of age-related disorders already established in the mice. To be clear, the mice's lifespan didn't increase—but their healthspan did. This allowed the treated mice to stay active and healthier longer than their untreated counterparts.

Realizing the finding's potential, countless national news outlets reported the study, including *Wired, CBS News, The Wall Street Journal, Time* and *USA Today,* which quoted Dr. Julian Sage, a genetics professor at Stanford University, as saying, "No one else has been able to do this." ■

A Mind-Blowing Assignment

Colter Meinert, 9, sits in a hospital bed with tubes coming out of his arms. His blue pajamas have ridden up to his knees as his little legs bounce around in anticipation—a red cooler just arrived at the airport with his new heart and kidney.

"As soon as I got the call, I was so excited," he lisps, making his doctor laugh. "That heart's not going to wait much longer. I'm getting it!"

Colter was one of the six people highlighted in *Nightline's* "Organ Transplants: Gift of Life." Within a couple days of the surgery, Colter was bonding with its anchor Bill Weir over Star Wars toys and showing off his scar. Colter's dad knelt at his bedside, stressing the importance of organ donation—"Otherwise, we wouldn't have him here."

Calling it a "mind-blowing assignment," Weir reported only about 40 percent of Americans sign up as organ donors, creating a shortage that kills about 18 people a day.

During his visit, Weir also started reporting a second story, this one for ABC News' *This Could Be Big*, on the next generation of organ repair, which he called, "Perhaps the most exciting medical breakthrough I've heard about." He visited Tim Nelson, M.D., who showed Weir how transplants are just a stepping stone to the next big thing—using adult stem cells to heal ourselves.

Dr. Nelson took a small biopsy of Weir's skin and broke it down into fibroblasts, which play a critical role in wound healing. Nelson then basically erased the fibroblasts' memories and convinced them they are embryonic stem cells, which can turn into any specialized cell in the body.

Recently, Dr. Nelson reported that everything proceeded according to plan (there was an 80 percent chance), which means Weir was the first person in history to see his own heart tissue beating outside his body. ■

Innovating to Make Emergency Rooms Safer

In fast-paced emergency rooms, where seconds can mean a life, it's a challenge to keep track of every patient present. The doctors and nurses are so focused on the one patient in front of them that the people next in line can fall out of focus.

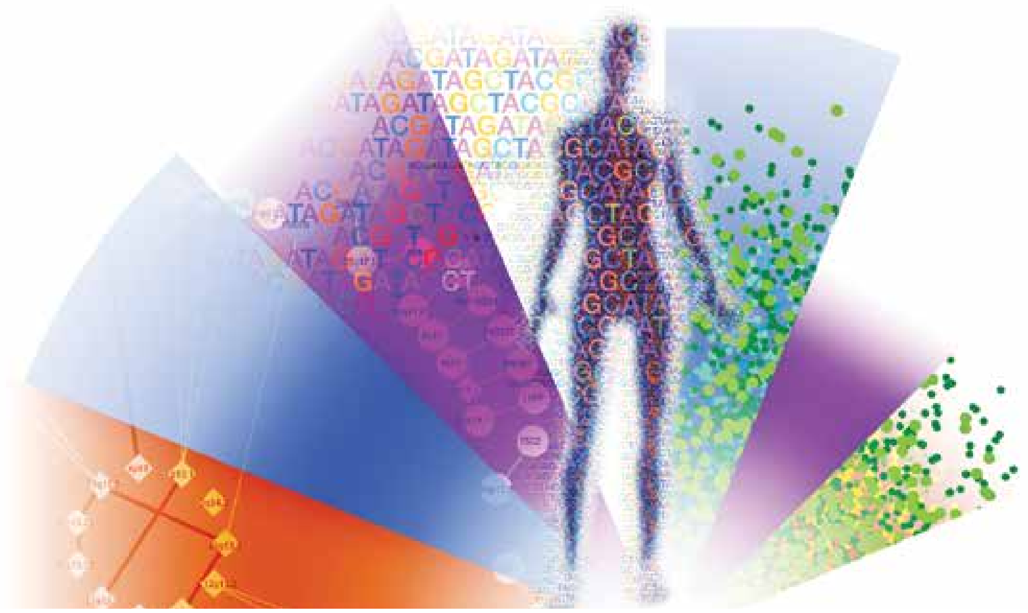
"Hospitals have great systems that allow us to focus on one patient," says Vernon Smith, M.D., an emergency room physician at Mayo Clinic in Arizona. "What we don't have is a system that allows us to see all of our patients at once."

Dr. Smith, who is passionate about computing and medicine, is changing that for Mayo Clinic. He built an information stream to track patient data for Mayo's emergency room in Rochester, Minn., and a simple system for sharing that data. He calls it the YES Board. It allows every member of the ER team to see at a glance the status of every patient present, which is crucial in determining the care for each patient.

The YES Board, displaying on 21-inch televisions mounted in the emergency rooms, exhibits rows of rectangular boxes glowing red, green, yellow, white and blue. Each box represents a room and includes an icon (such as a heart, airborne droplets, C-clamp) that tells providers something about the patients in those rooms. The board brings together data from 15 different systems.

The YES Board makes patient care safer and helps detect the most at-risk patients. It also improves efficiency by identifying when rooms and resources are freed up and forecasts the needs of the patients in the emergency department.

YES Boards are already in use in Rochester and Arizona emergency rooms, and there are plans to add them in Florida and the Mayo Clinic Health System. ■



Finding Answers
Tailored to You

Imagine suffering from cancer and exhausting all traditional therapeutic options, or living with a broad range of symptoms without having a precise diagnosis.

There's a new avenue to answers for patients with these types of struggles through the Individualized Medicine Clinic. A new service offered by Mayo Clinic's Center for Individualized Medicine, the IM Clinic seeks to improve outcomes for those with cancer or complex diseases by incorporating a team of specialists who work with patients and primary care providers to tailor care based on the patient's own genome.

This forward-thinking initiative sets Mayo apart by harnessing an expert team of Mayo clinical geneticists, genetic counselors, physicians, scientists, bioethicists, bioinformaticians and rapidly developing Next Generation Sequencing technology to decipher each individual patient's genome.

The science itself sounds futuristic, but it's becoming a proven process thanks to rapid gains in Whole Genome Sequencing and the ability to quickly and accurately interpret the great volumes of genomic data contained inside each of us.

And while it's a new approach to finding answers, it's part of Mayo's long established position as the place to come for comprehensive medical care. The experts involved in the IM Clinic create an organized team approach to complex genomic medical services that can lead to new hope through diagnoses and new tailored treatments.

Here's how it works.

After a patient and a primary care physician agree to consult Mayo's IM Clinic, laboratory experts decode the patient's genome (and for cancer patients, the genome of their tumor) on Next Generation Sequencing machines.

A team of bioinformaticians read and analyze the patient's resulting, voluminous data. These specialists in biology and computer science combine large computing clusters with the current genomic knowledge, searching for changes, or variations, in the patient's DNA likely implicated in his or her condition. Once discovered, these changes may better explain the patient's own "version" of the disease and allow a more tailored, individualized care for that patient in ways that were never before possible.

Armed with this complex variation data, the IM Clinic assembles a team of experts—a hallmark of Mayo's tradition and model of care—to interpret and discuss each patient's results and then develop a personalized plan for action. The team includes:

- Center for Individualized Medicine doctors
- Medical geneticists
- Bioethicists
- Genetic counselors
- Bioinformaticians
- Laboratory Medicine and Pathology experts
- Laboratory "champion" (doctorate-level professional assigned to follow a patient's care)
- Medical "champion" (physician assigned to follow a patient's care)

The team provides genomic education, tailored recommendations and a plan of action to the patient and his or her primary physician.

A comprehensive, team-based approach to care tailored to a patient's genetic information.

While the IM Clinic is the "front door" to the Center for Individualized Medicine for the patient, it's part of a large effort dubbed "Clinomics"—the science of developing and translating new genomic-analysis tools to clinical use for the benefit of our patients.

With these tools, Mayo can better assess individual risk for a disease, the likely course of a disease and optimal therapeutic options.

Soon, Whole Genome Sequencing will be both affordable and advisable for everyone. The challenge comes in interpreting the vast amount of data and using it effectively to improve patient care.

Ultimately, a patient's genomic information will become as routine a part of the doctor-patient experience as family histories, allergies, weight and age.

The Clinomics Program's translation tools enable both physicians and scientists to ask clinical questions and then use Next Generation Sequencing to harvest vast amounts of data (about 2 terabytes per person) and effectively interpret this data about the genomic and molecular interactions. The result? Finding answers, tailored to you.

