A close-up look at the profound, beautiful and relevant research in neuroscience and neurosurgery at Mayo Clinic

THE ultimate network
ENTWINED: Ways that patient care, education and research are interconnected

The ultimate network: A close-up look at the profound, beautiful and relevant research in neuroscience and neurosurgery at Mayo Clinic and what it means for people with neurodegenerative diseases, disorders and injuries

ON THE COVER: The image on the front cover appeared in the July 2010 issue of Nature Neuroscience Vol 13, No. 7 and is used here with permission from Nature Publishing Group. Taken by John Richard Henley, Ph.D., assistant professor of neurosurgery and physiology, the image of neuronal growth cones was generated in the neurobiology lab at Mayo Clinic. “We are testing to find out if during the process of developing neurons we see some of the same signals that control neurodevelopment and circuit formation,” says Dr. Henley. “We want to apply these findings to regenerate a system. We also want to make adult injured neurons regrow and regenerate, keep them alive and help guide them to make new functional synapses and circuits.”
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Bringing value to the patient

People who live in our communities and around the world are drawn to Mayo Clinic by its reputation for delivering cutting-edge diagnoses and treatments through a model of care that keeps patients’ needs central to everything it does. For more than 100 years, people from all walks of life have turned to Mayo for answers and have found peace of mind knowing they have received care from the world’s leading experts.

These are tenets of Mayo Clinic that will never change. Mayo Clinic is here to provide exceptional patient care via the daily collaborations of experts in clinical practice, education and research.

What has dramatically changed is the health care environment. Rising health care costs, declining reimbursements and the urgent need for health care policy reform are challenges confronting all health care organizations. At Mayo, delivering health care that brings value to the patient means delivering the best health care outcomes possible.

Reaching beyond tradition
To meet 21st century needs, Mayo is reaching beyond the tradition of illness care to include a focus on maintaining health and preventing illness. This requires new ways to serve more people. Mayo is developing new models of delivering health care to serve alongside its time-honored standard of doctors, nurses and technicians who see patients in offices and hospitals. This will allow Mayo to reach patients where they are in their homes, communities and workplaces. No matter where or how Mayo touches people’s lives, it will provide exceptional service via the daily collaboration of experts in every specialty. Underlying all that Mayo does and hopes to accomplish in the future is its primary value: The needs of the patient come first.

Delivering knowledge to the patient
Mayo Clinic produces vast amounts of new knowledge and is committed to continuously improving information systems and processes to move this knowledge across the enterprise. “We’re taking everything we know and everything that can be known about health care, about disease states, about genes and about imaging — and delivering it to the patient in front of us,” says Mayo President and CEO, John H. Noseworthy, M.D.

Establishing long-term relationships
Mayo is expanding services to include more health assessment, health guidance, disease prevention and personalized programs. Some examples include lifestyle management of chronic disease and employer and consumer healthy living products and services. Mayo is studying the effectiveness of daily in-home monitoring technology as a way to reduce emergency room visits and rehospitalizations. Mayo’s eConsults, an online portal, provides physicians inside and outside the U.S. with electronic and video consultations. These activities enable Mayo to establish and broaden long-term relationships with patients and providers.

Bringing timely solutions and hope
By carefully applying an array of tools and methods, including knowledge and information systems, Mayo expects to provide an interconnected network of care that is accessible, and in many cases, more affordable than ever before.

Through these initiatives, Mayo Clinic combines knowledge, integrity and teamwork into a uniquely effective, integrated model of care that brings timely solutions and hope to its patients. By broadening its reach, Mayo plans to provide more access and higher-value health care to people wherever they may be.
**MAYO CLINIC MISSION STATEMENT:**
To inspire hope and contribute to health and well-being by providing the best care to every patient through integrated clinical practice, education, and research.
What does good health care look like?
Some say good health care means a good fit with lifestyle. It’s care that’s minimally disruptive and fits you. For others, it’s about maintaining health and preventing illness. It’s timely solutions and hope. It’s Mayo Clinic reaching beyond its walls to collaborate with other leading institutions. It’s passion and tenacity in discovery and research. It’s technological advancement that minimizes medical invasiveness and preserves the quality of life. It’s time spent with each patient. It’s all of that and more. Good health care adds value by offering the best outcomes possible.

What does good health care look like to you? We want to hear from you. E-mail us at mayomagazine@mayo.edu
Mayo Clinic’s neuroscience program has earned a reputation of world renown — from molecular medicine and genetics, to treatment trials and disease prevention, from understanding neurodegenerative disorders and devising innovative surgical procedures, to defining the risk factors and causes of disease.

Take a look at what’s happening in neuroscience at Mayo Clinic.
RECONNECT WITH NEW AND IMPROVED INTERFACES
Nerves do three things: they facilitate motor function, sensory information and control of the heart, lungs and other organs. When damaged, nerves take a long time to heal. Since the rate of nerve repair is slow but constant — typically at a growth rate of an inch a month — the farther away the injury, the longer it takes to repair. Currently, men and women in our armed forces sustain mutilating-type injuries from combat and high speed accidents. A team of experts at Mayo Clinic specializing in peripheral nerves, the spinal cord, biomechanics and bioengineering are using regeneration to develop peripheral nerve interfaces that promise increased connectivity speed, performance and, ultimately, enhanced mobility to improve the quality of life for people suffering nerve trauma.

ENHANCE PROCESSING SPEED
Using spectroscopy, researchers can actually see chemicals present in the brain. There’s a specific molecule in the brain called N-acetyl-aspartate, or NAA. When NAA levels are down, neurons are not functioning well. Researchers have demonstrated a direct correlation in multiple sclerosis (MS) between the NAA level in the brain and function. With powerful chemical imaging and NAA as a marker, they can see whether the nervous system is improving or worsening. Using spectroscopy in the brain stem as a surrogate for the spinal cord, Mayo researchers are studying MS and function as it relates to NAA levels. Mayo researchers plan to use this process in clinical trials that look at ways of regenerating brain tissue.

REMOVE NETWORK DEBRIS
Files scattered randomly throughout a computer's hard disk can result in malfunction, and the accumulation of unnecessary files can cause system failure. Consider Alzheimer’s disease as a complex system failure. In Alzheimer's many different interacting neural networks fail — a part here, and a part there. Research is underway to look at the abnormal accumulation of tau proteins and the ways that cellular mechanisms either inhibit its production or rid the brain of this abnormal buildup. At Mayo, researchers are exploring new methods and probes to detect mild cognitive symptoms in people who will develop Alzheimer’s, as sooner intervention may well lead to the prevention of subsequent dementia.

MINIMIZE NOISE & APPLY ELEGANT SOLUTIONS WITH MICRO-PRECISION
Comparable to a computer hard drive, the brain controls every system and function in the body; it records and stores information through integrated components and circuitry. Advancements in imaging, electronics, electrophysiology, bioinformatics, pharmacology and biomedical technologies permit neurosurgeons to help people with devastating brain disorders. With its extensive neurosurgery practice, Mayo Clinic has the ability to develop, adapt and integrate technologies — for instance, high resolution intraoperative microscopes, MRI imaging, computer-guided neurosurgery, focused-stereotactic radiosurgery, endovascular surgery and deep brain stimulation.

PROTECT FROM SURGES AND SHORT CIRCUITS
An interruption or sudden spike in electrical flow to a computer can damage the hard drive or fry the computer's motherboard. Surge protectors and other backup devices help stabilize voltage to maintain a safe threshold. A stroke, the most common cerebrovascular event, involves bleeding in the brain or lack of blood supply to the brain — in a sense, a surge or a short circuit. Mayo physicians care for more than 4,000 patients with stroke or other cerebrovascular disorders each year. Teams of specialists at Mayo Clinic work across the spectrum of cerebrovascular conditions, disorders and diseases to provide medical options that range from genetics to prevention, from physical and rehabilitation programs to regenerative medicine.
An explosion of knowledge and activity in neuroregenerative research is enabling scientists and clinicians to replicate the precise form and enhance the physiology of injured nerves. A team of specialists from Mayo Clinic’s peripheral nerve surgery practice, one of the largest in the country, is conducting extensive research in the development of effective neuroregenerative cell transplant therapies.

**Turning cells into programmable circuitry**

Nerves do three things: they provide muscles with power; give skin sensation; and control the heart, lungs and other internal organs. The first step in neuroregeneration involves turning a stem cell into a neuron, the functional unit of a nerve. Persuading a stem cell to differentiate into a skin cell or a heart cell poses fewer complications than turning a stem cell into a neuron. Nerve cells are long so they can connect with other cells, other nerves, muscles and skin. John R. Henley, Ph.D., assistant professor of neurosurgery and physiology at Mayo, explains, “Stem cells can be used for two additional functions: one as a vehicle to secrete the factors which promote the survival of a neuron; and, two, as an aid for a neuron to form accurate connections with other nerves or effector cells to create a functional circuit. The chemical signals for forming the appropriate connections in the brain and body may be present for very limited times during development.”

**Filling gaps, building connections**

Robert J. Spinner, M.D., neurosurgeon and orthopedic surgeon at Mayo Clinic, is developing treatments to test in the peripheral nervous system, which can later be applied to the spinal cord in the central nervous system. Working with the peripheral nervous system is less complex and poses fewer risks than working on the spinal cord. Think of the spinal cord as a superhighway and the peripheral nerves as exits. If you shut down one exit, the only areas affected are those associated with that one exit. But, if you damage the spinal cord the main highway is shut down and all exits beyond the closure are affected.

To treat damage in the peripheral nerve system, surgeons typically rely on nerve grafts to replace damaged sections of the nerve tissue. Regenerated nerve cells and tissue can be used to fill in gaps between fragmented nerve circuits, the result of sports injuries, trauma from car accidents, or combat wounds. While nerve grafts frequently provide patients with the best possible chance to recover function, there are serious consequences that can accompany this procedure and some practical limitations to it.

Nerve grafts involve removing a nerve from another part of the body to bridge the gap created by damage to the affected nerve. In order to obtain a graft, surgeons often make an incision at a different location than the primary site of the surgery, which increases the risk of infection. Furthermore, the graft requires taking a healthy nerve and essentially robbing function from its area of the body to give it to the damaged nerve. The damaged nerve thus has a chance to recover, but a graft doesn’t guarantee that function will be restored.

When a nerve is damaged in the periphery, it must regrow from the site of the injury to the muscle or skin that it controls. The graft helps guide the newly growing nerve to the correct location, bypassing the zone...
of injury. Since nerves are slow to recover, however, the time and distance for successful regeneration are major obstacles. “Our major research focus has been to try to enhance peripheral nerve regeneration, because even under ideal circumstances, current nerve repairs do not restore 100 percent of function,” says Dr. Spinner.

Creating a better foundation
Mayo’s peripheral nerve team works closely with Michael Yaszemski, M.D., Ph.D., Mayo Clinic orthopedic surgeon and biomedical engineer, and Anthony Windebank, M.D., a Mayo neurologist and molecular neuroscientist. Dr. Yaszemski explains, “to build new tissue, we need to provide a foundation that lets cells anchor to it. These cells eventually form natural tissue.” To achieve this, the teams use special growth factors and dissolving polymers to construct scaffolds for the new cells. “To a large extent, our bodies already know how to repair and rejuvenate themselves,” says Dr. Windebank. “We want to understand these mechanisms to improve and accelerate a person’s own natural abilities to heal and regenerate at the cellular level.”

