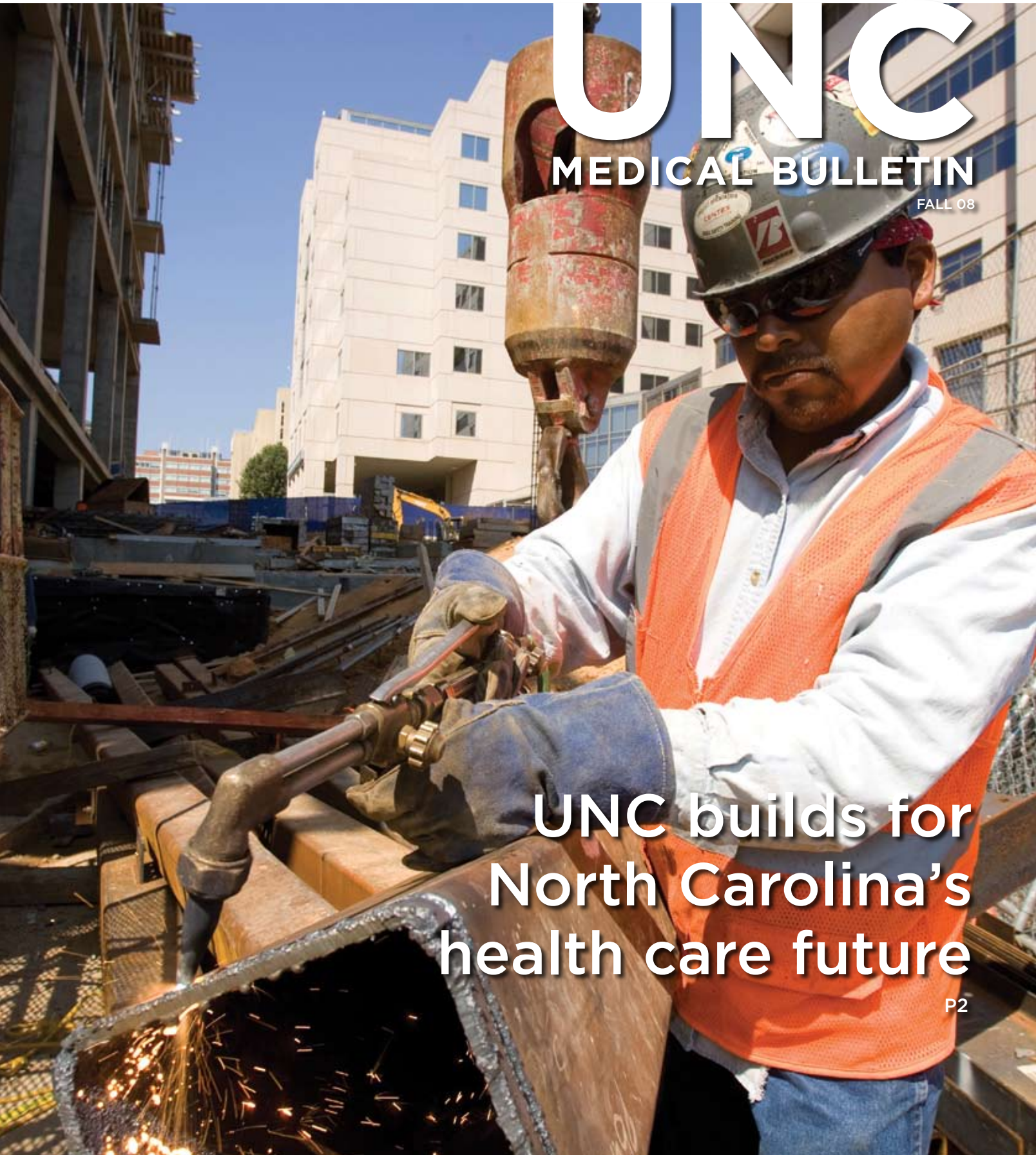

UNC MEDICAL BULLETIN

FALL 08

UNC builds for North Carolina's health care future

P2

Creating a CAROLINA LEGACY

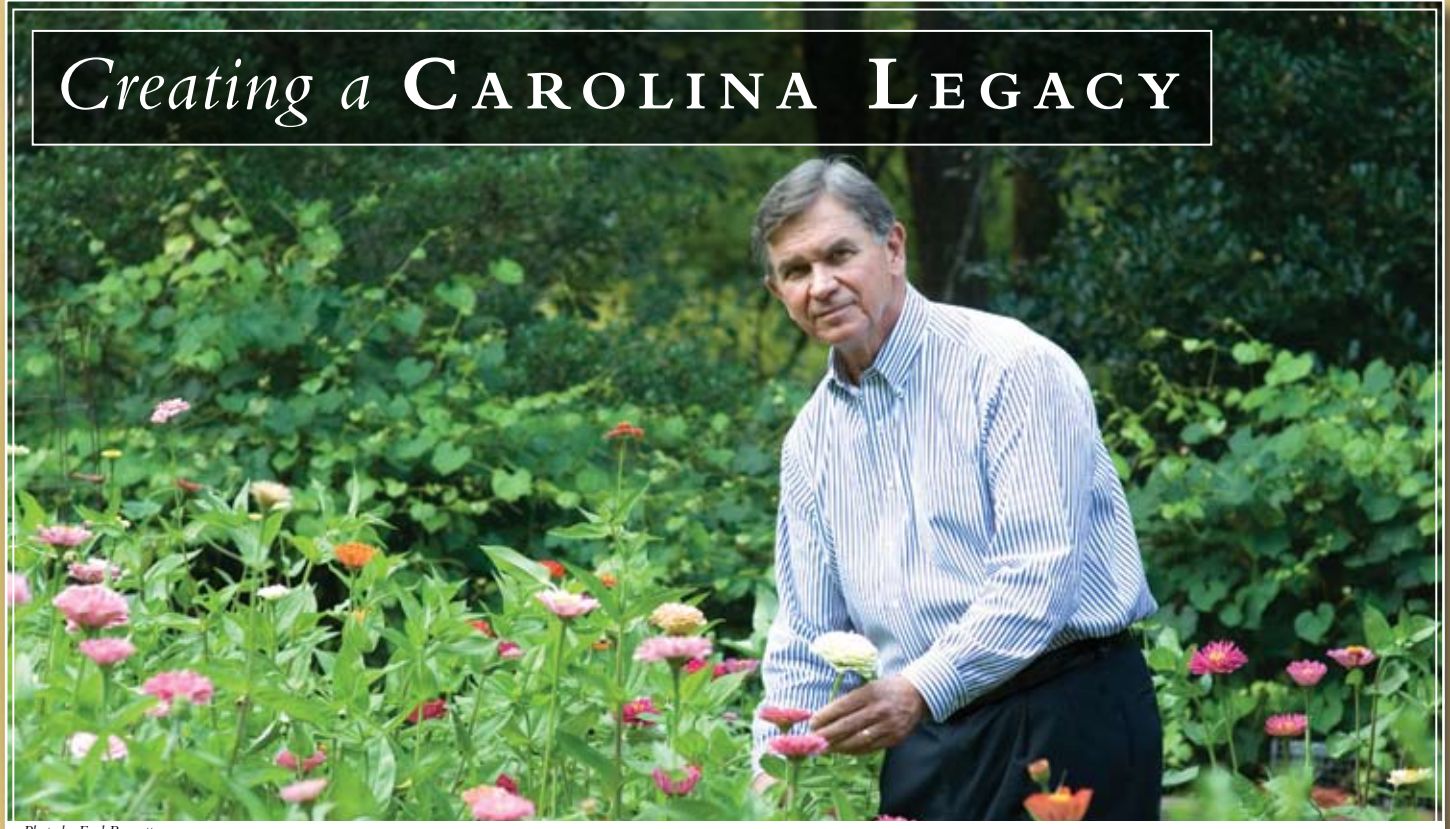

Photo by Fred Bennett

An Exponential Gift

MOREHEAD ALUMNUS AND RETIRED HEART SURGEON HONORS UNIVERSITY FOUNDATIONS THAT SHAPED HIM

If you're interested in creating your Carolina legacy, please contact Jane McNeer, vice president of The Medical Foundation of North Carolina, Inc., at 919-966-3946 or 800-962-2543 or Jane_McNeer@med.unc.edu. You may also contact Candace Clark, associate director of planned giving, at 919-962-3967 or 800-994-8803 or createalegacy@unc.edu.

The Berryhill Society

JOE CRAVER '63, '67 (MD) just retired from a 31-year career as a full-time cardiac surgeon and professor of surgery at Emory University School of Medicine. Reflecting on his life, Craver felt that there were some pivotal moments for which he was very grateful. The first big one, he said, after being born to and reared by his parents, was attending Carolina as a Morehead Scholar.

"THIS AWARD PRESENTED significant opportunities as well as challenges to me — to justify their selection," he said. "I endeavored to meet those, and I'm now even more grateful for their support and for UNC."

LEADERSHIP BECAME SYNONYMOUS with Craver on the Carolina campus. He co-captained the football team and received numerous awards as an undergraduate as well as a student at the UNC School of Medicine.

CRAVER FELT THAT he would like to make a tangible gift to UNC to express his gratitude. He and his wife, Amelia, decided that they were not as dependent on his 401(k) retirement funds as expected. Also, because these funds are taxed at the maximum rate if used personally or passed as inheritance, they seemed ideal for a charitable gift. Craver sought a creative way to use these funds while he was still alive. He learned he could buy a commercial annuity within his IRA rollover account and name the UNC Medical Foundation and the Morehead Scholarship Foundation as charitable beneficiaries. Upon his death, they would receive the full corpus (currently valued at $1.25 million, plus their growth) as endowment funds. The UNC Medical Foundation will use $250,000 of these funds to establish the Joseph M. Craver Teaching Professorship. He also will make annual gifts from the annuity income he receives to provide each foundation with current resources during his lifetime.

"THIS WAY, THE benefits start now for both of us," Craver said.

CRAVER ALSO PURCHASED life insurance policies for each to protect the values of the ultimate principal distributions to both foundations.

THE SON OF TEACHERS, Craver enjoyed teaching every single day of his professional career, and thinks of teaching as a way to "extend one's life's work exponentially." He is now taking that legacy of teaching in another direction by showing others how to discover creative ways to use their resources.

UNC
THE MEDICAL FOUNDATION OF NORTH CAROLINA, INC.

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UNC Medical Bulletin
Fall 2008
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The *UNC Medical Bulletin* is published for the alumni and friends of the University of North Carolina School of Medicine and UNC Health Care.

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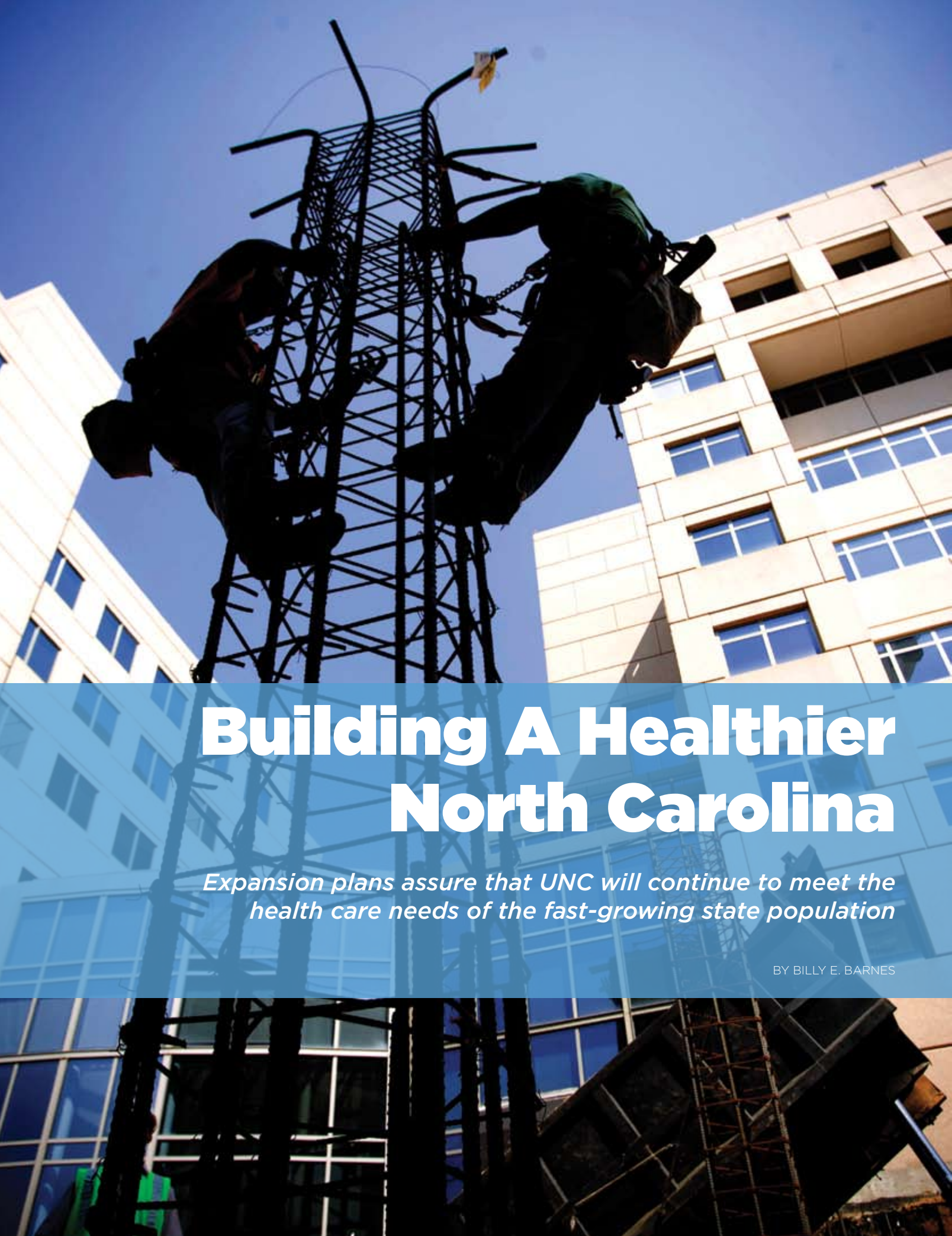
ON THE COVER

UNC Health Care and the School of Medicine are expanding to meet the growing needs of an ever-increasing state population. See story on page 2.