Clinomics

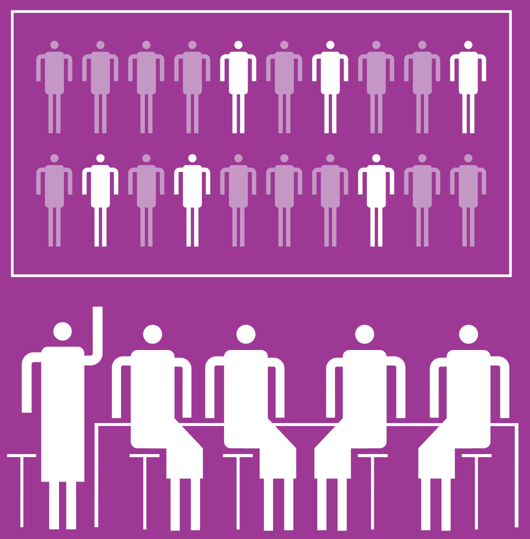
and the Translation Accelerator

Q: Starts with the Patient's Question or Issue

Hundreds of patients and physicians with clinical questions

And hundreds of curious scientists ready to help

The Individualized Medicine Clinic empowers patients and physicians to make better decisions based on genomic elements of disease. Physicians and researchers work together to create new tools to find the handful of genetic variants that could help secure a diagnosis and inform treatments.



Researchers Finding Answers

Clinomics is the study of applying the next generation of scientific findings in clinical care. At Mayo Clinic, the Clinomics Program accelerates the integration of genomic, proteomic and metabolomic information into routine patient care and prevention.

A key to the success of the Clinomics Program is Mayo's culture of collaboration and medical research. To facilitate this research, twice a year the Clinomics Program calls for proposals that answer clinical questions that have potential to change the practice of medicine. After peer review, funding is awarded to the proposals that are most likely to have a quick and lasting clinical impact.

Biorepository

Immediate access to a bank of patient tissues, DNA and blood serum dramatically increases the speed at which the researchers can translate their study ideas into clinical tools for doctors and patients. Mayo Clinic has one of the world's largest tissue collections and actively is building an automated DNA freezer system that links the individual samples with patient medical records and genome sequencing results. These integrated systems will rapidly accelerate Mayo's study of genomics of disease.

Benefactor Support

Critical Component

Competition for funds is stiff. Many valuable projects must wait until more funding becomes available. Philanthropy can—and does—help bridge this gap. With less than $50,000 in seed money, for example, a molecular pathologist at Mayo completed the world's first whole-genome analysis of peripheral t-cell lymphomas. Mayo's clinical laboratories were able to take these findings and develop five new genetic tests that will help doctors everywhere better treat patients with this aggressive blood cancer.

Medical Genome Facility

Teams of technicians and doctors process, sequence and analyze the genomes selected for research.

A: Treatment Tailored to Patient's Genomic Information

The Center for Individualized Medicine is advancing health care by developing the tools and techniques to diagnose and tailor treatment to a person's individual genetic code. Individualized Medicine will result in earlier and more accurate diagnoses, customized treatments and, ultimately, more effective, efficient and affordable health care.

Mayo Clinic is embedding genomic information about select patients into their electronic medical records—much like we currently do with family and treatment histories. Why? Certain genetic variants (small changes in DNA) can have a dramatic effect on how the body processes some common prescription medications. For those patients who choose to participate in this genomics pilot (called the "Right Protocol"), doctors will have the ability to tailor prescriptions and dosages to the individual patient's genome—improving outcomes, while reducing side effects and adverse reactions. ■

One Simple Question

Giving Voice to the Patient in Clinical Practice and Research

Frank, a Midwestern farmer, just emerged victorious from a major life battle.* He beat prostate cancer. Radiation and chemotherapy were behind him. Imaging was clear. Lab reports good. And he was back working the farmland he loved.

Life, by all visible indicators, was good. No one would have suspected his "stupid thoughts."

At Frank's next checkup, a nurse asked him to fill out a new, short quality-of-life (QOL) questionnaire. His rating had dropped to 5 (on a scale of 0-10). Studies suggest that a QOL below 5 in cancer patients indicates twice the risk of death. Frank's score prompted his doctor to ask, "Frank, what's going on in your life?"

That simple question was the invitation Frank needed to talk about his sleep problems. Every night he thought about death and suicide. Frank's doctor suggested he see a psychiatrist to get the counseling and medication he needed. A few months later, at his next checkup with his oncologist, his (QOL) score was back up to 8, and life was good.

Back to the Future

Over the decades, modern medicine has become increasingly focused on high technology and "hard-science" answers, says David Eton, Ph.D., assistant professor of Health Services Research in Mayo Clinic's College of Medicine. Appropriately so because scans, blood work and vital signs all guide care in essential ways. But, he says, we have lost something in the process—the "soft" data that doctors gather during routine house calls and good old-fashioned conversation where any topic was grist for the mill, including money problems, family relationships and other stressors. On these calls, it came out.

But today at clinics across the United States, the typical doctor's office visit lasts less than eight minutes and is dominated by lab results, a physical exam and vital signs. Little time is left for learning a patient's life circumstances, which might guide care in ways just as critical as any medical finding.

To give patients more voice in their care, Mayo Clinic health sciences researcher Jeff Sloan, Ph.D., spent years developing and validating a three-question survey asking:

- Are you tired?
- Are you in pain?
- How's your quality of life today?

Sloan, an expert in a field called patient-reported outcomes, says many doctors don't usually give a question like, "How's your quality of life today?" much attention because they consider it soft data. "But that's changing," he says. "Our research has validated that quality-of-life data is actionable and can improve patient outcomes and patient satisfaction with their care."

The bottom line for physicians is that this QOL tool is scientifically relevant, so physicians who act on this data will make better health care decisions with their patients.

Engaging Patients in Research

To ensure they understand the voice of the patient, Sloan and his colleagues engage patient advocates in their work. Mayo Clinic patient and benefactor Cynthia Chauhan became involved through her advocacy work for cancer patients. Chauhan regularly travels from her home in Wichita, Kan., to Mayo Clinic for care (her family calls Mayo Clinic "spa Cynthia"). Mayo helped her beat breast and kidney cancers, and she deals daily with daunting chronic conditions that fail to quell her *joi de vivre*. For years, she had made charitable gifts to Mayo Clinic in honor of her doctors and other caregivers. When Sloan asked her to become involved in his research, she saw it as one more way to "give back for all the good I had received."

Center for the Science of Health Care Delivery

Everybody wants a better product for better value, and that's exactly what the Center for the Science of Health Care Delivery wants to help create in health care. Inspired by real-world challenges, the center is exploring new ways to deliver health care that will increase safety, effectiveness and quality while decreasing costs.

Get a glimpse into the future: The Southeast Minnesota Beacon Program, a federally funded research effort, identifies best practices to improve health and health care delivery with the ultimate goal of improving disease management, community health and health care costs. Beacon includes medical centers, public health departments and public schools in an 11-county area in southeastern Minnesota. Among the Beacon projects is an online asthma toolkit for school nurses and other public school staff. About 7 percent of school-aged children have asthma, which contributes to 14 million missed school days each year. The toolkit is designed to help public schools effectively deal with children's chronic asthma symptoms to improve reporting accuracy and better manage asthma symptoms at school.

**Name and identifying characteristics have been changed for confidentiality.*

"Cynthia has brought so much to our work over the years, ensuring that perceptions of the patients are truly embedded in our scientific process," Sloan says. "Cynthia has demonstrated that patient advocates are true collaborators in the scientific process, not just subjects of experimentation. They bring an expertise to the table that nobody else has, but they're not usually in the process."

In Chauhan's case, test questionnaires revealed something a physician would not have caught. "If a doctor were to look just at my long list of diagnoses, he'd think he's dealing with a fragile, depressed, overwhelmed person," Chauhan says. "That's not what I am. When he saw the tools [the completed questionnaires submitted as part of the research], he saw I had an optimistic view of life and was very capable of participating in my own care. If he just looks at my chart, he's only seeing the pathology. All of us are more than our pathology."

Chauhan and Sloan say this survey frames the patient-doctor interaction in a useful way. Time is at a premium. This tool helps doctors "get" what's going on with the patient before he or she comes in the room.