Mayo Clinic researchers want to find ways to bridge the gap between healthy nerves and nerves that have been damaged. The aim is to find new ways to facilitate fuller, faster recovery. It’s philanthropic support that will help make this possible.
Multiple sclerosis (MS), a complex disease of the central nervous system, breaks down communication networks in the brain, spinal cord and optic nerves. MS causes the body’s immune system to destroy its myelin, a protective sheath that covers the nerves. MS and related illnesses are called demyelinating diseases because they result from damage to myelin, a process that’s not yet reversible. Early symptoms include tremors, fatigue, visual weakness, cognitive and memory problems. Severe inflammation of the nervous system related to MS can cause pain with crippling effects. Yet its progression can vary significantly by individual. Medical science doesn’t know what causes MS and, currently, it is not a curable disease. In fact, MS continues to perplex doctors and researchers. Thirty years ago no treatments existed for MS patients other than steroids, exercise and physical therapy. Unfortunately, these treatments only minimized the symptoms of the disease; they could not halt or slow its progression.

Each year, Mayo Clinic provides care for nearly 2,500 patients with MS, a testament to the clinic’s depth and breadth of expertise. Moses Rodriguez, M.D., director of Mayo Clinic’s Center for Multiple Sclerosis and CNS Demyelinating Diseases: Research and Therapeutics (CMSDD) has been involved in caring for patients with MS in addition to acting as a catalyst for the development of a multidisciplinary and multi-institutional research program in MS at Mayo.
Significant advancements in repairing network linings

Dr. Rodriguez’s group was one of the first to demonstrate in animal models how certain types of interferons (proteins involved in first line defense of infection) or antivirals are effective in the treatment of animal models of MS. Mayo played a substantial role in getting these treatments into the market and, thus, to patients. Breakthroughs included the development of a number of interferon treatments called by the trade names Betaseron™, Avonex™ and Rebif™. Other approved treatments for the disease include drugs that down-regulate the immune response, known as Tysabri™ and Copaxone™. The most recent drug approved is fingolimod (Gilenya)™, which is the first oral medication shown to have an effect on MS by affecting the immune system. All of these drugs reduce the frequency of attacks by one third, but unfortunately have little effect of slowing the progression of the disease.

Dr. Rodriguez and Dr. Brian Weinshenker were pioneers in getting plasma exchange into the field of MS. This approach has had a major impact on MS treatment so that patients with MS may now be spared a serious outcome. These are patients who would otherwise have needed skilled nursing home care. Yet, with plasma exchange about 40 percent will make an almost complete recovery.

Less invasive diagnostic tools for greater accuracy and speed

New imaging technologies, such as spectroscopy, allow researchers at Mayo to study levels of NAA (N-acetyl-aspartate) in the central nervous system of MS patients. This molecule is a key component in the function of neurons. Low levels of NAA indicate that neurons are not functioning correctly. Mayo researchers have discovered that instead of testing NAA levels in the spinal cord, readings can be taken from the brain stem, a structure found at the junction located between the brain and spinal cord. This approach may provide a more accurate overview of a patient’s condition and is a faster, less invasive diagnostic tool to indicate overall function of the spinal cord neurons. The technique is being used in experiments to determine whether a patient is responding to a certain treatment. Higher levels of NAA signify that the medication is effective, while lower levels indicate the reverse. The innovative idea was published recently in a high impact journal, *Annals of Neurology.*

As Dr. Rodriguez reflects on his extensive research career at Mayo Clinic, he marvels that when he started in 1983, “Mayo had very little MS research. Our strength in MS is really an evolving phenomenon. Now we’re extremely strong in this area. In fact, Mayo is working to develop a new group of natural human antibodies to promote repair of the nervous system.”

Advancements in genetics, protein chemistry, bioinformatics and, most importantly, a skilled community of research and clinical experts, create a fertile environment for Isobel Scarisbrick, Ph.D., assistant professor of physical medicine & rehabilitation, neurology and physiology, another key player on the MS research team. Scarisbrick educates students, residents and physical therapists in addition to conducting and facilitating research in the field of MS and spinal cord injury.

Dr. Scarisbrick’s team is focusing on two of 15 enzymes that are elevated in the blood and brain lesions of MS patients and which show strong evidence of contributing to pathology. Scarisbrick explains, “We’re excited by the idea that the enzymes we’ve identified not only mark the disease course but also may contribute to the pathogenesis.” Once doctors understand how these enzymes contribute to the injury process, they may be able to inhibit their effect.

Clinicians in the MS Group
Jonathan L. Carter, M.D.
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Sean J. Pittluck, M.D.
Moses Rodriguez, M.D.
Elizabeth A. Shuster, M.D.
Brian G. Weinshenker, M.D.
Dean M. Wingerchuk

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Twenty-five years ago, physicians could only diagnose Alzheimer’s disease after the ravages of illness had considerably impaired a person’s ability to think and remember. The research landscape started to change in 1986 when Mayo physicians Len Kurland, M.D. and Emre Kokmen, M.D., received a grant to research the evolution of cognitive changes in aging. They described a clinical state known as mild cognitive impairment, which preceded the onset of Alzheimer’s disease. They conducted their studies in the community of Rochester, Minn., and from those studies were able to characterize a transitional stage between normal aging and mild cognitive impairment that would eventually progress to Alzheimer’s. Medical and research institutions around the world still use the findings from those groundbreaking studies today.

According to Ronald Petersen, Ph.D., M.D., director of the Alzheimer’s Disease Research Center at Mayo Clinic, working with the clinical knowledge gained over the years, researchers can detect mild cognitive impairment. Now when they add sophisticated imaging, researchers can make good predictions as to which people with mild symptoms will go on to develop Alzheimer’s disease. “Not only can we recognize features of the disease much earlier than we could previously,” says Dr. Petersen, “but our colleagues have developed instruments that detect subtle differences between normal aging and the earliest features of what may become Alzheimer’s disease.”

Preserving function
Dr. Petersen and his team want to go even farther back, to the stage before symptoms ever develop. Using imaging and biomarkers, the researchers want to predict who will progress from normal to mild cognitive impairment and who will develop Alzheimer’s disease. Intervention at the point when a person is at the mild cognitive impairment stage could delay the onset of Alzheimer’s disease.

Yet they recognize the difficulty of conducting MRIs, PET scans, amyloid imaging scans and spinal taps on entire populations. That’s why Mayo wants to use information like genetics, blood, and family history profiles to determine risk factors associated with mild cognitive impairment and Alzheimer’s disease.

Researchers at Mayo Clinic are working to determine which tests are most efficient in detecting mild cognitive impairment, something that will ultimately reduce costs to both the patient and the health care system. They will show which of these tests, in fact, are going to be affordable and most effective for patients. Mayo’s Alzheimer’s Disease Research Center and the Mayo Clinic Study of Aging are interested in the development of these types of diagnostic instruments in combination with a model of health care delivery that helps key stakeholders, especially patients and families, make informed decisions.

Complementary research on the prediction of Alzheimer’s disease is also being conducted by Richard J. Caselli, M.D., at Mayo Clinic in Arizona and Steven G. Younkin, M.D., Ph.D., at Mayo Clinic in Florida.

Clearing internal cables to prevent messy tau tangles
Every neurodegenerative disorder causes an excess accumulation of certain proteins. Some of these proteins amass outside the cell and others pile up inside the cell. Although cells have quality control machinery
Abnormal accumulation of proteins both in and around neurons produce the tangles and plaques evident in Alzheimer’s disease.

for ridding themselves of this excess protein, these mechanisms can malfunction. When this happens, the proteins clog the cells in the nervous system; eventually, the cells are so clogged they no longer work.

For eight years, Leonard Petrucelli, Ph.D., chair of the Department of Neuroscience at Mayo Clinic in Florida, and his colleagues have been dovetailing their work with Dr. Petersen’s studies involving the abnormal accumulation of certain proteins that result in plaques and tangles — two types of brain cell (neuron) damage common in people who have Alzheimer’s disease. Plaques, or the clumps of a normally harmless protein called beta-amyloid, may interfere with communication between brain cells. Although the ultimate cause of neuron death in Alzheimer’s isn’t known, mounting evidence suggests that the abnormal processing of beta-amyloid protein may be a culprit. Tangles, on the other hand, affect the internal support structure that brain cells need for the normal processing of a protein called tau. In people with Alzheimer’s, threads of tau protein undergo alterations that cause them to become twisted. Many researchers believe that tangles may seriously damage neurons, causing them to die.

While most labs and pharmaceutical companies focus their efforts on the plaques, researchers in Dr. Petrucelli’s lab are investigating the tangles. Their goal is to identify the key protein involved in clearing the tangle, or tau protein. Dr. Petrucelli explains, “We believe that when a person first shows signs of dementia, it may be too late to intervene because there is already some plaque deposition and tau accumulation. We’re not stacking the cards in the favor of success if we start treatment too late.”

Dr. Petrucelli is exploring a third protein, discovered in 2007, called TDP-43. Based on post-mortem examinations, more than 50 percent of people with Alzheimer’s have TDP-43 present in their brain. If researchers developed a biomarker for this third protein, doctors could screen people for it and discriminate patients with and without TDP-43 pathology. “We want to eradicate Alzheimer’s disease,” says Dr. Petrucelli, “and we want to treat people who suffer with it now.”

4.5 million Americans now have Alzheimer’s disease and U.S. society spends $100 billion a year to care for them. By the year 2050, the figure is expected to quadruple as more people live into their 80s and 90s. By learning how to predict dementia, by collaborating with industry to develop new treatments, and by conducting basic research with a goal to discovering preventive therapies, Mayo scientists are part of the ongoing effort to stop this serious threat to the health of older adults.
In DBS treatment of Parkinson’s disease, physicians surgically implant an electrode in the brain and a neurostimulator (electronics and battery) under the skin in the chest or abdomen. An extension wire connecting the two devices allows the electrode to control the tremors by emitting electrical pulses to specific areas in the brain. Unlike previous surgical treatments, the DBS system may be turned off or removed.

**A sacred trust**

Each week, Kendall H. Lee, M.D., Ph.D., associate professor in neurosurgery and physiology and biomedical engineering and director of the Neuroengineering Laboratory at Mayo Clinic, performs DBS surgeries at Saint Mary’s Hospital on the Rochester campus. He also oversees research and product development for DBS therapies.

When Dr. Lee enters the room in his surgical outfit, he extends upright his freshly scrubbed arms for the attending nurse to glove. The nurse does his left hand first. To glove the chief surgeon’s left hand first is a long-held tradition, still practiced today, that pays homage to Will and Charlie Mayo, founders of Mayo Clinic. Both brothers were left handed, and this simple act serves as a reminder of the sacred trust between the patient and the Mayo Clinic medical team.
Areas commonly treated with deep brain stimulation:
A. Globus pallidus
B. Thalamus
C. Subthalamic nucleus

Quieting noisy tremor cells
One patient of Dr. Lee’s, a 73 year-old woman, seeks relief from tremors in her lips and hands caused by Parkinson’s disease. On the day of surgery, Dr. Lee introduces his patient to the team who prepares her for the operation.

