MAYO CLINIC

answers

MAYO CLINIC 2006 ANNUAL REPORT

an appointment at Mayo Clinic? Could I participate in a Mayo Clinic research study? Are there any benefits and/or risks to being in a researc
study? What should I consider before participating in a research study? Will results of the clinic trial be provided to me? Is Mayo Clinic current
developing or assessing new novel therapies for cancer? When will the new research be able to help me? Are my expectations for a quick
recovery too high? How do doctors at Mayo Clinic keep up-to-date on the latest medical research? What is my diagnosis? Can melanoma for
in internal organs, such as the intestines? Do tattoos have any adverse effects, such as risk of infection? Can we explore some new therapie
for my lung cancer? Is this the best treatment available for Alzheimer's? Are interns, residents, and doctors all familiar with my case? What a
I going to do with my insulin pump? What is "Individualized Medicine"? If Mayo knows my genetic makeup, will it help identify my risk for variou
diseases? How many grants from the National Institutes of Health does Mayo Clinic seek every year? Is there a way to narrow the gap betwee
new knowledge and its application to medical care? How can I help Mayo Clinic make biomedical discoveries now and transform medic
education today? When will advances in biomedical technology result in safer, more affordable patient care? What influences your commitme
to your work and to Mayo? Will my daughter get ovarian cancer too? What is the biggest difference between the hospital under construction
Mayo's campus in Jacksonville and St. Luke's Hospital? How many Federal and Foundation grants does Mayo submit each year? Are you pa
of research at Mayo Clinic? Did the series of tests my health care team conducted include an EKT, and cardiac ultrasound? Does leadersh
at Mayo Clinic think that developing talent will be one of the most important priorities in research throughout the next 10 years? Can researc
at Mayo identify biomarkers for the diagnosis of Parkinson's disease? Why is this happening to me? What should my father expect after h
thyroidectomy? Does my 6 year-old need a flu shot? Will proper screening and early detection significantly prevent colon cancer? Why a
women more affected by lower back pain than men? Does Mayo offer the new imaging technology, Magnetic Resonance Elastography, that
designed to assess tissue stiffness? Is there an effective treatment for thyroid cancers? Does Mayo Clinic collaborate with academic institution
and biotech companies to transform the medicine of tomorrow? What else am I at risk for? What will be my quality of life while receivi
treatment for cancer? How will this new treatment benefit the patient? How does stem cell therapy work? Have you had experience treati
acute myeloid leukemia before? Why do certain patients develop atrial fibrillation while others do not, despite comparable environment
stress exposures? What's wrong with me? What innovative therapies are Mayo Clinic oncologists using to treat rare cancers? Who can I turn
for definitive answer? Can the right medications alleviate symptoms of moderate valve disease? Why is this noninvasive test needed? Whe
the aortic arch is involved in an aneurysm, is stopping blood flow required? What makes Mayo a good investment for my gift? Will Mayo he
find a cure for Parkinson's disease? How do I include Mayo Clinic in my will? Will my gift really make a difference? Are most cancers familia
or linked to environmental causes, or a consequence of aging? When will I get well? Can you explain my condition in detail? Are there any ne
glucose lowering treatments? How can elders keep their memory sharp? What's the risk of a blocked artery? Will the doctor show me th
tomography scan used to make the diagnosis? Is radiosurgery an effective treatment for the nerve disorder, trigeminal neuralgia? Are vaccine
appropriate for children and pregnant women? Will advances in targeting technology make radiosurgery an option for more people? Do calciu
supplements interfere with my wife's chemotherapy treatments? Can chelation therapy help treat autism? Do my children need multivitamins
Have researchers at Mayo discovered the mechanisms in the brain that cause migraines? Can children get osteoporosis too? Are brea
calcifications cancerous? Does Mayo Clinic have the answers for my son's kidney cancer? Is Mayo Clinic currently developing alternati
therapies for glaucoma? How does Mayo Clinic measure its quality of care? How do benefactor gifts support patient care or biomedic
research at Mayo Clinic? What are the warning signs of a possible mutation-linked heart abnormality? How long does it take to bring researc
projects to the clinical trial stage for patients? Do Mayo Medical School students have an opportunity for hands-on patient-care experience? Ho
many research laboratories does Mayo Clinic Arizona have? As a medical student, will my work help provide answers to national healt
problems like cancer? Are faculty of the Mayo Clinic College of Medicine leaders in their fields? Does the Mayo Graduate School Ph.D. Progra
place a heavy emphasis on research training or coursework? How low is the student-to-faculty ratio at Mayo Graduate School? Is the Mayo Or
helicopter certified by the Commission on Accreditation of Medical Transport Services? What experience would a typical day as a Mayo Medic
School student be like? Can we find a better way to share information? How do Mayo Graduate School students utilize the Mayo campuses
Scottsdale and Jacksonville? What is the Mayo Model of Care? How far is Rochester from Minneapolis? What is the minimally invasiv
procedure called balloon sinuplasty? Are Mayo researchers looking to devise a molecular solution to bring new treatments for cardiomyopath
patients? Have Mayo researchers made significant contributions to understanding the genetics of blood pressure? Does a diabetic patie
benefit from using "decision cards" in the doctor's office? What if we could prompt and guide damaged heart cells to rebuild through se
renewal? Is Mayo defining the next step in the translation of stem cells into new therapies for patients? Are doctor's sharing resources and be
practices across all Mayo sites? Can informatics be applied to track patients' experience based on disease? How is Mayo Clinic finding ne
ways to meet patient needs and improve the way patient care is delivered? Can three-dimensional, computerized based mapping systems a

PATIENT CARE We deliver answers that comfort our patients and ease their concerns. MEDICAL RESEARCH We pursue answers that enable us to predict, prevent and treat diseases. MEDICAL EDUCATION We share answers that advance patient care worldwide.

OUR MISSION

Mayo Clinic will provide the best care to every patient every day through integrated clinical practice, education and research.

PEOPLE HAVE ALWAYS COME TO MAYO CLINIC FOR ANSWERS.
Their questions are variations on one basic request: "Can you help me?"

Can you help me stay healthy?
Can you help me face this diagnosis and treat my disease?
Can you help me overcome this injury?

Mayo's answer to those questions has been the same for more than 100 years: "We will do our very best." Mayo Clinic's mission is to provide the best care to every patient every day through integrated clinical practice, education and research.

Mayo Clinic uses a team approach to answering questions. Our doctors, nurses and allied health staff answer patients' questions on-site and online. Our educators ask and answer questions in our classrooms, conferences and publications. Our researchers seek answers to biomedical questions and then translate those answers into new treatments for patients.

At its core, Mayo Clinic is a learning organization — learning from each interaction, generating new knowledge, disseminating that knowledge and continuing the cycle. We are continuously learning so that we can help patients understand their conditions, overcome obstacles, and improve their health and their lives.

Helping patients is the reason Mayo Clinic exists. We are honored by the trust placed in us and committed to providing answers and hope.

Sincerely,

Denis A. Cortese

Denis A. Cortese, M.D.
President and Chief Executive Officer
Mayo Clinic


ays, two bad days, one good day, two bad d


s ... Will this ever end? I want to feel good.
Why do I feel so tired and weak all the time? Is it age related?
Why doesn't the prescription work?
I seem to be getting worse.
Will there be a heart for me?
How did this happen to me?
Stress, a virus or did I inherit it?
Will I ever be able to work again?

"I was the lucky one.
I'm still here."

Priscilla French

WHAT IF MY HEART CAN'T BE FIXED?
PHOENIX, ARIZONA

Priscilla French surprised herself in late August 2005 when she ran out of breath in midsentence. Energetic and active at age 59, she lived in the Phoenix area and worked in tourism sales, so gasping for air between words soon led her to consult a physician.

Her physician prescribed a diuretic to treat a trace of fluid on her lungs, saying her breathing should clear up soon. "I thought I had something that would go away in two days," French recalls. Instead, she encountered more surprises: nearly drowning during a quick swim that instantly made her breathless and weak; fading strength and energy; and feeling too exhausted to drive after a routine procedure to drain her lungs.

French's clinic arranged for her to see a heart specialist in October. She never made it to the appointment. "It got worse and worse. I couldn't go in to work. I just couldn't breathe," she says.

On Sept. 27, 2005, French's deteriorating condition became critical. She remembers struggling for air, a friend driving her to a local hospital emergency room, and then events blurred. A cardiologist at the hospital determined she had heart failure, attached her to an emergency heart pump, and had her transferred by ambulance to Mayo Clinic Hospital in Phoenix.

French arrived at Mayo in grave condition. "Without medical treatment, she would have died within six hours," says Francisco Arabia, M.D., surgical director of the Heart Transplant Program at Mayo Clinic in Arizona. "Her heart was not pumping much blood. Blood clots were forming inside the heart because of the low blood flow. We knew she needed a heart transplant."

Priscilla French walks a short distance down an area nature trail with her faithful companion, Honey Bunny, right behind.

French was too weak for major surgery, so Dr. Arabia performed a procedure to remove the clots, thus preventing a stroke. He also connected two ventricular assist devices (VADs) to her heart to restore normal pumping and help French regain strength.

Two days later, French awoke to find herself in the Cardiac Intensive Care Unit. Dilated cardiomyopathy, often undetected until an emergency, had developed over the years, causing her heart to expand and weaken. Her older sister, Janice, had received the same diagnosis seven years earlier but did not qualify for a heart transplant because of other smoking-related damage.

Hooked to medical equipment and still fatigued, French felt unrecognizable. "I was just a totally different person," she says. After six days with VAD-powered circulation, she was strong enough to undergo surgery and was placed on the transplant waiting list.

A DRAMATIC BEGINNING The day before French arrived at Mayo Clinic, the United Network for Organ Sharing (UNOS), which coordinates the nation's transplant system, approved Mayo Clinic in Arizona for heart transplantation, and the Heart Transplant Program officially opened at Mayo Clinic Hospital and Mayo Clinic's campus in Scottsdale.

Mayo Clinic, whose three campuses perform more solid organ transplants than any other U.S. medical center, had announced plans in September 2004 to introduce heart transplantation to Phoenix, the nation's fifth-largest metro area. At the time, the only Arizona hospital performing heart transplants was in Tucson, 120 miles away.

Mayo Clinic recruited Dr. Arabia, who had performed 120 heart transplants and assisted on nearly 200 more, to be surgical director and Robert L. Scott, M.D., to be medical director; invested in the latest mechanical circulatory technology for patients awaiting a transplant; and trained an integrated multidisciplinary team of about 20 people.

HAPPY TO BE ALIVE French's critical condition put her near the top of the waiting list. "I didn't want somebody to die for me," she recalls. She felt anxious, not fearful. "I didn't think about life and death. I trusted my doctors."

"There's no doubt that having a transplant program here in Phoenix makes it easier for the family in a difficult time."

Francisco Arabia, M.D. *(front)* + Robert L. Scott, M.D.

On Oct. 19, 2005, UNOS contacted Mayo Clinic with a *match* — a heart that would be medically compatible with French. The surgical team, the medical team and French were ready when the transport team returned with the heart from a donor at another medical center. The eight-hour surgery was complex yet went as planned: A new heart started beating in the chest of Priscilla French, the first heart-transplant recipient at Mayo Clinic Hospital.

She was discharged from the hospital on Nov. 9, 2005. The postsurgical pain slowly faded. She shed 27 pounds after temporarily losing her sense of taste, a common side effect of heart surgery. Waking up became a daily blessing. "Every day I'd see the sun and thank God," she says.