"It gets past the façade of what we do socially to be well-behaved people," Chauhan says. "When you give a patient this tool, it gives them a voice." ■

Points of Data

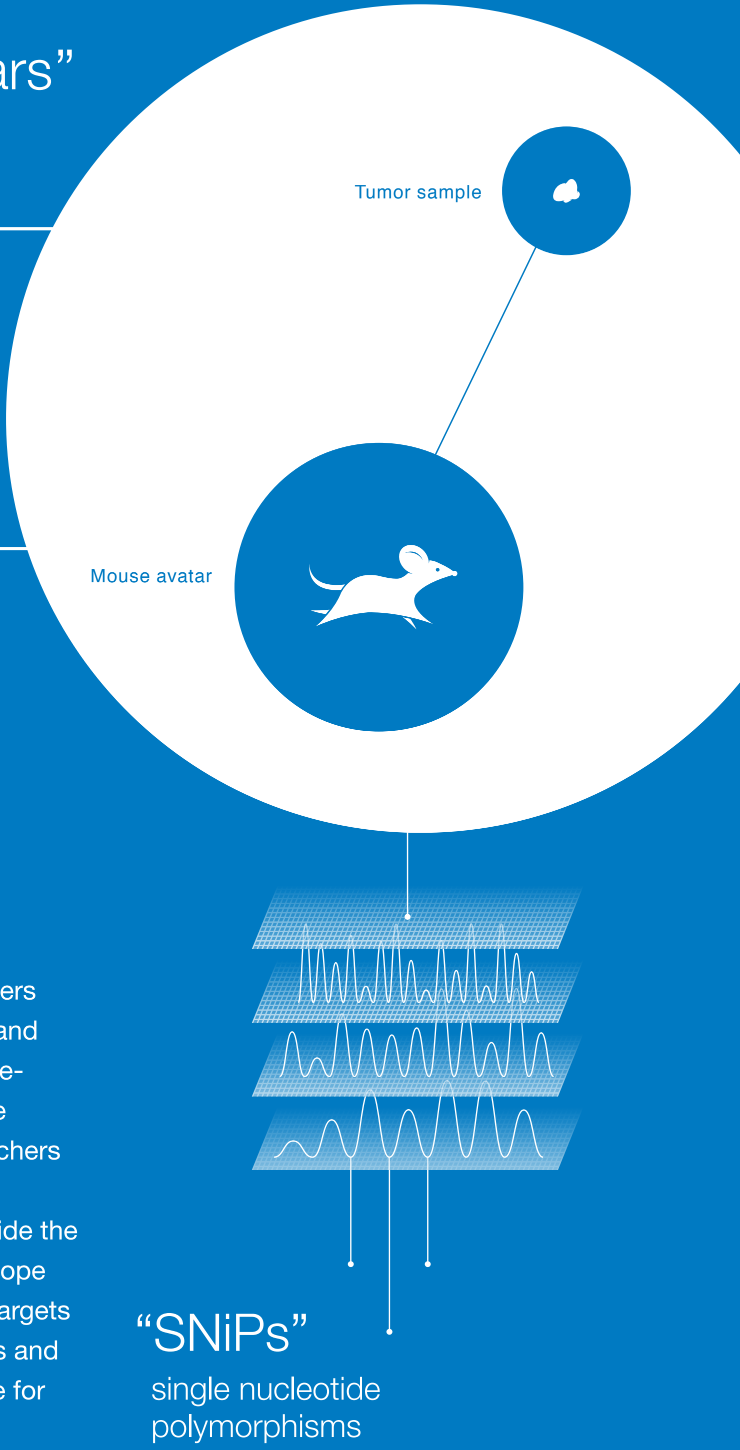
Chemotherapy in Mouse "Avatars" Reduces Risk to Patients

If it took one second to examine each data point created by **Mayo Clinic's Breast Cancer Genome A Guided Therapy Study** (BEAUTY), it would take more than **76,000 years** (or 2,500 generations) to sift through it all.

The benefactor-supported study is enrolling 200 breast cancer patients and sequencing both their healthy tissue and the tumor, twice—once before chemotherapy and once after. The 2.4 trillion data points will be fed through Mayo's bioinformatics program, made up of teams of mathematicians, who have expertise in biology and software engineering. They build sophisticated algorithms to layer the information gleaned from each patient—one on top of the other. Custom-made computer programs then sift through those layers, filtering out the irrelevant pieces until they're left with the handful of single nucleotide polymorphisms (called snips) that appear to have implications in each patient's tumor.

Researchers believe their work will identify the relatively small number of genetic changes that allow breast cancers to develop and thrive.

To learn more about each woman's cancer, researchers are sampling each tumor and implanting them in immune-compromised mice. These "avatars" will allow researchers to test the effects of new chemotherapy drugs outside the patient. The researchers hope to identify key molecular targets for existing and new drugs and establish optimum dosage for each person. ■



Looking Back to Help the Future

> “Before the war, it didn’t matter what religion you were.”

Looking back at her childhood, Vanya Graham remembers when times were good. She remembers jumping rope, playing outside at the park and coloring on sidewalks with chalk.

She also remembers long, harsh winters with no heat, food or electricity. And being too afraid to play outside because of bombs and snipers.

“One day we were just playing at the park and had to go inside for lunch,” Graham recalls. “Within a few moments, a bomb exploded in the exact spot we were playing.”

In 1992, when she was 6-years-old, Graham’s native city of Sarajevo, Bosnia, was torn apart by religious tension that led to more than 3,500 NATO bombing runs over the small country. Entire villages were destroyed, and thousands of people were expelled from their homes and detained in camps where they were tortured and sometimes executed.

“Before the war, it didn’t matter what religion you were,” the 26-year-old Rochester, Minn., resident says. “Then everything changed. My brother was playing basketball nearby when a bomb went off, and he was injured by some bomb fragments. He’s lucky to be alive. The hospital where he was rushed to have emergency surgery didn’t have any electricity.”

In 1996, Graham’s family fled their war-torn homeland with help from the United Nations. Graham, along with her mother, father, brother and sister moved to an apartment in the small, blue-collar town of Austin, Minn.

“We became the first Bosnian family in Austin,” she says. “Our sponsors helped find an apartment for us to live in, and they helped us learn English. We’re still very grateful for their support because we felt lost.”

Free from the terror of war, Graham still felt the tension. She knew what her parents went through to keep the family alive and what they were going through to build new lives in a new world. She didn’t want to cause them any more worry. Especially not about the pain she was starting to feel in her back and hips.

A Healing Mission

Within a few years, Graham’s pain became almost unbearable.

“My ribs hurt all the time, and my hips shifted unevenly, so it became really uncomfortable to walk,” she recalls. And the S-shaped curve in her spine was undeniable.

A specialist at Mayo Clinic diagnosed her with scoliosis, where the spine curves abnormally from side to side. An X-ray revealed Graham’s arched 71 degrees.

> “Everyone is welcome at Mayo Clinic, no matter what their financial situation.”

“It was one of the worst cases my doctor had seen,” Graham says. “By that point a brace wouldn’t have helped. The doctor said my lungs were starting to crush my other organs. Our only option was surgery—it was surgery or my life.”

But her family couldn’t afford the surgery. And because her parents weren’t yet U.S. citizens, no bank would give them a loan.

Through good fortune, the family found Sister Generose Gervais.

For nearly three decades, the Poverello Foundation she helped establish has represented a ministry of hope and healing for thousands of men, women and children who receive care at Mayo’s Saint Marys Hospital in Rochester. The foundation provides financial support to patients who are unable to pay, carrying on Mayo Clinic’s long tradition of providing care to patients, regardless of their ability to pay.

Sister Generose and her co-founders named the foundation for Saint Francis of Assisi, who devoted his life to serving the poor. The son of a wealthy merchant family, Saint Francis chose a life of poverty, humility, charity and service to God, earning the name “*Il Poverello*,” or “little poor one.”

“Helping people in need—that’s the healing mission of Christians,” Sister Generose says. “The Poverello Foundation carries out the work of Christ. It restores faith in humanity.”

To help people in need, like Graham’s family, the Poverello Foundation consists of an endowment fund that’s largely supported by donations from grateful patients and benefactors. Since its inception in 1983, the fund has impacted more than 10,500 patients by providing more than $17.8 million in financial support.

A Renewed Life

To fix the curve in Graham’s spine, the doctors had to cut one of her ribs and fuse it with a titanium rod. The 12-hour surgery was a success, and Graham started physical rehabilitation almost immediately, returning home about a week later.

Physicians at Mayo operated on Graham in December. By spring, not only was she two inches taller, she was back to playing her favorite sport: tennis.

“The doctor said I could do everything but tackle football,” she remembers with a smile.

Forever grateful to the clinic and her doctors, Graham later made a gift to the Poverello Foundation in honor of her surgeon, whom she remembers saying, “Everyone is welcome at Mayo Clinic, no matter what their financial situation.”

And she wanted to carry on that tradition. ■

A Steward of the Franciscan Legacy

Sister Generose began a life of service in 1938, when she entered the Community of the Sisters of Saint Francis in Rochester. She received a master’s degree in hospital administration in 1954 and became the fifth, and last, Franciscan Sister administrator of Saint Marys Hospital, serving from 1971 to 1981.

Sister Generose served as its executive director until she retired in 1985. Today at age 93, she continues to serve as president of the Poverello Foundation.