Photo by Brian Strickland



Building A Healthier North Carolina

Expansion plans assure that UNC will continue to meet the health care needs of the fast-growing state population

BY BILLY E. BARNES

"**By 2030, the state will grow in population** from nine million to about 13 million. That is the equivalent of moving everyone who lives in South Carolina today, to North Carolina," Dr. William L. Roper, dean of the School of Medicine and CEO of UNC Health Care, explains. "We need the best facilities in Chapel Hill and throughout our state so we can conduct cutting-edge research, provide treatment, and adequately train the next generation of doctors and health care workers." The "best facilities" to which Roper refers will provide expansion designed to meet the needs of North Carolinians as the state's population grows.

With the faltering US economy, one may wonder why UNC has significant expansion plans in the works. The answer lies in North Carolina's many health care priorities: cancer, heart disease, diabetes, the aging population, obesity, the physician shortage—all of which, if left unaddressed, could lead to serious consequences for the state.

"We need to start now before our challenge turns into a crisis. As we face these tight economic times, we need to make sure we are smart with the resources we have and that we continue to lay the groundwork to meet our state's health care needs in the future," says Roper.

Near-term expansion at UNC Hospitals will be implemented in two phases.

Phase one calls for three new facilities:

(1) a modern 321-bed patient tower;

(2) a spacious patient-entrance wing for registration and room assignment; and,

(3) a cluster of 38 state-of-the art operating rooms including procedure rooms, adult cardiac catheterization labs, electrophysiology labs, and other procedure spaces.

Phase two of the plan includes a pair of service and support buildings on the northern edge of the medical complex (near Kenan Stadium).

The new bed tower won't be just another stack of hospital rooms. For years it has been evident that medical facilities built in the 1950s and '60s are woefully outdated and unable to accommodate the wiring, piping, and air-handling hardware required for state-of-the-art health care. Rooms in UNC Hospitals' new bed tower will be ultramodern units capable of providing several levels of care that may be needed. This versatility will help match a specific patient's needs to the room required.

At the School of Medicine, expansion has proceeded at a rapid pace for the past six years and will continue to do so well into the future.

Roper says, "Within 20 years, North Carolina will have 25 percent fewer primary care physicians than it should, especially in rural areas. This makes having the right facilities all the more important so we can attract and train the best and brightest.

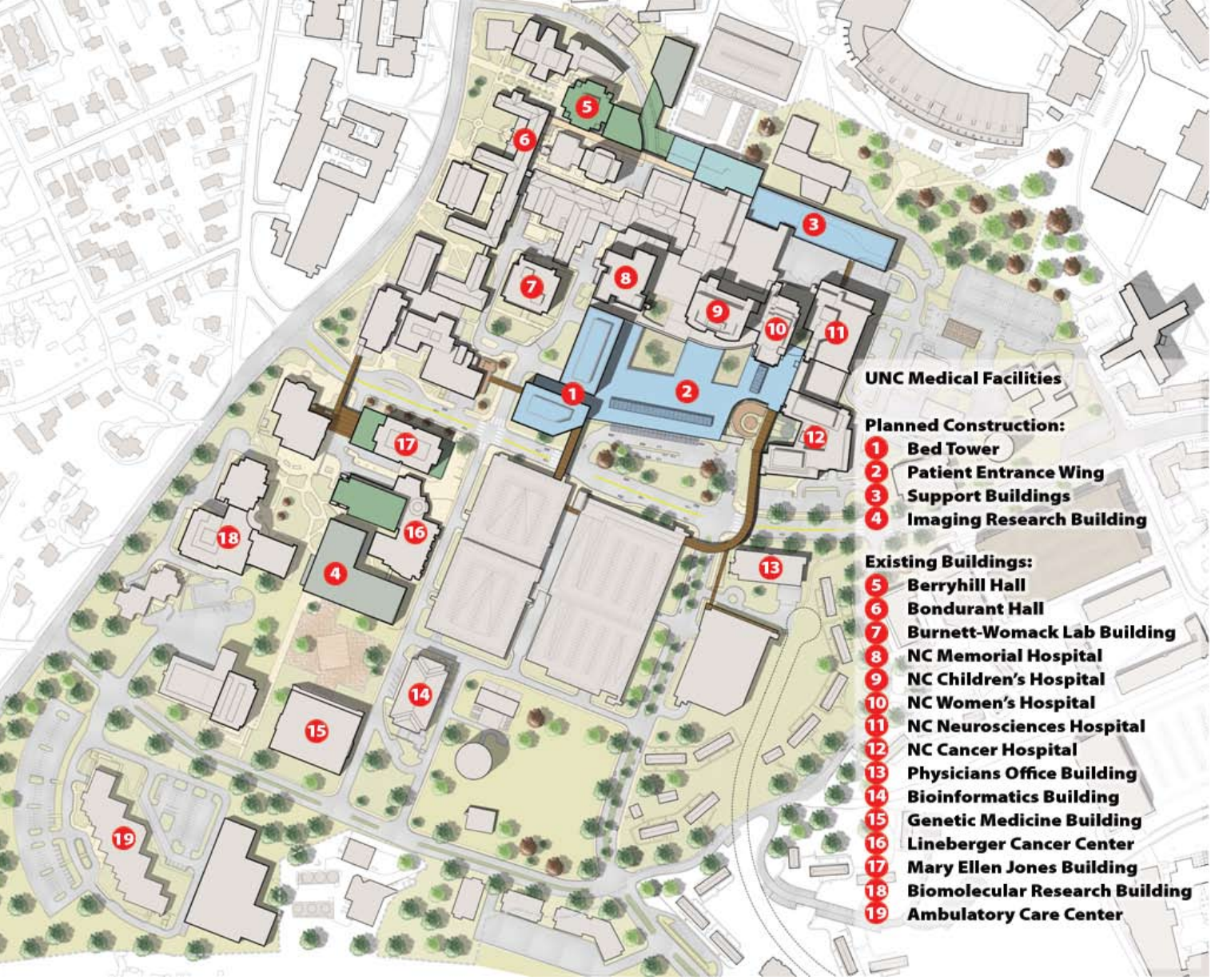
"We'll also need facilities to treat more patients, especially as cancer and other chronic diseases continue to grow. Public health officials say that, over the next 20 to 30 years, the number of cancer cases in the state will double. The survival rate for many cancers is increasing, making it more of a chronic disease than it once was. To conduct cutting-edge research, we will need world-class facilities."

By 2030, the state will grow in population from nine million to about 13 million. That is the equivalent of moving everyone who lives in South Carolina today, to North Carolina.

The University Cancer Research Fund, approved in 2007 by the North Carolina General Assembly, was established to accelerate cancer research at the UNC School of Medicine and the Lineberger Comprehensive Cancer Center. The fund began with $25 million in 2007 and is slated to increase to $50 million per year beginning in 2009.

In addition, UNC recently received a $61 million Clinical and Translational Science Award from the National Institutes of Health to fund the North Carolina Translational and Clinical Sciences Institute. Roper says the award will transform the way research is performed in North Carolina by enabling UNC to partner with communities to more rapidly and efficiently translate scientific discoveries into improvements for the health of the state's citizens.

Clearly, the UNC School of Medicine must expand its facilities to meet these needs, and the tall cranes and helmeted construction crews are busy making it happen.



The above illustration shows the planned layout of the medical campus at the completion of the master plan.

Recent additions and renovations

An amazing amount of construction has been completed in the past seven years. The Bioinformatics Building, completed in 2002, provides 156,653 square feet of offices and work space for 400 staff.

The new Biomolecular Research Building provides 21st century laboratory space and equipment to complement the scores of brilliant minds at work in search of new medical discoveries. Completed in early 2004, the structure features seven floors (260,000 square feet) of research laboratory space, plus two auditoriums—one seating 200 and the other 500. This structure, attached to Taylor Hall and the Neuroscience Research Building (completed in 2001), provides research labs for cardiology, infectious diseases, gastrointestinal disorders, and pediatric endocrinology. The building provided the first new lab space since the early 1990s and the first open-lab architecture to be found at the School of Medicine. Instead of a series of small rooms, the lab space is a 3,000 square-foot open area in which teams of researchers can be in constant collaboration. That's a radical change from the traditional configuration where researchers work alone in small rooms.

Ever mindful of the necessity to preserve both the environment and UNC's architectural history, several older buildings have been retrofitted to meet this century's needs. Soon after the completion of the Bioinformatics and Biomolecular Research buildings, the old nine-story, 190,000 square-foot Burnett-Womack lab building was emptied, gutted, and rebuilt. Reopened in 2005, it now houses six floors of clinicians' offices and three floors of labs, including the largest biosafety level-three lab on the UNC campus. With this lab in place, School of Medicine researchers can safely study airborne diseases such as equine encephalitis.

The School of Medicine has operated for more than half a century without a building that visibly stood out as its hub and headquarters. That situation has changed, and handsomely so. The old Medical Sciences Research

Building, located south of the School of Nursing, was gutted, its size doubled with a 50,000 square-foot addition, and reopened in 2006 with a grand new façade facing Columbia Street. The building was renamed Bondurant Hall, in honor of Stuart Bondurant, who served as dean of the School of Medicine from 1979 to 1994. Today it houses the School of Medicine's main administrative offices, plus the Department of Allied Health Sciences.

The 107,455 square-foot Physicians Office Building is the most recently completed structure. It contains offices for all physicians who will be practicing in the new North Carolina Cancer Hospital, plus physicians and staff in the departments of emergency medicine, neurology, and otolaryngology.

Now underway or on the drawing board

Recent media reports have noted that, despite many decades of concentrated research, cancer stubbornly remains one of the world's most life- and lifestyle-threatening diseases. In 2009, an exciting response to this challenge will be the opening of the North Carolina Cancer Hospital, providing a platform for major advances in patient treatment and discovery of new therapies by world-class cancer researchers. This $180 million, 320,000 square-foot building will provide cancer patients with services including radiology/imaging, infusion, mammography, radiation oncology, phlebotomy, genetic counseling, clinical laboratory services, rehabilitation, as well as a pediatric clinic with a play area, outpatient clinics, and inpatient beds. Patient parking will be provided near the building's main entrance.

Dr. Richard Goldberg, chief of Hematology/Oncology at UNC Health Care and associate director for clinical research at the UNC Lineberger Comprehensive Cancer Center, will serve as the Cancer Hospital's medical director. He says, "This building will allow us to bring resources to the patient instead of having to take the patient to the resource. Nearly everything a cancer patient needs will be under one roof."

Dr. H. Shelton Earp, director of Lineberger, says, "We envision the Cancer Hospital as becoming a hub that reaches out to doctors across the state. This building will enhance our ability to move fundamental research directly into patient applications."

"To maximize efficiency and create a decidedly patient-friendly atmosphere in the new building, teams of patients and hospital staff members were actively involved in the Cancer Hospital's design process," says Mary Beck, UNC Hospitals' senior vice president for system affiliations. Beck has been impressed with how the cohesiveness of the oncology staff has come to the fore during the project. Instead of jockeying for space individually, she says, the entire staff worked together to make the whole layout more seamless.

Also nearing completion is the Genetic Medicine Building, which has been under construction for more than three and a half years. At 331,000 square feet, it is the largest building on the UNC campus, soon to be home to the departments of Biochemistry, Pharmacology, and Genetics, plus several School of Pharmacy functions. In addition, this building houses an animal facility larger than a combination of all other such operations on campus, remedying a chronic shortage of animal research space at UNC.

The seven-story Genetic Medicine Building will house laboratories, classrooms and offices for both the School of Medicine and the School of Pharmacy. Two floors of the 331,000 square-foot building are underground.

Robert Marriott, Jr., the School of Medicine's associate dean for planning, management, and resources, is working on plans for an Imaging Research Building that he refers to as "the new largest building on the UNC campus." The 343,000-square-foot structure, to be built at a cost of $260 million (including equipment), will be devoted entirely to research labs and imaging research aimed at finding and treating the whole family

In August 2004, the state of North Carolina authorized $180 million in funding to construct the state-of-the-art NC Cancer Hospital. Construction began in October 2005, and the building will open in late 2009. The state's investment will substantially improve patient care for the citizens of North Carolina and, through the stimulation of cancer research, significantly improve the state's economy and position as a national leader in biotechnology. Photo by Edward Byrnes

of ailments related to cancer.