A DISTINCT NEED FOR TRANSPLANTS In its first year, the Heart Transplant Program performed 18 transplants — triple the projected number. "There's no doubt that having a transplant program here in Phoenix makes it easier for the family in a difficult time," Dr. Arabia says. "When the family is closer, they're able to provide more support to the patient."

The program's specialized transport team also helps save lives. "Three times last week they went to pick up patients who were dying," Dr. Arabia says. "We had a 16-year-old male whose heart stopped twice in the ambulance. We got him on a VAD within 45 minutes of receiving the call."

Meanwhile, this highly visible program has brought more patients with all kinds of heart problems to Mayo Clinic for all kinds of answers.

ENJOYING EVERY DAY Sixteen months after her transplant, French lives independently and continues to gradually regain strength and add activities: climbing stairs, driving, swimming, traveling. "My next challenge is hiking," she says. "I want to get back into everything I used to do."

She joined the New Life Society, a group of about 50 transplant recipients, and helped organize a support group for people who received a new heart at Mayo Clinic. Her sister Janice died from cardiomyopathy in August 2006 at the age of 68. "I was the lucky one," French says. "She couldn't get a heart."

French must take immunosuppressive medications to maintain a delicate balance that prevents her body from rejecting the new heart and still protects her from infection. Those pills and a new heart have made it possible for her to celebrate her 61st birthday and to build a new life with her faithful companion, a furry, white lapdog named Honey Bunny.

"I'm still here," French says with profound appreciation for the magnitude of that simple statement. "I live every day to enjoy it."

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the Healing Enhancement Program

Colleen Daly woke on Christmas Day 2006 aching from a rib-spreading, muscle-stretching heart transplant and the tension of her life-or-death ordeal.

"I hurt so bad — *every* bone in my body," says the 51-year-old wife and mother from Spirit Lake, Iowa. "I was scared to death, and I think I had every muscle in my body tensed up."

Then she received a massage. Stress and aches melted away. "It relaxed me so much," Daly says. "I actually got rest and got to sleep."

The Healing Enhancement Program provides massage, music and relaxation therapies to help reduce pain, tension and anxiety for patients undergoing heart surgery at Mayo Clinic in Rochester, Minn. The divisions of Cardiovascular Surgery and Complementary and Integrative Medicine developed the pilot program to meet patients' physical, psychological and spiritual needs. As a result, patients feel better physically and emotionally, sleep better, need less pain medication, and recover more quickly.

"This is the most multidisciplinary effort I've ever seen," says Thoralf Sundt, M.D., a cardiac surgeon on the committee that organized the Healing Enhancement Program. "We're trying to transform the patient's hospital experience. The Cardiac Intensive Care Unit doesn't have to be a scary place. We want to make it a healing environment."

Although medicine in the United States has been slow to adopt complementary therapies, the Healing Enhancement Program is helping to establish evidence-based practices through research, including a study on the effectiveness of acupuncture in treating nausea, a common problem after heart surgery.

Therapeutic massage remains a pilot program because it raises the cost of care but is not charged to the patient. Donations designated for the Mayo Clinic Healing Enhancement Program can help ensure this option for heart-surgery patients.

Rakesh Suri, M.D., D.Phil., lead surgeon on Daly's transplant, believes that complementary therapies speed healing and recovery by tapping into the patient's natural healing ability. Daly had no need for pain medication, experienced no issues with fluid buildup, and was discharged two days ahead of schedule.

"I blame it on the fantastic care," Daly says. "Things are going great."

Where will our girls get


the care they deserve?
Would Abby and Belle survive separation surgery?
What kind of difficulties would
Abby and Belle face after surgery?
Is there someone
at Mayo Clinic who
can help our girls?
Will our girls have a normal life?
Whom can we trust our girls' lives to?

"We knew we'd found the place where our girls would get the kind of care they deserved."

Jesse and Amy Carlsen

AND THEN THEY WERE TWO
FARGO, NORTH DAKOTA

"*Do you love your sister?*" It's a question Jesse and Amy Carlsen of Fargo never tire of asking their daughters, identical twins Abbigail (Abby) and Isabelle (Belle). Put the question to Abby, she races to her sister and places her head on Belle's chest. Ask Belle, and she rests her head on Abby. The sweet expression of sibling love has become one of the girls' favorite games, along with a synchronized pacifier exchange and endless rounds of copycatting that Amy refers to as "*monkey see, monkey do.*"

For most parents, these toddler games wouldn't warrant an entry in the baby book. But for Jesse and Amy, even normal milestones still feel like miracles.

When Abby and Belle were born conjoined in November 2005, the Carlsens weren't sure their daughters would ever crawl, walk or blow out the candles on their first birthday cakes. But the couple was determined to do whatever it took to ensure their daughters would experience every first. That determination would lead the Carlsens to Mayo Clinic, where a dedicated team of physicians, nurses and allied health staff would work together to give the Carlsens what they most wanted for their children: a future.

BEATING THE ODDS The Carlsens' medical odyssey began nine weeks into Amy's pregnancy, when an ultrasound revealed the possibility that she was carrying conjoined twins. Two weeks later, a second ultrasound left no doubt. The couple's daughters were joined at the chest and abdomen, sharing a liver, bile ducts and intestines.

Research suggests that conjoined twins develop in as many as one in 50,000 pregnancies, but they account for only one in 250,000 live births. Almost half of conjoined twins are stillborn; fewer than half of those born alive survive long enough to be candidates for separation surgery. In spite of such bleak statistics, Jesse and Amy were optimistic. "Much of the situation was out of our hands, but we knew we could at least remain positive," says Jesse.

On November 29, 2005, their optimism was rewarded when Abbigail Lynn and Isabelle Anne arrived via planned C-section at Abbott Northwestern Hospital in Minneapolis. They were healthy babies, just as Jesse and Amy had prayed they would be. The couple hoped the rest of their prayers would be answered as perfectly.

COMING TO MAYO With the girls' birth behind them, Jesse and Amy began searching for the right team to separate Abby and Belle. They had already spoken with staff at two facilities when Jesse called Mayo Clinic in February 2006. After speaking with Christopher Moir, M.D., a pediatric surgeon, the Carlsens decided to take Abby and Belle to Mayo for evaluation.

"Dr. Moir told me Mayo had the best children's liver surgeon, which was important because the girls shared a liver," says Jesse. Something else Dr. Moir said impressed the Carlsens: a decade earlier, he had led a team that separated two sets of conjoined twins. If the Carlsens decided to bring Abby and Belle to Mayo for treatment, many of the same people would be providing the girls' care. "We were impressed by Dr. Moir's confidence and Mayo's experience," says Jesse. With only 250 sets of conjoined twins successfully separated, that experience was a considerable advantage.

The Carlsens packed their bags, planning to spend a week in Rochester meeting with doctors. But soon after they walked through the doors of Saint Marys Hospital, the Carlsens realized their stay in Rochester would be a much longer one.

"Everyone was prepared for us," says Jesse. "It was obvious Mayo had all of its ducks in a row. We knew we'd found the place where our girls would get the kind of care they deserved." That care was provided by a cast of 70 people, including plastic, pediatric, bile duct, cardiac and transplant surgeons; pediatric anesthesiologists; radiologists; nurses; dieticians; intensive care specialists; physical therapists; and child life specialists.

While it was the largest team ever assembled at Mayo Clinic, in many respects the Carlsens' care was business as usual.

"We assemble a team for each of our patients," says Dr. Moir. "This was a much larger group than most, but the way we worked together was no different than if we had been caring for a child with a hernia."

"When caring for any patient, I figure out what the defect is and then figure out how to fix it," says Ricky Clay, M.D., a Mayo Clinic plastic surgeon specializing in pediatrics. "The approach was the same with Abby and Belle. We used the same techniques we use every day — we just combined them in a slightly different fashion."

"By the day of surgery, we had separated Abby and Belle hundreds of times in our heads. … We were ready."

Christopher Moir, M.D.

As the team's leader, Dr. Moir kept the Carlsens informed of plans for their daughters' care. "Dr. Moir made sure we knew everything the care team knew," says Jesse. "Because we aren't doctors, he sometimes had to explain things more than once and it took a lot of his time. But at Mayo, time isn't the most important thing — the patients are the most important thing. The staff made us feel like our girls were the most important thing in the world to them."

ANSWERED PRAYERS On May 10, 2006, the Carlsens invited everyone involved in Abby and Belle's care to a healing service, which included the blessing and anointing of Dr. Moir's hands. Two days later, those hands — backed by months of prayer and preparation — would hold the Carlsens' world.

As Jesse and Amy placed their daughters on an operating table on the morning of surgery, their hearts were full of equal parts of hope and fear. If everything went as planned, the next time they saw Abby and Belle it would be as two separate little girls. But if something went wrong, they could lose one — or even both — of their daughters.

The odds were on their side. Dr. Moir originally told the Carlsens there was a 30 percent chance one or both girls would not survive the surgery. But after months of studying images of the girls' anatomy, Dr. Moir felt the risk was less than 5 percent. "By the day of surgery, we had separated Abby and Belle hundreds of times in our heads," he explains. "We knew every aspect of their anatomy, and had discussed every possible option for separating them. We were ready."

At 4:28 p.m., after approximately eight hours of surgery, the final piece of tissue connecting Abby and Belle was cut. A few hours later, Jesse and Amy saw Abby alone for the first time. Not long after, they saw Belle. "They looked so good, the way they were supposed to," says Jesse. "It was like they were free."

After just three and a half weeks of recovery, the Carlsens returned to their home in Fargo.

"As happy as we were to be going home, we were really sad to leave Mayo," says Jesse. "It was hard to leave the people behind." So he and Amy were thrilled when some surprise guests showed up at Abby and Belle's first birthday party: Dr. Moir and his sons, twins Spencer and Logan.

"I believe there was a reason we were led to Mayo Clinic," says Jesse. "Our girls got amazing care from amazing people. We couldn't have asked for anything more."

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Pictured left to right, Belle and Abby Carlsen

Building on Experience

On Aug. 8, 2006, identical twins Abygail and Madysen Fitterer were born to Suzy and Stacy Fitterer of Bismarck, N.D. Like another set of twins from North Dakota, Abbigail and Isabelle Carlsen, Abygail and Madysen were conjoined. The Fitterers drew hope from the Carlsens' story, following news reports and speaking with parents Jesse and Amy Carlsen about their experiences at Mayo Clinic.

"I was so happy they decided to bring their girls to Mayo," says Jesse. "I knew they would get such great care."

Physicians drew on their recent experience with the Carlsen twins, who were separated May 12, 2006, when caring for Abygail and Madysen.

"The Carlsens helped us get separating conjoined twins down to a standard operating procedure," says Christopher Moir, M.D., the Mayo Clinic pediatric surgeon who led the teams caring for both sets of twins. "We had the opportunity to take a difficult and unique case and make it routine, which meant our team knew exactly what to do when the Fitterers arrived."

On Jan. 3, 2007, that team successfully separated Abygail and Madysen. Seven weeks later, the Fitterer family left Mayo Clinic and returned home to Bismarck.

For Dr. Moir, the separation surgeries were meaningful both professionally and personally.

"I choose to work at Mayo because of its unique focus on the patient and its emphasis on teamwork among staff," he says. "The Carlsen and Fitterer cases are wonderful examples of the best of Mayo Clinic."

And those little girls?

"The girls are all absolutely charming," says Dr. Moir. "You can tell by the smiles on the girls' faces that they are well loved and have incredible parents. It was a privilege getting to know both of these families, and I look forward to staying in touch and watching the girls grow up."