Sister Generose has always been creative in finding ways to grow foundation funds. Until a few years ago she contributed homemade food items to the sisters’ annual bazaar. Perhaps one of the most sought-after items for sale was her jams and jellies, and people are always asking for the recipes.“I just follow the recipe on the (Sure Jell) box,” she says.

In summer, Sister Generose would gather the fruit as it ripened, then help make some 5,000 jars of marmalade, jams and jellies in the kitchens of Saint Marys Hospital. Sales from the bazaar accounted for an annual average of $23,000, all of which supported the Poverello Foundation.

Together, the sisters have raised more than $1 million to support the foundation.

Giving Back to Give Thanks

For Scott Litin, M.D., supporting the Poverello Foundation isn’t just about helping others. It’s also his way of saying thank you to Sister Generose.

In 1952, a polio epidemic swept through Rochester, striking Dr. Litin’s mother, Lorraine, and sister, Nancie. The disease disabled his mother’s pulmonary muscles, forcing her to spend a great deal of time at Saint Marys Hospital, including the last years of her life.

“Sister Generose and the other sisters took wonderful care of my mother,” says Dr. Litin, who has dedicated his life to helping people and is now an internal medicine specialist at Mayo Clinic in Rochester, Minn. “They befriended her and took care of her as if she were family. It was a nurturing, home-away-from-home experience for her during those years.”

Dr. Litin’s mother’s succumbed to the disease in 1983, around the same time Sister Generose broke ground on the Poverello Foundation. Dr. Litin wanted to repay his debt of gratitude and has supported the foundation with a yearly gift ever since.

“I wanted to thank and honor Sister Generose for the kindness she showed to my mother and my family,” Dr. Litin says. “The Poverello Foundation aligns with Sister Generose’s spirit and generosity. It preserves the sisters’ belief that patients in need of specialized services at Saint Marys should not be denied on the basis of their ability to pay.”

In 2006, Dr. Litin served as president of the Mayo Clinic Alumni Association. The highlight of his year was when he presented a check to the Poverello Foundation for $50,000, on behalf of the Alumni Association. He says it’s important that he and others continue to support the fund because it will preserve the legacy of Sister Generose and her colleagues long into the future. ■

Where Support is the Cornerstone

Kohl's, the department store that has everything from clothing to housewares, is a business success story. Over the last 20 years, the company's annual revenue grew an average of about 25 percent a year to $18 billion (from $200 million). So, when one of the driving forces behind this meteoric growth says he's spotted another venture with enormous potential, he's probably right.

> "The Mayo Medical School expansion is going to be huge," says Larry Montgomery, the former Chairman and CEO for Kohl's. "There is not a better program for us to spend our time and money on."

Larry and his wife of 27 years, Sherry, are early supporters of the expansion of Mayo Medical School to Arizona. The Arizona residents are investing their time and philanthropy into launching the new campus. The addition of a master's in the Science of Health Care Delivery is the type of innovation they believe will set a new course for health care in the U.S.

“We believe Mayo Clinic can lead the conversation on any health care matter in the country, and world for that matter,” Larry says. The Montgomerys’ experience with Mayo Clinic and the vision it laid out for the medical school’s Arizona campus inspired them to support its future. “We want to do whatever we can to help advance Mayo.”

“The difference in the care that you receive at Mayo is the spirit of collaboration,” Sherry says. “Before you arrive in the exam room, the staff understands the reason for your appointment. They have your test results and blood work, and have reviewed them. The organization of both people and processes provides you with the sense of having a team of advocates for your wellbeing. It was very eye opening to see how things work at Mayo Clinic.”

“The future of health care needs this focus,” Larry says.

As a member of the Mayo Clinic in Arizona Leadership Council, an advisory and philanthropic group, Larry has had an insider’s view of the clinic’s operations. And as patients the Montgomerys have experienced first-hand the difference of coordinated care.

> “We believe Mayo Clinic can lead the conversation on any health care matter in the country, and world for that matter.”

“I like the Mayo business model because I’ve seen it at work more than others who have not had the opportunity,” Larry says, comparing the model to those he helped build at Kohl’s.

“You have to work with other people to get the job done. That is how we built our business at Kohl’s. It is exactly what Mayo Clinic does every day.”

Larry retired from Kohl’s in 2010, but his life is anything but retiring. He and Sherry are pursuing shared passions they didn’t have time for when Larry was running Kohl’s and Sherry was raising their two children. Their five business ventures are perfect examples: a construction and remodeling company, a bottled water line, a private wine label, a coffee company and a restaurant in Laguna Beach, Calif. They direct their endeavors as a team and enter areas they are both passionate about.

The Montgomerys have a similar approach to their philanthropy, focusing on where they have an interest and can make the biggest impact. They see the Mayo Model of Care as the ideal health care model and their support of the Mayo Medical School–Arizona Campus as a way to extend that model to more people. At the same time, their support will help provide the U.S. health care system with physicians who are equipped to lead positive reforms in the system. Ultimately, the new school will improve the lives of patients around the country.

“If you look at health care in the United States, Mayo actually delivers health care in a manner that the rest of the country can learn from,” Larry says. “Graduating students with a master’s in Health Care Delivery is unique and, we believe, the right direction for health care. We’re excited to be part of that.” ■

Mayo Medical School–Arizona Campus

EDUCATING DOCTORS TO TRANSFORM THE DELIVERY OF HEALTH CARE

According to the Centers for Disease Control and Prevention, more than one-third of U.S. adults (over 72 million people) and 17 percent of U.S. children are obese. These statistics have deep implications for every corner of health care, from cardiac care to diabetes research. Managing such a complex epidemic will require physicians with unique skills to move beyond treating just the symptoms of disease.

Mayo Medical School–Arizona Campus is re-imagining the medical school model to combine a medical degree from Mayo Clinic with a master’s in the Science of Health Care Delivery from Arizona State University. In addition to traditional medical training, the curriculum will equip future doctors with management and systems engineering principles used in other industries to enhance value, both qualitatively and monetarily.

New generations of caregivers must have the tools to effect change where necessary. Doctors trained at Mayo Medical School–Arizona Campus will shift the practice of medicine by addressing complex problems, like obesity, holistically throughout the health care system, before catastrophic illness.

That will not only save money. It will save lives. ■

Walking the Line

"When it looked like my time was up, selling outdoor home supplies no longer seemed worth my time," says Loren Wolfe.

At 60 years old, he dropped his sales routine and picked up the guitar he had played for more than 50 years. He always entertained the idea of making a living from music but never dared leave the security of a guaranteed paycheck. But a pain in his shoulder changed how he viewed the world. And his place in it.

Seeking a New Standard for Therapy

Wolfe had no reason to believe he was ill—“Oh, I had a bit of tendinitis in my shoulder,” he says. “Other than that, I was as healthy as healthy can be.” But in 2010, the pain got in the way of throwing a football to his grandkids, and he decided to “get it looked at,” presuming nothing more than arthritis.

The MRI came back tagged with results no one expected: a suspicious mass.

“Turns out,” Wolfe says in a baritone chuckle, “it was as bad as bad can be.”

What started as undetected skin melanoma had spread to a lymph node. By the time Wolfe had noticed anything, the mass had developed into stage III cancer the size of a baseball. Thankfully, his tumor was contained to one lymph node that his oncologist in Minneapolis successfully removed.

But cancer is a formidable adversary. Because the cancer invaded a lymph node, Wolfe faces a 70 to 80 percent chance of it returning within the next three to five years.

To lessen the odds, Wolfe’s oncologist recommended interferon-alfa2b as an adjuvant (after-surgery) treatment. (Interferon is a natural part of the immune system that scientists can produce in a laboratory to boost the body’s ability to fight cancer.) But as with many good things, there’s a downside. Interferon’s side effects include flu-like symptoms and fatigue, bone marrow suppression, liver damage, depression, loss of appetite and impaired cognitive function.

Wolfe sought a second opinion at Mayo Clinic.

“If you live in Minnesota and you face a life-changing event like cancer, why wouldn’t you go to Mayo?” he asks.

Wolfe’s charts passed the keen eye of Svetomir Markovic, M.D., Ph.D., the Charles F. Mathy Professor of Melanoma Research. Dr. Markovic is a world leader in the battle against melanoma. His research is changing the landscape of cancer treatment by integrating different systemic treatments into more-effective therapies for advanced melanoma.

“Loren was uneasy with using the ‘standard’ immunotherapy approach of adjuvant therapy for metastatic melanoma,” Dr. Markovic says. “We offered him an alternative.”

Dr. Markovic suggested Wolfe use Leukine, an adjuvant therapy currently under study that has shown promising results. It boosts the body’s immune system like interferon but has fewer side effects. Dr. Markovic is hopeful that it will become an approved form of immunotherapy.

Turns Out, Fighting Cancer IS Rocket Science

A tumor exhausts the immune system, leaving the body defenseless against it. Doctors try to boost immunity to give the body a fighting chance, but often fail.