The patient is anesthetized yet awake. She is comfortable and able to interact with the surgical team while Dr. Lee implants an electrode in her brain. Throughout the procedure, Dr. Lee asks the patient to extend her hands; there is a noticeable quiver of Parkinson’s disease. When his team locates the tremor cells in her brain, a screen monitor displays intense wavelength frequencies with an audible, static noise. The patient’s hands are still extended, trembling. Dr. Lee pinpoints the electrode to within 500 micrometers (a size slightly larger than a dust mite) of the target area in the woman’s brain. As he teases the problematic area with pulses of electricity, her tremors stop.

She responds with relief and gratitude. For the first time in two years, she is no longer a prisoner to uncontrollable tremors. The newly implanted stimulation device may be programmed and adjusted non-invasively by the clinician to help maximize symptom control and minimize side effects.

DBS won’t cure the problem, but it can give people with certain movement disorders more control to function with greater continuity and less disruption in their lives. “Some people are overcome with emotion in the operating room because they are so joyful to have immediate relief of their symptoms,” says Dr. Lee. “That’s a very powerful incentive.”
Fredric Meyer, M.D., chair of Neurosurgery at Mayo Clinic, recalls with clarity his first brain surgery as a medical student in Massachusetts. “It was a right frontal glioma. The chief neurosurgeon, a very senior, gray-haired gentleman, performed a frontal resection of the tumor. There was no operative microscope. There was no computer-guided surgery, no MRI scans. We based the surgery on a CT scan. I remember distinctly that he couldn’t tell where the tumor began and ended. For hours the chief neurosurgeon labored tediously to remove tiny parts of the tumor. He tried to compensate for his frustration by giving 200 percent, in hopes of helping this patient fight a malignant tumor.”

Dr. Meyer considers himself to be primarily a cranial surgeon, operating on patients with brain tumors, pituitary tumors, vascular disorders and epilepsy. He performs about 470 surgeries each year, while the department itself does about 3,700 major cases.

In addition to having a strong and deep neurosurgery practice with complicated esoteric types of surgery, Mayo’s multidisciplinary approach between different surgical, neurology, medical and radiology teams attracts patients from the world over. “We collaborate extensively with neurology, neuroradiology, endocrinology, ear, nose and throat (ENT), plastic surgery and orthopedic surgery. In addition we support a growing pediatric neurosurgery practice,” says Dr. Meyer.
Dr. Meyer has witnessed a number of major technological advancements in neurosurgery. The most significant include:

- **a** High resolution intraoperative microscopes that makes microneurosurgery safer and more effective.
- **b** Computer-guided neurosurgery that helps clinicians to:
  - Perform minimally-invasive neurosurgery, a technique particularly useful in cranial surgery when surgeons need to access brain lesions through the shortest and safest pathways. This approach minimizes surgical incisions and craniotomies.
  - Place instrumentation accurately in order to reduce the risk of injury to nerves and spinal cord.
  - Create three dimensional anatomic models of either brain or spinal cord by reconstructing the patient’s CT or MRI scans.
- **c** MRI imaging that allows for surgeons to better visualize three-dimensional anatomy.
- **d** Focused-stereotactic radiosurgery that provides a method for delivering irradiation to both benign and cancerous lesions with limited risk to surrounding tissue. In particular, the gamma knife, a device used to treat brain tumors, allows a high dose of targeted radiation delivered in a single session, with extreme precision. The technology offers patients a safe, noninvasive form of brain surgery. Mayo Clinic was one of the first in the country to install and use this technology.
- **e** Interventional or endovascular surgery, a minimally-invasive technique that gives radiologists, neurologists, neurosurgeons, cardiologists and vascular surgeons access to many regions of the body via major blood vessels. Mayo offers a robust practice in neurosurgery and interventional neuroradiology through which vascular diseases such as cerebral aneurysm, vascular malformation and carotid disease can be treated with endovascular methods.
- **f** Reinvigoration of deep brain stimulation with implantation of medical devices like a “brain pacemaker” that sends electrical impulses to specific parts of the brain for therapeutic benefits for tremor, Parkinson’s disease, Tourette’s syndrome, dystonia, depression, epilepsy and chronic pain.

“One of the long held tenets of neuroscience was that when brain tissue died, it could not regenerate. We now understand differently. One of the next paradigm shifts in neurosurgery and neuroscience may be regenerative technologies. For example, a spinal cord is injured. How do we make it regenerate? A patient suffers a stroke. How do we get tissue to grow and try to develop some new function? We need stem cell biologists to study cells deep within the center part of the brain that have the potential to differentiate, to grow and migrate to make synaptic connections.”

In the Department of Neurologic Surgery, philanthropy will play a critical role in building a basic science research program. Dr. Meyer smiles, “When we’re fortunate enough to receive funding from benefactors, we use it to build programs. Programs consist of people, equipment, space and resources. It’s the whole thing.”
Mayo Clinic, one of the nation’s largest stroke practices, translates its education and research into the clinical world of treatments for cerebrovascular disorders. Stroke, the most common cerebrovascular disorder, falls into two categories: ischemic stroke, which results from an interruption in or lack of blood supply to the brain, and hemorrhagic stroke, which involves bleeding in the brain.

Robert D. Brown, M.D., professor of neurology and chair of the Department of Neurology at Mayo Clinic explains, “We’re looking at cerebrovascular disorders and diseases across a range of disciplines: from epidemiology to the genetic underpinnings of disorders that include cerebral infarction (the death of brain tissue due to sudden deprivation of circulating blood), as well as brain aneurysms and other diseases from stroke prevention to new and innovative acute therapies and rehabilitation techniques.” Mayo brings together a multidisciplinary team of physicians, subspecialty-based nurses and other health care providers whose depth and breadth in the neurovascular field spans neurology, neurosurgery, neuroradiology, physical medicine/rehabilitation, and cardiology, hematology and psychiatry.

According to James F. Meschia, M.D., professor of neurology and a neurologist at Mayo Clinic in Florida, Mayo has been contracted by the National Institutes of Health (NIH) to gather over 6,000 DNA samples from sufferers of ischemic stroke. “To do this we’re basically combining two studies that we were involved in early on — the Ischemic Stroke Genetics Study and the Siblings With Ischemic Stroke Study,” he says. In addition, Mayo is partnering on well-established studies, like the Women’s Health Initiative, the Nurses’ Health Study, the Northern Manhattan Study (NOMAS), and a nationwide study, known as REGARDS, with over 30,000 participants.

“Using research studies conducted previously, we can now integrate the newer discoveries to use as signposts for making predictions about which people are more likely to develop a stroke,” adds Dr. Meschia. Access to a huge sample size in combination with ongoing advancements in genetic testing serves as a platform for clinicians and researchers to guide treatments and, hopefully, one day, cures for stroke.

Making a common language
Mayo is leveraging its strength in clinical expertise, diagnosis and treatment of ischemic stroke through a central mechanism for characterizing this type of stroke. Instead of each research initiative using slightly different classification scales to study symptoms of stroke, Mayo is using a uniform system of characterizing ischemic strokes.

Reaching beyond the walls
Bart M. Demaerschalk, M.D., professor of neurology at Mayo Clinic in Arizona, principal investigator for the government funded STRoKE DOCTIME AZ and Stroke Telemedicine (the clinical application of medical information transferred through interactive audiovisual media) for Arizona Rural Residents (STARR) studies, describes his team’s successful
Telestroke outreach program. “What we started as a research pilot initiative in 2007 with the Arizona Department of Health Services Government Research Grant, has developed into a new sustainable service line for Mayo Clinic. We have translated telemedicine research into a standard extension of the clinical practice, one that we are rapidly expanding within Arizona in addition to assisting our counterparts in Florida and Minnesota. We are already working on cross-states initiatives with the Mayo Clinic Telestroke program and also have conducted pilots in Canada, Spain, India and Bhutan.”

“We feel as though we can distribute our expertise to people, to patients and to communities where we formerly had no reach. Now, we not only reach the patients faster and apply the treatment early, but we save the expensive transportation fees that would normally be associated with this kind of patient care,” says Dr. Demaerschalk.

Mayo’s specialty in Physical Medicine and Rehabilitation (PM&R) promotes recovery and quality of life in the care of people who have experienced neurologic disease or injury. Kathryn A. Stolp, M.D., associate professor and chair of the Department of Physical Medicine and Rehabilitation explains, “Mayo’s PM&R team customizes programs to help each ‘patient’ return to their lives as ‘people’ within their families and communities.”

**PM&R clinical activities include:**

- 11 accredited nationally recognized programs utilizing new drug and exercise therapies
- virtual experiences
- electrical stimulation
- computer-based assistive technology
- tele-rehabilitation and
- robotic therapies to treat stroke, and other causes of non-traumatic and traumatic brain and spinal cord injuries, including multiple sclerosis.

The brain rehabilitation research group in Rochester ranks among the top programs in the nation and is one of 16 federally-funded Traumatic Brain Injury Model System Centers. The group is also a member of an international multicenter clinical stroke trial network with extensive experience in community-based clinical trials and epidemiological research.
The ultimate network — the human brain and nervous system — considered the most complex living system in the universe, controls all of our functions and senses. It keeps our hearts beating. It is the source of our emotions and personalities. It gives us the power to communicate. It lets us plan and remember. It enables us to estimate the passage of time and allows us to consider our fate.

The strategies highlighted in this story represent the tip of the iceberg in terms of specialties and subspecialty disciplines within the neuroscience and neurosurgery “network” at Mayo Clinic. Each day, more than 400 M.D. and Ph.D. investigators engage in clinical, translational and basic neuroscience research. Supporting them is a vast number of specialists, as well as graduate students, research fellows and resident physicians. Inspired by science and driven by unmet patient needs, these are communities of investigators and clinical specialists who work together to eradicate suffering and touch lives with a deeper knowledge of health care.

Philanthropy has been central to the development of neuroscience research at Mayo Clinic. Innovative research in neurosciences has led to numerous recent publications, novel diagnostics, clinical trials and funding from the National Institutes of Health. Benefactor support also ensures continuous improvement of its infrastructure and training for the next generation of neuroscientists.
HONORING YOUR PHILANTHROPY

Mayo Clinic honors the many people who support its mission. Philanthropic gifts of all sizes help Mayo provide the best care to each patient through integrated clinical practice, education and research.

Cumulative Philanthropy
Three giving levels honor Mayo Clinic benefactors for cumulative gifts of $100,000 to $10 million or more.

Philanthropic Partners:
Benefactors who have contributed $10 million or more.

Principal Benefactors:
Individuals and organizations that demonstrate leadership by committing $1 million to $9,999,999.

Major Benefactors:
Those who have made contributions of $100,000 to $999,999.