Mayo Clinic brings together teams of physicians, nurses and other allied health professionals to diagnose and treat medical problems. Thousands of patients come to all Mayo Clinic locations every day for accurate diagnosis and the highest-quality care. Most patients are treated on an outpatient basis. Most patients make their appointments themselves — in most cases, a doctor's referral is not necessary.

MAYO CLINIC PATIENTS

Total clinic patients*	**521,000**
Hospital admissions	**135,000**
Hospital days of patient care	**619,000**

* Rochester, Jacksonville and Arizona only

MAYO CLINIC PERSONNEL
(including temporary and supplemental employees)

Staff physicians, medical scientists and clinical and research associates	**3,317**
Residents, fellows and students and other temporary professionals	**3,235**
Administrative and allied health personnel	**46,656**
TOTAL	**53,208**

• Mayo Clinic collaborated with Gamma Medica and GE Healthcare to develop a diagnostic device that is sensitive enough to detect breast tumors as tiny as one-fifth of an inch in diameter. The new technique, molecular breast imaging, uses a dual-head gamma camera system to obtain images that, unlike mammography images, are not affected by dense breast tissue.

• A Mayo Clinic team developed a new medical device that helps patients control their breathing when undergoing computed tomographic (CT) fluoroscopy-guided biopsies. The Interactive Breath-hold Control — the first medical device of its kind — allows physicians to more rapidly and accurately diagnose patients, reducing the need for a more invasive surgical biopsy.

• Mayo Clinic Cancer Center researchers (epidemiologists) found that a radical prostatectomy can be a safe option for some men over 80 years old. While some surgeries are traditionally not offered for patients over a certain age, researchers suggest that age should not be the deciding factor when considering treatment options.

• Cardiologists at Mayo Clinic devised a new strategy to improve the effectiveness and safety of heart stents, which are used to open narrowed blood vessels and have been the recent subject of clotting concerns. The novel approach is based on magnetizing healing cells from the patient's blood so the cells are quickly drawn to magnetically coated stents.

• In October, Mayo Clinic and The American Legacy Foundation announced a collaboration to bring together the expertise of Mayo Clinic's Nicotine Dependence Center and The American Legacy Foundation's public health and marketing acumen to help smokers who want to quit.

• Mayo Clinic radiology researchers developed a new technique for using magnetic resonance imaging (MRI) to accurately measure the hardness or elasticity of the liver. Initial tests show this technology — MR Elastography (MRE) — holds great promise for detecting liver fibrosis, a common condition that can lead to incurable cirrhosis if not treated in time.

• Mayo Medical Laboratories began offering a new genetic test to help physicians nationwide identify patients who are likely to have side effects from drugs commonly used to treat depression. Results of the test can help physicians determine the best treatment choice for their patients.

• Mayo Clinic hosted a cardiac screening event in Arizona for retired NFL players as part of a national initiative by the Living Heart Foundation and the National Football League Players Association. It was held to raise awareness of potential heart disease related to body mass.

• Radiologists and radiation oncologists at Mayo Clinic began using tiny glass bubbles filled with radioactive material to deliver high doses of tumor-killing radiation directly to liver tumors. Physicians say the procedure, called radioembolizatIon or intra-arterial brachytherapy, is better tolerated than other forms of liver cancer treatments. It may be the best option for patients who aren't candidates for other treatments, such as surgery or liver transplantation.

• Mayo Clinic ear, nose and throat surgeons began using angioplasty — a technique long used to open clogged arteries — as a minimally invasive option to help open sinuses in patients who require more than just medicine. The new outpatient procedure, called balloon sinuplasty, alleviates symptoms of sinusitis, an inflammation of the sinus cavities usually due to infection.

• Hematologists in the Mayo Clinic Cancer Center found that certain patients suffering from multiple myeloma, a difficult-to-treat cancer of the blood, may respond positively to bortezomib, a drug that shows potential to extend their survival rates by as much as six months. The findings may help researchers target individualized treatments to patients.

• Researchers from Mayo Clinic found that occipital nerve stimulation may be an effective treatment for patients suffering from chronic migraine headaches. The treatment involves implanting a neurostimulator under the skin at the base of the head, which then delivers electrical impulses near the occipital nerves via insulated lead wires tunneled under the skin.

Why don't underrepresented populations participate in clinical research projects?

Would early memory loss be a symptom of Alzheimer's disease?

How do we build trust between health care providers and the community?

How can we increase minority participation in research?

How do we promote healthy living lifestyle changes to underrepresented communities?

Alzheimer's disease resea


ch enhanced by outreach?

"… in future prevention and treatment studies, we must build on these outreach successes and do even more."

Floyd Willis, M.D.

BUILDING TRUST TO FIND BETTER ANSWERS ABOUT ALZHEIMER'S
JACKSONVILLE, FLORIDA

Alzheimer's disease — which robs elders of memory, thinking ability and eventually independence — disproportionately affects African-Americans. Studies vary, but most research shows that Alzheimer's disease is 14 percent to nearly 100 percent more prevalent in African-Americans than in Caucasians. And little is understood about this huge difference in prevalence.

Mayo Clinic doctors and researchers are taking steps to change that — in churches, sororities, community centers and other places where seniors gather to listen and learn how to keep their brain healthy as they age.

In 2006, Mayo Clinic in Jacksonville launched *Live Well. Think Well.*, a pilot community outreach program to promote healthy brain aging. Floyd Willis, M.D., a Mayo family physician who led the effort, says the primary goal was to share information about memory loss, its disproportionate toll on African-Americans and how to minimize risk.

GOOD FOR THE BRAIN, GOOD FOR THE BODY Dr. Willis says the gospel of healthy brain aging might sound like advice your grandmother would give: eat right, lose weight if needed, exercise your body and brain, manage stress, and stay connected to others.

"The good news, call it the cherry on the ice cream, is that if you lead a lifestyle that is good for the brain, that lifestyle is also good for the heart, kidneys and vascular system," says Dr. Willis. In fact, risk factors for vascular diseases — high blood pressure and diabetes — seem to be significant risk factors for Alzheimer's in African-Americans. And those conditions are more prevalent in African-Americans than in other racial groups.

Doctors, nurses and trained community volunteers have taken the healthy brain aging message to audiences throughout the community. In six months, they made 30 presentations, reaching 465 people. Countless more were reached through health fairs, direct mail and media coverage.

Floyd Willis, M.D., leads a Live Well. Think Well. *group session at a Jacksonville Senior Center.*

Doris Putman, a retired public health nurse, was eager to be a volunteer speaker because of personal experiences. She's kept her diabetes in control for 15 years with healthy choices. She's also seen how Alzheimer's can affect a family; her sister has the disease. "A healthy lifestyle might not prevent memory problems, but it can slow them down," she says. She also notes that audiences are more receptive when a peer shares experiences.

Live Well. Think Well. is more than a wellness initiative. It is also about advancing research to find better treatments and, eventually, a cure for Alzheimer's disease, and ensuring that the research represents all people. At *Live Well. Think Well.* presentations, audience members learn about research and how they can participate.

Mayo Clinic is at the forefront of research looking at ethnic differences in patients with Alzheimer's disease. About 400 Jacksonville-area residents are part of an ongoing Mayo study that looks at normal brain aging in African-Americans. One result: researchers published standards in 2005 to better diagnose Alzheimer's disease and other dementia in the African-American population.

"Many elderly African-Americans, especially those raised and educated in the South, endured significant disparities in educational opportunities," says John Lucas, Ph.D., the Mayo neuropsychologist who led the study. "Previous diagnostic tests for memory disorders did not take cultural and educational differences into account."

Thanks to research participation from members of the Jacksonville community, doctors nationwide now can use these new normal aging standards to better diagnose memory problems in African-American elders. But many more answers are needed, about treatment and, one day, a cure.

AFRICAN-AMERICANS UNDERREPRESENTED IN RESEARCH

Throughout Mayo Clinic, there are dozens of studies under way on Alzheimer's and memory disorders. Even in a diverse community like Jacksonville, African-American elders are underrepresented in many of Mayo Clinic's memory disorder research programs. It's not a surprise, says Pam Quarles, a member of the advisory panel for *Live Well. Think Well.* The panel meets to provide guidance to the outreach program.

"People might say you don't have to worry about what happened 50 years ago," says Quarles, who also serves on the Alzheimer's Disease Advisory Committee to the state of Florida's Department of Elder Affairs. But for people in their 60s, 70s and 80s, many may be reticent to participate in research because of examples of past poor care and unethical research involving African-Americans.

Live Well. Think Well. aims to build trust so more African-Americans consider participating in research. "When you go out to people on their territory — repeatedly — and treat them with dignity and respect, it begins to make a difference," says Quarles.

Mayo researchers hoped to recruit 54 African-American elders for several open studies on neurological and memory disorders during the six-month outreach program. Many of these programs had never recruited any African-Americans.

The initial response was encouraging, says Dr. Willis. About 80 individuals indicated interest in participating. Interviews and screenings are under way to determine if these individuals meet study criteria. "Frankly, it takes many decades to make inroads, where for hundreds of years, there have been barriers," says Dr. Willis. "To be inclusive of African-Americans in future prevention and treatment studies, we must build on these outreach successes and do even more."

Quarles, whose work with the Alzheimer's Disease Advisory Council puts her in contact with 13 state-supported memory clinics throughout Florida, says Mayo Clinic is at the forefront in outreach to elders in Florida. She hopes others follow Mayo's lead, both to advance research and to improve care for African-Americans who have Alzheimer's. She notes that African-Americans account for less than 1 percent of patient services provided at 13 state-supported memory clinics, which includes Mayo Clinic. Yet, African-Americans are affected by Alzheimer's disease more so than Caucasians.

"When you go out to people on their territory — *repeatedly* — and treat them with dignity and respect, it begins to make a difference." Pam Quarles

Live Well. Think Well. is a step forward, ensuring that all people have access to care for memory disorders, and that research benefits people of all races and backgrounds. "Building trust is paramount," says Quarles. "And if Mayo is doing it, why can't others?"

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Tailor-made Medicine

At our very core — our genes — we're 99.9 percent the same. Mayo Clinic researchers are delving into how the tiny difference that makes us unique can affect, and ultimately improve, the prevention, diagnosis and treatment of diseases.

This new field of study is called *individualized medicine*. "We want to better tailor treatments to patients," says Eric Wieben, Ph.D., director of the Mayo Clinic Genomics Research Center. Research on individualized medicine is under way at all Mayo Clinic locations on health issues such as Alzheimer's and Parkinson's diseases, diabetes, cardiovascular disease and chemical dependency. Already, researchers have made discoveries that are improving treatments.

The concept of individualized medicine isn't new. It begins whenever a doctor takes a detailed family history. Now, emerging technology allows researchers to better understand how genetic differences affect treatment.

BREAST CANCER: Tamoxifen, a drug often used to treat breast cancer, may not be the best treatment option for all women. About 10 percent of Caucasian women have genetic alterations that affect the activity of cytochrome P4502D6, a liver enzyme responsible for tamoxifen metabolism. A study led by researchers at Mayo Clinic and the University of Michigan found that these women were twice as likely to have breast cancer relapse.

COLON CANCER: For people who have a common alteration in gene UGT1A1, the standard dose of a first-line chemotherapy medication used to treat colon cancer causes serious or life-threatening complications. Now, a specialized blood test prior to treatment helps avoid these problems.