To find out why, Dr. Markovic enlisted NASA to harness its ability to process immensely complex data.

Using aerospace analytical tools, Dr. Markovic and his team worked collaboratively with engineers from Texas A&M University and NASA to measure and track the dynamics between tumor, blood supply and the body’s immune response. Through state-of-the-art engineering and mathematical tools, a pattern is beginning to emerge that suggests a complex dynamic interaction between cancer and the entire body’s immune system. This pattern appears similar to changes in the immune system commonly observed during pregnancy (a “placenta-like” effect).

The team is heavily invested in attempting to decipher this phenomenon and use it to design novel therapies. One answer could be as simple as delivering treatment during a specific phase of the patient’s immune biorhythm, e.g. giving chemotherapy on a Tuesday instead of a Friday.

“Things are moving, and we are improving survival,” Dr. Markovic says, emphasizing that his staff and the consortium work day and night to find an answer to cancer. “We do not give up, we don’t surrender. There’s one issue on the table—life. I’ll be darned if I’m going to back down.”

“Things are moving, and we are improving survival.”

Because the World Needs a Little More Johnny Cash

Today, Wolfe spends his time doing what he loves.

“Every day is a gift,” says Wolfe, who recently released a CD that includes classic hits from Johnny Cash and others plus two original songs. The title track “N.E.D. and Me”—which stands for No Evidence of Disease—is Wolfe’s tribute to the term used to describe a patient’s status after treatment, when cancer is defeated.

“I just met N.E.D. recently.
I was facing a life emergency.
I can’t say we’re close friends just yet.
Sure hope someday that’s a safe bet.”

To learn more about Loren Wolfe and his music, visit: lorenwolfe.com. ■

A Lifesaving Haircut

During a haircut in 2009, a barber noticed a red spot on Chad Morgan's scalp. "Psoriasis," Chad thought.

It turned out to be melanoma.

"I thought, 'it's only skin cancer,'" Chad's wife, Molly, says. "Just cut it off and we're good to go."

But by the time Chad came to Mayo Clinic to see Svetomir Markovic, M.D., Ph.D., he knew it was more serious. Doctors jumped into action, removing the right side of Chad's scalp, 44 lymph nodes from his neck and two glands.

Chad was clear of cancer for nearly a year, but then a PET scan showed that the melanoma metastasized in his liver. Since then, the Morgans have traveled from their home in Colorado to Rochester, Minn., every two to four weeks to receive treatment at Mayo.

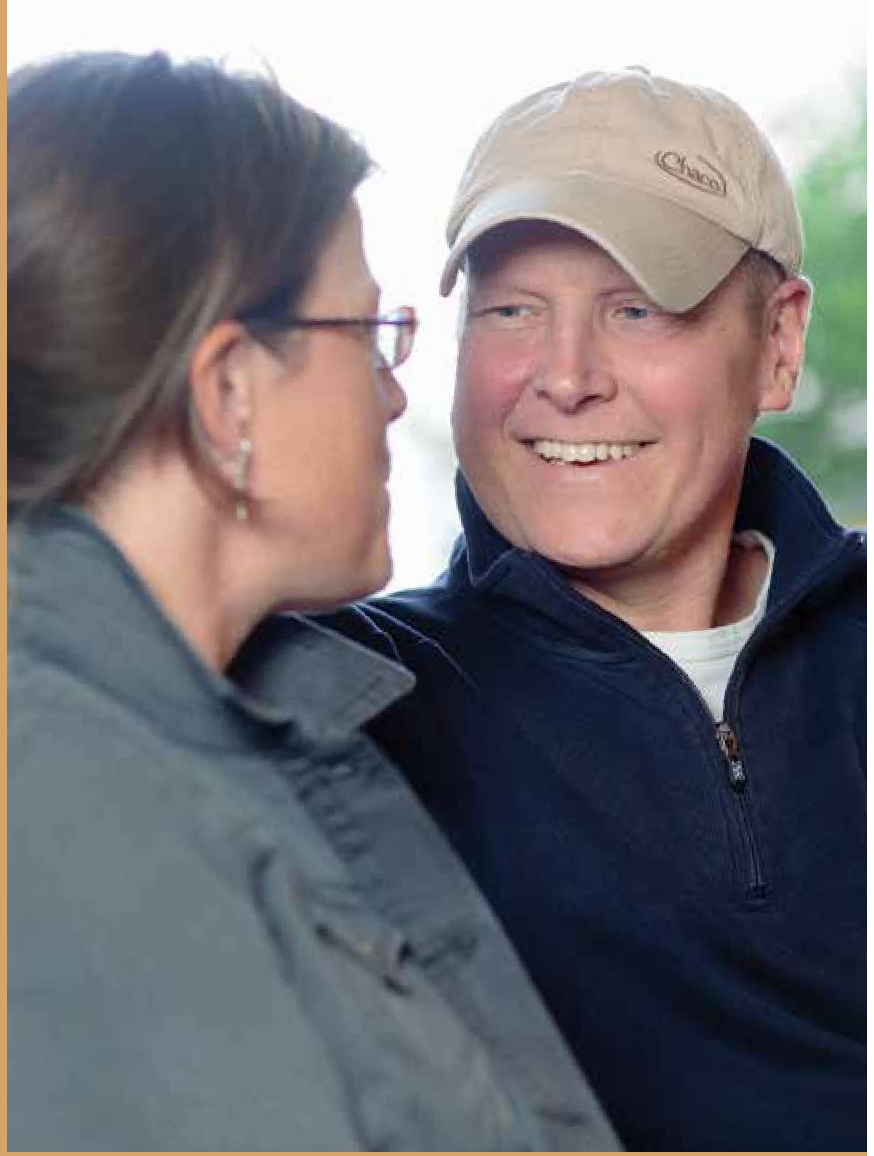
"When Chad's cancer zigs," Dr. Markovic says, "we zag to get in front of it."

That includes sending Chad to other institutions. At one point, Dr. Markovic contacted a cancer researcher in California who was experimenting with a treatment that was the best option for Chad. Chad was there within days.

Another time, Dr. Markovic learned about an experimental therapy at the University of Minnesota and sent Chad there.

"It's very reassuring," Chad says. "Dr. Markovic leaves no stone unturned. He's looking out for my best interest inside and outside of Mayo. If there's a clinical trial at another institution that shows promise for me, he'll get me in there."

> "I thought, it's only skin cancer. Just cut it off and we're good to go."



Throughout his treatment, Chad has maintained his active life as an avid outdoorsman, private plane mechanic, loving husband and father of three.

"I can fight this," he says. "I'm strong. I'm healthy."

"And," adds Molly, "If he puts on a baseball cap, you'd never suspect anything was wrong. He's as handsome as ever." ■

Applying New Tools to Melanoma

Over the last 10 years, researchers have made great strides against many cancers like leukemia and breast cancer. But metastatic melanoma has remained stubbornly difficult to treat.

To turn the tide, the Mayo Clinic Cancer Center is striving to enhance its melanoma program. Recent major breakthroughs in molecular biology and genomics have given researchers critical new tools to make progress against many cancers. It's time to make melanoma one of them.

By applying the integrated strengths of Mayo Clinic and its successes in other cancers, researchers in the cancer center are confident they can make an impact. For instance, by using techniques like genomic sequencing to examine breast cancers, Mayo Clinic researchers found molecular abnormalities specific to various tumors and clues in how to attack them.

The same techniques hold great promise for melanoma.

Today, Mayo's melanoma program is one of the largest melanoma practices in the country. Its researchers, such as Svetomir Markovic, M.D., Ph.D., are part of a "dream team" recently awarded the highly competitive Stand Up To Cancer grant, which allows them to pioneer gene-directed therapy like we have for breast cancer.