Imaging is an important part of the fight against cancer because early detection is so important. The Imaging Research Building will be attached to the Lineberger Comprehensive Cancer Center so that physicians and researchers can conveniently collaborate on cancer treatments. "We expect this facility to elevate UNC and the state of North Carolina into the sort of atmosphere MD Anderson and Sloan Kettering occupy in the field of cancer treatment," says Marriott.

The Imaging Research Building will be equipped with a cyclotron to make radioactive isotopes used in tracing tumors and other research. Marriott describes the cyclotron as "about the size of an office desk," but expensive medical equipment often comes in small packages. The cyclotron bears a $1.5 million price tag. Safety considerations require that the device be housed in a vault with four-feet-thick concrete walls at a cost of an additional $3.5 million. The cyclotron, Marriott adds, is just one feature—there will be about $40 million worth of state-of-the-art equipment in the building.

Obviously there's a limit to the amount of land available for expansion on the UNC Health Care and medical school campuses. One solution to the acreage shortage is to move clinical services off campus. For example, the Ambulatory Care Center (ACC), housed in a free-standing building a block south of the main hospital complex, sees more than 167,000 of the nearly 800,000 patients seen annually at UNC and has been operating at capacity for several years. To take pressure off the outpatient space on campus, Cardiac Care services have been moved to space in the Meadowmont residential and business community and Surgical Oncology and Otolaryngology further to the eastern outskirts of Chapel Hill. Dermatology and Rheumatology soon will be relocated into the community as well. These moves alleviate parking problems at the main campus while reducing access problems for patients, who are delighted to be able to park just a few steps from the clinics' front doors.

An artist's rendering depicts the new bed tower and patient entrance wing along Manning Drive.

In another off-campus development, design work is underway for a new Diagnostic Imaging and Spine Center to be constructed in eastern Chapel Hill on the corner of Highway 54 and Finley Golf Course Road. The project is scheduled for completion in 2010.

These brick-and-mortar improvements are crucial to the pursuit of excellence but many important, though less visible, changes are underway.

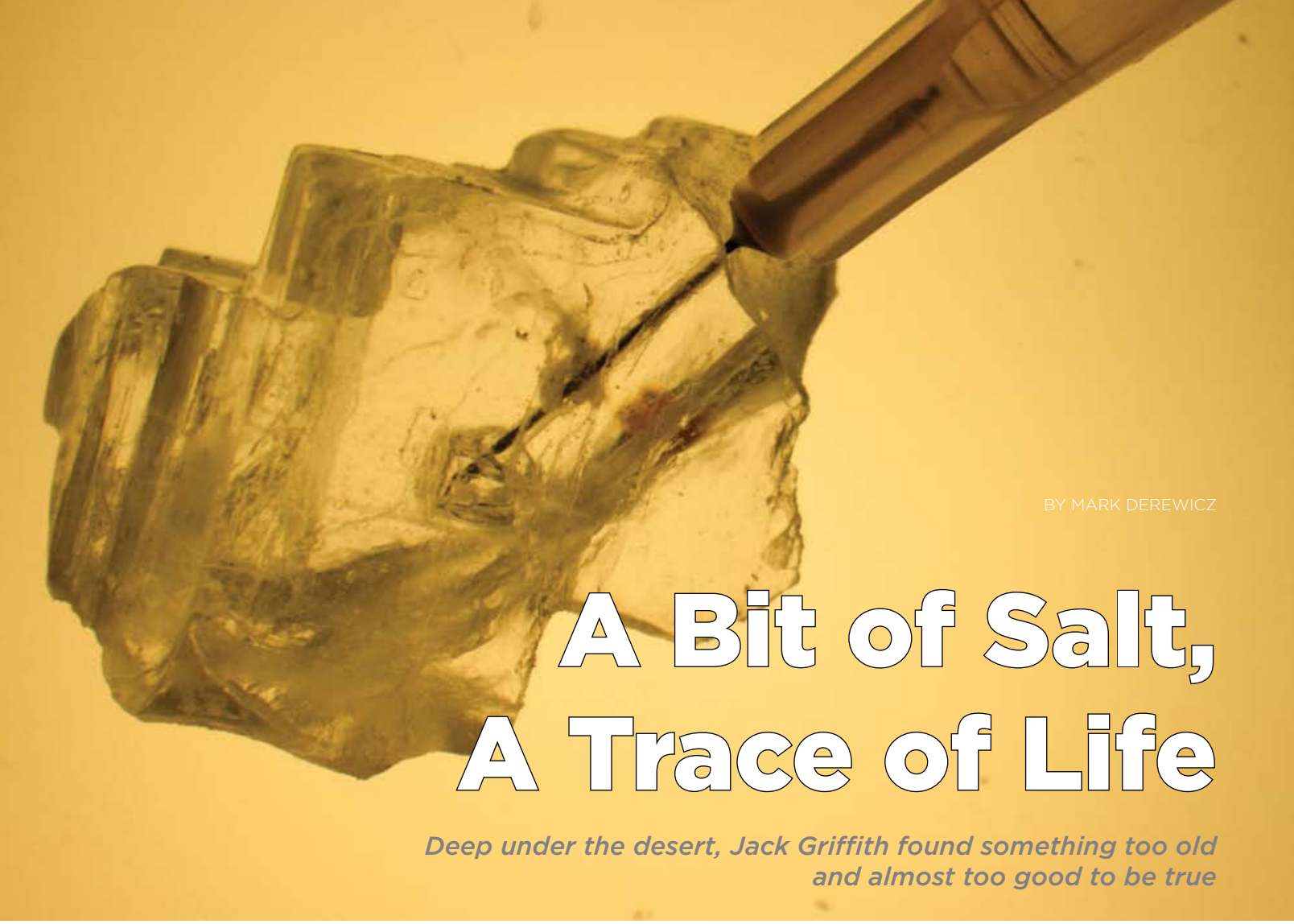
Near future

Looking further—eight to ten years—into the future, it's clear that the School of Medicine must graduate more physicians. In response, the venerable Berryhill Hall will be either drastically rebuilt or totally replaced. The result will be a large, ultramodern medical education facility that will allow an increase in enrollment capacity from the current 160 students to as many as 230.

Roper continues to emphasize statewide outreach and partnerships. "Our expansion should move beyond Chapel Hill. We would like to expand the medical school to Charlotte and Asheville in order to extend our reach and ability to train more doctors for all areas of the state. In addition, we are looking for partnerships with other organizations, like the Leo W. Jenkins Cancer Center at East Carolina University, to partner on medical education and cancer care delivery."

Under these partnership plans, medical students would complete their basic science training at the Chapel Hill campus, then move to one of the other three universities for clinical training in concert with major hospitals in Charlotte, Asheville, and Greenville. By situating significant medical training centers in the mountains, the urban piedmont, and coastal plain, UNC School of Medicine officials hope to interest more young physicians in pursuing careers in areas of the state where health provider shortages are most severe. At the same time, the plan will enable expansion of medical student enrollment at the UNC-Chapel Hill campus.

North Carolina is a large state with a fast-growing, fast-aging population. UNC Health Systems' motto, "Leading, Teaching, Caring," isn't just another promotional slogan. It's the keystone that binds patients, teachers, students, caregivers, researchers, buildings, state-of-art equipment, and far-seeing administrators in a total effort providing better health and better living to the people of North Carolina and the world at large.



BY MARK DEREWICZ

A Bit of Salt, A Trace of Life

Deep under the desert, Jack Griffith found something too old and almost too good to be true

In a tunnel 2,000 feet below the desert near Roswell, New Mexico, a lone beam of light from Jack Griffith's headlamp struck a thick wall of ancient salt. Griffith had no idea what was trapped inside this 250-million-year-old crystallized formation. Ancient fossils? Bacteria? Nothing? He didn't dream of finding an organic molecule that might help scientists find life on other planets. That sort of idea usually belongs above ground in Roswell, de facto home of ufology and alien conspiracy theories. But Griffith's science project turned out to be almost as surreal as Roswell, and a whole lot more provable than a UFO.

Jack Griffith, the Kenan Distinguished Professor of Microbiology and Immunology in the UNC School of Medicine and a professor of biochemistry, isn't known to traipse into the wild searching for odd and ancient matter. He is, though, something of a legend for his work photographing the tiniest of things with his electron microscope. He figured out a way to see the finer details of DNA, and he took the first photo of DNA bound to a known protein. Such work has helped biochemists analyze macromolecules of all shapes and sizes.

One such biochemist is Bonnie Baxter. Several years ago, she asked Griffith to photograph bacteria she had found in Great Salt Lake. He agreed, and while peering at Baxter's samples he saw surprisingly large amounts of bacterial viruses in the background.

"We didn't expect to see that," Griffith says. "Scientists had seen it in other salt environments but never in the Great Salt Lake. The viruses looked like ones that grow in people."

Curious but focused on his main research, Griffith had two high-school interns spend the summer studying the bacterial viruses. But Griffith's curiosity eventually got the best of him. He knew that really old halite formations exist around the world; what if bacteria and their viruses were trapped inside these ancient salt crystals?

Baxter sent Griffith salt crystals from an old mine in Utah, but he couldn't find many with inclusions, the pockets of water that might contain very old organic material. Geologists told him that surface water had continually leaked into that salt formation, redissolving the salt over and over and casting doubt on the age of anything encased in the crystals.

"That salt deposit was geologically trashed," Griffith

says. “So then it became a matter of, well, should we drop this, or should we get a little more serious?”

Griffith read up on ancient halite formations and found out that the most promising, undisturbed salt deposit lies 2,000 feet below the desert 30 miles southwest of Roswell.

Last summer, Griffith flew to El Paso, Texas, and drove 200 miles into the middle of the desert until he came upon an inconspicuous mining operation.

“Unless you knew what this was you’d drive right past,” he says. “There are no signs. It has a very low profile, yes, except for all the security.”

Turns out, this isn’t salt mine. It’s a dump for nuclear waste. Or, as the US Department of Energy (DOE) calls it, a Waste Isolation Pilot Plant. Either way, it’s where the DOE buries transuranium waste from old nuclear warheads.

But Griffith says this is no pilot plant.

“There’s almost an entire city cut into that gigantic salt deposit a half-mile underground.”

In the 1990s, the DOE dug a mine shaft through 2,000 feet of rock to reach the Permian Salado Formation, a 250-million-year-old conglomeration of halite — crystallized sodium chloride, also known as salt. The Salado is 2,000 feet thick and extends for miles underground. Using a gigantic drill, the DOE has hollowed out miles of tunnels and dozens of rooms as big as football fields to store thousands of barrels full of nuclear waste. The 100-gallon barrels are stacked three high, wrapped tight, and then sealed behind a twelve-foot cement wall. Geologists say that over time, the salt will act like a glacier, slowly covering the barrels and encasing them permanently.

Griffith says that most geologists who have studied the Salado are confident the formation is too deep under rock to have ever been penetrated by surface water. This means that the Salado very likely had remained unperturbed for 250 million years, since the continents were clumped together in one landmass called Pangaea. When the continents began drifting apart, a large pool of oceanic salt water was trapped inland near the equator. The water eventually evaporated, leaving an enormous salt deposit that crystallized and was covered by sedimentary rock. That part of Pangaea is now southeastern New Mexico.

Most macromolecules are thought to degrade well before 250 million years have passed. DNA definitely isn’t supposed to last that long. But few people have looked for it in such a strange place.

Griffith pulled up to the outer fence at the nuclear waste site, watching a conveyor belt dump tons of large salt crystals onto enormous trucks. There, he met geologist Dennis Powers, a DOE consultant and Salado formation expert who handed Griffith a hard hat with a headlamp. They stepped inside an elevator and whooshed down through 2,000 feet of darkness.

“Whether you’d like this depends on whether you’re claustrophobic and like insects or not,” Griffith says. The elevator let them off near the intake shaft that sucks in air—and bugs—from the surface.

“There’s a colony of black widow spiders, thousands of them, just hanging out by the intake shaft waiting for insects to be blown into their nests,” Griffith says. “We did our sampling elsewhere.”

Powers and Griffith hopped on an electric-powered cart and navigated their way through the eerie caverns, passing the many rooms full of nuclear waste until they came upon a freshly cut wall of halite that glowed when lit. There they found a perfect chunk of salt that Powers chipped away at, searching for inclusions. He found a lot.

For two days Griffith and Powers, along with Bonnie Baxter and DOE physicist Roger Nelson, collected chunks of halite and stuffed them into Ziploc bags.

Jack Griffith and graduate student Smaranda Willcox in the lab. Photo courtesy of Jack Griffith

All told they hauled out more than 100 pounds of salt, packed the bags into black fiberglass camera cases, and FedExed the lot to Chapel Hill.

Back at his lab, Griffith and graduate student Smaranda Willcox searched for inclusions. They sterilized the surfaces of the crystals to kill any bacteria that might have contaminated them since they were removed from the Salado. Then, while peering through a regular microscope, Griffith and Willcox clamped a crystal to a drill press and, with a very fine needle, drilled into the salt until they reached the trapped water. Then they

used a glass microcapillary to remove the salt-saturated water.