DEPRESSION: About 30 percent of patients with major depression disorder don't improve with the first antidepressant prescribed. A deficiency of the gene Cyp4502D6, which is responsible for metabolizing commonly used antidepressant medications, often is the reason. "Knowing there is a deficiency of Cyp450 is especially helpful for high-risk patients with limited ability to articulate how well the medication is working," says Dennis O'Kane, Ph.D., Mayo Clinic scientist.

"Our goal is to make individualized medicine a more widespread and routine part of clinical practice," says Dr. Wieben.


What is the risk o


What is a *balloon angioplasty*?
What does a heart attack feel like?
Will I die?
What if this pain is a false alarm?
Is it safe for me to shovel snow?
a blocked artery?

"Learning to live a much healthier life is going to be a serious challenge for a hot-dog chomping, coffee-guzzling, hash-brown loving, fried-chicken feasting fool like me."

Dave Smith

REPORTER GETS THE STORY OF HIS LIFE

FAIRMONT, MINNESOTA

Dave Smith, a reporter and weekend editor for the *Fairmont Sentinel*, knew that an insider's view of Mayo One, Mayo Clinic's emergency medical helicopter, would make a great story. Somehow, the timing for a ride-along was never right.

On Sunday, Oct. 22, 2006, he got the ride. But not as an observer; he was a patient having a heart attack.

The story he lived to tell is an example of what's right in the health care system. From Fairmont Medical Center's emergency department to the Mayo One emergency medical helicopter to the coronary care unit at Saint Marys Hospital at Mayo Clinic in Rochester, Minn., his timely care made for a happy ending — with no permanent damage to his heart. But a happy ending was not a foregone conclusion.

At 2 p.m. that Sunday, Smith's chest began to hurt. Despite the pain, he went to the newspaper office to lay out pages, a typical Sunday chore. At 42 years old, with normal cholesterol and blood pressure and no history of heart problems, Smith was not alarmed. "Even to myself, I didn't want to admit or say *heart attack*," he says.

But the chest pain worsened. His head, neck and shoulders began to hurt, too. "I'm in a newsroom with computers," he says. "So I hit the Internet quick." The advice he found at the American Heart Association's Web site was 'call 911.' That got his attention. He called his wife Tanya to take him to the emergency department at Fairmont Medical Center — Mayo Health System, just minutes away from the newspaper office.

Immediately, Smith was given aspirin and nitroglycerin to relieve his symptoms, says Blake Anderson, M.D., emergency physician who cared for Smith. An electrocardiogram and a blood enzyme test confirmed what symptoms suggested; Smith was having a heart attack and needed access to advanced care quickly. "With that information, we pull the trigger, contact Mayo Clinic and call for air transport," says Dr. Anderson.

Mayo One can be in flight within minutes of a dispatch call, 24 hours a day, every day. Like Dave Smith, about one-half of transports are cardiac patients.

"Donna [my nurse] gave me the wonderful and beautiful news that I should never shovel snow again." Dave Smith

At 4:44 p.m., the calls were made. Mayo One, based that day in Mankato, Minn., was dispatched. Within 30 minutes, Smith was in the air, heading toward Saint Marys Hospital. "We didn't even shut the helicopter down when we landed in Fairmont," says Todd Emanuel, Mayo One flight nurse. The helicopter lands just yards from the Fairmont emergency department.

Emanuel and his partner, paramedic Jessica Fite, continued the care started in Fairmont. En route, Smith's chest pain had diminished, but it wasn't gone. Emanuel called Jae Oh, M.D., the cardiologist on duty at the Saint Marys Coronary Care Unit, to get approval for additional medications to ease symptoms. Smith felt good enough to joke with his caregivers that he was finally going to get his Mayo One story.

When Smith arrived at Saint Marys at 6 p.m., his pain was gone. An electrocardiogram indicated that the immediate danger was over, says Dr. Oh.

The next morning, Mayo cardiologists performed coronary angiography, which found a 90 percent blockage in a major coronary artery. During the procedure, Smith was awake and comfortable as doctors inserted a long, thin tube with a balloon tip into an incision in his leg through the artery to the blockage near the heart. At the blockage site, the balloon tip was inflated to open the artery. A metal stent was placed to keep the artery open.

From the emergency physician and nurses in Fairmont, to the Mayo One dispatcher and flight crew, to cardiologists and critical care nurses, at least 30 people provided hands-on care during the 24 hours after Smith's chest pain began. Smith, an avid sports fan, says that the coordination and care was an all-star performance. "The ones that are the best, practice and play together the most," he says. "That's the feeling I got from them."

That prompt and coordinated care, which began with Smith's choice to seek care quickly, is why his heart was unscathed. An electrocardiogram — done before Smith headed home — was normal and showed no signs of heart damage.

"If a patient seeks treatment in an hour or two of chest pain, we often can minimize heart damage or even stop the heart attack," says Dr. Oh. "If a patient waits six or seven hours to seek treatment, there's going to be major heart damage. Consequences could include shortness of breath, fatigue, heart failure and potentially fatal arrhythmias."

Two days later, Smith went home. Donna McMurtry, R.N., a Fairmont cardiac rehabilitation nurse, and Fairmont physician Durga Komaragiri, M.D., an internal medicine specialist, have worked closely with Smith since the heart attack.

"Donna gave me the wonderful and beautiful news that I should never shovel snow again," says Smith, whose sons, ages 9 and 13, now handle the chore. McMurtry also encouraged more exercise, healthier eating and losing weight. By mid-January 2007, Smith had attended 15 cardiac rehabilitation sessions in Fairmont, where supervised exercise was combined with learning about heart-healthy living. He'd lost about 12 pounds.

The changes aren't easy, wrote Smith in a column in the *Fairmont Sentinel*. "Learning to live a much healthier life is going to be a serious challenge for a hot-dog chomping, coffee-guzzling, hash-brown loving, fried-chicken feasting fool like me," he wrote.

But he's doing it. He's become an evangelist on seeking prompt care for heart attack symptoms. "I can't stress it enough," he says. "If you think you might be having a heart attack, it's not that big of a deal to go in and find out that you're not."

Thinking back to when his chest pain began, Smith says, "I could have stayed on my feet and worked longer." He credits divine intervention — he's also a pastor of the Fair Lakes Apostolic Fellowship in Fairmont — as well as the Internet for his decision to seek care quickly. "Once I saw these were heart attack symptoms, the idea of gutting it out was gone," he says. "I don't want to be a tough guy. I'm going to be the alive guy."

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As part of his cardiac rehabilitation, Dave Smith is walking as much as he can. The sidewalks of Fairmont are slushy with melting snow in March, but that won't stop him.

A Gift to the Community

Long before paramedic Josh Toms joined Gold Cross Ambulance Service in Duluth, Minn., he knew the role, importance and challenges of first responders.

His parents, Mark and Brenda Toms, are longtime volunteer emergency responders in largely rural Fredenberg Township, about 20 minutes north of Duluth. At age 18, Josh completed training and joined them.

"When a pager went off, the house emptied," says Mark Toms, chief of the Fredenberg Volunteer Fire Department.

At car crashes and medical emergencies in the township, Fredenberg first responders have long worked side by side with paramedics from Gold Cross, part of Mayo Clinic Medical Transport. The Fredenberg team often arrives first, beginning treatment to stabilize patients until paramedics arrive.

The Fredenberg emergency response vehicle was a 1978 converted Air Force van. "It was definitely time to update," says Mark. But in a township of 1,400 people, finding the dollars to upgrade was nearly impossible.

Josh, who joined Gold Cross last year, alerted his dad to a possible solution. Each year, Gold Cross donates retired ambulances to first responders, schools or other organizations, with priority given to organizations in the areas Gold Cross serves. The donations are another way Gold Cross gives back to communities.

Josh put in a request for Fredenberg. After a six-month wait, Fredenberg's "new" emergency vehicle was ready to roll in November 2006, freshly painted and a fire department insignia on each door.

"It was a welcome gift," says Mark. In spite of tender-loving maintenance, Fredenberg's old emergency vehicle wouldn't always start.

In 2006, Gold Cross, with bases in 10 communities in Minnesota and Wisconsin, also donated vehicles to the American Red Cross, Southeast Minnesota Chapter, Rochester, Minn.; South Central College, Mankato, Minn.; and Midway Township First Responders, near Duluth.

In the last six years, Gold Cross has donated 33 well-maintained, used vehicles to first responders and schools. But the donation to the Fredenberg Volunteer Fire Department marked a first and a bit of a role reversal — a son handing over the keys to his dad.

Biomedical research at Mayo Clinic includes outstanding programs in laboratory science, clinical research and population studies — all of which lead to new treatments and a better understanding of disease. This coordinated effort helps Mayo quickly translate research discoveries into better care for patients. Most Mayo medical staff participate in research activities in addition to their medical practice.

RESEARCH PERSONNEL

Mayo physicians and medical scientists	310
Temporary professionals	521
Allied health personnel	1,880
TOTAL	**2,711**

Mayo's integrated practice encourages and enables many to play a role in advancing medical research. The number of staff with some part of their time dedicated to research activities totals more than 6,000.

• A Mayo Clinic researcher discovered a target in malaria-carrying mosquitoes that may aid in development of pesticides that are toxic to some mosquito species but not harmful to mammals. The findings could offer a safer and more effective control of mosquito-borne diseases such as malaria.

• A Mayo Clinic study found that difficulties in the heart's ability to fill with blood are common causes of heart failure. The study is the first large, community-based study to clarify this aspect of heart failure. Researchers believe that as a result of the findings, heart failure can likely be managed more effectively to identify and treat those at highest risk of dying from heart disease.

• An international research collaboration led by Mayo Clinic — one of the largest studies of its kind — found strong evidence that a genetic risk factor may account for 3 percent of Parkinson's disease cases. The study provides evidence that variations in the alpha-synuclein gene contribute to Parkinson's risk across several populations worldwide.

• Mayo Clinic researchers, working with colleagues in Germany, devised a multilevel safety feature for viruses used to treat cancer, making cancer-killing viruses more specific to cancer tumor cells and improving the therapeutic effectiveness of viruses. They did this by engineering a modified measles virus that turns on only in the presence of secretions specific to malignant cancer cells. This is a key advance because it provides a way to design a therapeutic virus that is safe, stable and that reliably targets and kills cancer cells.

• Mayo Clinic, in collaboration with GE Healthcare, began a new program for clinical development of high-field magnetic resonance imaging (MRI) of the abdomen, heart, breast and musculoskeletal system using a new, state-of-the-art 3T MR system. The new MR system was installed in Mayo's Body MRI Advanced Development Unit in Rochester.

• In October, InNexus Biotechnology, a publicly held company, moved into space in the Mayo Clinic Collaborative Research Building on the Mayo Clinic campus in Arizona. This first-of-its-kind facility joins multiple strategic partners under one roof to focus on developing and supporting medical research and education.