To advance the melanoma researchers' work, the cancer center is building robust bioinformatics to interpret genetic information. Benefactor support will accelerate these efforts. ■

View from the Top

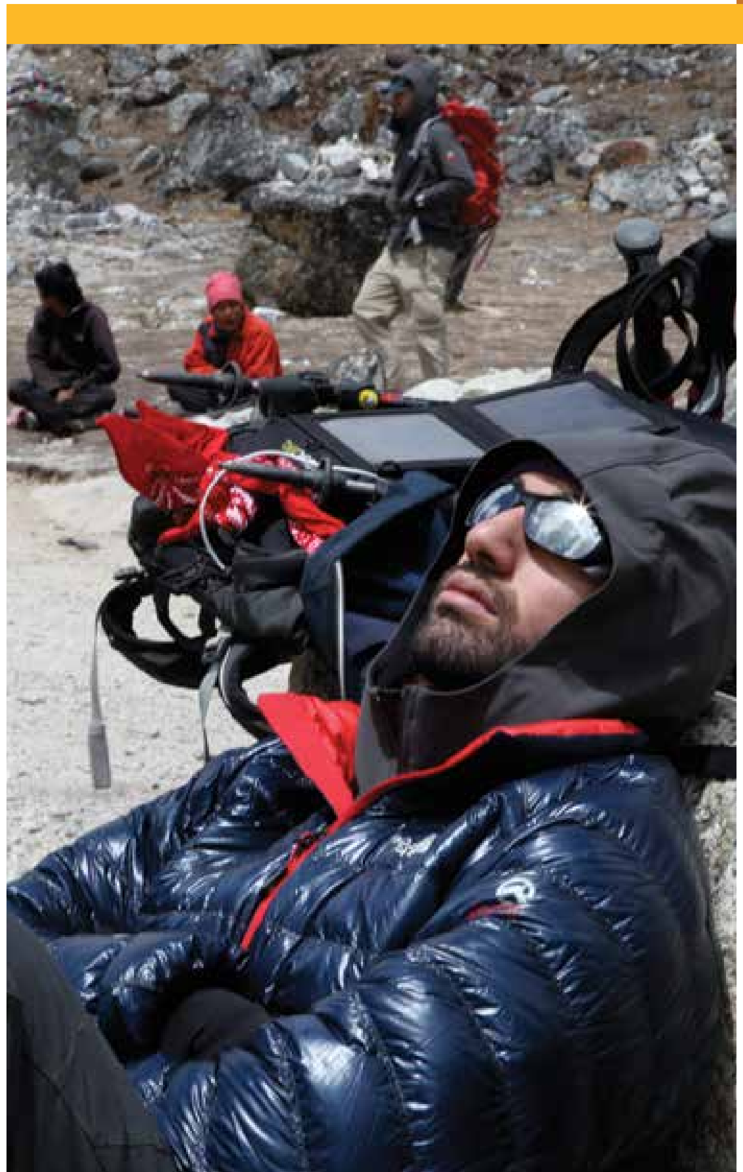
A Team of Mayo Clinic Researchers Find Answers on Everest.

In May, six people from Mayo Clinic joined forces with National Geographic, The North Face and Montana State University and trekked to Mount Everest to conduct research in one of the most inhospitable environments in the world.

One Mayo researcher, Amine Issa, Ph.D., had never really camped before. They were some of the hardest days his life. But also some of the most rewarding.

I still can't explain how I found myself conducting research in one of the most inhospitable environments in the world. Why did I agree to essentially transform myself into a "heart failure patient" by hiking up to Mount Everest Base Camp and working at 17,598 feet for two weeks?

I'd like to blame Bruce Johnson, Ph.D., head of Mayo Clinic's Human Integrative and Physiology Research Laboratory. He has a long history of studying the limits of human performance and adaptation in extreme environments, of driving research in novel directions. (And an even longer history of convincing greenhorns like me to join him.) But the truth is, I wanted to take part in cutting-edge research that I knew would help a lot of people.



Bruce chose the unparalleled altitude of Everest because it made the most sense logistically. We wanted to monitor the body's functions under extreme conditions to mimic the experience of patients with highly prevalent diseases, especially heart disease. The closest lab simulation is a hypobaric chamber, which controls pressure, but the sheer scope of the experimental protocol made a remote testing laboratory in Nepal a more effective solution, both qualitatively and economically.

Little did I know when I joined the expedition that my blood oxygen levels, which are normally about 100 percent, wouldn't rise above 65 percent nearly the whole time at Base Camp. (They take you to the emergency room for anything under 80 percent back home.) Each few steps forced me to pause to catch my breath. Just lacing my boots felt like the hardest thing I'd ever done. I was constantly exhausted and sick.

The experience made me and my colleagues realize what it's like to be in a patient's shoes.

The study formed a team of 18 people from Mayo Clinic, National Geographic and Montana State University. We monitored nine "normal" people (me included) and nine elite climbers with technology specifically developed for this research trip.

The cumbersome monitoring equipment only added to our distress. Each night we'd lie in our sleeping bags, stiff as a board on the rocky ice, surrounded by hot water bottles mixed with laptops and tablets to make sure the batteries were warm enough to work in the morning.

I almost began to find comfort in the three belts and recording box strapped across my chest, the three EEG electrodes glued to my forehead and ear (that one kept latching onto my hair), the sensor around my finger, and the canula shoved up my nose…almost.

However, I never acclimated to waking up, gasping for air. Now I can begin to imagine what it's like for patients to live with that every day.

> “Everest's environment is one of the most extreme on the planet.”

Over two weeks, we recorded heart rate, cognitive function, blood oxygen saturation, sleep quality, gas exchange and body composition.

By comparing the normal and elite groups in such an extreme climate, we hope to understand how the human body adapts to handle possibly deadly changes seen in both the high-altitude ascender and the heart-failure patient.

In particular, we are studying how the body reacts to the deprivation of normal levels of oxygen (hypoxia). The condition is common at high altitude and we see similar physiological responses in patients with heart failure, the leading cause of hospital admissions in people over 65 years old.

Cold, Yet Sweltering

Beyond the altitude, Everest's environment is one of the most extreme on the planet. Every night was well below zero, and moisture condensed on the roof of our tents and dripped onto our faces. It's an odd sensation to have your head freezing and the rest of your body drenched in sweat. How could a person be so hot and so cold at the same time? Sometimes it felt like the ice of the mountain was running through my veins, then burning up at my extremities.

Every night, my colleagues and I would go to bed thinking there weren't enough clothes in the world to keep us warm. But later we would wake up panting and sweating, remove a layer, and try to get some more sleep. By morning, wet clothes cluttered our tents. I shudder to think about the sweat and the dirt that saturated them after two weeks of constant wear. The old me would have never put up with the grime, the smell.

The “Everest me” hardly even noticed.

This need for high-performance clothing in extreme environments presented us with another research opportunity. The outdoor equipment and clothing company The North Face partially sponsored the trip as we looked at how specific garments and materials helped or hindered performance. We expect this part of our work to impact everything from a tourist

> We were frantic when we told Temba about the malfunction. But he just smiled and said, “Okay”

hiking up a mountain to troops deployed in environments like Afghanistan.

Tough, But Simple

As challenging as the work was, I wouldn’t exchange the experience for anything. We all hated, even feared, the nights, and I did whatever I could to stay awake. But the breaking light of day was something else. The blood-orange sun hovering over the towering mountains always calmed me. Each day the light cast a different angle, reminding me that on the top of the world no day was the same as another.

I deepened bonds with friends and colleagues, like Bryan Taylor, Ph.D., our exercise and pulmonary physiologist. I often tease him that, for a Scotsman, he’s a pretty cheerful dude, but without him I’m not sure I would have made it back down the mountain. He taught me most of what I needed to know about keeping healthy at altitude. And even though I listened to his advice, I stayed sick and cold nearly the entire time. He was neither. I often taunted him that I couldn’t tell if it was because of his Scottish blood or because he’s so thickheaded.

I also got to know the people of Nepal, especially Temba, our Sherpa guide and the anchor of our ship. Nothing shook that guy, nothing perturbed him. One day our generator failed, which meant no research, a possibly fatal blow to our work. We were frantic when we told Temba about the malfunction. But he just smiled and said, “Okay,” like he just learned a gift awaited him in the main tent, and then ran off to fix it.

For the record, Temba summited Everest a long time ago and is now the head of his own guide company. He was always smiling and laughing, no matter the hardship.

I have already noticed how his attitude has influenced my work and life. When a project isn’t going my way and I start to get frustrated, I try to remember his broad smile and his “Okay.” It relaxes me and allows me to concentrate on the problem at hand. That makes me a better researcher.

In fact, I think Everest made us all better researchers. Life on the mountain was tough, but simple. No email. No phone. No laundry. The lack of “noise” allowed us to better appreciate work and colleagues. Unexpected impediments were par for conducting complex science on the mountain. The key was not letting the challenges distract you.

You just had to breathe deep (literally), accept the circumstances and focus on the one or two tasks before you, no matter how difficult the terrain. It’s a lesson I’ve carried back to the lab and to life on flat ground. ■

Never Giving Up Hope

The Pursuit of New Treatment Leads Family to Mayo Clinic's Regenerative Medicine Consult Service

Patty and Dave Ausnehmer couldn’t believe what they were hearing. Patty had just given birth to their first child, Jared. But instead of doting and celebrating, they were listening to doctors say letting Jared die was a very real option.

He was born with hypoplastic left heart syndrome (HLHS), a birth defect in which the left side of the heart is underdeveloped or nonexistent. It’s always fatal without surgical intervention, and when Jared was born 22 years ago, only three options existed, each with terrible drawbacks.