"This was a complete nuisance," Griffith says. "And we didn't get much material."

They did this eighty times before Griffith found a way around. He whittled the crystals to their pristine cores before dissolving them in ultraclean water.

Using the bulk-dissolved crystals and the salt water recovered from the tiny inclusions, Griffith and Willcox prepared the samples for viewing in the simplest way possible, in order to avoid contamination. They applied a drop of the sample to a three-millimeter round copper screen coated with carbon, washed it with water, air dried it in a vacuum, and finally coated the sample with tungsten so that the microscope would contrast whatever was in the sample with the background.

Then Griffith and Willcox popped samples into the electron microscope and searched for the remnants of ancient life. It didn't take long to find something. And at first they weren't sure what it was, because they had never seen anything like it. Griffith searched through dozens of samples and saw this same strange substance. Then he found another substance he didn't expect. It was DNA. And it had to be 250 million years old.

But other scientists had found supposedly ancient organic matter, only to face questions about its true age. Is the DNA Griffith found truly ancient, or is it a modern contaminant of ancient samples?

Ever since scientists figured out how to study the tiniest of things, they've been trying to find remnants of the oldest life forms on Earth. They've dug up skull fragments of bears and Neanderthals from 100,000 years ago. They've tracked down dormant bacteria in ice glaciers that date back 750,000 years. And they've unearthed 11-million-year-old cellulose—the chief component of a plant's cell wall—in Canada's arctic forest.

Griffith says this work is pretty much accepted as fact within the scientific community. Other findings, though, are kind of murky. In the 1990s, for example, researchers found bacteria in amber—fossilized sap—that was between 25 million and 45 million years old. "That's the Jurassic Park stuff," Griffith says.

But Griffith and others say that such amber might not be the best stuff for this kind of test. The bacteria inside might not be very old. Also, scientists didn't find a colony of bacteria to study under a microscope. They put a sample from amber on a Petri dish coated with nutrients and hoped that this new environment would be conducive for a dormant bacterium to multiply.

"You do this a couple hundred times and see what happens," Griffith says. The colony is definitely not ancient, he says. It might have grown from something ancient. Or maybe not.

"This bacterium could've been something that floated in from your hair or anything else," he says. "You just don't know."

Last year, NC State researchers reported finding fragments of proteins from dinosaur eggshells dating back 68 million years. Griffith says their findings are certainly valid, but to detect ancient DNA, researchers normally rely on the polymerase chain reaction, or PCR, to amplify their samples. And PCR, like growing colonies on a plate, is an amplification method.

"You do a PCR and out comes a test tube full of DNA," Griffith says. "But only one DNA molecule is needed to start that reaction. Does the PCR truly amplify something that was an ancient molecule, or something that was stuck to the tube?"

Griffith says PCR tests have a bad habit of amplifying present-day contaminants. The only thing an electron microscope amplifies is an image. Still, contamination could play a role.

Jack Griffith stands in a cavern cut out of an ancient salt deposit two thousand feet below the New Mexico desert. Photo by Bonnie Baxter

Griffith did see DNA trapped inside ancient halite. And he thinks it's the remains of a 250-million-year-old organism, which would make it the oldest macromolecule ever found.

"This flies in the face of biochemical experiments that show that DNA probably shouldn't last that long,"

Griffith says. "But the high-salt environment of the Salado is probably quite protective to DNA."

He wrote his paper and sent it to journals, but the biochemists who reviewed it were skeptical because Griffith found only a trace amount of DNA.

"When you see things only occasionally with an electron microscope, you worry," Griffith says.

His lab is now using biochemical assays to confirm or disprove his findings. But he's confident he found ancient DNA, and one reason is that he found so much of that other strange substance. It looked a lot like cellulose, only no type he had ever seen.

"Modern cellulose is clumped together," he says. "This ancient stuff was untangled. We were tripping over it, there was so much."

Ann Matthysse, a professor of biology in the College of Arts and Sciences at UNC, helped Griffith figure out if it was really cellulose.

Matthysse told Griffith to douse the ancient material in a mixture of sodium hydroxide and sodium borohydride at 65 degrees Celsius. This stuff will eat through leather, disintegrate insects, and burn away dead skin. But it won't harm cellulose, and nothing happened to Griffith's sample. Certain enzymes, Matthysse told him, will chew up a lot of things, but they won't harm cellulose. These enzymes didn't harm Griffith's sample either.

Then Matthysse told Griffith that a protein enzyme called cellulase chops up cellulose so it can be degraded. And that's what happened to Griffith's substance.

He snapped pictures with the high-resolution digital camera inside his electron microscope, and then he remembered that Malcolm Brown, a former UNC biologist now at the University of Texas, had taken some of the only photos of cellulose microfibers with an electron microscope.

"His photos looked very similar to ours," Griffith says.

It's cellulose. Griffith has no doubt. And it's at least 250-million-years old, by far the oldest native macromolecule ever found. Griffith says that analyzing this cellulose may reveal more details about Earth's ancient biosphere.

It might even give us some clues about places other than Earth.

When Griffith sent his findings to journal editors, they gave the paper to geologists. The geologists not only questioned the likelihood of finding DNA in halite, but a few of them also wondered if the Permian Salado Formation is really that old and undisturbed.

Griffith rewrote the paper, adding nearly everything known about the Salado so that the geologists would be satisfied.

He also removed his findings about DNA and focused on proving the cellulose side of the story. The presence of ancient cellulose in Griffith's samples led him to an interesting conclusion: when scientists go seeking life on other planets, cellulose microfibers—not DNA—may be the best thing to look for.

He sent his paper to the journal *Astrobiology*, which published it in April 2008.

Griffith's theory, which he admits is a bit philosophical, is that life on other planets would likely be carbon-based. The six-carbon glucose molecule is the fundamental energy currency of most known carbon-based life forms, including the most primitive bacteria that existed 1.6 billion years ago, before there was an oxygen-rich atmosphere. Cyanobacteria are the modern-day descendents of those ancient primitive bacteria. And cyanobacteria create cellulose out of glucose molecules.

"It's very likely that any of the earliest life forms on other planets would learn how to stick these glucose units together to make this semi-crystalline five-nanometer cellulose microfiber," he says. "It's stiff and rigid, and very few things will break it down."

When cells die, cellulase enzymes typically are not around to break up cellulose. That means that cellulose won't degrade quickly, as Griffith's findings prove. And even if cellulase is present, it cannot completely digest the 36-glycan chain that makes up a cellulose microfiber. DNA and proteins, on the other hand, rapidly degrade when enzymes are released after cells die.

Cellulose microfibers exist in a semi-dehydrated state. This means that cellulose might cope better than other macromolecules with the dry conditions found on other planets in our solar system. Cellulose would

CONTINUED ON PAGE 35

> Griffith did see DNA trapped inside ancient halite. And he thinks it's the remains of a 250-million-year-old organism, which would make it the oldest macromolecule ever found.

Paso a paso:

Steps forward in Latino health

BY DICK BROOM

Marco Aleman, MD, clinical associate professor in UNC's Department of Medicine, looks at the Latino population in North Carolina and sees a health care time bomb.

The 2003-04 North Carolina Institute of Medicine report on Latino health concluded that, currently, Latinos are healthier than other North Carolinians and have fewer chronic diseases, primarily because they are a younger population—two-thirds of Latinos in the state are under 35. "But they are going to be aging without consistent access to health care, and aging with a genetic predisposition to the metabolic syndrome and a higher incidence of obesity, diabetes, and fatty liver disease," Aleman says. "It's an explosive mix."

Another dangerous component of the mix, he says, is cultural assimilation and the "fast food" diet of many low-income Latinos. "In this country, the poor are more obese than the rich because they don't have as much access to nutritious, healthy foods such as vegetables, fruit and fiber. They eat much more food that is highly processed because it is significantly less expensive."

Census realities

Aleman says it is important to note that the terms "Hispanic" and "Latino" are used interchangeably, but their meaning and origins are often vigorously debated. Though "Hispanic" points to Iberia and "Latino" suggests Latin America, Aleman, originally from Peru, says, "The population is diverse and heterogeneous. Taking into account the geography: Mesoamerica, the Caribbean, the Andes, and the "European cone" of South America; the existence of numerous indigenous groups; the stage of immigration; and the level of cultural assimilation—all of these factors and more add to the diversity of the Latino population."

Hispanics have become the nation's largest minority (15.1 percent, or 45.5 million), according to the 2008 US Census Bureau update. This trend is projected to continue; by 2050, approximately 25 percent (103 million) of the US population will be of Hispanic origin or Spanish-speaking. Currently, between 80 and 85 percent of the US Hispanic population has immigrated from Mesoamerica (Mexico and Central America).
The southeastern US has had the highest growth rate of the Latino population in the US over the past decade. From 1990-2000, growth rates were 300-400 percent in North Carolina, Arkansas, and Georgia. In central North Carolina, the Latino population ranges between five percent and 10 percent in the five-county region served by UNC. Hispanics here are more likely to be employed, but in hazardous or low paying jobs, while making significant contributions to the local and country-of-origin economies.

North Carolina doesn't have as many Latino residents as Florida, Texas, California, or some other large states. Latinos also don't make up as large a percentage of the population in North Carolina as in some parts of the country, particularly the Southwest; but the Latino population in North Carolina has been growing at a faster rate than almost anywhere else.

Between 1990 and 2000, the number of Latinos calling North Carolina home increased by nearly 400 percent. Latinos now make up about six percent of the state's overall population. In some counties, more than one in 10 residents is Latino.

As an astoundingly fast-growing segment of the population that is distinct in both culture and native language, Latinos present unique health care challenges. The most obvious of these is the difficulty that health care providers and their patients have in simply trying to communicate with each other.

According to a 2003 report on Latino health by the North Carolina Institute of Medicine, 34 percent of Latinos in the state spoke limited English and 50 percent had only a modest command of English. At the same time, relatively few physicians and other health care providers speak both English and Spanish.

The primary mission of the UNC Health Care System and the School of Medicine is to serve the people of North Carolina. Now that more and more of those people are Latinos, the School of Medicine and UNC Hospitals have responded with innovative initiatives designed to break down the barriers of language and culture that currently impede optimum health care.

Center for Latino Health

The UNC Center for Latino Health (CELAH) is being developed within the School of Medicine to provide clinical care specifically for Spanish-speaking patients, to promote and coordinate clinical research, and to train health care providers to serve this population. The startup of CELAH was funded by a grant from the School of Medicine's Investments for the Future (IFF) program. CELAH addresses each of the IFF program's goals: innovations for diverse populations, community partnerships, and support of the UNC Clinical and Translational Science Award. The hub of the new center is a multidisciplinary adult medicine clinic at UNC Hospitals that is opening this fall.

"We are promoting a Center of Excellence model and seeking synergistic partnerships on campus and in North Carolina," says Douglas Morgan, MD, MPH, assistant professor of medicine and director of CELAH. Morgan served as a Peace Corps engineer in Honduras and currently leads research initiatives in that country and Nicaragua. "Initially, we are focused on medicine specialties and family medicine, and hope to expand to other departments of the School of Medicine based upon the need. The census realities, Title VI mandates, and North Carolina Institute of Medicine summary oblige us to be proactive in Hispanic-Latino health."

The clinic operates in cooperation with Piedmont Health Services, a private non-profit organization that provides health care to people in central North Carolina through six community health centers. CELAH brings faculty providers together with a bilingual infrastructure and support staff. In its initial phase, the clinic staff includes Clinic Manager Claudia Rojas, Nurse Practitioner Liz Prata, Community Liaison Mayra McCarty, and Research Manager Paris Heidt.

"The US health care system can be very unforgiving to the uninsured and people with a low socioeconomic status, and that describes many Latinos, especially the ones who come to work in rural jobs or construction jobs," says Morgan. "Access to health care is a problem because they're not used to navigating the system, which is fairly complicated. Then you get the bills and have to deal with the insurance claims, and that can be very intimidating to people who have a significant language barrier."

Morgan says many Latinos don't have established relationships with primary care physicians, so they receive little or no preventive care and are more likely to go to a hospital emergency department when they are sick.

"That is much more costly and inefficient, of course, and we end up seeing them at later stages of disease," he says. "That is the price we all pay for not approaching health care for Latinos in a systematic way."

In addition to providing focused clinical care to Spanish-speaking patients, UNC's new bilingual clinic will foster teaching and research, according to Morgan, whose specialty is gastroenterology. Direct collaborations across the UNC Health Care campus are in progress, including the schools of nursing and pharmacy. The model provides a teaching infrastructure for one-month "bilingual rotations" for medical and nursing students, residents, and other trainees, to improve their bilingual and multicultural competency.

Proyecto Puentes de Salud is a student-run organization that conducts health fairs in North Carolina and in Mexico, providing health education and screenings to countless individuals who would otherwise have little or no access to quality health care. Photo by Mauricio Cohen

Back row, left to right: Douglas Morgan, MD; Daniel Reuland, MD; Dr. Mauricio Cohen, MD. Front row, left to right: Elizabeth Prata, FNP; Mayra McCarty, PBA; Lisa Slatt, research associate professor; Claudia Chaparro-Rojas, Hispanic-Latino clinic manager; Dr. Marco Aleman, MD. Photo by Edward Byrnes

Another goal of the new center is to ensure that a representative percentage of Latinos is involved in clinical trials.