Alumni Philanthropy

The Doctors Mayo Society: Alumni who make gifts of $10,000 or more.

Mayo Alumni Laureates: Alumni who have contributed $100,000 or more.

Planned Giving

The Mayo Legacy: Benefactors who provide a bequest in their will, or arrange another type of planned gift.

Annual Giving

Six giving levels honor benefactors who sustain financial support through yearly gifts of $1,000 to $99,999.

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

Mayo Clinic recognition areas include Halls of Benefactors and electronic kiosks in the Harold W. Siebens Medical Education Building in Rochester, Minn., the Davis Building in Jacksonville, Fla., and the Mayo Building Concourse in Scottsdale/Phoenix, Ariz.

For more information about philanthropy at Mayo Clinic, please visit www.mayoclinic.org/development
What Christopher Jorgensen accomplishes and what they represent in the present gives us hope and strength.
I’ve never, in my 10 years of writing, encountered a story like the one that involves the Bacardi and Gregory families and Mayo Clinic. I hope I adequately describe its uniqueness. Words, please don’t fail me now.

— Matt Derechin, author

Where to begin? Perhaps the best spot is Thursday, March 27, 2008, when the Bacardis flew from their home in the Bahamas to Mayo Clinic’s campus in Jacksonville, Fla., where a team of staff readied for Jorge Bacardi’s lifesaving, double-lung transplant.

That the trip occurred at all is something of a miracle. Mr. Bacardi wasn’t supposed to live long enough to make it — not by a long shot. Initially diagnosed with cystic fibrosis when he was a boy, doctors told his parents to make the most of the time they had with him.

“Cystic fibrosis is still a serious diagnosis today, but back then it was basically a death sentence,” says Mr. Bacardi, 66, and a member of the widely known Bacardi family that has manufactured rum and other spirits for 150 years. “You don’t think about those things when you are a kid, though, and I just focused on doing the things that I enjoyed and being as active as I could be. I think that’s one of the reasons I survived as long as I did.”

Survived he did, albeit through hordes of respiratory infections and with the help of multiple surgeries to remove scar tissue that slowly, inexorably, formed in his lungs. Eventually, doctors determined that he didn’t have cystic fibrosis, and in his 50s his true diagnosis was finally identified — a congenital disease called primary ciliary dyskinesia.

Nonetheless, a transplant was his only hope, which, Mr. Bacardi says, created a moral and physical dilemma.

“I had doubts about whether I would even be accepted because of my age and my medical history,” he says. “I struggled with it morally, too. I knew that a lot of younger people were waiting for organs, and that made me think twice about opting for a transplant. I needed a focal point, a reason to accept such a precious gift. It was my wife and my nieces and nephews.”

In addition to being his wife of 37 years, Mrs. Bacardi is his primary caregiver. It was far from easy, seeing her husband wasting away and, at the same time, struggling with the decision to pursue the only treatment that might save his life. “It was a really tough time and as the caregiver you’re not allowed to get depressed,” she says. “I kept telling him that people don’t know how strong in mind and spirit you are if they never get to meet you. And I knew he still had so much to offer. We did a lot of soul searching together and decided we would pursue transplantation. I was elated.”
At the same time, they promised they would do their utmost to respect the gift that is a transplant — if Mr. Bacardi was approved for the procedure and if he was fortunate enough to receive an organ.

His surgery was a remarkable success. He took his first steps 19 hours afterward and left the hospital five days after his feet first touched the floor. Aside from saving his life, the procedure gave him a new one, in a fundamental way.

Because he was born with this disease, he had never taken in a full breath of air. Now, at age 64, he experienced for the first time something that most of us take for granted. “My disease had forced my body to become accustomed to less oxygen,” he says. “So when I took that first breath after my surgery, it was euphoric.”

Almost immediately, he and Mrs. Bacardi began thinking of his donor family. Mayo Clinic encourages patients to contact their donor families via a letter that is coordinated through the United Network for Organ Sharing (UNOS), which screens the letters to ensure the anonymity of both parties. The Bacardis needed little prompting to take this step.

Today, looking back on that first letter, it is easy to say that the Bacardis could never have foreseen the events it set in motion. To fully understand those events, it’s necessary to go back to the night of Mr. Bacardi’s surgery, but to a different place — a New Orleans hospital, where a 19-year-old college student named Christopher Gregory received last rites after suffering a brain aneurysm.

The third son of Eric and Grace Gregory of Baltimore, Md., Christopher Mark Gregory was a jokester who made friends easily. His 6-foot-4-inch frame — just a shade taller than his father, as he was fond of pointing out — also gave him a good vantage point to look after people, something he seemed to have a natural affinity for.

“He was our baby, our youngest of three boys, and he always wanted to have a younger sister or brother to look out for,” says Mr. Gregory, a United Parcel Service worker whose faith, love for his family and sense of humor emerge quickly in conversation. “He was always looking out for the little kids next door and in high school he drove across town every day to help take care of his grandfather, who was in home hospice during Chris’s senior year.”

Mr. and Mrs. Gregory and Christopher’s two brothers, Colin and John, were by his side throughout his final days, flying in from Baltimore the moment they heard that Chris had collapsed at a friend’s house and was hospitalized. Grim news greeted them the moment they arrived.

“We should talk,” the treating neurologist began, as he told the family of Christopher’s poor prognosis. Shortly afterward, an organ procurement coordinator asked them about donating Christopher’s organs. The decision was surprisingly easy, if not a bitter irony.

“Chris registered as an organ donor when he was 16, but just a week before he died, we were all talking about organ donation,” says Mrs. Gregory, a registered nurse who speaks in calm, patient tones that are perhaps the byproduct of raising three boys. “We were on spring break together, in Arizona, and we were sitting around the dinner table. Somehow, we got on the subject of organ donation, and Chris said, ‘What do I need my organs for after I die? Of course I’m going to donate my organs.’ So when we were asked about it in the hospital, it was really a matter of fulfilling Chris’s wishes.”

But very quickly the conversation took on much greater significance. Instead of washing away with the tides of grief that swept over the Gregories, it became a sort of life preserver, as they clung to news about where Christopher’s organs traveled.

There’s planes flying all over the place tonight because of your boy. It meant a lot. We knew that Chris wasn’t dying in vain, that his death would mean something.”
“As soon as we got the bad news about Chris, it was important to learn there were matches for his organs,” says Mr. Gregory, who has to compose himself several times as he recalls the moment. “Chris’s organs went to five people and his corneas went to two others. At one point, the organ procurement coordinator pulled us aside and said, ’There’s planes flying all over the place tonight because of your boy.’ It meant a lot. We knew that Chris wasn’t dying in vain; that his death would mean something.”

Soon, they were making their own flight, home to Baltimore, where scores of condolences awaited and continued to come, flooding their mailbox for weeks. The sentiments were thoughtful, the Gregories say, but at the same time, they were painful reminders of their anguish. They needed something to help them look toward the future.

Their wish was soon fulfilled, in the form of that first letter from Mr. Bacardi. As per UNOS requirements, permanent ink and whiteout covered every piece of identifying information. That didn’t stop Mr. Gregory. He used a magnifying glass and a heavy flashlight to detect the shadows of Mr. Bacardi’s original writing. Some of the words remained impenetrable. The ones he uncovered amazed him.

“He had addressed the letter to ‘Gabriel,’ for the archangel of incarnation and consolation,” Mr. Gregory says. “He chose that name for Chris, and the impact that had on our family was powerful beyond words to describe.”

Quickly, the two families established a regular correspondence, and they eventually obtained each other’s personal e-mail addresses. As their communication increased, Mr. Bacardi sensed that the Gregories wanted to meet. But he was reluctant to do so because of the age difference between him and Christopher. He consulted with his Mayo “team”—physicians, social workers and friends in the double-lung transplant support group. All of them told him not to worry. Still, he had to be sure, so he found a way to “break the ice,” as he says.

“They asked me about my schooling, and I wrote back that I went to such-and-such a place and I graduated in 1966,” he says. “They responded that I created quite a dilemma for them because they didn’t know whether to call me ‘son’ or ‘dad.’ It showed a remarkable sense of humor and that they were extraordinary people, so we made arrangements to meet.”

They met Friday, July 11, 2009, in Baltimore, at the Bacardis’ hotel. They hugged immediately and spent the next two days together. They went to Mass together, met the Gregories’ extended family and many of Christopher’s friends. They visited Christopher’s gravesite, where the Bacardis read a letter that described the life they were living in the Bahamas with Christopher. On Sunday, as they said their good-byes, the emotion of it all became too much to bear.

“Eric and Jorge just collapsed in each other’s arms and cried and cried,” Mrs. Bacardi says. “Grace and I just held their hands, hoping we could get them through it. It was an amazing weekend. Jorge and I went there with the intention of thanking everyone and hoping we could do something positive for them. We left feeling we were the ones who did all of the receiving.”
As extraordinary as this relationship has become, it is only one part of the Bacardis’ efforts to repay the gift they received from Christopher. Shortly after Mr. Bacardi recovered from his surgery, he contacted Mayo Clinic about making a significant gift, one that would honor Christopher, all organ donors and his medical team at Mayo Clinic.

In this story of extraordinary people, I feel somewhat guilty to introduce the medical staff only now. They, too, are extraordinary. In fact, the transplant program at Mayo Clinic in Florida is one of the largest in the country, and its wait times and outcomes are excellent. Every day, this team does its best to make the most of the gifts that people like Christopher Gregory give.

This was especially true in Mr. Bacardi’s case. His surgery was tremendously complex and his outcome exceptional. The leader of the lung transplant program in Florida is Cesar Keller, M.D., a quiet man who speaks with economy, walks fast and rarely sleeps. “He never seemed to leave my side,” Mr. Bacardi says. “I remember waking up in my hospital bed at 3 in the morning, and Dr. Keller was there. I asked him, ‘When do you sleep?’ He told me, ‘I can sleep later. This is more important.’”

The Bacardis’ expression of philanthropic support ignited a long-smoldering ember at the Florida campus. For years, staff and patients there have discussed the need for an on-campus residence that would offer affordable, long-term housing to visiting transplant and radiation oncology patients. After the Bacardis made their philanthropic desires known, those discussions became much more than talk. At a meeting in July 2009, Mayo Clinic leaders from Rochester and Jacksonville met with the Bacardis to gauge the couple’s interest in supporting the building’s construction.

Mrs. Bacardi wept tears of joy when she heard the proposal. They made the naming gift for the building right away, and they knew immediately what they wanted to call it: the Gabriel House of Care.

It opens spring 2011. Each of its 30 rooms will be large and comfortable. The location is secluded, away from the campus hub, but convenient. The design will make it a “home away from home.” Best of all, especially given the events in this story, it will be a place of friendship and support, with a variety of features that encourage interactions between patients and their caregivers.

A celebratory groundbreaking for the building occurred in March. Mr. and Mrs. Gregory, their son Colin and members of their extended family attended, as well as Mr. and Mrs. Bacardi, who spoke during the ceremony.