The most obvious option was a heart transplant. But infant donor hearts were (and remain) very rare, so it was unlikely Jared would receive one in time. And if he did, his body might reject it despite the cocktail of immunosuppressant drugs he would take for the rest of his life. Even if everything went perfectly, the donated heart would eventually fail years down the road, putting Jared and his parents through the whole ordeal again. In fact, it was quite likely Jared would need three or four hearts throughout his life.

Another option was the relatively new Norwood procedure, which would re-plumb his arteries so oxygenated blood could flow from his lungs to the rest of his body. Doctors told them the procedure required three open-chest surgeries in Jared’s first year of life, each with a worrisome survival rate. The initial procedure’s survival rate was lower than a transplant. If Jared lived, there was a good chance he’d be severely disabled.

Doctors also gave the Ausnehmers the option to just “let nature take its course,”—to care for Jared, make him comfortable and let him pass, which would be in a few days.

For the new parents, doing nothing was not an option.

Figuring the transplant option would always exist, they decided on the Norwood procedure. But their hospital had little experience with it, and they weren’t going to let anyone perfect their technique on Jared. So the Ausnehmers tracked down the inventor of the procedure, William Norwood, in Pennsylvania.

“The hospital told us they had done one or two,” Patty says. “Or we could have the man who invented it. Now what would you do? You could have the best in the world, or you could have someone who’s just done it once or twice.” At one-month-old, Jared was flying to Philadelphia, where the word-famous surgeon awaited him.

Hope After the Chaos

Growing up, Jared fared better than expected. He has a slight learning disability and has had a stent here, a stent there. But overall, he’s lived the life of a normal rural Ohio boy—riding

> “The hardest part was watching him going through it, wishing it was me.”

four-wheelers, playing sports, crashing his parents’ Jeep into a backyard tree. Unlike doctors’ predictions, he grew up active and energetic. His mom and dad might even say he was too energetic as Jared could never sit still.

So when he got sick last year, they thought it was just a flu bug. But after a few days, he was still uncharacteristically lethargic. He started to look yellow-greenish and his stomach puffed out. Doctors tried various treatments, but Jared worsened. To get answers, the family took him to a hospital with one of the highest reputations for cardiac care in the nation.

The Ausnehmers quickly found out Jared was sick. Very sick.

“At that point, Jared could hardly walk,” his mom says. “When the doctor listened to his heart, it was off in the distance. He couldn’t really hear his heartbeat.”

He was in heart failure. It was enlarged and a valve was leaking.

The next month was chaotic. Patty and Dave shared a single bed in Jared’s hospital room as doctors and nurses came in and out, performing tests and trying to figure out how to treat Jared. Every day Dave drove back and forth to his job more than an hour away. Patty tried to stay connected to her two other teenagers, who were on their own at home.

Patty and Dave talked with doctors continuously, but eventually found out that no conventional treatments existed.

“The hardest part was watching him going through it, wishing it was me,” Patty says. “Saying to God, ‘C’mon now, let me switch places, let’s make a deal.’ And we had to make these decisions for him. That was very hard. Here’s my baby, and I’m selfish, I don’t want him to die, but look what we have to put him through to have him live. That was the hardest part.”

When Jared left the hospital, carrying a tank of oxygen, the Ausnehmers had no options and very little hope. But then they saw a news story about stem cell treatments for heart patients. Patty immediately went to her computer and Googled “HLHS stem cell therapy.”

She thanks God for finding Mayo Clinic’s Regenerative Medicine Consult Service and its director, Tim Nelson, M.D., Ph.D.

The Front Door to a New Revolution

Stem cell therapies promise to be some of the most effective treatments ever created. Until now, the health care community could only treat symptoms for most diseases of the heart, lung and nerve. But stem cells promise to cure diseases.

For instance, today Mayo Clinic researchers are making progress toward using stem cells to treat patients with bone disease (making hip replacements unnecessary), to grow new skin (making skin grafts a thing of the past) and even to grow completely new organs (ending the wait for an organ to become available).

Even how we get stem cells is revolutionizing the field. Once upon a time, researchers thought embryos were the only source of suitable stem cells. But now scientists can take a bit of skin, pull out cells called “fibroblasts,” wipe their memory and reprogram them. These “induced pluripotent stem cells” (iPS cells) can differentiate into virtually any tissue in the body.

One research team has taken these iPS cells, convinced them they’re cardiac cells, and grown functioning heart tissue that beats on its own. Dr. Nelson leads that research team. His focus happens to be HLHS. And he’s the director of Mayo Clinic’s Regenerative Medicine Consult Service, Mayo’s front door to regenerative therapies and research.

The Ausnehmers may not have known it then, but they had found the perfect access point to connect Jared with the latest research into HLHS, including the status of stem cell therapy.

Hype vs. Reality

Dr. Nelson says the Ausnehmers’ situation was one he hears regularly from patients who call the consult service. He spent about an hour on the phone talking with Patty and, as with all consult service patients, his first question was, “How do you think regenerative medicine and stem cells can help?” He uses the question to gauge understanding and expectations.

“Patients have been asking really intelligent questions,” Dr. Nelson says. “Typically, they wonder if there’s something new out there that they may not have access to. Generally, they know a lot about stem cells, so they’re trying to educate themselves. Our goal is to guide people to make informed decisions about what is reality, what is hope and what is hype and not realistic.”

Dr. Nelson says one of the big hurdles in the public’s understanding of stem cells is that the technology sits between early research and full clinical applications. So they hear a lot about the promise long before it’s actually ready for use.

Another problem is a glut of misinformation. Oftentimes people are desperate for help, and unscrupulous “doctors” try to take advantage of them by overpromising results. Many people turn to countries with little or no regulation of research or clinical practice for stem cell treatment.

To help the most patients, the Regenerative Medicine Consult Service tracks all the different regenerative medicine trials happening throughout the country, and even the world. So when a patient calls about a specific condition, Dr. Nelson can recommend a trial even if it’s not at Mayo. The tracking also helps drive new therapies into the clinic as soon as they’re available.

When Patty connected with the consult service, she told Dr. Nelson she was worried the family was missing something, that she hadn't done everything possible for her son. Dr. Nelson assured her she had done exactly the right thing and that Jared was receiving the standard of care for HLHS.

As for stem cells, Dr. Nelson explained HLHS therapies were still developmental and at that point there was nothing he, or anyone, could offer Jared. But Mayo still gave the family hope.

Mayo Clinic houses the Todd and Karen Wanek Family Program for Hypoplastic Left Heart Syndrome, which had an open study. That meant doctors with years of experience in treating HLHS could evaluate Jared free of charge. One of those doctors was pediatric cardiologist Patrick O'Leary, M.D., who immediately restored one medicine and upped the dose of another.

> “I feel like I'm back to normal. I feel better than I did in high school.”

Then the family consulted with Dr. Nelson on regenerative medicine. He explained that while no FDA-approved stem cell protocol for HLHS yet existed, he expected to have the first by the end of the year, at least for infants. If Jared's condition didn't improve as much as expected by then, Dr. Nelson would go to the FDA to ask for a “compassionate use” exception, which it sometimes grants when patients have no other options.

“That actually gave us hope. Up until then it was gloom and doom of ‘oh, he's just going to get worse, eventually he's going to have to have a heart transplant,’” Patty says. “You have to be pretty much on your deathbed to get a heart transplant. I don't want to watch Jared crash and burn first. Jared's too well to watch that.”

Back at Home

A few months after visiting Mayo Clinic through the Regenerative Medicine Consult Service, Jared is hanging out with his mom and dad in the backyard of their Victorian home, which sits on eight acres of hills and trees. He recently finished his baseball season and is preparing to go out with friends on a Friday night.

“Everyone thinks because it's my heart I must be so bad,” Jared says. “But I don't feel like that. I feel like I'm back to normal. I feel better than I did in high school.”

A cell-phone alarm goes off.

“Take your 8 o'clock pills,” his mom says.

“She usually texts me when it's time, but I usually let it go for a little bit,” he teases with a devilishly crooked grin.

“He's never home,” his mom protests, and then pretends to type on her phone. “‘Take your pills, take your pills, take your pills.’ That's me. And if he doesn't text me, there's another one. ‘Take your pills. Did you take your pills?’ I'm the pill-meister.”

Jared may pretend to object, but he remembers last year, being stuck at home unable to move around, unable to breathe. The constant pills may be a pain, but Jared and his mom both know know it's a whole lot better than the alternative. ■

Center for Regenerative Medicine

Many diseases damage tissues and organs in ways that cannot be fully repaired with medication or surgery, meaning physicians can do little more than treat the symptoms.

By finding ways to rejuvenate, repair or regenerate the body's own tissue, the Center for Regenerative Medicine hopes to offer therapies to cure major diseases—such as diabetes, heart disease, degenerative joint conditions and neurological disorders—as well as injuries and congenital conditions.