"Historically, Spanish-speakers have been excluded from many research protocols because of either real or perceived language barriers," Morgan says. "We are hoping that the new bilingual clinic will provide kind of an automatic entryway for folks to participate in clinical trials, as appropriate, if they would like to."

Spanish language enrichment

Four years ago, the School of Medicine began CAMPOS (Comprehensive Advanced Medical Program of Spanish) with the support of a grant from the Duke Endowment. CAMPOS is an enrichment program offered to first- and second-year medical students who have intermediate-level fluency in Spanish.

"The goal is to graduate more students who can independently provide linguistically and culturally competent care to North Carolina's expanding Latino population," explains Daniel Reuland, MD, MPH, who with Aleman co-directs CAMPOS.

Students in the CAMPOS program must perform 10 hours of service to the Latino community during each of their two years in the program. Many students fulfill their service requirement through El Proyecto Bienestar (The Wellbeing Project) in Siler City. They can help individual Spanish-speaking patients complete health risk assessments, conduct health history interviews and provide counseling on the results, or take part in health screening events in the community.

Morgan calls CAMPOS, which is now part of CELAH, "an innovative program that has positioned UNC to become a national leader in medical Spanish education and educational research."

Global health partnerships

Many of the School of Medicine faculty engaged in Latino health are actively involved with global health initiatives in service and research in Latin America. The School of Medicine is fortunate to work with six collaborative sites in Latin America. These include: Trujillo, Peru (Trujillo SOM; Drs. Aleman and Luis Diaz); Copan, Honduras (Western Regional Hospital; Dr. Morgan), León, Nicaragua (University of Nicaragua-UNAN; Drs. Morgan and Susan Hogan), and Intíbuca, Honduras (Shoulder to Shoulder NGO; Drs. Martha Carlough, Lisa Slatt, and Jeff Heck). Dynamic UNC medical student organizations established in Latin America include: Honduras Health Alliance (Choluteca, Honduras), Proyecto Puentes de Salud (Juventino Rosas, Mexico), and the Collaborative Sahsa Health Initiative (Mosquitia, Nicaragua, with UNAN).

These collaborations provide natural immersion, service, and research opportunities for students and residents. "CAMPOS students are strongly encouraged to do an immersion elective, after their first year, in a Spanish-speaking country," Reuland says. "They spend most of their time in clinical settings providing direct

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A Rare Flower

Families with children facing rare neurodegenerative disease have found a powerful ally in Dr. Maria Escolar BY EDWARD BYRNES

Dr. Maria Escolar is not a collector, but her office is decorated with a mozaic of colorful artwork. Each piece that graces her walls is a one-of-a-kind original, created mostly in crayon, by a child. This art, which ranges from an exquisitely multicolored beetle to a piece of notebook paper on which is scrawled, "This is Dr. Escolar's Office," came from the fertile minds of her young patients—all of whom are, or were, unfortunate victims of some of the rarest diseases known to medicine.

Some of Escolar's patients, who would have died before their second birthday without treatment, are enjoying their 10th. And many families who have been touched by the care of Escolar and her Program for Neurodevelopmental Function in Rare Disorders (NFRD) go on to offer their assistance to other families who find themselves face-to-face with the reality of having a child with a life-threatening disease. Although it is heart-wrenching to deal with children who are very ill or dying and the family members who love them, Escolar finds her inspiration among them.

"These families are amazing. They have always been the ones that fuel me to keep on going," she says.

Escolar, a clinical associate professor in pediatrics at UNC and director of the NFRD at UNC's Clinical Center for the Study of Development and Learning (CDL), was working as a clinical associate in pediatrics at Duke University Medical Center in 1999 when she came across her first patient with a rare condition called Krabbe's disease.

Krabbe's disease belongs to a set of rare lysosomal storage diseases (LSDs) caused by a lack of or defect in enzymes that normally eliminate unwanted substances from the cells of the body. These enzymes are found in the lysosomes of each cell, which break down macromolecules into simpler compounds for elimination or reuse. The defect causes an abnormal accumulation of waste substances, inefficient functioning, and damage to the body's cells, which ultimately leads to serious

Above: Dr. Maria Escolar (right) reads with patient Caterina Marcus and her mother Claudina during a recent evaluation at UNC's Clinical Center for the Study of Development and Learning. Photo by Jim Kenny

health problems and in most cases, death. In addition to Krabbe's disease, the LSD family includes more than 40 other conditions, such as Hurler, Hunter's, and Sanfilippo's syndrome, metachromatic leukodystrophy, Tay-Sachs disease, and Sandhoff disease. All are neurodegenerative and fatal.

Escolar came to the US in 1986 from Bogotá, Colombia, after completing her medical degree at Escuela Colombiana de Medicina. She was at Duke, testing children who were receiving umbilical cord blood transplants in an effort to replace the missing enzymes. Her background in neurological development told her that the neurological systems of these children were already too damaged to be helped. They needed help sooner.

"I wanted to see the kids when they were younger and less symptomatic because I thought, with earlier treatment, their outcomes could be better," Escolar said. She began several small projects to evaluate children at younger ages; but to effectively evaluate and help these kids, Escolar knew she needed a multidisciplinary team.

"Duke wasn't interested in supporting that kind of effort; I think partly because they knew UNC already had a big center doing a lot of work in child development. So at that point, I thought I should go to UNC," Escolar said.

Although there weren't any job openings at UNC's CDL, Escolar made a proposal to its leadership: she would find funding for her project herself while getting patient referrals from Duke—all she needed was some clinic space. After some deliberations, they came to an arrangement in which Escolar would serve one day a week as a developmental pediatrician and help with the CDL's clinic in exchange for the clinic space she needed.

Escolar and patient Jaxon Cooper, who has Hunter's syndrome. The death of a sibling from the disease at age 14 prompted Jaxon's early testing and diagnosis as a newborn. Jaxon received a cord blood transplantation; and for the six years since then, Escolar and the NFRD has tracked his outcome and provided services that support his development and maximize his function both at school and at home. Escolar says Jaxon's success is an example of one of the basic concepts of her program: early intervention, newborn screening, and the importance of preventing neurological disease before injury occurs.
Photo courtesy of Maria Escolar

With patient referrals from Duke and a foundation grant, she established her Early Childhood Clinic at the CDL in 2000, which evolved into the NFRD program by 2002. The first goal of the clinic was to study rare autosomal recessive diseases to gain an understanding of their natural history.

"Most families who have a child with one of these diseases are very desperate because no one can tell them anything about the disease," Escolar said. "I knew that the only way we can begin to help is to be very systematic about the way we look at these diseases. We have to have a core dataset that will help us understand what the needs of these children are."

Escolar began collecting all the data she could on the rare diseases affecting the children she had been seeing. As word of her clinic spread, Escolar was soon getting referrals from across the country and around the world. She pulled together a multidisciplinary team from across UNC Health Care, including physicians with expertise in genetics, psychiatry, neurology, and other allied health professionals such as audiology and physical therapy.

Escolar's clinical research database grew quickly, so quickly in fact that she soon possessed the largest known database of clinical information on rare neurodegenerative diseases. The database now contains integrated information on 20 diseases and 450 patients from approximately 1,200 evaluations.

"When families now come to the NFRD, they get a multidisciplinary evaluation of their child so that when they leave, they do so with recommendations for everything from schooling and therapy to palliative medical care," Escolar says. "They get, in one to three

days, what other families may get in six months of going from one appointment to the next, with no one integrating the information along the way."

When the program began, Escolar and her colleagues put together a combination of tests to be used to gather information on patients' motor and cognitive skills that could be tracked longitudinally over time. Then, through administering different treatments, they could determine best practices for these patients.

Escolar and her colleagues published retrospective studies about what they had learned. Among many other things, they developed staging systems for the diseases to help clinicians determine the best course of action when they come across a patient with one of these conditions.

"If a clinician sees a child with one of these diseases, they can refer to our staging system and decide if their patient is a good candidate for transplant or if it's too late and they should work toward improving quality of life. It has helped many clinicians manage these diseases for their patients," Escolar said.

With this new information, many young patients and their parents are spared unnecessary worry, costly testing, and unnecessary treatments, Escolar says. As more and more health care providers become familiar with Escolar and the NFRD, she and her staff have begun to receive more and more phone calls regarding proper medications and other care related to the treatment and management of pediatric patients with these rare neurodegenerative diseases.

"We now have more experience with these diseases than just about any other place. There have been new discoveries in terms of treatments, such as recombinant enzymes, that can be used instead of or in addition to transplant. There are a lot of different things we can do clinically now that we couldn't do before. So, there was suddenly a need for clinical trials, and because we have such an extensive database on the natural history of these diseases, many companies became very interested in doing them with us," Escolar said.

The growth of Escolar's program has led other clinicians and researchers to seek her out for advice, information, and now, training. Escolar recently created a fellowship program for other physicians to come to UNC and train at the NFRD to ensure that the knowledge and information of the clinic will be spread elsewhere. So far, Escolar has trained two fellows. One, now an attending, continues to see patients at the clinic on a part-time basis, while the other has just begun her third year. Other requests for training fellowships have come from Italy, Canada, South America, British Columbia, and elsewhere.

Additionally, Escolar consults other health care professionals interested in setting up clinical information databases similar to hers. Escolar says that they accommodate these requests so that their model can be replicated in other places; and, as more and more treatment becomes available, it is important for researchers to be able to replicate studies in different populations. "This need for training is growing fast and is now an incredibly important part of what the NFRD does," she said.

Another area of growth for the NFRD is in imaging research. "Using MRI imaging technology, we're trying to correlate what happens in the brain with what manifests behaviorally. We might see signs that demyelination is occurring in the brain and the child may be OK. In another case we may see no signs of demyelination in the imaging and yet the child is very sick. So we're trying to figure out what the MRIs can tell us about function," Escolar said.

Escolar has begun collaborative imaging studies with the hope of finding ways in which imaging of the brain can inform treatment pre-emptively.

"We are going back and forth between behavioral phenotypes of a disease and the imaging; and, in collaboration with basic researchers with animal models, we can refer to their studies to try to figure out how treatments affect different areas of the brain and see how it affects development and timing of myelination," Escolar said.

With the addition of the training and imaging components, in addition to seeing patients and maintaining the database, Escolar's time is at a premium. Though she sees potential for further growth, the current size and structure of the NFRD is pretty close to what she had envisioned from the beginning.

"Where we are now is as big as I wanted [the NFRD] to get. But I can see how it could grow in a virtual way; this infrastructure is unique and I think a lot of other clinicians may want to benefit from it," said Escolar. "Other researchers may start collaborating with us—using the database to look at other diseases. Things like this could happen that don't require a lot of additional staff and funding, just the existing infrastructure. One of the fellows we train could begin more of these types of efforts here or in another part of the world. You never know."

Creating better doctors: The MD-MPH Program at UNC-Chapel Hill

BY DRS. RUSSELL HARRIS, LINDA KINSINGER, SUE TOLLESON-RINEHART, ANTHONY VIERA, AND GEORGETTE DENT

Although clinical medicine and public health were once intimately tied together, they have drifted apart in recent years. Physicians who are equally comfortable in clinical and community settings can: contribute to the control of the health problems that face us today; deal with the issues of quality of care, access to care, and cost of care; emphasize prevention; interpret and apply evidence appropriately; and work collaboratively with our public health colleagues.

Within the clinical system, such physicians will be leaders in organizing care to optimally meet the needs of panels of patients. Beyond the clinic, these physicians will work with others to address such issues as lifestyle change, environmental exposure, health literacy, health disparities, and international health.

Program development

In 1995, unofficial discussions began between faculty members of the UNC School of Public Health (SPH) and School of Medicine (SOM) who were concerned about the current MPH training for people with medical backgrounds (i.e., medical students, fellows, and faculty). These discussions were made easier because of the large number of faculty in the SOM with MPH degrees, many from the UNC SPH.

The group identified two primary problems: (1) clinicians pursuing MPH degrees (primarily fellows along with one to three medical students each year) often had different interests from those of many faculty in the SPH and (2) few medical students were taking advantage of the opportunity to get MPH degrees.

After a series of meetings, the group developed a plan for a new MPH, the Health Care and Prevention (HC&P) Program, tailored specifically for people coming to the population sciences from the clinical sciences. There was excellent support from both schools for this plan, and the HC&P Program admitted its first class of 18 students in the fall of 1997.

Today, the HC&P MPH program is a concentration within the Public Health Leadership Program (PHLP) of the SPH. This structure allows the HC&P MPH Program to take advantage of all SPH departments and to offer a broad, flexible program that can be tailored to the needs of its students.

The twofold mission of the HC&P program is to provide an educational program of the highest quality that has a focus on population and social sciences for medical students, residents, fellows, and others who have clinical science backgrounds and also to help students in the HC&P Program to integrate population and clinical sciences into a life course that will prepare them to contribute to improving the health of the public in a broader manner with a focus on the needs of populations as well as individual patients.

Curriculum

The HC&P MPH curriculum has been designed to provide a broad education in population health sciences to students who have a clinical background. It is planned to be maximally flexible and to encourage students to take charge of their own education. The curriculum is structured to be completed in 12 months, but students sometimes require a few additional months to complete the master's paper.