I heard there weren’t many dry eyes during the ceremony. But I couldn’t say for sure. I had to walk away in the middle, to be alone with my tears. I’m not really sure why I cried. As I think about it now, I choke up again. I guess there are at least a couple of reasons. I cry tears of joy for the man who lived longer than he ever expected and discovered the sweet taste of a full breath of air. I cry tears of sorrow for the boy who died long before he ever should have and for his family, who shouldn’t have to struggle with such a weight.

But I guess I cry also in awe of the human spirit. That people can overcome tragedy. That they can have such nobility. That so much pain can give birth to something so good that will potentially benefit so many lives.

I wish I came to this revelation by myself, but I didn’t. Mr. Gregory helped me see it. “It’s not lost on us that what gives five people and their families endless joy gives us endless sorrow, but it’s not a zero-sum game,” he told me. “The Gabriel House of Care represents Christopher in the present and what he’s still doing. What Christopher was able to do for Jorge and what Jorge is able to do for others and what Mayo will do for still others and what they will be able to accomplish represents Christopher in the present and in the future and that gives us hope and strength.”
Jorge Bacardi and Eric Gregory during a trip that both families made after the groundbreaking ceremony for the Gabriel House of Care.
Transplantation at Mayo Clinic

Since doctors performed the first kidney transplant at Mayo Clinic in 1963, thousands of organ recipients have benefited from the collective innovative skills of Mayo’s transplant leaders. Transplant teams in Arizona, Florida and Minnesota apply novel techniques to improve care for transplant patients. These collaborations produce outcomes that set Mayo’s transplant programs in high standing with national norms and reinforce its worldwide reputation for quality and excellence. Today, Mayo Clinic is the largest transplant center in the country and a leader in transplant research.

1 donor can save 8 lives and enhance 50 others.
In September, Mayo Clinic opened the first clinical Hand Transplant Program in the United States. Mayo has extensive experience and national recognition in both transplantation and hand surgery, combined with one of the strongest rehabilitation programs in the country.

In 2009, Mayo Clinic conducted 1,290 transplants.

- **70** Heart
- **1** Heart-Lung
- **58** Lung
- **334** Liver
- **436** Kidney
- **34** Kidney-Pancreas
- **8** Pancreas
- **349** Bone marrow
Tailored health care

Take the right medications. Eat a healthy diet. Monitor your blood sugar level. Exercise. Quit smoking. Control your blood pressure. Limit alcohol consumption. Reduce stress. If you’re diagnosed with diabetes, all these instructions, and more, will be part of your daily to-do list. For many people with diabetes and other chronic medical conditions, accomplishing all that’s required to stay healthy can be daunting, even in the best of circumstances. But add real life stressors — meeting financial obligations, filing insurance authorizations, managing work and family demands, traveling to and from appointments, coping with medical problems — and it’s easy to understand how managing a chronic disease can quickly become overwhelming.

Mayo Clinic is helping patients overcome such obstacles by exploring more creative, patient-focused methods of providing health care. New technologies and treatments will always be key to advancing medicine at Mayo Clinic. Creating innovative ways of bringing those advances to patients is critical to ensuring patients receive the best possible care wherever they may be — geographically, medically, emotionally and socially — so their medical care fits their lives.

John has diabetes. His doctor tells him that each day he needs to swallow three pills, check his blood sugars six times and inject insulin. Plus he needs to cut salt from his diet, lose 20 pounds and walk at least 30 minutes a day. But he doesn’t take the pills regularly or follow most of the other directions. John is what’s called a nonadherent patient.

It’s not that John doesn’t understand his doctor’s directions, nor does he necessarily disagree with them. Rather, it’s that his doctor’s advice doesn’t fit his life.

Making medicine fit

Individualized medicine, in which prevention, screening and treatment is based on a person’s genetic makeup, offers enormous opportunities to tailor health care to each patient. Taking into consideration the way a person lives each day is also a big step in customizing care, making it more likely to be effective over the long term.
Aenean tellus metus, bibendum sed, posuere ac, mattis non, nunc.
“It’s true that a person’s genetic makeup is important. But even with care that’s customized to that, there are challenges that make it difficult for a patient to do everything we ask of them,” says Victor Montori, M.D., a Mayo Clinic endocrinologist and director of Mayo’s Health Care Delivery Research Program. “For some patients, health care means major disruption to their lives. To minimize disruptions, our program focuses on tailoring therapies to patients’ values, preferences, goals and circumstances in a way that’s complementary to the biological and genetic considerations.”

More than small talk: Conversations with the doctor

Dr. Montori’s research has shown that a good conversation is critical to health care that’s minimally disruptive. It’s the first step in a patient-doctor collaboration that results in decisions consistent with the patient’s values and with a greater likelihood of those decisions being carried out consistently.

“At Mayo Clinic the needs of the patient are our main interest. Realistically, though, a patient’s needs remain obscure to us unless the patient becomes engaged in shared decision-making with the health care team,” says Dr. Montori. “If a conversation between a doctor and a patient is too technical, or if it doesn’t fit the patient’s self-understanding, that person has no real chance of sharing in the decision-making. As a result, the doctor has no chance, except by happenstance, to tailor treatment to the patient’s needs, goals and preferences. We must start with a meaningful conversation. That’s why many patients value coming to Mayo: because there’s enough time for that meaningful conversation with their clinician.”

One example of how Mayo Clinic’s Health Care Delivery Research Program is working to encourage meaningful dialogue is the development of decision aids, a tool that physicians and patients can use to steer discussions. In conjunction with Mayo Clinic’s Center for Innovation, Dr. Montori and his team devised a diabetes decision aid to increase patient involvement in choosing diabetes medication.

The decision aid consists of cards that spell out the possible effects various drug choices have on seven factors: weight change, low blood sugar, blood sugar, daily routine, daily sugar testing, cost and side effects. A doctor and patient use the cards to talk through the medication options, uncovering the patient’s preferences and values about the impact of the medication on his or her life.

This process brings together several elements:

- Evidence-based guidelines
- Doctor’s knowledge of the medication chemistry, biology and side effects, and of the patient’s medical history
- Patient’s knowledge about his or her own body and how it responds to medicines
- Patient’s concerns about which side effects are less acceptable
- Patient’s opinion about which treatment-related life disruptions he or she is willing to deal with every day

Researchers wanted to give patients a way to choose a diabetes medication they would take consistently. “Patients often don’t know how — or don’t have the tools they need — to ask questions that impact their medical decisions in accordance with their values,” says Maggie Breslin, a Center for Innovation researcher/designer who worked on the project. “Our strategy was to develop a tool that would prompt patients to ask those questions when they’re with their doctors. Within the conversation generated by those questions, doctors can provide specific information that is relevant to the individual.”

Research conducted on use of the diabetes decision aid found that the aid was well-received by both patients and physicians. Patients who used the aid were more knowledgeable about their medication options than those who didn’t use it. A larger study will examine the long-term effects of the decision aid.
on patients’ adherence to their diabetes medication schedule. Other decision aids in development cover topics including heart attacks, depression, osteoporosis fractures, tests for chest pain, and a device to prevent sudden cardiac death.

A meeting of the minds: Gaining from others’ perspectives

Of course medications are just one aspect of chronic disease management. Details that might seem minor can have a major impact on a patient’s adherence to a plan. Details like making time to exercise or finding easy, healthy recipes may seem trivial, or not medical in nature, so patients are hesitant to broach the subject with their doctors.

To give patients a forum to share and discuss their concerns, as well as learn more about their disease, Mayo Clinic is conducting a pilot program of group diabetes appointments at its campus in Florida. Twelve to 15 patients, who have agreed to participate in group visits, meet for two-hour sessions. The groups are facilitated by a nurse practitioner with a special interest in diabetes care.

In addition to receiving diabetes health education and information from the nurse practitioner, each person is encouraged to talk about how he or she overcomes barriers in dealing with the disease. Participants also can pose questions to the facilitator and others in the group about issues they’re facing.

“Rarely does a person with diabetes get a chance to spend as much time with a health care provider as is offered in these group visits,” says Floyd Willis, M.D., chair of Mayo Clinic’s Department of Family Medicine in Florida. “Patients have ample time to discuss whatever is on their minds about managing their disease, and they learn from others who are dealing with similar challenges.”

Still in the pilot stage, the program is open to Mayo Clinic employees. But because feedback has been positive from both participants and providers, plans are in the works to expand group visits to other diabetes patients and to other conditions.

“We began with chronic disease management because that need seemed most pressing,” says Dr. Willis. “Now we’re also considering well-baby checks and pregnancy visits using the group model. These could be a good fit because patients would get much more information in that setting than is possible in a 15 to 20 minute visit with their doctor, and they’d have the added bonus of exchanging information among themselves.”

Convenient connections: Managing complexity

Although we’re familiar with the doctor’s office visit, in some situations, meeting patients where they’re at means not meeting face-to-face at all.

Based on research and the benchmarking that Mayo Clinic has conducted, it’s clear that patients want online access to their health information, and they want the ability to communicate electronically with their doctors and other members of the health care team. To meet those demands, Mayo is conducting trials of web portals, through which patients have secure, individual web sites that include personal health information, such as lists of allergies, medications and upcoming appointments. They can use the page to see results of lab tests, access Mayo Clinic resources for more information and send messages to their doctor or nurse.

“What does good healthcare look like? It’s genuine conversation between the patient and the doctor. It’s the most human thing you’ve ever seen.”

— Maggie Breslin, Mayo Clinic Center for Innovation
“We’ve started developing better solutions, and that we hope to continue,” says Russell Heigh, M.D., a Mayo Clinic gastroenterologist and chair of the External Connection Coordination Council. “If you can buy a container of milk at 2 a.m. from a convenience store, you should be able to get answers about your child’s earache at 2 a.m. without going to an emergency room. The technology and opportunities are rapidly evolving. We’re working on ways to embrace these opportunities now and in the near future.”

Mayo also is exploring the feasibility of e-visits. These online tools allow individuals to walk through a series of questions to assess symptoms or concerns. That information is then forwarded to the health care provider to determine whether a medical appointment is necessary, if a prescription is required or if self-care steps at home are all that’s needed.

“The tool could be particularly helpful for someone who has a specific problem that crops up repeatedly,” says Dr. Willis. “For example, some people get recurrent allergies or sinusitis at the same time every year. The individual has a history of it, and the doctor is familiar with it. With this technology, the patient may not need to take time to come in for an appointment. We could exchange the important information through the e-visit, provide a prescription and other treatment as needed, and it’s taken care of. On the flip side, these assessments could alert us to a patient who needs to be seen right away, and we can make sure that happens, too.”

Innovative health care delivery and the related projects and programs underway at Mayo Clinic converge on one key goal: to provide care in a way that successfully manages the medical condition while being manageable for the patient.

The Mayo Clinic Center for Innovation

It takes more than good ideas to create better ways to provide the kind of health care that fits a person’s life. It takes time for investigation, observation and conversations to learn about what people want and need.

The Mayo Clinic Center for Innovation is dedicated to transforming the way health care is experienced and delivered. When it comes to tackling a problem, the center’s staff uses a two-pronged approach. The first step is careful observational and field research. This may involve talking with patients, or sitting in on appointments and interviewing staff members to develop insight into the issues at play — whether they’re emotional, geographic, social, relational or something else.