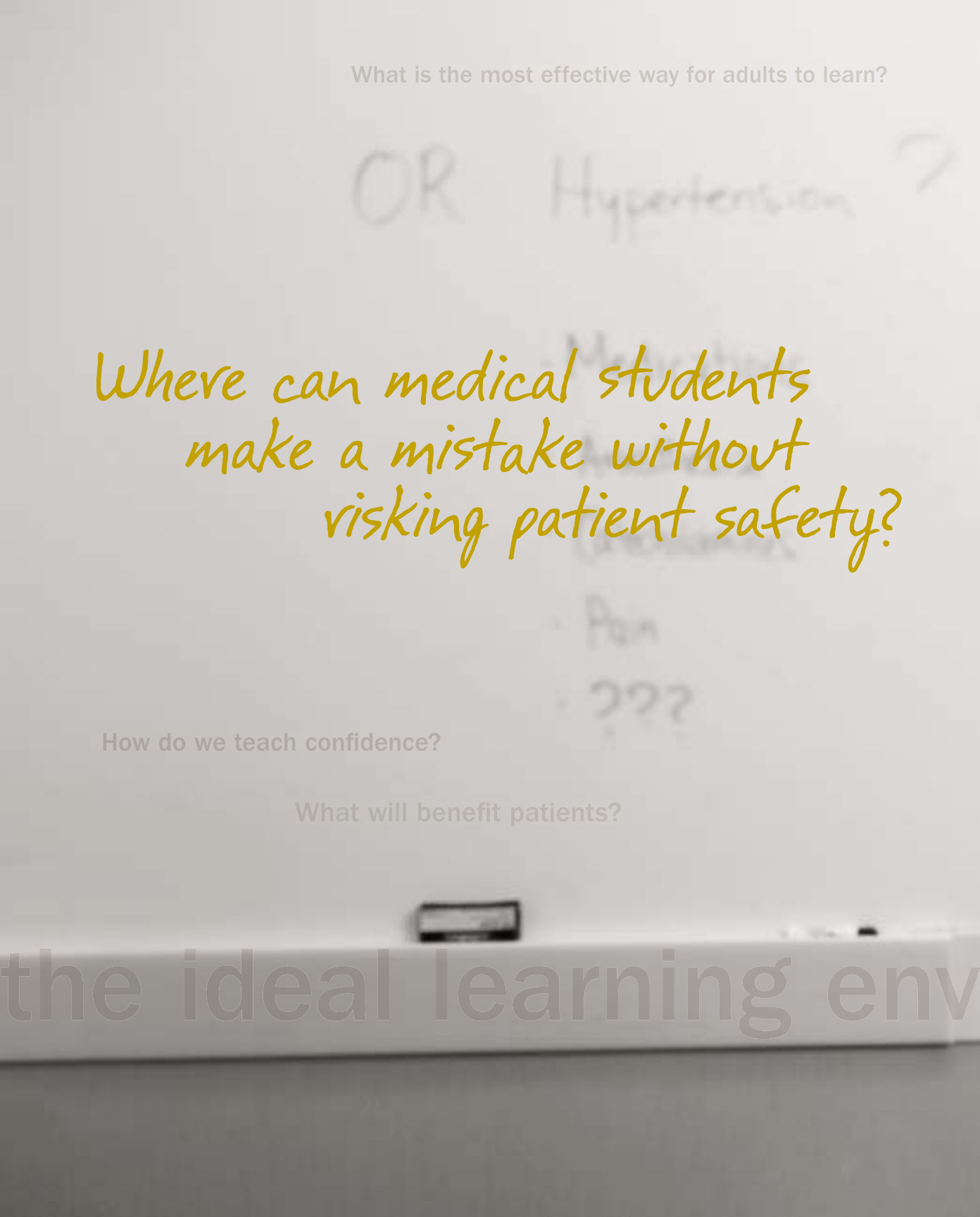
• A study led by Mayo Clinic demonstrated that mild cognitive impairment, a memory disorder considered a strong early predictor of Alzheimer's disease, not only results in behavioral symptoms but also structural changes that can be identified in the brain. The study is one of the first autopsy studies of mild cognitive impairment.

• Mayo Clinic researchers discovered that a common imaging technique when combined with genetic testing nearly doubles the effectiveness in detecting the presence of a potentially deadly, inherited heart condition called hypertrophic cardiomyopathy (HCM). Currently the genetic test correctly detects HCM only 40 percent of the time. But coupled with echocardiography imaging, the detection power of the test nearly doubles.

• Mayo Clinic broke ground for a new building in Rochester that will house advanced imaging research. Mayo received a gift of $7 million from The Opus Group, a commercial real estate development and management company, to support construction of the facility. Research in the Mayo Clinic Opus Imaging Research Building will focus on discovery and development of new medical imaging technologies and integration of innovative imaging techniques into patient care.

• Mayo Clinic researchers took a step in targeting childhood obesity with the anti-obesity concept-project called *The Classroom of the Future*. Researchers monitored children's activity levels in a 'normal' classroom setting and then compared it to activity in the "classroom of the future," where movement is integrated into the children's entire learning experience.

• Mayo Clinic researchers found that cognitively normal, elderly people who developed depression were at increased risk of developing mild cognitive impairment. When viewed as a spectrum of cognitive functioning, mild cognitive impairment falls between normal brain aging and dementing illnesses such as Alzheimer's disease.


What is the most effective way for adults to learn?
Where can medical students make a mistake without risking patient safety?
How do we teach confidence?
What will benefit patients?
the ideal learning env


onment for surgeons?

"In this setting, it's okay to make a mistake. In fact, sometimes it's great because it gives us a perfect opportunity to teach."

David Farley, M.D.

EVERYTHING BUT THE RISK
ROCHESTER, MINNESOTA

In a busy operating room, monitors beep and hum, pagers go off, the surgical team holds several conversations at once, the telephone rings, staff members walk in and out. In short, it's not an ideal environment for thoughtful concentration. But, that's exactly what's asked of surgeons in many operating room situations. How can new surgeons develop the poise required of them? According to David Farley, M.D., a Mayo Clinic surgeon and vice chair for education in Mayo's Department of Surgery in Rochester, Minn., the answer is practice, practice and more practice.

"We want our students to have training in the operating room, so they understand what's happening around them and are familiar with all the sights and sounds in there," says Dr. Farley. "Surgeons are asked to make crucial decisions in this environment, and it's not an easy one to work in. People have to learn to think on their feet."

Instead of just putting surgical residents in an operating room and allowing them to watch what's going on or participate in a limited way, through its Multidisciplinary Simulation Center, Mayo Clinic can immerse students in the operating room environment, allowing them to learn firsthand.

In the simulation center, students have a unique opportunity to practice and master their skills in a setting that mimics almost every aspect of real patient care, except for one crucial feature. In the simulation center, students can make mistakes and learn from them risk-free. Here, the only damage from errors is perhaps a bruised ego.

A POWERFUL TEACHER When you walk into the Mayo Clinic Multidisciplinary Simulation Center on the first floor of the Stabile Building at Mayo Clinic's campus in Rochester, the setting looks like most other clinical areas. It has a reception desk, signs that point you in the right direction, and several patient exam rooms. But, what happens there is far from ordinary.

From hands-on guidance, to active role-playing in the operating suite, every scenario within the Simulation Center is recorded. Together, students and physicians review these and use as learning opportunities.

In this exceptional learning environment, instructors can simulate almost any medical situation. In addition to the reception area and the patient exam rooms, the simulation center has four suites, each equipped as a different medical area: an operating room, emergency room, intensive care unit, and an endovascular lab.

Within these spaces, Mayo educators use several types of simulation training. Life-size, technologically advanced mannequins are programmed to show complex findings and react just as a patient would to treatment decisions. Students learn surgical or endoscopic procedures, such as cardiac catheterization or colonoscopy, using the center's task trainers. These trainers allow students to experience the look and feel of performing a procedure.

Honing interpersonal skills that are key to good patient care is also part of the simulation center. Actors play the roles of patients and family members so that students can enhance their communication proficiency in difficult situations, such as delivering bad news.

"The concept of simulation use in medicine is that experience is a powerful teacher," says William Dunn, M.D., a Mayo Clinic Pulmonary and Critical Care physician and the simulation center director. "Technology can now produce incredibly real, simulated environments that provide memorable learning experiences."

AN IDEAL LEARNING ATMOSPHERE According to Dr. Farley, the simulation center is an ideal place to give Mayo Clinic's surgery residents a chance to problem-solve in uncommon but critical circumstances that require not only surgical skill, but communication and teamwork, as well.

"When residents are working in the hospital, there's no guarantee they will be involved in a variety of cases," he says. "The simulation center allows us to concoct educational experiences, so our students are ready to handle rare situations that they may not see otherwise."

For example, dealing with a lab report from a pathologist during surgery can be a challenge for new surgeons. At Mayo, every surgical resident gets a chance to face that scenario in the simulation center.

In one simulated situation, students surgically remove a pancreatic tumor and send the specimen to the lab for evaluation to determine if they extracted all the cancer. They wait in the operating room for a call from the pathologist. If the report indicates cancer at the edges of the tissue that was removed, the students must make a decision.

"At that point, an astute surgeon — assisted by an astute pathologist — would assess if he or she should keep going to ensure all the cancer is out," says Dr. Farley. "Usually, if there's cancer at the edge, you have to take out a little more. But, with that decision come other considerations. The more of the pancreas you take, the more likely a patient is to become diabetic. There are times where it's not black and white. We like to explore those gray zones in the simulation center and test the residents' ability to think on their feet in the midst of a stressful situation."

A SAFE PLACE FOR MISTAKES After students finish in the simulation center, a debriefing session follows in which students and instructors analyze what happened. Audiovisual equipment in each room records the simulation, so participants can review exactly what they said and did. The debriefing is the most important part of the experience because students learn ways to improve, and instructors can raise students' awareness about what they may have overlooked or forgotten in the heat of the moment.

"In this setting, it's okay to make a mistake. In fact, sometimes it's great because it gives us a perfect opportunity to teach," says Dr. Farley. "The really impressive part is that after our students leave the center, the experiences stay with them. Adults learn better by being involved in a process like this. Although the simulation center is only one part of the students' education, it's a crucial one. The realistic situations in the center engage them in a way that makes a lasting impression and enhances their ability to use mature judgment — a critical skill they need as surgeons."

By using the Multidisciplinary Simulation Center to teach students ways to respond appropriately in difficult situations — before they actually have to face those situations involving real patients — Mayo Clinic is not only enhancing medical education, it's improving patient safety and patient care quality.

"Simulation is transforming the way we are educating health care providers," says Dr. Dunn. "We expect this to have serious impact on improving patient safety and outcomes, and we are committed to being a world leader in this area."

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"The really impressive part is that after our students leave the center, the experiences stay with them." David Farley, M.D.

Education Technology Center unites teaching, learning and practice

At Mayo Clinic, learning isn't confined to students. To offer the best patient care, all Mayo physicians need to stay on top of advances in medicine. But, with hundreds of journal articles, abstracts, reports and medical news releases published every day, keeping up with new information is a challenge. That's where Mayo's Education Technology Center comes in.

The Education Technology Center develops learning technologies to support Mayo Clinic's five schools and to help Mayo physicians incorporate new medical information into their work.

"Mayo Clinic is built around the concept that no individual has all knowledge," says Farrell Lloyd, M.D., a General Internal Medicine physician and director of the Education Technology Center. "The Education Technology Center is based on a collaborative approach to support Mayo as a professional learning organization."

In that spirit of collaboration, the center gathers knowledge from physicians and researchers and disseminates it throughout the organization.

For example, the center has developed a way for physicians who have patients with certain conditions, such as long QT syndrome (a dangerous heart disorder), to have online access to current information about the condition, best practices for diagnosing and treating it, and contact details about Mayo experts on the condition. The information can be customized, depending on each physician's practice area.

This project involved developing an application called *MayoExpert*, using the center's Enterprise Learning System, a computer-based tool that allows the Education Technology Center to connect staff to up-to-date learning resources.