Get a glimpse into the future: Beta cells produce the insulin people need to control the amount of sugar in their blood. However, for diabetes patients, beta cells are either destroyed or do not produce enough insulin. In the laboratory, Mayo Clinic researchers have successfully converted a person's own skin cells and blood cells into insulin-producing cells. These cells could one day eliminate the need for insulin medications. ■

The Gift of Innovation

Todd and Karen Wanek established Mayo Clinic's Todd and Karen Wanek Family Program for Hypoplastic Left Heart Syndrome to accelerate advanced research into the rare congenital heart defect. Children born with the condition have hearts where the left side is severely underdeveloped. That leaves the right side of the heart to do all the work, a job it wasn't designed for.

“This gift is made in honor of our daughter and all children afflicted with this condition,” the Waneks say. Through the program, the Waneks support research to better understand the causes of the disease and to develop a system for predicting how it will progress. They also help researchers focus on the next generation of therapies, such as stem cells. The current option—three-stage heart surgery—is incredibly invasive and only a temporary fix. Due to the extra load, the heart eventually wears out, landing the patient on the heart transplant list.

“Stem cell therapy would be similar to planting a seed in order to grow a flower,” Wanek Program Director Tim Nelson, M.D., Ph.D., says. “Stem cell therapies aim to transplant bioengineered stem cells into damaged hearts with the goal of growing new heart muscle.”

Today, the program is conducting five studies and has enrolled about 150 participants. Researchers hope to have their first stem cell protocol treating infants approved by 2013. ■

New Directions

The patient experienced heart problems on a trip to North Dakota. The local hospital needed medicine to stabilize his condition, so doctors at Mayo Clinic rushed a delivery—through a blizzard—saving his life.

Returning to Rochester, he had a heart transplant but developed rare complications. Mayo specialists located an experimental drug, which again saved the patient, leading to 16 years of high-quality life.

As chair of the Department of Development, Cheryl Hadaway hears many inspiring stories about Mayo Clinic. This one, however, has unique resonance. The patient was her father, Gene Behrns.

"I'd known Mayo my whole life and worked here for several years," she says, "but then I understood the Mayo Clinic Model of Care."

Philanthropy is Absolutely Vital

Deeply rooted at Mayo, Hadaway is setting a bold new direction in philanthropy. "The support of Mayo's benefactors is absolutely vital to realizing our vision," says president and CEO, John Noseworthy, M.D.

The challenge is clear. Dr. Noseworthy describes a goal of $3 billion within the next several years, but the case is so compelling, and Mayo's credibility is so strong, that people from all walks of life are coming forward with support.

Hadaway uses the phrase "benefactor-centric" to describe her approach. "Mayo's practice of philanthropy aligns with the practice of medicine, which puts the patient at the center.

Philanthropy is Hadaway’s personal and professional commitment. She and her husband, Marc, are members of The Mayo Legacy and the Doctors Mayo Society. Hadaway earned a master’s degree in philanthropy from Saint Mary’s University in Winona, Minn.

“We have the privilege of helping benefactors connect their passions with Mayo’s ability to set the gold standard of medical practice, research and education.”

Another alignment is Hadaway’s collaboration with Michael Camilleri, M.D., executive dean for Development. “Cheryl has a genuine respect for patients, colleagues and benefactors,” he notes, “with the ability to help her staff succeed.”

Hadaway’s career path informs her understanding. She joined Mayo in 1975 as a medical secretary, rising to Blood Bank recruiter, manager of direct response and benefactor relations in Development, major and principal gift officer, assistant chair and chair of Mayo Clinic fund raising in Florida. Her innovative leadership is reflected in the Development business plan, which James Barksdale, a member of the Board of Trustees, held up—literally, waving it in his hand—as an example for other groups to follow.

Philanthropy is Hadaway’s personal and professional commitment. She and her husband, Marc, are members of The Mayo Legacy and the Doctors Mayo Society. Hadaway earned a master’s degree in philanthropy from Saint Mary’s University in Winona, Minn. She has been an active volunteer with the Senior Citizens Center, Gift of Life Transplant House and Rochester Catholic Schools.

As this article went to press, Hadaway was preparing for a trip to London, where the United States Ambassador to the Court of St. James’s would host a gathering for friends of Mayo. Those plans recalled another trip, her first-time benefactor visit to a small Midwestern town.

“I had a 4:00 appointment, which I thought would last 45 minutes. The lady greeted me at the door with a hug and said, ‘Of course you’re staying for dinner.’ She and her husband had invited friends over, they were so eager to share their Mayo experience. This wasn’t about me—I’d never met them before. It was their love of Mayo Clinic. We spent the evening together and had a wonderful time. That’s when I knew it’s such an honor to represent Mayo.” ■

The Perspective of Experience

“The best way for anyone to learn about Mayo is to experience it from the perspective of a patient. While we can read about the great things at Mayo and hear wonderful testimonials from others, there is simply no substitute for actually seeing it in practice. The Mayo commitment to put the interest of the patient first is on display from the moment a patient enters any of their facilities. We both have experienced that every time we have called on Mayo for care.

“We are so grateful for the opportunity to give back to this organization that has given so much to others. We know firsthand that our support is put to good use.”

Gary and Marilyn Gilmer
Major Benefactors
Florida

Thank You

Gifts of all sizes strengthen health care for people everywhere. Mayo Clinic is deeply grateful for each one and finds inspiration in such personal demonstrations of support.

Making an Impact

Cumulative Philanthropy

Each benefactor is recognized for philanthropic giving of $100,000 to $10 million or more in the Hall of Benefactors at Mayo Clinic in Rochester, Minn. Those who support our work in Florida and Arizona are also recognized in the Hall of Benefactors on the respective campus.

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 beyond their lives 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 and are recognized in electronic recognition kiosks in the Halls of Benefactors at all Mayo sites.

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. Their generosity is recognized in electronic recognition kiosks in the Halls of Benefactors at all Mayo sites.

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

Giving Back

Annual Giving

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

Mayo Leadership Circle	$50,000 to $99,999
Mayo Ambassadors	$25,000 to $49,999
Mayo Sponsors	$10,000 to $24,999
Mayo Stewards	$5,000 to $9,999
Mayo Patrons	$2,500 to $4,999
Mayo Friends	$1,000 to $2,499

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

Shared Beliefs

> “If we entirely spend our life directed outwards and simply live on the sensory level, then, essentially, we are leading a life that is total distraction.”

His Holiness the Dalai Lama visited Mayo Clinic’s Rochester campus on April 24 for a special presentation, “Resilience Through Mindfulness.”

Approximately 500 people gathered in Saint Marys Hospital Chapel to listen to him share thoughts on how mindfulness relates to the medical community.

After a welcome from Mayo Clinic President and CEO John Noseworthy, M.D., His Holiness answered questions from panel members Amit Sood, M.D., who chairs the Mayo Mind Body Initiative; Dan Goleman, Ph.D., board member of Mind & Life Institute; Sherry Chesak, who works in the Mayo Clinic Multidisciplinary Simulation Center; and Carla Paonessa, principal benefactor of Mayo Clinic and supporter of the Mind, Body, Spirit Initiative, as well as post-surgery housing for transplant patients and their caregivers.

His Holiness the Dalai Lama ended the lengthy discussion by telling the audience, “We have to pay more attention about our inner value.” ■

A Gift for You

Mayo caregivers are an extraordinary bunch. Even in their lives outside of Mayo they are doing what they can to make the world a better place. Casey Caldwell, M.D., is no different.

A few years ago, a priest accompanied a band of caregivers volunteering their time and talents to provide free care to an indigent population in Mexico. A young boy, skin darkened by the sun, took an especial liking to the priest, never leaving his side. When the priest was about to leave, he gave the boy an inexpensive Phoenix Suns hat and said, "*un regalo para ti*" (a gift for you).

Delighted, the boy ran off, and the priest didn't think he'd see him again. But as the team packed up their gear to move to another site, the boy reappeared and held out a closed fist to the priest.

"*Un regalo para ti,*" he said, placing three dirty, worn out Legos in the priest's hand.

Meet the Caregiver

Mayo Clinic's Casey Caldwell, M.D., started this medical mission nearly 20 years ago. He and his fellow volunteers are continually amazed by the deep level of gratitude from the people they help.

Every year for his July vacation, Dr. Caldwell coordinates about 50 volunteers—doctors, nurses, optometrists, dentists—who spend a week in Mexico providing free care and medicine to about 1,200 people. They've seen and treated it all, from chronic eye irritation caused by working in the fields to a failing heart valve that saved a woman's life.

"The feeling you get from having done this, you come away feeling like you got more than you gave," he says. "The people are so thankful for what little they have. They don't have refrigerators or microwaves or cars. But they have family and they have food on the table and they have God and they're grateful for what they have. The whole materialistic motivation is not there. It's rendered down to what's truly important in life." ■

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