“We think creatively about how to get information about the problem at hand,” says Maggie Breslin. “We have all the resources of Mayo Clinic available to us, and many patients are exceedingly generous with their time. We talk with Mayo staff, as well, to understand their perspectives. It’s a partnership between the patients, the caregivers and the center.”

After research is complete, the next step is to develop ideas that move toward a solution. This means testing those ideas in real-life situations with physicians, nurses, patients and anyone else who’s involved.

“When faced with health care delivery issues, there’s a tendency to send people into a room to find a solution,” says Breslin. “You can get resolution that way, but it’s often isolated from the complexities of real life. We try to circumvent that problem by working in the complexities of the real world. It takes longer, but we know the solutions work.”

This approach also offers the benefit of actively involving patients, physicians and other caregivers in testing the ideas, providing feedback and creating a solution. In the end, that collaborative process makes it more likely the new way of doing things will truly meet patients’ needs, and will stand the test of time.

“Evidence-based medicine has an undeniable role. But to apply it, we must artfully incorporate patients’ values, preferences and context of their lives,” says Dr. Montori. “Mayo Clinic is well-suited to accomplish that in an integrated and patient-centered way.”
Life-changing moments often connect benefactors to Mayo Clinic in significant ways. Such moments define what Mayo Clinic means to patients and their families.

The *Expressions* feature presents benefactors who share their Mayo experience and thoughts about how their gifts are making a difference.
On a snowy winter morning in the mid-1930s, 12-year-old CJ lay flat on his stomach on the living room floor. The fresh pine smell of the nearby Christmas tree hung in the air and breakfast conversation drifted in from the kitchen. But CJ didn’t notice. His attention was riveted to the scene at eye level in front of him — a sleek locomotive followed by chrome-plated railroad cars lined up on their steel tracks. The model train, a Yankee Flyer, was CJ’s Christmas wish come true. Decades have passed, but CJ (Cyril John) Lehnhardt’s passion for locomotives remained. Now retired, he has garnered a lifetime of experience around big machines, and he’s accumulated an impressive collection of model trains along the way.

CJ grew up in Dubuque, Iowa. At age 19, he entered the U.S. Army 10th Mountain Division ski troop and, during World War II, was sent to the Po Valley and Apennine Mountains of northern Italy, where he served, not on skis, but on snowshoes. After the war, he hung up the snowshoes and reestablished his roots in Dubuque. Then, because he enjoyed working with his hands, he began an apprenticeship in pattern making, followed by a career at John Deere, where he worked mainly in the seeding division creating parts for planters.

Pattern makers design prototypes of various mechanical parts to serve as patterns or foundry molds in the manufacturing industry. That was what CJ learned. Starting with a two-dimensional blueprint, he would create a three-dimensional object out of wood or metal. This “pattern” would be used to create a metal casting for a machine part for a tractor or some other farm equipment. “I spent 38 years as a pattern maker, 31 of them with John Deere. We made a lot of different designed objects. It was interesting work; I enjoyed it,” he says.

During his career with John Deere, CJ continued to expand his train collection and added model tractors and old switchman lanterns. They fill the basement of the home that he built for himself and his wife, Doris, outside Moline, Ill. Every year for about 25 years, CJ attended farm equipment collectors’ shows.

The switchman’s lantern
A pattern maker lights the way
in Indiana, where he often found items to add to his collections. “If it was green and mechanical,” he says enthusiastically, “I was interested in it!”

He even combined travel destinations with his love for trains. In Colorado, he photographed narrow-gauge rail trains in the mountains while his wife played bridge with friends. “I was always interested in steam locomotives. I spent a lot of time in Colorado chasing the trains,” he says.

Since that Christmas Day long ago when he received his first model train, the decades of CJ’s life tell the story of a loyalty to loved ones, to his home and to his career.

Mayo Clinic, he says, earned his loyalty because he has been “showered with care,” starting with his first visit to Mayo in the 1950s. CJ is a Major Benefactor to Mayo Clinic and a member of The Mayo Legacy (TML), an organization of patients, staff and benefactors who provide planned gifts (such as bequests and trusts) to support Mayo’s work. He attends the meetings each year because he is interested in learning what’s happening in research, especially in the field of heart research. Doris died in 1991 from heart valve problems. “I want my contributions to help people with heart problems like those my wife suffered,” he says, “and I appreciate knowing that my gifts are put to good use.”

“I want my contributions to help people with heart problems like those my wife suffered, and I appreciate knowing that my gifts are put to good use.” — Cyril John Lehnhardt
Home grown
A legacy of love

The setting suggests a Paul Cezanne still life painting. Light from the late afternoon sun angles across a long table in a low-ceilinged room that smells of harvest. On the table are ripe tomatoes, bathed in the waning sunlight, each waiting its turn for the canning jar.

In Tom and Danis Wilson’s large open kitchen, a few rows of already-filled canning jars stand cooling on the counter. “That’s my V-7 juice,” Danis explains. “There’s no watercress in it, so I call it V-7 instead of V-8.” Tom and Danis sit on tall stools at the kitchen counter and talked between sips of Danis’ homemade juice.

It was August in Brook, Ind., population about 1,000, where rows of corn end only where pavement begins. This is the center of American farm life. Wilson Fertilizer and Wilson Industrial Sales, located on South Wilson Street, are the center of Brook — and have been for 50 years.

Tom and his siblings grew up in Foresman, a farm town smaller than Brook, about five miles east. They grew up in hard times. Tom was 15 when he started hauling cattle to the Chicago market, and not much older than 20 when, laid up with a back injury, he decided to take a chance. He and his late brother, Richard, cobbled together about $100 and enough nerve to ask a banker for a small business loan. With the money, the brothers bought two old trucks and a trailer and hauled grain and steel — until they could afford to add a lime truck.

Spreading lime on farmers’ fields increased crop yields. It also planted a seed in Tom’s mind. “Being young and ambitious,” he says, “we started testing soil and watching what made things grow. It was the early 60s and nobody knew about fertilizer. Farmers used manure back then. So I said to my brother, ‘Let’s sell these semis and start a fertilizer plant.’” And they did; Tom says they got in on the ground floor. “Yes, we did,” he says, “and we thank God for those farmers because they put us in business.”

The fertilizer business eventually spawned an offspring, Wilson Industrial Sales, which handles and supplies industrial and agriculture chemicals. The Wilson companies were founded on visionary thinking and a strong belief in the satisfied employee as the backbone of the business. In fact, 25 years ago a young agriculture student started in the shop. When he showed leadership potential, the Wilsons sponsored his management degree at Purdue University, and he’s now a plant manager for the company. Tom values the people who work for the companies. “That’s true,” Danis says as she looks up and smiles.
“Once a year, Tom takes all the employees to a fun event in Chicago. They go for the day, stay the night, and have brunch the next morning.” There is pride in her voice as she speaks.

While hard work is nothing new to agricultural families like the Wilsons, “hard” travel has been an eye-opener. Their travel adventures have taken them from the Serengeti Plains to the Great Wall of China and points north — to Alaska. “Alaska is beautiful, Tom says. “It was one wide-angle shot after another. We took off for two weeks and drove every road in the state.”

“I think we drove a few that weren’t there, too,” Danis adds. Tom is the adventurer, she explains, “but I’m the brakes in this family!” Tom laughs. “She was always worried about getting lost,” he says. Adventurers need pragmatists.

“Africa was my favorite,” Danis says. “The culture, the people, it’s awe-inspiring. We saw people with poor living conditions and many have little food. Yet the children want to attend school and they’ll walk miles to do it.” Although their African safari trip limited personal luggage to a carry-on and 25-pound duffel bag each, Danis managed an extra suitcase packed with books, pencils and crayons for the schoolchildren.

The Wilsons have strong relationships with family and their faith. With seven children, 23 grandchildren and four great-grandchildren, weekends are often packed with sporting events and family get-togethers. Yet, regardless of busy schedules, each year the entire group gathers at the Wilson cabin nestled in the pines of northern Wisconsin. Their relationship to Mayo Clinic has been strong as well. Tom and Danis are lifetime annual givers to Mayo and recently became Major Benefactors. When asked what motivates their generous support of Mayo Clinic, Tom replies, “we feel it’s the best health care there is in the world.” Danis agrees. “At Mayo, we feel like family.”

“We feel it’s the best health care there is in the world. We feel like family.” — Tom Wilson

Mayo Clinic honors the memory and celebrates the life of Danis Wilson who died suddenly and unexpectedly on Nov. 27, 2009, in Lafayette, Ind. She was 64.
nestled amid a rolling sea of green fields in Florida’s horse country sits the beautiful home that Al and Judy Dunlap share with their gentle German Shepherds, Brit and Cadet, and their calico cat, Tabby. More than 40 years after the couple first laid eyes on each other, at a bank in Eau Claire, Wis., Al and Judy still share a mutual affection and energy that enlivens each other and anyone within earshot.

Judy’s hometown is Eau Claire, but no one knew that the city was destined to play a prominent role in their connection to Mayo Clinic.

They enjoy sharing stories about their experiences involving Mayo Clinic. The Dunlops have been patients at the Florida campus since 2008. Judy gets the credit for steering both toward Mayo and both are glad she did. It was during this initial visit that they met Fred Kusumoto, M.D., a cardiologist who was to address a heart problem, atrial fibrillation, that had affected Al for many years. They immediately established a rapport with Dr. Kusumoto and their confidence in him led to Al’s decision to have surgery to correct the problem.

“Dr. Kusumoto told me about the heart surgery, and gave me what I call the ‘paratrooper’s talk,’ where they tell you all the things that can go wrong during your jump,” says Al, a graduate of the United States Military Academy at West Point and a former high school football star who still exercises regularly. “Naturally, I was a little nervous.”

But the surgery was a success, and Al hit the ground running. As a result, the Dunlaps started looking for ways to support Mayo philanthropically.

They had extensive conversations. “Our previous giving has had more to do with Al’s past, so I told him I wanted to create a philanthropic legacy in my hometown, in Eau Claire,” Judy says.

Her husband agreed, and the accord led them back to that opportune place at precisely the right time. Judy’s mother, Virginia “Ginny” Stringer, who passed away earlier this year, also had lived in Eau Claire.

And coincidentally or not, Luther Midelfort Hospital, a Mayo Health System facility based in Eau Claire, had recently launched a $112 million capital campaign.

The Dunlaps, who are Mayo Clinic Principal Benefactors, decided to make a gift to support the construction of a cancer center that will open later this
year and provide a central place for oncologists and radiation oncologists to work together to better treat patients. A garden around the center will provide a serene, healing environment. To honor Judy’s parents, it will be named the Joseph and Virginia Stringer Garden. And, it will be nicknamed “Ginny’s Garden,” to enhance the tribute to Judy’s mother, who loved gardening.

The garden is also an affectionate statement from Al about his wife and mother-in-law.