Using the Enterprise Learning System, the center is also creating electronic curriculum for several Mayo education programs. The curriculum will allow students to study information related to their clinical work online, while allowing faculty to track students' progress.

"One of the biggest benefits of the Education Technology Center is that it unifies our teaching," says Dr. Lloyd. "We know that everyone who uses these technologies is learning the same material developed with input from Mayo experts. It helps ensure that we are teaching what we practice and practicing what we teach. Ultimately, that kind of cohesive approach benefits patients."

Mayo Clinic offers educational programs and training opportunities on its three campuses to those pursuing careers in medicine, research and the health sciences. The College of Medicine at Mayo Clinic includes five schools.

MAYO SCHOOL OF GRADUATE MEDICAL EDUCATION, the oldest of Mayo's five schools, has trained more than 17,000 alumni in virtually all medical specialties since 1915.

Clinical residents and fellows 2,738

MAYO GRADUATE SCHOOL, in operation since 1917, focuses on six biomedical subspecialties. With an annual average predoctoral enrollment of 300 students, the school graduates around 50 Master's and Ph.D. students per year. The school also serves the educational needs of visiting predoctoral students and Summer Undergraduate Research students.

Predoctoral and other students 466

MAYO MEDICAL SCHOOL has trained and graduated more than 1,000 students since 1972. The school enrolls 42 students per year, and it also trains visiting medical clerkship students and Summer Minority Medical Students.

Medical and other special student categories... 575

MAYO SCHOOL OF HEALTH SCIENCES has increased its enrollment to over 1,275 students annually. The school provides training in 30 allied health science programs, offering associate's, bachelor's, certificate, master's and Ph.D. level training, as well as clinical internships.

MAYO SCHOOL OF CONTINUING MEDICAL EDUCATION formally became a school in 1996. It offers approximately 257 courses and 7,000 hours of continuing medical education each year.

EDUCATION FUNDING SOURCES *(in Millions)*

Extramural funding $39

Mayo funds $147

TOTAL FUNDING $186

• Mayo Clinic and the U.S. Department of Health and Human Services, on behalf of the Indian Health Service, formed a collaboration to work together to seek ways to reduce the burden of cancer and other diseases in American Indian and Alaska Native communities. This national agreement is the most comprehensive between the Indian Health Service and another health care organization.

• All 36 Mayo Medical School seniors who participated in the 2006 National Residency Matching Program were successful in matching with a residency program. Mayo School of Graduate Medical Education reported that 98.5 percent of its residency training positions were filled.

• In May, the first radiation therapy and respiratory care baccalaureate classes graduated from a combined Mayo School of Health Sciences/University of Minnesota program. Four radiation therapists and 10 respiratory care specialists received their degrees. The collaboration enables respiratory care and radiation therapy students to achieve a four-year bachelor's degree and professional certification from Mayo School of Health Sciences.

• Mayo Clinic hosted local high school students for its second annual Doc Camp in Arizona, in which students spend time with Mayo physicians and learn about careers in medicine.

• Mayo Clinic partnered with IBM to host a week-long ExITE camp, which encourages junior high girls to pursue scientific interests and highlights opportunities in engineering and technology. Students met with Mayo researchers, participated in a variety of projects (including isolating DNA strands), and viewed machines that create medical equipment.

• Through a partnership with the University of North Florida, Mayo Clinic in Jacksonville hosted the *Minorities in Medicine Symposium* for promising 10th grade students from schools in the area. Students and their parents attended a session to improve test taking skills, received information on completing scholarship applications, and were encouraged to take more rigorous courses.

• Mayo School of Graduate Medical Education was granted continued accreditation from the Accreditation Council for Graduate Medical Education Institutional Review Committee. The committee acknowledged the school's continuing efforts to maintain effective institutional oversight of graduate medical education, commended its multiple best practices, and noted its support of medical education scholarship.

Mayo Clinic is driven by its mission of providing the best patient care to every patient every day through integrated clinical practice, education and research. As a not-for-profit institution, Mayo invests all of its net operating income back into programs that support this mission.

OVERVIEW

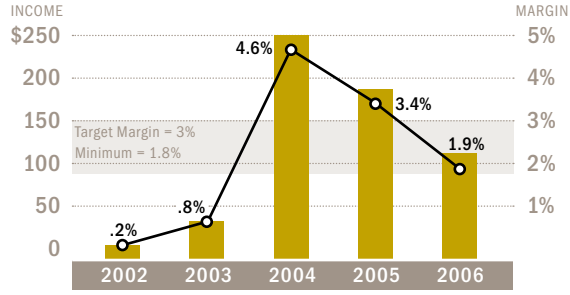
During 2006, Mayo Clinic's income from current activities — the best measure of Mayo's financial performance — was $117 million. This gave the institution a 1.9 percent operating margin. This performance was within Mayo's financial target for patient care and overall operations. Mayo Clinic sets its financial targets with the goal of achieving a return that will allow the institution to meet its expenses, reinvest in the practice, cover pension obligations, build its liability reserves, and grow its endowment.

The number of patients visits at Mayo Clinic grew by 2 percent to 3 percent across the system. Growth in expenses outpaced growth in revenue, due in part to important Mayo investments in patient care, research activities and information technology infrastructure. Mayo's total revenues grew by 8 percent, while expenses grew by nearly 10 percent.

OPERATING PERFORMANCE *(in Millions)*

	2006	2005	Percent Change
Total Revenue	6,289.4	5,811.6	8.2
Total Expenses	6,172.0	5,615.7	9.9
Income from Current Activities	117.4	195.9	
Operating Margin	1.9%	3.4%	(1.5)p

INCOME FROM CURRENT ACTIVITIES
(in Millions and % of revenue)



Significant benefactor support for education and research activities, and strong investment performance contributed to the positive overall financial performance for 2006. This performance also reflects both strategic investments by the institution in research and tremendous efforts by Mayo staff throughout the system to provide the best patient care in the most efficient and effective manner.

Continued strong financial performance is essential in the coming years to allow for continued investment in strategic priorities, restore Mayo Clinic's financial resources, meet increased pension payment obligations, and prepare for other financial challenges that lie ahead, including a growing number of Medicare patients and a constrained National Institutes of Health research budget.

INCOME FROM PATIENT CARE

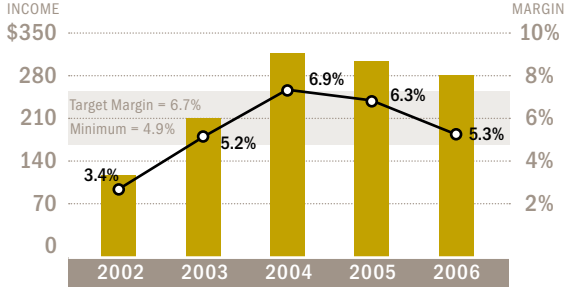
Mayo Clinic staff served 521,000 individual patients in 2006. The total number of patient visits for all locations was 2.8 million. Patient volumes grew 2 percent to 3 percent across the system. Mayo Clinic hospitals admitted 135,000 patients during the year, an increase of 3,000 admissions.

Income from patient care was down slightly — $279 million in 2006 compared to $307 million in 2005. However, overall financial performance in patient care was consistent with Mayo Clinic's multiyear financial plan.

PATIENT CARE OPERATING PERFORMANCE
(in Millions)

	2006	2005	Percent Change
Total Revenue	5,234.1	4,838.2	8.2
Total Expenses	4,955.1	4,531.2	9.4
Income from Patient Care	279.0	307.0	
Operating Margin	5.3%	6.3%	(1.0)p

INCOME FROM PATIENT CARE
(in Millions and % of revenue)



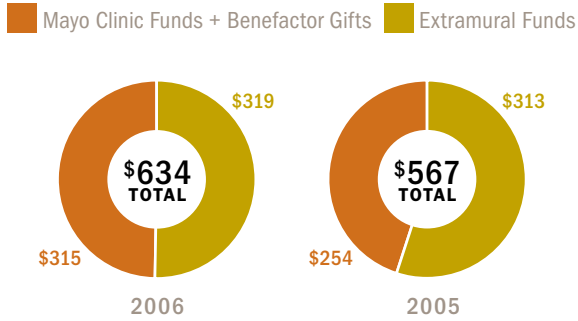
INVESTING IN RESEARCH + EDUCATION

Mayo Clinic's net operating income is reinvested to advance the science of medicine and to teach the next generation of health care professionals. However, Mayo can't rely on excess funds from operations alone to completely fund education and research.

Overall funding for Mayo research and education programs was $634 million in 2006, an increase of $67 million over 2005. Government, foundations and industry sources provided $319 million of the total amount — a 1.9 percent increase over 2005. Mayo invested $315 million in research and education in 2006. This includes Mayo funds and benefactor gifts.

Mayo will continue to partner with foundations, benefactors, government and industry with mutual aims to support education programs that train the next generation of medical professionals and research programs that identify tomorrow's medical breakthroughs.

RESEARCH AND EDUCATION FUNDING *(in Millions)*



SUPPORT FROM BENEFACTORS

More than 87,000 benefactors gave $230 million in 2006 to support Mayo programs. Support from grateful patients, foundations, corporations and other organizations is essential to Mayo Clinic's ability to carry out its mission in patient care, education and research, to provide outstanding facilities and technology, and to provide charity care.

ENDOWMENT

Mayo's endowment reached nearly $1.3 billion, growing by more than $260 million during 2006. The endowment helps provide a stable funding source for Mayo Clinic research and education programs. Mayo's goal is to increase the endowment to $2 billion in coming years. Mayo Clinic's endowment is a critical element in providing a long-term funding base for these programs.

DIVERSIFIED ACTIVITIES

Mayo Clinic's diversified activities include health information publishing enterprises, clinical laboratory reference services, technology commercialization, and other services and products that use Mayo's medical and scientific knowledge base. These diversified activities generated $35 million in 2006, which is reinvested in Mayo Clinic programs in medical research and education.

INVESTMENT PERFORMANCE

The financial markets made significant gains, with Mayo's portfolio returning over 18 percent. Mayo Clinic's investments increased in value by $569 million in 2006. Each year, a portion of the investment return is used to fund research and education programs. However, because there is significant variability of results from year to year, Mayo can't rely on strong stock market performance as a source of funding for the long-term.

INVESTMENT PERFORMANCE
(Annualized Return)

	ONE-YEAR	THREE-YEAR	FIVE-YEAR
General Fund	18.4%	15.6%	12.3%
Benchmark	16.3%	13.3%	9.7%

CAPITAL PROJECTS

In 2006, Mayo Clinic continued to make significant investments in facilities and infrastructure. Capital expenditures increased by $175 million in 2006 over 2005 levels, totaling $588 million.

The organization continued a number of major projects during 2006, including construction of a new hospital in Jacksonville, the build-out of the Gonda Building in Rochester, the opening of the Mayo Clinic Specialty Building in Arizona, and the development of the electronic medical record in the Mayo Health System. These major projects, along with technology, medical equipment, major renovations and projects are fundamental in providing advanced, quality care to our patients.