The HC&P curriculum's six closely integrated components are: the core courses, as required by the Council on Education for Public Health (CEPH), usually completed by the end of the fall semester;

Health Care & Prevention Program student Steve Parker spent summer 2008 working in Uganda, where he helped operate a neurosurgery clinic and treated children from a local orphanage. Parker is a Duke Global Health and Neurosurgery resident pursuing his MPH this year as part of his Global Health residency. Photo courtesy of Steve Parker

elective courses, usually taken in the spring semester; a practicum experience; an oral presentation; a comprehensive examination; and a master's paper.

Core and elective courses

To receive accreditation by the CEPH, an MPH program must provide instruction in five basic knowledge areas: biostatistics, epidemiology, health services administration, social and behavioral sciences, and environmental health sciences. Traditional introductory courses in each of these areas taken by UNC SPH students meet this requirement, but founders of the HC&P Program felt that it would be more attractive and successful if the required courses were made more relevant to clinicians' experience and interests. Four of the five required courses were redesigned specifically with clinicians in mind.

In addition to tailoring most of the required courses to meet the needs and interests of clinicians, several other courses have been developed with the MD–MPH student in mind. Most of the students take a two-semester course sequence that teaches how to critically appraise the health literature.

Practicum experience

Students usually complete their practicum experience in the first summer semester. In the practicum, the student works with a mentor to develop a set of learning objectives to be met in part by incorporating some sort of hands-on experience working on a public health problem. Some students have completed this requirement by working with a research team studying a population health problem or with a team doing an evaluation of a public health program. An increasing number of students are meeting the practicum requirement by working on an international project,

Meredith Niess worked with the Family Hygiene/Potable Water Project during her summer 2008 practicum experience in the Batey Central area of Barahona, Dominican Republic. Above, she (wearing the straw hat) visits with local families to determine how the recently installed biosand filters are operating and to hear about any problems the families may be experiencing with them.
Photo courtesy of Meredith Niess

including traveling to another country. One recent student traveled to India to learn about tuberculosis control in that country, and another examined child malnutrition in Haiti.

Oral presentation and comprehensive examination

Students are required to give a formal oral presentation before an audience and to receive feedback on the effectiveness of their communication. The purpose of the presentation is to improve the student's skills in oral communication, so the focus is not the content of the presentation as much as the delivery.

Students must also pass a comprehensive examination, usually taken after the end of the spring semester. The student has one day to complete answers to three questions from five areas (i.e., health policy, clinical epidemiology, prevention, critical appraisal, and public communication of health information).

Master's paper

Students commonly develop their master's paper topics by the beginning of the spring semester. Because the program is usually only 12 months in length, few students are able to collect primary data for a research article. Some students work with faculty in the SPH and/or SOM to perform a secondary analysis of previously collected data. Other students satisfy the master's paper requirement by conducting a systematic review of a

focused health question. Students may also conduct a policy analysis of an important public health issue or conduct an evaluation of a public health program.

Faculty

The HC&P Program has eight to 10 primary faculty who teach core courses. All of them have faculty appointments in both the SPH and the SOM. Another 10 to 12 faculty are very familiar with the program and serve as mentors for several students each year. Another group of faculty have a general understanding of the program and occasionally serve as mentors or readers. Finally, a larger group of faculty, primarily from the SOM, are asked to serve as mentors to students with a special interest in a particular area. These faculty often have little initial understanding of the program; core HC&P faculty provide an orientation to the program for them.

Students are encouraged to seek out and develop a strong relationship with at least one faculty member mentor with a background in the population sciences. One of the tacit goals of such mentorship is for the MD–MPH student to interact closely with someone whose work combines the clinical sciences with an understanding of the population sciences. In this way, students can get a better idea of how they can use what they are learning in the master's program.

Students

The backgrounds of the students in the HC&P Program have changed over the years of the program. At present, more than 20 percent of the 160 students in the UNC medical school class pursue an MPH at some time during medical school, primarily between their third and fourth years. Although some students choose to go elsewhere for their MPH, and some choose a departmental MPH at UNC SPH, the great majority of UNC medical students pursue their MPH within the HC&P Program.

Long-term strategies

How does one measure the success of programs such as the HC&P Program at UNC? Rigorous program evaluations of such curricula can be hard to execute, but it is important to devise ongoing measures of the program's likelihood of meeting its graduates' needs at the same time that it is seeking to create the kind of population health awareness and skills envisioned for the program. To this end, a survey attempts to ascertain students' goals and students' assessment of how their training has prepared them to reach those goals.

This initial survey, now in the field, will be a baseline measurement in a longitudinal study of UNC medical student HC&P graduates and their career progression. The study design involves at least three cross-sectional snapshots—in 2007–2008, 2012, and 2017—of HC&P graduates. In addition to these students, other UNC medical students in their graduating classes will be surveyed. At each five-year time interval, new students will be added to the cohort. The comparison of cross-sectional and longitudinal cohort studies will help us determine both "contextual change" (change that might arise from the graduates' reaction to a changing environment) and what social scientists call "life cycle change" (change that arises from movement through the life cycle and all that such change suggests for professional and intellectual maturation).

Conclusions and challenges

Although we can measure the program's substantial growth over the past decade, we do not have similar systematic data on the motivations of the increasing number of students entering the curriculum. Most medical students entering the HC&P Program seem to be doing so to prepare themselves to better serve the health of the public. Their interests are, increasingly, health care disparities, getting care to disadvantaged groups, changing the health care system, and international health.

Our vision is to train physicians to integrate population thinking with their clinical thinking. Our hope is that this will help develop physicians who will make a greater contribution to the health of the public. We realize that a single year of training is likely insufficient to change the direction of a physician's career. We further realize that the students who choose to pursue MPH degrees during medical school are already different from their peers. It is uncertain what additional contribution programs such as ours provide. This issue is worth studying, and we plan to do so.

The University of North Carolina has made a substantial effort to provide a more in-depth educational experience in the population sciences to complement the traditional medical curriculum. Our hope is that it will lead, over time, to a new and more population-minded physician who can make a greater contribution to the health of the public.

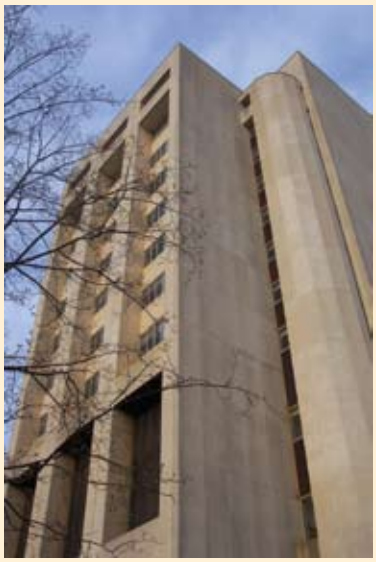
This article was adapted from "The MD-MPH Program at the University of North Carolina" which appeared in the April 2008 issue of Academic Medicine*. Used with permission from* Academic Medicine*.*

UNC earns Clinical and Translational Science Award

Last May, UNC became one of 14 institutions nationwide to earn a Clinical and Translational Science Award (CTSA) from the National Institutes of Health (NIH). UNC and Duke University are the only institutions in North Carolina to earn CTSA recognition. These 14 academic health centers join 24 others announced in 2006 and 2007. Total funding for these new awards is $533 million over five years. The 2008 CTSA grants expand state representation in the consortium to Alabama, Colorado, Indiana, Massachusetts, and Utah. They also support pediatric research at 13 dedicated children's hospitals; expand research in genetics and genomics; enhance research in behavioral immunology and infection risk; and increase outreach into local communities.

The $61 million award will help fund the North Carolina Translational and Clinical Sciences (TraCS) Institute, which will transform the way research is performed in our state by partnering with communities to more rapidly and efficiently "translate" scientific discoveries into improvements in the health of citizens.

UNC solicited input from over 300 faculty, administrators, and other stakeholders, from the university and across the state, to establish the TraCS Institute in January 2007. The TraCS Institute has three simple goals: prepare and empower faculty, health care providers, and citizens to participate in all aspects of the process involved in translating good ideas into health advances; provide the advice and resources necessary to design and execute the best research projects; and see that the best discoveries and ideas evolving from these projects are rapidly used to solve important health problems in the state. The Translational Research Advisory Board, consisting of senior faculty from across the UNC System, will partner with communities to identify and prioritize important health issues and will call for project proposals that address these priorities. The TraCS study section, which includes community members, will prioritize and help improve project proposals contributed by over 40 units across campus and the state. A special TraCS program will make sure the best ideas that result from these projects are implemented throughout the state to improve the health of citizens.



The North Carolina Translational and Clinical Sciences (TraCS) Institute at UNC-Chapel Hill.

Funded through CTSAs, the NIH supports a national consortium of medical research institutions working together to improve the way biomedical research is conducted across the country. The consortium shares a common vision to reduce the time it takes for laboratory discoveries to become treatments for patients, and to engage communities in clinical research efforts. It is also fulfilling the critical need to train the next generation of clinical researchers. The consortium is led by the National Center for Research Resources (NCRR), a part of the NIH. The CTSA initiative grew out of the NIH commitment to re-engineer the clinical research enterprise, one of the key objectives of the NIH Roadmap for Medical Research. Most of the funding will come from terminating grants to General Clinical Research Centers, supplemented by NIH Roadmap funds. In 2012, when the program is fully implemented, approximately 60 CTSAs will be connected with an annual budget of $500 million.

Study points to genetic causes of schizophrenia

Even though scientific evidence has long hinted that schizophrenia has a genetic basis, no study has definitively proven that this is the case. Now researchers at UNC, as part of an international team, have developed the first hard lead into the genetic causes of schizophrenia.

The study—the largest of its kind—identified genetic variants that can increase the risk of developing the disease as much as 21-fold. It also showed that schizophrenia patients are much more likely than normal individuals to have a large number of genetic variants distributed throughout their genomes.

These findings, published online recently in the journal *Nature*, give researchers a starting point to investigate the underlying biology of the disease. The research also provides hope for people affected by schizophrenia—showing that there is a reason for their illness and that new treatments may be within reach.

"My hope is that by recognizing the genetic causes of schizophrenia, we may begin to see a shift in how our society perceives the mentally ill," said study co-author Patrick F. Sullivan, MD, Ray M. Hayworth and Family Distinguished Professor of Psychiatry in the Department of Genetics at the UNC School of Medicine.

Schizophrenia is a chronic and often devastating brain disease that affects one person in every 100 in the course of their lives. Scientists believe that schizophrenia has many causes—some genetic, some environmental. Despite the many scientific investigations into the topic, little has been learned about the genetics of the disease.

Advances in technology have made it possible to examine genetic variation at a level that was never before possible. In this study, the researchers were interested in a form of genetic variation that relates to the number of specific genes each of us carries in our DNA. People usually have two copies of each gene, one inherited from a father and the other from a mother.

But recently, researchers discovered that healthy people can occasionally have fewer, or more, than two copies of a gene. A person might have three copies at one spot in his genome,

sixteen at another spot, or one at another.

"Every person has their own set of copy number variants," Sullivan said. "Most of these variants are innocuous, but a few can cause disease."

UNC, Caltech research finds further evidence for genetic contribution to autism

Some parents of children with autism evaluate facial expressions differently than the rest of us—and in a way that is strikingly similar to autistic patients themselves, according to new research by psychiatrist Joseph Piven, MD, of UNC and neuroscientist Ralph Adolphs, PhD, of the California Institute of Technology.

Piven, Adolphs and colleague Michael Spezio, PhD, formerly of Caltech but now at Scripps College in Claremont, Calif., collaborated to study 42 parents of children with autism, a complex developmental disability that affects an individual's ability to interact socially and communicate with others. Based on psychological testing, 15 of the parents were classified as being socially aloof.

"This manifests as a tendency not to prefer interactions with others, not to enjoy 'small talk' for the sake of the social experience and to have few close friendships involving sharing and mutual support," said Piven, senior author of the study, Sarah Graham Kenan professor of psychiatry in the UNC School of Medicine and director of the newly established Carolina Institute for Developmental Disabilities. "This characteristic is really a variation of normal and not associated with any functional impairment."

The parents participated in an experiment that measured how they make use of the face to judge emotions. The subjects were shown images depicting facial expressions of emotion that were digitally filtered so that only certain regions of the face were discernible—the left eye, for example, or the mouth. The subjects were then asked to decide as quickly as possible if the emotion depicted was "happy" or "fear." The part of the face shown and the size of the revealed area randomly varied from trial to trial.

An analysis of the subjects' correct responses revealed that "aloof" parents relied much more heavily on the mouth to recognize emotion than they did on the eyes, as compared to non-aloof parents and, to a greater extent, to a group of parents of children without autism. Prior studies by Adolphs and his colleagues have shown that humans normally evaluate emotions by looking at the eyes—but studies by Adolphs and Piven have shown that individuals with autism do not.

"We found that some parents who have a child with autism process face information in a subtly but clearly different way from other parents," Adolphs said. "This is evidence for the hypothesis that the parents with the autistic child have brains that function somewhat differently as well."

The researchers noted that an important part of the paper is that it is not claiming all people with autism—or their parents—are 'impaired.' Instead, they said the study shows that parents who have children with autism—like the autistic subjects themselves—are different and do things differently.