“I have great empathy for cancer patients, but this gift was also for Judy and for Ginny,” Al says. “I liked Ginny and I respected her a great deal. She was a cashier. She worked hard all of her life. I wrote a poem for her memorial about how she watched over us in life, and I’m sure she’s doing it now.”

The gift to Luther Midelfort substantiates a conversation that Al and Judy had regarding their philanthropy and Judy’s interest in making gifts during their lifetimes — as well as through their estate — so they could enjoy their giving first-hand. The Dunlaps have made leadership gifts to numerous institutions, including West Point and Florida State University, where they have supported the construction of athletic fields and a one-of-a-kind student success center that provides career mentoring and programs in leadership and community involvement.

“Our previous giving has had more to do with Al’s past, so I told him I wanted to create a philanthropic legacy in my hometown, in Eau Claire.” — Judy Dunlap

The student center has provided the experiences they hoped for. The Dunlaps visit frequently and enjoy lunches with students who benefit from its services.

“To me, if you don’t care enough to see what’s going on, you shouldn’t make the gift,” Al says.

His tone emphasizes his sincerity, and Judy nods in agreement.
The world for their home
Mayo Clinic for their health care

When asked what inspired this couple to make a Principal level gift to Mayo Clinic, Charles Allmon says with a laugh, “Why? Because I’m still here at age 88!”

Those few simple words convey the essence of why he and his wife, Gwen, have trusted their health to Mayo Clinic for over six decades. Chuck and Gwen are healthy, happy and exude an energy that’s defined their lives together for more than 55 years. His response seems natural for a man who spent much of his early career as a photographer and editor for National Geographic. During that time, he hopped from one continent to the next with the ease of catching the local bus. Chuck’s work took him to the most exotic and breathtaking natural wonders in the world.

Then in 1951, while on assignment in Barbados, Chuck caught a glimpse of a vision he couldn’t quite capture on film. The only way to immortalize the moment was to marry her. Chuck and Gwen began a courtship that lasted three years. During that time, Gwen won a scholarship to McGill University in Montreal and married Chuck on graduation day in 1954.

As members of the British Colonial Service, Gwen’s family had been stationed in Barbados. On those beaches throughout her childhood and adolescence, she indulged her daily ritual of squeezing the sand between her toes — a sensation she still enjoys each year at the couple’s winter home in Maui.

During the National Geographic years, the Allmons made Washington, D.C., their home base. At the same time, Chuck took a keen interest in writing and producing an investment newsletter, Growth Stock Outlook, which he distributed to the international network of colleagues and friends he’d made over the years.

It was 1965, and the newsletter he produced at home soon attracted over 10,000 subscribers. By 1968, his income from the newsletter and trading stocks was netting 14 times his salary at National Geographic. Chuck decided to retire from the magazine. “Plus,” Gwen says, “it was a matter of necessity. By that time we had two young girls, both in private school.”

Chuck’s relationship with Mayo dates back more than 60 years, when he’d turned to Mayo for help with a problem that had troubled him since childhood. When he was six, the bone inside his ear, as fragile as an eggshell, developed an abscess that interfered with his hearing. He was treated then, but the physician warned that a condition such as Chuck’s could be fatal. The problem persisted until, in 1946, he came to Mayo Clinic. For more than three months, Chuck called Rochester’s old Zumbro Hotel his home. At the end of the stay, Chuck returned home, his ear completely healed, and his gratitude to Mayo never-ending.
As the years passed, Gwen, too, turned to Mayo for answers and once, during a medical emergency, flew to Mayo for care. Gwen describes her care at Mayo as being altogether different from anywhere else. “The doctors and staff took the extra time and effort to discuss and illuminate details about my condition and what procedures and treatments they recommended for a healthy recovery,” she says. “Nothing is routine at Mayo. The quality of the people and their genuine concern gave me such comfort.”


The Allmons know that trust and expertise have formed the foundation for much of their financial success. As philanthropists, they reference these same cornerstones to determine the organizations they support. They are Principal Benefactors at Mayo Clinic and credit their good health and good fortune to the excellent care Mayo continues to provide to them, both daughters, and, now, a young grandson.

“We credit the combined expertise of Mayo physicians and staff for keeping us well. We support Mayo Clinic because we have always been treated so well by staff, and we want to make that opportunity available for others with less means.” — Charles Allmon

The couple travels between their homes in Washington, D.C., Vermont, Montana and Maui. These days, Chuck focuses his photography mostly on his five grandchildren. The most recent photo shows them lined up along a beach, each with an arm around a colorful surfboard, and every single one of them smiling and squishing sand between their toes.
Imagine the testing ground — a staging area where medical students, residents, physicians, nurses and health care professionals come to hone their clinical skills and bolster their specialized communications abilities. The setting is a medical location such as a doctor’s office, an emergency room, or a surgical suite. It looks as you’d expect, with sophisticated consoles and monitors, X-ray images in light boxes on the wall, surgical lights and IV poles. As your eyes pan the scene, you see a patient lying on a stretcher receiving intravenous fluids. But he’s not a patient exactly — he’s a high-fidelity medical mannequin who responds as if human. He breathes, moans, bleeds and he’ll even answer questions.

Welcome to the Mayo Clinic Multidisciplinary Simulation Center (Sim Center).

Today it’s almost a commonplace that interactive technology has helped to advance experiential approaches to medical education. Interactive technology is woven into every level of health care, including medical education and training. Yet, these interacting mannequins, however sophisticated, are still mannequins. The fact is that face-to-face human communication, with all its nuances, its variability and eccentricity, remains central to the art of medicine. It’s a learned skill. And no place teaches it more effectively than Mayo Clinic’s Simulation Center. Enter — the standardized patient (SP).

The Cast
Standardized patients, once called “simulated patients,” are actors who come from all walks of life. Under the scrutinizing eye of their mentor, Kathy Keech, a pool of 60 on-call actors are specially trained to interact with learners in the Sim Center. Although Keech’s formal title is Standardized Patient Coordinator, she sees herself as the casting director for the varied scenes that will ultimately play out in this unique educational facility.

Three members of Keech’s dedicated and talented troupe provide an insider’s view of this brand of theater and its importance to health care delivery. Nicklas Mezaca, Bari Amadio, and Steve Skogan, all actors who are standardized patients, in total bring more than 25 years’ experience to the program. As for the program, what began as simulated interviews and patient-practitioner role plays for first-year medical students has grown into a diverse range of complex scenarios that teach a growing spectrum of medical professionals.
The plot
Father Nicklas Mezacapa is a priest. He’s also a public speaker, former football coach and an actor. In his earliest memories of his standardized patient work, he participated in simple first-patient interviews representing a student’s first experience interacting with a patient. For medical students, these interviews mark the first steps on their long path to professional mastery. As a student’s skills develop, the interactions through simulated scenes become more complex and more demanding for actor and student alike.

Designed to help learners hear and assess what patients say, and what they don’t say, scenes unfold with the interpersonal nuances and complexity that future medical practice promises to deliver. “The richness here is that in this setting, the students are allowed to make mistakes and learn from them,” Mezacapa says. “You have to be able to take coaching in life. When medical students are willing to be coached, they come out ahead of the game, as do their patients.” That’s why standardized patients are invaluable. They challenge medical professionals to effectively respond in the moment, and in true-to-life situations. Through careful coaching and debriefing, students can witness first-hand the impact of their

Kathy Keech is an accomplished actor and director of theater. Her many roles include portrayal of Professor Vivian Bearing, Ph.D., in the Rochester Repertory Theatre’s production of Margaret Edson’s Pulitzer Prize-winning drama, “WIT” Keech brings the character of Professor Vivian Bearing (above) to Sim Center students.

Professor Bearing finds her well-ordered life overturned by a diagnosis of advanced ovarian cancer. The play represents the reality a patient faces when life spins out of control and trust must necessarily be placed in the hands of a team of strangers. These circumstances simulate daily life in clinical settings like Mayo Clinic. Interpersonal opportunities like this often provide defining moments in the training of Mayo medical students and staff.
words and actions, and they learn to recognize how their own emotions affect the outcome.

Another regular on Keech’s call list, Bari Amadio, an arts administrator and former nurse, generally prefers backstage to the spotlight. At the Sim Center, however, she enjoys representing the medical world she knows. She knows what she does here is important. “The Sim Center provides medical professionals with a great learning experience in a safe environment,” says Amadio.

Amadio excels at creating personas that challenge medical students and professionals to think on their feet. Circumstances may be simple or complex. Today, for instance, she’s a quiet housewife whose physical complaints mask post-traumatic stress syndrome dating back to the Kent State shootings of 1970. Tomorrow she’s a biker chick, and next week she will be a terminally ill cancer patient. In the theater of the Sim Center, any mistake — a wrong word spoken, a tone of voice or inattention while delivering unexpected news becomes a teaching moment. Amadio’s special ability to cry on cue lends further realism for the unsuspecting student.

Sometimes the plot requires a “heavy,” and Steve Skogan admits that he often wins the part of the bad guy. Despite some initial apprehension about appearing on stage, Skogan feels comfortable in his Sim Center roles. For example, a scenario, may involve an angry and abrasive husband who wreaks chaos in the Emergency Room. “It’s fun because it isn’t me,” he says, “plus I don’t have to remember lines.” And although it’s unsettling for the students who are trying to treat a patient, it’s also a realistic situation they are likely to encounter at some point during their careers.

The actors admit to loving what they do. They recognize its importance and know when they’ve connected with the student. And, too, it’s not all nose to the grindstone; there’s also a good deal of laughter.

At Mayo Clinic, the needs of the patient always come first. In medical practice and education, the power of technology is amazing, but meaningless in the absence of one-on-one interactions with real human beings.

Movie buffs follow the Oscars. In the field of medicine, the preparation, testing and excitement all lead up to the “OSCEs.” Objective Structured Clinical Examinations (OSCE) are performance-based tests that assess a medical student’s judgment and ability in specific areas of medicine. At the end of medical training, students face an OSCE challenge to test their readiness to practice medicine. Standardized patients are not in the running for these honors, but their work at the Sim Center is instrumental in the success of students as they prepare for this level of their professional training. The standardized patients at the Sim Center pride themselves on being the ones to walk students up the red carpet to receive the prize. Then it all begins again.
Marilyn Carlson Nelson has been elected chair of the Mayo Clinic Board of Trustees. Ms. Carlson Nelson is chair and former CEO of Carlson, an international corporation in the hotel, restaurant and travel industries, and one of the largest privately held companies in the world. She has been named one of “America’s Best Leaders” by U.S. News & World Report, and Forbes magazine has regularly selected her as one of “The World’s 100 Most Powerful Women.” In 2007, Ethisphere Magazine named her one of the “100 Most Influential People in Business Ethics.”

James Barksdale completed his four-year term as board chair at the trustees meeting in February 2010 and continues as a public trustee. Mr. Barksdale, who joined the board in 2001, heads Barksdale Management Corporation. “We are grateful for the visionary leadership provided by Jim Barksdale and look forward to working with Marilyn Carlson Nelson in the years ahead,” says John Noseworthy, M.D., Mayo Clinic president and CEO.