CONSOLIDATED STATEMENTS OF ACTIVITIES *YEARS ENDED DECEMBER 31, 2006 & 2005 (IN MILLIONS)*

REVENUE, GAINS, AND OTHER SUPPORT:	2006	2005
Net medical service revenue	$ 5,300.5	$ 4,910.7
Grants and contracts	270.5	258.2
Investment return allocated to current activities	93.1	78.1
Contributions available for current activities	130.8	135.7
Premium revenue	82.0	71.0
Other	412.5	357.9
Total revenue, gains, and other support	$ 6,289.4	$ 5,811.6
EXPENSES:		
Salaries and benefits	$ 4,050.0	$ 3,648.0
Supplies and services	1,481.2	1,329.2
Facilities	478.9	468.2
Provision for uncollectible accounts	102.0	117.6
Finance and investment	59.9	52.7
Total expenses	$ 6,172.0	$ 5,615.7
INCOME FROM CURRENT ACTIVITIES	$ 117.4	$ 195.9
NONCURRENT AND OTHER ITEMS:		
Contributions not available for current activities, net	$ 84.9	$ 121.6
Unallocated investment return, net	335.4	194.4
Change in net deferred tax asset	2.8	(1.0)
Asset retirement obligation	(25.7)	-
Miscellaneous	(2.2)	(5.9)
Total noncurrent and other items	$ 395.2	$ 309.1
INCREASE IN NET ASSETS (BEFORE OTHER CHANGES IN NET ASSETS)	512.6	505.0
CHANGE IN MINIMUM PENSION LIABILITY	12.0	7.1
INCREASE IN NET ASSETS	$ 524.6	$ 512.1
NET ASSETS AT BEGINNING OF YEAR	$ 3,551.7	$ 3,039.6
NET ASSETS AT END OF YEAR	$ 4,076.3	$ 3,551.7

CONSOLIDATED STATEMENTS OF FINANCIAL POSITION

YEARS ENDED DECEMBER 31, 2006 & 2005 (IN MILLIONS)

ASSETS	2006	2005	CHANGE
Cash and cash equivalents	$ 52.8	$ 43.1	$ 9.7
Accounts receivable for medical services, net	981.0	887.0	94.0
Investments — at market	3,230.1	2,661.0	569.1
Other assets	835.0	776.1	58.9
Property, plant, and equipment, net	3,126.0	2,862.4	263.6
Total assets	**$ 8,224.9**	**$ 7,229.6**	**$ 995.3**
LIABILITIES AND NET ASSETS			
Accounts payable and current liabilities	$ 1,058.0	$ 998.4	$ 59.6
Long-term debt	1,445.6	1,201.7	243.9
Other long-term liabilities	1,645.0	1,477.8	167.2
Net assets	4,076.3	3,551.7	524.6
Total liabilities and net assets	**$ 8,224.9**	**$ 7,229.6**	**$ 995.3**
MAYO SERVICES AND PEOPLE			
Measures of service			
Total clinic patients*	521,000	513,000	
Hospital admissions	135,000	132,000	
Hospital days of patient care	619,000	609,000	
People of Mayo (average full-time equivalents)			
Staff physicians, medical scientists, clinical and research associates	3,000	2,900	
Allied health, Residents, fellows and students	43,500	42,100	
Total	**46,500**	45,000	

* *Includes Rochester, Jacksonville and Arizona locations only.*

The above summary is intended to present a brief review of Mayo Clinic's financial condition and activities for 2006 compared with 2005. The Consolidated Financial Statements of Mayo Clinic for the years ended December 31, 2006 and 2005 were examined by Ernst & Young LLP.

A copy of its report and Mayo Clinic's financial statement can be obtained by writing to:
Treasurer, Mayo Clinic
Rochester, MN 55905

COMMUNITY BENEFIT SUMMARY: *BENEFITS TO THOSE IN NEED AND THE BROADER COMMUNITY**
YEAR ENDED DECEMBER 31, 2006 (ESTIMATED COSTS STATED IN MILLIONS)

COST OF BENEFIT PROVIDED TO THOSE IN NEED	2006
Charity care	$ 63.9
Unpaid portions of Medicaid and other indigent care programs	150.3
Total quantifiable benefit to those in need	**$ 214.2**

COST OF BENEFIT PROVIDED TO THE BROADER COMMUNITY	
Non-billed services and cash and in-kind donations	$ 8.6
Education and Research **	315.0
Total quantifiable benefit to the broader community	**$ 323.6**
Total estimated cost of quantifiable community benefit	**$ 537.8**
Unpaid portions of Medicare and other senior programs	$ 485.3

* *The estimated cost of benefits to those in need and the broader community were calculated in accordance with the guidelines set forth by CHA/VHA.*

** *The estimated cost of education and research excludes externally sponsored funding that totaled $319 in 2006.*

"All who are benefited by community life, especially the physician, owe something to the community." Charles H. Mayo, M.D., 1927

Mayo Clinic's founding fathers believed in giving back to the community. In many ways, Mayo Clinic and its staff continue the tradition of service established by Drs. Will and Charlie Mayo. Here are a few highlights of our year in service:

THE ARTS Using a grant from Mayo Clinic, the Rochester Art Center is creating a Learning Center for the Arts. The center will provide arts curriculum support to teachers of students from kindergarten through college. • Mayo Clinic provides financial support to more than two dozen visual and performing arts organizations in Rochester and the surrounding area.

DIVERSITY Mayo Clinic provides leadership to the Diversity Leadership Alliance in Arizona, a community collaborative dedicated to building, empowering and sustaining a community. • Through its Diversity Interest Groups in Arizona, Mayo Clinic provides health care and other outreach services, financial contributions and volunteers for various community projects. • Mayo Clinic staff work with Delta Sigma Theta Sorority Inc. and the American Heart Association to address health disparities in the Jacksonville community. The groups educated and screened more than 60,000 people in 2006 on issues related to heart health and stroke. As part of this effort, Mayo physicians addressed congregants in a dozen African-American churches. • Mayo Clinic supports *Study Circles*, a community program in Jacksonville that fosters positive race relations and understanding. *Study Circle* participants attend a series of meetings, during which they are guided through a curriculum designed to promote understanding of differences. Mayo has hosted two *Study Circles* on its campus, and plans to host additional sessions. • Mayo Clinic targeted outreach efforts to address the educational differences between the majority and minority communities in Jacksonville. Through Junior Achievement, staff have presented programs to assist students in better understanding the business environment. Additionally, staff have spoken at career fairs, read-a-thons and educational workshops. Mayo is a business partner at three local elementary schools, providing representation on School Advisory Committees, donating furniture and supplies, staffing health fairs, and participating in reading programs. • Nearly 18,000 children participated in Prejudice Reduction workshops, thanks to financial support from Mayo Clinic and other organizations in Rochester. Teachers give the program good grades for engaging students and teaching the lessons of respect and understanding. • Mayo Clinic support provided equipment to a Rochester chapter of the Black Data Processing Associates, a group that teaches advanced programming skills to high school students from diverse backgrounds. This group recently won second place in a national programming competition.

HEALTH CARE Mayo Clinic provided board leadership, volunteers and financial contributions to the Arizona Transplant House through fundraisers, direct contributions and a 5K run/walk fitness camp. • Mayo Clinic staff in Arizona volunteer at the Society of St. Vincent de Paul health clinic, which serves homeless and disadvantaged populations. • Mayo Clinic staff in Jacksonville volunteer at the Volunteers in Medicine clinic, which provides health services to the uninsured. • Mayo Clinic established the Mayo exam room at the Salzbacher Center for the Homeless in Jacksonville. • Mayo Clinic provided a start-up grant to Apple Tree Dental, a nonprofit organization that provides dental care to people who have special dental-access needs in Rochester. The grant enables dentists and hygienists to visit southeastern Minnesota nursing homes and group homes for the developmentally disabled to provide care. • Mayo Clinic provided capital campaign contributions of $100,000 each to the Ronald McDonald House and Gift of Life Transplant House in Rochester. The contributions helped finance needed expansions at the facilities, which offer long-term, low-cost housing for patients and family members. • Mayo Clinic provides financial support, equipment and volunteers to the Good Samaritan Medical and Dental Clinics, which provide medical and dental care to those who lack resources to pay for health care in Rochester.

HUNGER Mayo Clinic employees in Arizona donated hundreds of pounds of food to the Joshua Tree Food Shelter, the Ronald McDonald House and the Mesa Men's Shelter. Mayo Clinic Arizona also supports food banks and meal programs for the homeless and underserved through the Society of St. Vincent de Paul. • Mayo Clinic's support for Channel One Food Shelf helped launch a much-needed warehouse expansion effort in Rochester. In addition, Mayo employees contributed 4,586 pounds of food to Channel One.

SERVING THE UNDERSERVED As part of the seventh annual *Big Hearts Warm Small Hands* collection event, Mayo Clinic employees in Rochester donated warm winter outerwear to more than 500 families. • Mayo Clinic helped fund scholarships for five students, the first graduates from the community health worker program at Rochester Community and Technical College. This program prepares graduates to help people from diverse cultures gain better access to the health care system.

UNITED WAY Each year, Mayo Clinic sponsors a United Way fundraising drive. In 2006, Mayo Clinic employees pledged nearly $1.4 million to the United Way. The total contribution of $1.75 million was the largest United Way contribution in Mayo Clinic history.

YOUTH Together with the University of North Florida, Mayo Clinic in Jacksonville hosts a *Minorities in Medicine Symposium* for 10th graders and their parents. More than 60 students attended the symposium in 2006. • Mayo Clinic made a capital campaign donation to the Gamehaven Council of Boy Scouts, which will help construct a community building on the council's 262-acre camp near Rochester. The building will enable the council's 5,000 scouts to participate in year-round activities. • A contribution from Mayo Clinic helped jump-start *First Steps*, a community effort for early childhood development in Rochester.

Today much is being written about quality in health care, and the need to improve what we do and how we do it. A number of organizations, including the government, have been measuring physicians and hospitals to determine if their performance is the very best it can be.

This has led to a number of pay-for-performance projects sponsored by government purchasers such as Medicare and Medicaid; large employers who purchase health care for their employees; and health care coalitions. In these projects, providers are paid for doing very specific things for patients in a very specific way, with an emphasis on the processes of care. Recently, Denis Cortese, M.D., president and CEO of Mayo Clinic, and Robert Smoldt, the clinic's chief administrative officer, explored this phenomenon in a commentary they published in *Mayo Clinic Proceedings*, entitled *Pay-for-Performance or Pay for Value?* They emphasize that it's patient outcomes — not process — that should be the focus of quality improvement efforts.

"Most of these incentive programs target a mix of process and structural measures with less emphasis on patient satisfaction and overall patient outcomes. Programs have varying payment approaches, but quality bonuses are most common. In this scenario, payers give physicians and medical institutions an annual 'bonus' or percentage for meeting a goal (such as prescribing aspirin at discharge after an acute myocardial infarction) or withhold a small percentage of payment until requirements are met.

Mayo Clinic recently hosted its first National Symposium on Health Care Reform, at which 300 national leaders convened and reached consensus on the direction that reform must take. Two of the key recommendations dealt with value. Participants agreed that the health care system needs to deliver value to all stakeholders and that payment should be based on results of coordinated care delivered over time.

We must move away from pay-for-performance approaches that reward process achievement and move toward paying for value. Patients want health care that is a good value — high-quality health care (good outcomes, safe care, and great service) at a reasonable price."

$$\text{VALUE} = \frac{\text{QUALITY } \textit{(outcomes of care, safety, service)}}{\text{COST PER PATIENT OVER TIME}}$$

This value equation would move away from the current emphasis on processes and focus instead on patient outcomes. Improving processes of care is still important, but making sure that the processes result in improved care for patients will result in increased value and increased patient satisfaction.

An example of this is Mayo Clinic's STEMI project: a time-shaving approach to help more patients survive the most serious heart attacks.