The paper, "Selective face processing abnormalities in parents of autistic children," was published in the July issue of the journal *Current Biology*. The research was funded by grants from the National Institutes of Health and the Simons Foundation.

UNC study ties ending moderate drinking to depression

Scientific evidence has long suggested that moderate drinking offers some protection against heart disease, certain types of stroke and some forms of cancer.

But new research shows that stopping drinking—including at moderate levels—may lead to health problems including depression and a reduced capacity of the brain to produce new neurons, a process called neurogenesis.

The findings from the Bowles Center for Alcohol Studies at UNC appear online in the journal *Neuropsychopharmacology*.

"Our research in an animal model establishes a causal link between abstinence from alcohol drinking and depression," said study senior author Clyde W. Hodge, PhD, professor of psychiatry and pharmacology in the UNC School of Medicine. "In mice that voluntarily drank alcohol for 28 days, depression-like behavior was evident 14 days after termination of alcohol drinking. This suggests that people who stop drinking may experience negative mood states days or weeks after the alcohol has cleared their systems. This research provides the first evidence that long-term abstinence from moderate alcohol drinking—rather than drinking per se—leads to a negative mood state, depression," Hodge said.

But the study also found that treatment with an antidepressant drug during 14 days of abstinence prevented the development of depression and restored the capability of the brain to produce new cells.

"Treatment with antidepressant drugs may help people who suffer from both alcoholism and depression by restoring the brain's ability to form new neurons," Hodge said. "Moreover, this research provides an animal model of alcohol-related depression with which we can begin to fully understand the neurobiology underlying co-occurring alcoholism and depression, and thereby develop successful treatment options. At this point it appears that blunted neurogenesis may underlie the effects of abstinence from alcohol drinking on mood, but understanding the mechanisms by which this occurs is a key challenge for future research."

Several co-authors, all from UNC, also contributed: Jennie R. Stevenson, neurobiology graduate student; Jason P. Schroeder, PhD, and Kimberly Nixon, PhD, research associates with the Bowles Center; Joyce Besheer, PhD, assistant professor of psychiatry; and Fulton T. Crews, PhD, director of the Bowles Center and professor of psychiatry and pharmacology.

The research was supported by grants from the National Institute on Alcohol Abuse and Alcoholism (a component of the National Institutes of Health) and by the Bowles Center for Alcohol Studies.

Study provides clues to preventing, treating cancer spread

Why is it that certain cancers prefer to spread, or metastasize, to certain places? Prostate cancer usually moves to bone; colon cancer, to the liver. To answer these questions, Dr. Hendrik van Deventer, assistant professor of medicine at UNC and a member of the UNC Lineberger Comprehensive Cancer Center, turned to a century-old theory of cancer spread: English surgeon Stephen Paget's "seed and soil."

The idea is that the spread of cancer isn't just about the tumor itself (the seed), but also the environment where it grows (the soil). Other scientists have shown that cells from bone marrow can migrate and change the environment so that it is receptive to incoming cancer cells. These cells do so by forming small neighborhoods or niches within distant organs. Thus, biologists refer to these areas as "premetastatic niches."

Van Deventer and his colleagues wanted to know what non-tumor cell could change a normal organ so cancer cells would invade. If scientists could discover the identity of that normal cell, maybe they could devise treatments to stop metastases.

In a study published in the July issue of *The American Journal of Pathology*, van Deventer showed for the first time that that cell could be a fibrocyte—cells that travel around the body, rushing to the site of an injury to aid in healing when needed. Once there, they produce changes that are good for wounds. Unfortunately, these same changes can help cancers grow. It is not yet clear if fibrocytes are causing these problems in cancer patients. However, "there is some clinical data that suggests that these cells are increased in patients with metastatic cancer," he said.

The experiment also showed that injection of these cells induced MMP9, an enzyme that is known to promote cancer. The researchers considered this good news, since drugs are available that block MMP enzymes and have proven beneficial in treating cancer. The study also suggests ways to develop treatments to prevent metastases using already available medications.

Still, many basic questions remain to be answered. How do cancers promote the formation of the premetastatic niche? Are some patients at higher risk for metastasis because their environment changes their fibrocytes? "These are daunting questions, but ones that would have pleased Dr. Paget," van Deventer said. "This paper gives us a place to start looking for the answers."

Other authors of the study, all from UNC Lineberger, are research specialist Qing Ping Wu; professional fellow Daniel T. Bergstralh, PhD; research associate Beckley K. Davis, PhD; postdoctoral fellow Brian P. O'Connor, PhD; Distinguished Professor of Microbiology and Immunology Jenny P.Y. Ting, PhD; and Distinguished Associate Professor of Medicine and of microbiology and immunology Jonathan S. Serody, MD, PhD. The study was funded by the National Cancer Institute, part of the National Institutes of Health.

Oral contraceptives may ease suffering of women with severe PMS; UNC study tests new regimen for treatment

A new clinical trial at UNC using a popular low-dose contraceptive could uncover a more effective treatment for the five to 10 percent of women who suffer from premenstrual dysphoric disorder (PMDD).

PMDD is much more severe than premenstrual syndrome, or PMS. The disorder interferes with a woman's ability to function effectively several days out of each month, every month. Physical symptoms include bloating, low energy, heart palpitations and joint or muscle pain. Far more disruptive emotional symptoms include irritability, anxiety, depression, mood swings, difficulty focusing, and trouble sleeping. For many women with PMDD, five or more of these symptoms occur the week before menstruation starts and disappear a few days after the period begins.

The National Institute of Mental Health awarded UNC a $3 million grant for a five-year clinical trial using a low-dose contraceptive called YAZ (ethinyl estradiol/drospirenone). There are no other studies of continuous administration of birth control pills, so the ability of this study to identify the role of neurosteroids like allopregnanolone (a metabolite of progesterone) in PMDD is unique.

"This study will potentially demonstrate that it is the regimen of administration of birth control pills rather than their specific formulation that results in successful treatment of PMDD," said Dr. David Rubinow, the Asad Meymandi, MD, Distinguished Professor and chair of psychiatry at UNC. The trial is based on his previous research that discovered it is the change in reproductive hormones that triggers depression in women who are susceptible to PMDD.

In other words, women with PMDD don't have abnormal levels of reproductive hormones, but are more sensitive to the shifts in them that occur prior to menstruation. That sensitivity triggers mood symptoms.

"If we can eliminate the hormone cycling, we should eliminate the PMDD symptoms," explained Susan Girdler, PhD, professor of psychiatry. She and Rubinow are co-principal investigators of the trial.

Psychosocial issues affect HIV/AIDS treatment outcomes

Psychosocial influences such as stress, depression and trauma have been neglected in biomedical and treatment studies involving HIV-infected persons, yet those influences are now known to have significant health impact on these individuals and the spread of AIDS, according to a UNC School of Medicine scientist.

Now, a comprehensive update on those influences in the June issue of *Psychosomatic Medicine* offers a wake-up call and should give infectious disease physicians and other healthcare practitioners working with HIV-infected persons information to improve patient outcomes, said Jane Leserman,

PhD, sociologist and professor of psychiatry and co-editor of the special journal issue subtitled "Psychosocial Influences in HIV/AIDS: Biobehavioral Mechanisms, Interventions, and Clinical Implications."

"A huge amount of research has been done in our field around these psychosocial influences, yet we felt not all medical professionals working with HIV-infected persons were aware of this body of knowledge," Leserman said. "Our goal was to publish a comprehensive—yet succinct—review of the important biobehavior research and its impact on patient care.

"We hope this special issue will serve as a catalyst for healthcare providers to address these problems as part of standard HIV care, and to stimulate collaborations between biomedical and biobehavioral clinicians and researchers working as a team to address the quantity and quality of life for these patients."

Psychosomatic Medicine is the journal of the American Psychosomatic Society. The contents of this special issue are available as an open-access document, free-of-charge to all interested parties at www.psychosomaticmedicine.org.

Adult stem cells aid fracture healing; UNC study lays groundwork for potential treatments

In an approach that could become a new treatment for the 10 to 20 percent of people whose broken bones fail to heal, researchers at UNC have shown that transplantation of adult stem cells can improve healing of fractures.

Researchers have used adult stem cells in a few cases to improve fracture healing, but further study was needed to show that this method was truly effective and safe before it can be pursued as a new treatment. Now UNC scientists have provided the scientific foundation for future clinical trials of this approach by demonstrating in animal models that these cells can be used to repair broken bones.

"This finding is critical to patients who lack the proper healing process and to individuals prone to broken bones, such as those with osteoporosis and the rare genetic condition known as brittle bone disease," said Dr. Anna Spagnoli, associate professor of pediatrics and biomedical engineering in the UNC School of Medicine and senior author on the study.

The study, presented in June at the annual Endocrine Society meeting in San Francisco by the first author, Froilan Granero-Molto, PhD, post-doctoral associate researcher in UNC's pediatrics department, is the first to visualize the action of transplanted adult stem cells as they mend fractures in mice.

During normal fracture healing, stem cells form the cartilage and bone needed to fuse the broken bones back together. But in more than 600,000 Americans a year, this process does not occur as it should. The result can be long periods of immobilization, pain, bone deformities and even death. Current therapies, such as multiple surgeries with bone autografts and artificial prosthetic materials, often are not enough to cure these patients.

Kicking stem cells into repair mode is one of the objectives of a new branch of medicine called regenerative medicine. Stem cells in human bone marrow—called mesenchymal stem cells—can turn into bone, cartilage, fat, muscle and blood vessel cells.

"The beauty of regenerative medicine is that we are helping the body improve its innate ability to regenerate healthy tissue on its own, rather than introducing man-made materials to try to patch up a broken bone," Spagnoli said.

If scientists can duplicate the results of their animal study in humans, it may lead to a new treatment for the millions of people who suffer fractures that do not heal properly, Spagnoli said. Once a physician determines that the bone has not healed, they could obtain adult stem cells from the person's bone marrow in a minimally invasive procedure and transplant them at the same time the patient is receiving a bone graft.

Other co-authors of the study include Dr. Lara Longobardi, UNC assistant professor of pediatrics, along with the following researchers from Vanderbilt University: Dr. Michael Miga, assistant professor of biomedical engineering; Dr. Jared A. Weis, postgraduate fellow in biomedical engineering; Benjamin Landis, medical student; and Lynda O'Rear, research specialist. Funding for the study came from the National Institutes of Health.

$19.9 million federal grant to UNC stroke prevention study

The UNC School of Medicine has been awarded a $19.9 million five-year federal grant for a national clinical trial to determine if brain bypass surgery can prevent stroke.

The Carotid Occlusion Surgery Study is headed by Dr. William J. Powers, the H. Houston Merritt Distinguished Professor and chair of neurology at UNC.

Sponsored by the National Institute for Neurological Disorders and Stroke, the multi-center study will determine if a branch of an artery that supplies blood to the scalp can be used to bypass blockages of a major neck artery that supplies blood to the brain.

The study is enrolling patients at 41 medical centers in the US and Canada.

UCRF Web site launched

A Web site for the University Cancer Research Fund was recently launched to provide access to news, publications, outreach activities, and other items related to the UCRF. The Web site can be accessed at ucrf.unc.edu.

The Web site also features a page where users can submit comments online about the UCRF. Access the page at http://ucrf.unc.edu/listening/survey.asp to submit your thoughts about the UCRF.

The University Cancer Research Fund was established at UNC last year by the NC legislature. With funding starting at $25 million in 2007 and expected to grow to $50 million a year by 2009, the UCRF has provided UNC with significant resources to address North Carolina's growing cancer problem.

NC Children's Hospital ranked in nation's top 10 for children with respiratory disorders

US News and World Report has recognized North Carolina Children's Hospital as seventh in the nation among the Top 30 children's hospitals caring for children with respiratory disorders. The ranking appears in the magazine's 2008 edition of America's Best Children's Hospitals, available online at www.usnews.com/pediatrics.

"We are proud and honored to be ranked by US News and World Report," said Alan Stiles, MD, physician-in-chief of North Carolina Children's Hospital. "We've long recognized ourselves as one of the country's best children's hospitals, and I firmly believe this distinction is reflective of our faculty and clinical staff's tireless dedication and commitment to our three-tiered mission of patient care, research and education."

This year marks the first time that the magazine has extended its pediatric rankings beyond the top 30 pediatric centers overall. The 2008 America's Best Children's Hospitals list now includes the 30 top-ranked hospitals in cancer, digestive disorders, heart and heart surgery, neonatal care, neurology and neurosurgery, respiratory disorders, and general pediatrics.

"Very sick kids need very special care," said Senior Writer Avery Comarow, who has been editor of the America's Best Hospitals and America's Best Children's Hospitals annual rankings since their inception. "The best places for them are pediatric facilities with a deep pool of expertise in their particular illness. Breaking out key specialties is crucial to help parents and other caregivers find these facilities."

NC Children's Hospital's seventh place ranking is the highest achieved by any children's hospital in North Carolina. In fact, NC Children's Hospital and Duke Children's Hospital are the only two children's hospitals in the entire state to be recognized in the 2008 edition of America's Best Children's Hospitals.

The specialty rankings of this year's America's Best Children's Hospitals were based on a new and improved methodology that weighed a three-part blend of reputation, outcome, and care-related measures such as nursing care, advanced technology, credentialing, and other factors. A detailed description of the methodology can be found online at www.usnews.com/pediatrics.