The Mayo Clinic Board of Trustees, a 29-member group of public representatives and Mayo physicians and administrators, oversees Mayo Clinic’s patient care, medical education and research activities.

Robert E. Nesse, M.D., has been named CEO of Mayo Health System, succeeding Peter Carryer, M.D., who retired in June 2010. Dr. Nesse, a family medicine physician, joined Mayo Clinic in 1980 and, since 2004, has been president and CEO of Franciscan Skemp Healthcare — Mayo Health System in La Crosse, Wis. He has been active in Mayo Clinic’s health policy efforts and has been a member of the Mayo Clinic Board of Governors since 2005.

As CEO, Dr. Nesse will provide leadership and direction to Mayo Health System, a network of clinics and hospitals dedicated to serving the health care needs of people in 70 communities throughout Iowa, Minnesota and Wisconsin. Mayo Health System encompasses more than 800 providers, 13,000 allied health staff and 17 hospitals. Dr. Nesse will team with Mayo Clinic and Mayo Health System leaders, physicians and allied health staff to develop operational plans targeted at developing a single practice that meets the needs of regional patients and further integrates the activities of Mayo Clinic and Mayo Health System.
Named professorships

Named professorships represent the highest academic distinction at Mayo Clinic. These professorships recognize outstanding physicians and scientists for their contributions to research and teaching. A professorship bears the name of the benefactor or honors an individual important to the benefactor.

Gift funds are held in endowment, and all income supports medical education and research. Faculty members are appointed to named professorships through nomination and endorsement by their peers and then confirmed by Mayo Clinic senior leadership. The following professorships were named in the past year:

The **Lloyd A. and Barbara A. Amundson Professorship in Orthopedics**, was established by Lloyd and Barbara Amundson of Sioux Falls, S.D., Henning, Minn., and Kihei, Hawaii. Mr. Amundson entered the banking business in the early 1960s and is the owner of two Midwest bank holding companies and several First Security Bank locations in Minnesota, North Dakota, Iowa and Montana.

The Amundsons’ relationship with Mayo Clinic dates back to the 1950s when both of their children were delivered by Mayo physicians. For many years, all of their medical needs were handled at Mayo Clinic. They established this professorship to show appreciation for their care and improved quality of life, and to ensure continued research and innovation in orthopedics.

**Peter C. Amadio, M.D.,** recipient of the award, is a consultant in the Division of Hand Surgery in the Department of Orthopedic Surgery, with joint appointments in the Division of Health Care Policy and Research and the Department of Physiology and Biomedical Engineering. His clinical interests include congenital hand diseases, upper extremity tumors and distal upper extremity tendon injuries. He serves as chair for the Division of Orthopedic Research in the Department of Orthopedic Surgery. Dr. Amadio is professor of orthopedic surgery and professor of biomedical engineering in the College of Medicine, Mayo Clinic.

The **Getz Family Professorship in Cancer** was established by Sandy and Bert Getz of Scottsdale, Ariz., and Libertyville, Ill.

As the CEO and director of Globe Corporation, Mr. Getz has placed his own distinctive stamp on his family enterprise, which dates back to the early 1900s. Mr. and Mrs. Getz are actively involved with Mayo Clinic and wish to ensure that medical education, research and patient care flourish. Mr. Getz has provided leadership services as former chair of Mayo Clinic Board of Trustees and as the founding chair of Mayo Clinic Leadership Council in Arizona. As Principal Benefactors, the Getzes’ generosity includes a leadership gift for the underground concourse at Mayo Clinic in Arizona — an innovative and comfortable area where patients can rest and relax — and two professorships.

**Rafael Fonseca, M.D.,** recipient of the award, is a consultant in the Division of Hematology/Oncology, deputy director of Mayo Clinic Cancer Center and site director for the Hematologic Malignancies Program at Mayo Clinic in Arizona. Dr. Fonseca is a professor of medicine in the College of Medicine. He is a mentor to research trainees, postdoctoral fellows, medical students, special project associates and postgraduate students. Dr. Fonseca’s practice has focused on diagnosing and treating plasma cell disorders and leading Mayo’s multiple myeloma team in developing a better understanding of the disease and its impact on patients.

The **Erivan K. Haub Family Professorship in Cancer Research Honoring Richard F. Emslander, M.D.,** has been established by Erivan K. and Helga Haub of Germany. Mr. Haub is owner and chairman of Tengelmann Group, an advisory entrepreneurial group established in 1867 by his great-grandparents as a coffee and tea importing company that has since expanded to a grocery chain.

Previous gifts to Mayo Clinic from the Haubs have supported Mayo Clinic Stiftung, a charitable foundation in Germany that Mr. Haub was instrumental in establishing and where he currently serves as director. The foundation enables German physicians to receive educational experiences at Mayo Clinic and supports the exchange of scientific and medical information between Mayo Clinic and Germany.

This professorship honors Richard F. Emslander, M.D., a consultant in Mayo Clinic’s Division of Endocrinology, Diabetes, Metabolism, and Nutrition, Department of Internal Medicine. This permanent endowment recognizes his clinical expertise and 50-year career at Mayo Clinic.
Edward B. Leof, Ph.D., is the recipient of the professorship. He is a consultant in the Division of Pulmonary and Critical Care Medicine, Department of Internal Medicine, with a joint appointment in the Department of Biochemistry and Molecular Biology. He also served as the associate director of Basic Sciences in the Mayo Clinic Cancer Center from 1998 to 2010. Dr. Leof is a professor of biochemistry and molecular biology and professor of medicine in the College of Medicine.

The Robert E. Jacoby Professorship for Alzheimer’s Research was established by Robert E. and Monica F. Jacoby of Ponte Vedra Beach, Fla.

Mr. Jacoby is the retired chairman and CEO of Ted Bates Worldwide, which at one time was the third-largest advertising firm in the world. He built the company to over 142 offices in 40 countries.

Dennis W. Dickson, M.D., recipient of the award, is a consultant in the Department of Neuroscience at Mayo Clinic, with a joint appointment in the Department of Laboratory Medicine and Pathology. He is a professor of laboratory medicine and pathology in the College of Medicine. As director of the Mayo Clinic Brain Bank for neurodegenerative diseases, Dr. Dickson focuses his research primarily on the molecular neuropathologic characterization of dementia and movement disorders, including Alzheimer’s disease, Lewy body dementia and parkinsonian disorders.

The Vasek and Anna Maria Polak Professorship in Cancer Research, designated for Mayo Clinic in Arizona, was established through the generosity of The Vasek and Anna Maria Polak Charitable Foundation of Torrance, Calif.

Mr. Polak was a native of Prague. He fled Prague in 1948 and later came to the West Coast, where he owned the first Porsche-only dealership in the United States, located in Manhattan Beach, Calif. Mrs. Polak died of cancer in 1993, and Mr. Polak passed away in 1997. Mr. Polak’s assets established The Vasek and Anna Maria Polak Charitable Foundation.

Keith Stewart, M.B., Ch.B., recipient of the professorship, is a consultant in the Division of Hematology and Oncology, Department of Internal Medicine. Dr. Stewart is a professor of medicine in the College of Medicine. Dr. Stewart’s research focuses on the biology and treatment of multiple myeloma. His achievements include establishing a large clinical practice with interest in autologous stem cell transplant and novel therapies for myeloma, obtaining national funding and industry support for clinical trials in these arenas, and actively leading a nationally funded laboratory research program in genomics and target identification in myeloma.

The Regis Professorship in Breast Cancer Research was established by the Regis Foundation for Breast Cancer Research of Minneapolis. The Regis Corporation initiated efforts to increase awareness of breast cancer research, education and prevention in 1990. Subsequently, the Regis Foundation for Breast Cancer Research was founded by Anita Kunin, wife of Regis founder Myron Kunin. She is a breast cancer survivor. The Regis Foundation provides support for early diagnosis, prevention and treatment of breast cancer, in addition to research that hopefully will lead to a cure.

Charles L. Loprinzi, M.D., recipient of the award, is a Mayo Clinic oncology consultant and professor of oncology in the College of Medicine. He has served as chair of the Division of Medical Oncology and vice chair of the Department of Oncology. A nationally renowned breast cancer expert, he is director of the North Central Cancer Treatment Group (NCCTG) Cancer Control Program and co-director of the Mayo Clinic Cancer Center Cancer Prevention and Control Program. For over a decade, Dr. Loprinzi has served as a principal investigator of a NCCTG Community Clinical Oncology Program research base grant. Primarily through this venue, he runs an active cancer control program directed toward both cancer prevention and symptom control efforts.
The Roland Seidler, Jr., Professorship in the Art of Medicine in Honor of Michael D. Brennan, M.D., was established by the Blue Donkey Foundation of California. Blue Donkey is a private charitable foundation whose mission is to make significant financial gifts to causes that are sustainable, have a proven impact and are led in a hands-on manner by talented, disciplined professionals.

The medical care given by Dr. Brennan to three generations of Seidler family members inspired Blue Donkey to establish a professorship that will recognize Dr. Brennan, honor their father, Roland Seidler, Jr., and further educate medical professionals in the art of medicine. Dr. Brennan is a consultant in Mayo Clinic’s Division of Endocrinology, Diabetes, Metabolism, and Nutrition, Department of Internal Medicine.

Morie A. Gertz, M.D., recipient of the professorship, is a consultant in the Division of Hematology and chair of the Department of Medicine at Mayo Clinic. Dr. Gertz has received numerous honors and awards, including the Excellence in Leadership Award and Distinguished Clinician Award, and the International Waldenstrom’s Macroglobulinemia Foundation Physician Service Award for Patient Education. He has been active in curriculum development, teaching and mentoring activities. In addition, he has given numerous invited and visiting professor presentations throughout the world and has co-authored many articles, books, book chapters, editorials, abstracts and letters. Dr. Gertz is a professor of medicine in the College of Medicine.

The Tyson Family Endocrinology Clinical Professorship in Honor of Vahab Fatourechi, M.D., was established by the Tyson family to honor their physician for his compassionate and skilled care. The Tyson family has had a relationship with Mayo Clinic for more than 60 years. Tyson Foods, Inc., is a premier protein provider in the United States, supplying 1 out of 4 pounds of beef, pork and chicken, with operations throughout the world. Dr. Fatourechi is a consultant in the Division of Endocrinology, Diabetes, Metabolism, and Nutrition, Department of Internal Medicine and a professor of medicine in the College of Medicine.

William F. Young, Jr., M.D., recipient of the named professorship, is a consultant in the Division of Endocrinology, Diabetes, Metabolism, and Nutrition, where he serves as vice chair. Dr. Young is a professor of medicine in the College of Medicine.

Dr. Young has received numerous honors and awards, including the Distinction in Clinical Endocrinology Award from the American College of Endocrinology, Distinguished Clinician Award at Mayo Clinic, Outstanding Faculty Member at Mayo School of Continuous Professional Development, and Outstanding Speaker Award from the American Association for Clinical Chemistry. He has published over 210 articles and has presented at over 250 national and international meetings.

Dr. Young has been an invited visiting professor for more than 80 medical institutions.
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