The goal: Streamline care so time elapsed from when a patient enters the emergency department door to the moment a tiny balloon opens a blocked artery in the cardiac catheterization laboratory — balloon angioplasty — is 90 minutes or less. Few hospitals (less than 40 percent for non-transferred patients and less than 5 percent for transferred patients) meet this objective. The approach is dubbed door-to-balloon (D2B) time. The American College of Cardiology in collaboration with the American Heart Association and other organizations launched a national campaign to improve D2B times in 2006.

Mayo Clinic began its initiative in 2004, according to Henry Ting, M.D., the Mayo cardiologist who headed the multidisciplinary team effort. In two years, the median D2B time decreased from 92 minutes to 60 minutes for patients who come to Saint Marys Hospital in Rochester.

This quicker response saves the lives of patients with ST-elevation myocardial infarction (STEMI), a type of heart attack with total blockage of an artery (about 20 percent of all heart attacks). "Every 30-minute delay before opening the artery increases relative mortality by 8 percent," says Dr. Ting. "For these patients, time is muscle damage, time is cell death, and every minute counts."

Dr. Ting's team also focused on improving results regionally. "Even with our efforts here, we weren't helping most of the people in the region," says Dr. Ting. That's because most community hospitals, where patients go first, aren't equipped to perform balloon angioplasties.

"By streamlining the care, we've been able to dramatically improve outcomes." Henry Ting, M.D.

The solution was *Fast Track for Heart Attack*. Mayo Clinic coordinates with 28 regional hospitals within 200 miles. When a patient's electrocardiogram indicates a STEMI, the *Fast Track* protocol kicks in. The community hospital starts the right medications and activates the *Fast Track* with a single phone call. The air ambulance transport and preparations for an angioplasty procedure in Rochester are set in motion.

The median D2B time within 200 miles of Mayo Clinic is 108 minutes, compared to 180 minutes nationally. Sixty of the 108 minutes are to transport the patient to Rochester via helicopter.

"STEMIs are one of the true medical emergencies," says Dr. Ting. "By streamlining the care, we've been able to dramatically improve outcomes."

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Mayo Clinic is committed to providing the highest-quality medical care. Our mission — to provide the best care to every patient every day through integrated clinical practice, education and research — captures what the organization has stood for throughout its history. *The patient is the focus of everything we do.*

Four organizational priorities in 2007 are aimed at ensuring that our patient focus permeates the entire organization, in every department at every location. Mayo Clinic will focus significant effort on improving its ability to:

1. **Connect** as a unified organization with multiple locations so that wherever patients are seen, they have the same experience and know that they have access to all of Mayo Clinic's resources.

2. Build its **culture of teamwork and quality** across the institution, so that every practice is examined to ensure that it contributes the highest-quality care and service.

3. Search for answers for every patient through **individualized medicine** so that Mayo can better understand disease differences at the genetic level, enabling Mayo to personalize treatments more effectively.

4. **Transform the science of health care delivery** by improving and sharing what it has learned for the benefit of the entire organization and all of medicine.

1. WORKING AS ONE

Mayo Clinic is one organization with multiple locations. No matter where patients are seen, they should experience Mayo's model of care — the highest-quality care and personal service — and know that they have access to all of the resources of Mayo Clinic.

Inside the organization, Mayo is motivated by common goals and values, with staff at all locations dedicated to working together for our patients. Historically, Mayo Clinic has excelled at bringing together teams of specialists to diagnose and treat the most difficult medical conditions. Today, with specialists in virtually every medical specialty committed to collaboration, and connected through common goals and the latest technology, Mayo has resources unmatched by any other medical institution.

2. CULTURE OF TEAMWORK + QUALITY

Mayo Clinic has always been synonymous with quality. As an organization, Mayo has a culture of teamwork and quality that allows it to pursue excellence in patient care, to make important discoveries and apply the latest medical knowledge, and to provide great service.

The challenge today is to build on advances in teamwork and quality to create lasting improvements, spread throughout the organization, that deliver the best outcomes, the safest medical care, and the best in service. Delivering the best outcomes in the most efficient and cost-effective manner creates the best value in medical care.

3. INDIVIDUALIZED MEDICINE

Modern medicine has made great strides in linking clinical and biological data to improve our ability to predict an individual's susceptibility to disease, onset and progression of disease, and likely response to therapies.

In the coming years, even more will be possible by taking advantage of the rapidly increasing understanding of our genetic makeup, and developing more sophisticated information systems and tools to allow Mayo Clinic to predict better outcomes.

4. SCIENCE OF HEALTH CARE DELIVERY

Mayo Clinic is poised to transform medicine in the 21st century. As the Mayo practice developed, it built on excellent care for patients with a unified patient record, advanced communications and scheduling systems, and facilities designed to support and strengthen the practice of Mayo staff.

Mayo is creating the future of patient care by continuing to apply expertise not only to episodes of care but to the systems and processes that support the delivery of care. The goal is to improve the quality of our care, to improve the safety of our care, and to improve service we provide to patients. Mayo Clinic brings science to health care delivery through the study and application of process improvement and systems engineering principles, increasing the value of the care we deliver.

People have always come to Mayo Clinic for answers, for diagnoses, for treatments, for cures. Thanks to benefactor support, people can continue to rely on the excellence of Mayo Clinic.

Philanthropic support touches virtually every aspect of life at Mayo Clinic, and its benefits reach far beyond our walls. Every day, Mayo is at work — researching and teaching, sharing innovations, caring for patients and consulting with medical professionals around the world. A gift to Mayo is an investment in people.

Today, more than ever, philanthropy is essential to making progress in patient care through research and education at Mayo Clinic. Benefactor support enriches our programs and helps keep Mayo on the cutting edge of medical science. Our benefactors are partners in our mission. Their generosity helps nurture our commitment to provide the best care to every patient every day through practice, education and research. *Together* we are making a difference in the lives and the hopes of so many in need.

www.mayoclinic.org/annualreport

"People from all over the world come to Mayo when they've failed to be treated elsewhere. When I go to Mayo, I know I'm going to receive the best care possible. There's a human touch that you just don't get anywhere else." Helen Houle

"We support Mayo now to help others. We give to multiple myeloma research in the hopes of one day finding a cure." Tom + Linda Garrett

ow can elders keep their memory sharp? What's the risk of a blocked artery? Will the doctor show me the tomography scan used to make the agnosis? What is the chance of being treated at Mayo Clinic in Arizona? Has Mayo Clinic done a study on patients with seizures who also had is type of headache? Will waiting too long make the surgery more difficult? Is Mayo committed to creating distinctive environments that ncourage collaboration between researchers and physicians? What is Mayo doing to create the future of medicine? What's the most effective ay for adults to learn? What if this pain is a false alarm? What Alzheimer's research is Mayo Clinic doing? What is important to you in your ork here at Mayo Clinic? What can we do to ensure patient safety? What does a heart attack feel like? Would my conjoined twins survive eparation surgery? Why didn't the prescribed medicine work? How does a patient know that he/she has the right to have his/her pain anaged? Could I develop the same problem as my sister? Has this treatment for osteosarcoma been successful for others? What is healthy rain aging? Should I call 911? What is a balloon angioplasty? Is there a connection between hypertension and Alzheimer's? Is there someone t Mayo Clinic who can help our girls? When will the genomic revolution make a difference to my family? Why aren't more African Americans volved in medical research? Will I ever be able to work again after a transplant? Can Mayo tell me for sure what's wrong? Will I ever be able o remember what pills and when to take them? Why do I feel so tired and weak all the time? What hope can clinical research give me? How d I develop lung cancer? How do we at Mayo Clinic enhance patient care quality? How is Alzheimer's diagnosed? How does exercise help fter a heart attack? Should I go to the emergency room? How will this new research breakthrough benefit our patients? Where will my children et the health care they deserve? What kind of difficulties would she face after surgery? How does "living well" affect my ability to think? What's y prognosis? What side effects would my new treatment have? What is my motivation for a healthier life? How does this new medication work? Why do so many African-Americans have Alzheimer's? Will I die? What changes are needed to prevent another heart attack? Where can medical tudents make a mistake without risks? What is the ideal learning environment? Will our babies make it through surgery? Any connection etween hypothyroidism and high cholesterol? Is reversible ischemic neurologic deficit a stroke? Is there a better solution to this problem? Can y cholesterol level be too low? Will my new implantable cardioverter-defibrillator interfere with mammograms? Does coenzyme Q10 prevent tatin side effects? Should I be concerned about my heart palpitations? What are the causes of my father's slurred speech? Can an antinuclear ntibody test diagnose lupus? Why do I have a severe drop in blood pressure every time I stand up? Are researchers defining specific causes f heart attacks? What is the cause of my Parkinson-like tremors? Is Mayo offering any clinical trials for children with ADHD? Can glucosamine upplements rebuild cartilage? What are the symptoms of lupus? How is arthritis diagnosed? How can we decide what treatment is best for my nother? Is gout a risk factor for heart disease? What's the difference between mini-stroke and stroke? Does Mayo Clinic offer an effective eatment for low back pain? Can insulin injections relieve fibromyalgia symptoms? Is air travel safe with an enlarged heart? Does Mayo offer screening test for Alzheimer's? What is the difference between bypass surgery vs. angioplasty for coronary artery disease? Could my hearing ss be a side effect of my medication? What causes my hands to go numb? Can ozone air purifiers improve asthma symptoms? Is Mayo Clinic esearching a better prostate cancer test? Do artificial sweeteners have any effect on blood sugar? What warning signs might indicate I need nore help? Am I too old for strength training? Can thermography detect breast cancer? How does my asthma affect my baby and me during regnancy? What should I expect with this disease? Is it true that my diabetic mother should avoid electric blankets? In the future, will Mayo ffer search engines to retrieve relevant information for optimal patient care? What is the latest research Mayo Clinic has done for lung cancer? oes cold weather make my emphysema worse? How does Mayo Clinic measure the effectiveness of breast cancer treatments? By establishing n endowment for Mayo Clinic, can I create a legacy that perpetuates my passion for diabetes research? How do you feel about Mayo Clinic? an I get my dad into Mayo Clinic without an appointment? What is the link between diabetes and liver disease? Are hypothyroidism and bipolar sorders related in some way? Is bronchial thermoplasty a new asthma treatment? Could Mayo Clinic help my mother with her Alzheimer's? an certain foods increase thyroid function? Why is this happening to me? What should my father expect after his thyroidectomy? Does my 6 ear-old need flu shots? Do calcium supplements interfere with my wife's chemotherapy treatments? Can chelation therapy help treat autism? o my children need multivitamins? Is there a diabetes drug that can also help me lose weight? Can children get osteoporosis too? Are breast alcifications cancerous? Does your risk of diabetes increase with age? What treatment options does Mayo Clinic offer for my husband's nusitis? Can I inherit my fathers Type 1 diabetes? Does Köhler's bone disease cause permanent bone damage? What causes my legs to ramp up at night? How long would my father have to wait for a kidney transplant? Does cinnamon lower my blood sugar levels? Whom should trust my ailing father's health to? Can larger, universal patient rooms in the new hospital be converted to ICU rooms at any time? Is erectile ysfunction an early indicator of heart disease? How are genomics and proteomics revolutionizing medicine? How will I know that the drug eatment is working? What are the symptoms for an aspirin allergy? Is surgery the only option? What can I do to prevent my breast cancer from oming back? Should I take migraine headache medication only when I need it, or take it daily for prevention? Are Mayo researchers developing eatments to reduce alpha-synuclein? To ensure my cancer is gone, do I need to begin radiation therapy? Do you need a doctor's referral for

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