NC Children's Hospital's placement on the 2008 America's Best Children's Hospitals further distinguishes UNC Hospitals, which has been included in US News & World Report's America's Best Hospitals issue rankings for each of the last 15 years.

Five specialties at UNC Hospitals ranked among nation's best by US News & World Report

Five medical specialties offered at the University of North Carolina Hospitals rank among the top 50 programs of their kind nationwide in US News's 2008 publication of America's Best Hospitals, published in July.

The 2008 America's Best Hospitals guide ranks 170 medical centers nationwide in 16 specialties—with full data available online for another 1,500 that are unranked.

"This is the 16th year in a row that multiple specialties at UNC Hospitals have been included in America's Best Hospitals," said Dr. William L. Roper, dean of the UNC School of Medicine and chief executive officer of the UNC Health Care System. "Our inclusion in these rankings is a testament to the excellent quality and longstanding consistency of care offered at UNC Hospitals."

The magazine unveiled the rankings in July for its 19th annual "America's Best Hospitals" issue. What follows are brief descriptions of each of UNC's ranked programs.

Cancer (ranked 38th): Cancer care at UNC is coordinated through the UNC Lineberger Comprehensive Cancer Center by Dr. Richard Goldberg, physician-in-chief of the North Carolina Cancer Hospital, and Lineberger associate director. The Center, established in 1975, is headed by Dr. Shelton Earp, director, and is one of only 41 National Cancer Institute (NCI)-designated comprehensive cancer centers. UNC Lineberger holds two Specialized Program of Research Excellence (SPORE) grants, one of 11 in the US for breast cancer and one of five in the US for GI cancers.

Ear, Nose & Throat (ranked 42nd): The Department of Otolaryngology/Head and Neck Surgery, headed by Dr. Harold C. Pillsbury III, has a long history of excellence dating back to the opening of NC Memorial Hospital in 1952. In recent years the department has become known as a leader in cochlear implant surgery, which enables many deaf people to regain a functional level of hearing.

Gastrointestinal Disorders (ranked 35th): UNC's Division of Gastroenterology and Hepatology is headed by Dr. Robert Sandler, who is the current president of the American Gastroenterological Association (AGA Institute). The division provides highly specialized, compassionate care for patients

with gastrointestinal, liver and nutritional diseases. The division is a national leader in research initiatives that further our understanding of complex disease processes and lead to innovative therapeutics.

Gynecology (ranked 33rd): Gynecology services at UNC Hospitals are housed in the Department of Obstetrics and Gynecology, headed by Dr. Daniel Clarke-Pearson. The department is known as a leader in areas such as advanced laparoscopy and gynecologic surgery, treatment of gynecologic cancers and maternal-fetal medicine.

Kidney Disease (ranked 25th): Patients with kidney problems receive excellent care through UNC's Division of Nephrology and Hypertension, headed by Dr. Ronald Falk. Care for kidney patients is provided in seven outpatient clinics, plus UNC Hospitals' kidney and kidney transplant wards and community-based dialysis units in Burlington, Carrboro, Sanford, Siler City, Yanceyville and Pittsboro.

UNC performs second US implant of new hearing device

On March 28, surgeons at UNC Hospitals performed the second implantation in the US of the Vibrant Soundbridge (VSB) device as a treatment for conductive and mixed hearing loss using direct round window cochlear stimulation.

The Vibrant Soundbridge is the first US Food and Drug Administration (FDA) approved implantable middle ear hearing device to treat sensorineural hearing loss. Adults with conductive or mixed hearing loss who have been unsuccessful with traditional amplification may be helped by this device.

The surgery was performed by Drs. Craig Buchman and Oliver Adunka, both from the Department of Otolaryngology-Head & Neck Surgery in the UNC School of Medicine.

"The Vibrant Soundbridge device should provide a solution for a subset of patients that previously had few good options for improving their hearing. Those individuals with hearing loss resulting from hearing bone or ear canal disease now have the opportunity for restoration of normal hearing without the need for a conventional hearing aid," Buchman said.

"The potential benefits are substantial in that the device might eliminate problems with ear canal occlusion, infections, and feedback which are common among certain hearing aid users," Adunka said.

The patient who received the surgery recovered at home until May 22, when he returned to UNC Hospitals to have the implant activated and its settings adjusted by an audiologist.

The Vibrant Soundbridge is marketed by MED-EL, which has its US headquarters in Durham, NC. The device is currently indicated for use in adults who have moderate-to-severe sensorineural hearing loss and who cannot achieve success or adequate benefit from hearing aids or cannot medically tolerate hearing aids. Although the Vibrant Soundbridge is a newly approved device in the US, it has already been used in thousands of patients in Europe.

The Vibrant Soundbridge utilizes hearing technology that directly drives the ossicular chain (middle ear bones) or other middle ear structures, bypassing the ear canal and tympanic membrane (eardrum). It consists of two major components: 1) the implanted component, called the Vibrating Ossicular Prosthesis (VORP), and 2) the externally-worn receiver, called the Audio Processor (AP), which is approximately the size of a quarter. Unlike a hearing aid, which simply amplifies sound, the Soundbridge is a direct drive prosthetic, which mechanically vibrates structures in the middle ear.

Implantation of the Soundbridge bears the same surgical risk as any middle ear surgery. The surgical procedure is very similar to that of the approved Vibrant Soundbridge indication and also that of the approved MED-EL Cochlear Implant. It is possible that placement of the device may need to be revised if the optimum outcome is not obtained or if the device migrates from the original position. Trauma to the inner ear during surgery may result in decreased residual hearing.

UNC Health Care is first in Carolinas to offer 'GPS for the Body' treatment

UNC Health Care is the first medical center in the Carolinas to begin treating cancer patients with a new system that tracks movement of the prostate to provide safer, more accurate radiation therapy.

The system, called the Calypso 4D Localization System, uses three tiny electromagnetic transponders—each about the size of a seed or a grain of rice—implanted in the prostate. These transponders send out signals that are used to track movement of the gland in real time, much like a global positioning or GPS system in an automobile tracks the vehicle's movement. For that reason, the manufacturer of the Calypso system also calls it "GPS for the Body."

In addition to the transponders, the Calypso system includes a console the size of a large rolling suitcase, an electromagnetic array to receive the transponder signals, a tracking workstation and infrared cameras installed in the treatment room.

"Many things can cause the prostate to move during radiation therapy," said Dr. Joel Tepper, a UNC Health Care radiation oncologist and member of the UNC Lineberger Comprehensive Cancer Center. "For example, if the patient makes small motions during treatment, or if the body changes internally due to bowel or bladder activity, the prostate can move enough to introduce errors in the precise radiation targeting. This movement makes it difficult to keep the radiation beam focused on the tumor and to avoid irradiating surrounding healthy tissues that should not receive radiation.

"We believe the Calypso system will make a real difference in patient outcome, by delivering radiation only where it is needed and thus reducing the side effects that are associated with radiation therapy, as well as assuring that the tumor receives the full radiation dose to maximize the chance of curing the tumor,"

Tepper said.

UNC Health Care's first patient to be treated with the Calypso began his course of radiation therapy in early May.

UNC School of Medicine establishes Carolina Institute for Developmental Disabilities

The University of North Carolina at Chapel Hill School of Medicine has established a new institute to advance research, training and treatment efforts aimed at aiding children and adults with developmental disabilities.

The new Carolina Institute for Developmental Disabilities (CIDD) brings together four existing programs on the UNC campus—the TEACCH Program (Treatment and Education for Autistic and Related Communication Handicapped Children); the Clinical Center for Development and Learning; the Family Support Network of North Carolina; and the Neurodevelopmental Disorders Research Center.

"I believe the formation of the Carolina Institute will substantially raise our ability to provide state-of-the-art treatment to individuals with developmental disabilities, conduct cutting-edge clinical and research training, and position UNC as one of the premier research programs in the country in the area of developmental disabilities," said the institute's founding director, Dr. Joseph Piven, Sarah Graham Kenan Professor of Psychiatry and Pediatrics in the School of Medicine and in the College of Arts and Sciences' psychology department.

The new institute will be one of the largest programs for developmental disabilities in the country and UNC's primary source for treatment, education and research in this field. Partnerships with organizations across the state to promote and develop education and treatment programs will be an integral part of the institute's mission. The institute will also provide important, state-of-the-art resources aimed at supporting North Carolinians with developmental disabilities and their families, and will promote research on the causes, development, effects and treatment of these conditions.

Visit the institute's new Web site, www.cidd.unc.edu, to learn more.

Arjun Deb wins New Scholar Award in Aging

Arjun Deb, MD, an assistant professor in the UNC School of Medicine, has received a 2008 New Scholar Award in Aging from the Ellison Medical Foundation.

Deb's project studies the role of cardiac stem cells in the biology of aging of the adult heart and will determine whether cardiac aging is associated with decreased self-renewal of cardiac stem cells. His lab plans to investigate signaling mechanisms that regulate cardiac stem cell renewal and how this is altered following injury and aging.

The award provides funding of $100,000 per year for a four-year period.

Deb joined the Department of Medicine's cardiology division and the Carolina Cardiovascular Biology Center in 2007.

The foundation's New Scholar awards provide support for newly independent investigators in the first three years after their postdoctoral training, when they are establishing their own labs. These awards support bright young scientists during their early years, allowing them to staff their laboratories, collect preliminary data and organize research programs of sufficient momentum to obtain ongoing support from other sources.

New Scholar applications are solicited by invitation only. Candidates are investigators who are nominated by their institutions for their outstanding promise in basic aging research.

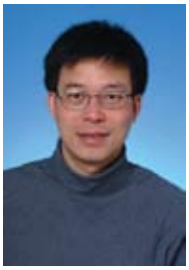
The Ellison Medical Foundation is a non-profit organization that supports basic biomedical research on aging relevant to understanding lifespan development processes and age-related diseases and disabilities. The Foundation aims particularly to stimulate new, creative research that might not be funded by traditional sources or that is often under-funded in the US.

More information about foundation's New Scholar award program and other funding activities is available at http://www.ellisonfoundation.org/index.jsp.

Lineberger scientist receives first Battle Research Award

Yi Zhang, PhD, professor of biochemistry and biophysics in the UNC School of Medicine, has been awarded the first Hyman L. Battle Distinguished Cancer Research Award in recognition of his work.

The award, established last year by the Battle Foundation of Rocky Mount, recognizes exceptional cancer research at the medical school and comes with a $25,000 prize. The Battle Award fund is a permanent endowment held by The Medical Foundation of North Carolina, Inc.



Zhang

Zhang, a member of the UNC Lineberger Comprehensive Cancer Center, is an internationally recognized scientist in the area of chromatin, a genetic material. He received the Gertrude Elion Award in 2003 from the American Association of Cancer Research and is a Howard Hughes Medical Institute investigator.

Zhang and his colleagues study how DNA is packaged in different cell types into chromatin. The differences in chromatin affect almost every cellular process from gene expression through the shape and differentiated function of cells and tissues. Chromatin dynamics help explain why nerve cells and skin cells—which have the exact same DNA—differ in shape, size and capabilities. When the enzymes that control chromatin are deranged, cancer can develop.

Zhang's lab has discovered and characterized many of the proteins that regulate chromatin structure. A testament to the high impact of his work came recently from the research information company, Thomson Scientific, which ranked Zhang 7th worldwide in numbers of high impact citations in the area of molecular biology and genetics.

Hyman L. Battle (1896-1972) established the Battle Foundation in 1946. His grandfather, Kemp Plummer Battle, was an early president of UNC-Chapel Hill.

UNC researchers, spin-off receive NIH small business grant

UNC School of Medicine researcher Dr. Jonathan Serody, in collaboration with local research company TheraLogics, has received an $800,000 grant from the National Institutes of Health (NIH) to study the treatment and prevention of graft versus host disease.


Serody

Serody is the Elizabeth Thomas Professor of Medicine, Microbiology and Immunology, and co-leader of the immunology program at the UNC Lineberger Comprehensive Cancer Center.

The two-year NIH Small Business Technology Transfer grant supports cooperative research and development projects between small business concerns and research institutions that have potential for commercialization.

Graft versus host disease, or GVHD, is a common side effect following a bone marrow or cord blood transplant. It occurs when the "new" immune system of a patient who has undergone transplantation for a disease such as cancer attacks its host—the patient's body.

The grant will fund research to evaluate NF-kappa B blockade as a method of preventing or treating GVHD. NF-kappa B is a protein that attaches to DNA inside cell nuclei and turns genes on and off.

TheraLogics, a Chapel Hill-based company spun out of UNC research, investigates the role of NF-kappa B in diseases such as cancer and muscular dystrophy.

Collaborating with Serody are Albert Baldwin, PhD, UNC Lineberger associate director and founder of TheraLogics; Patrick Flood, PhD, associate professor in the UNC School of Dentistry and Theralogics' grants officer; William Zamboni, PhD, associate professor in the UNC School of Pharmacy; along with scientists from the University of Minnesota and the Fred Hutchinson Cancer Research Center in Seattle, Wash.

Researcher awarded Rita Allen Foundation Scholarship

Ian Davis, MD, PhD, assistant professor of pediatrics in the UNC School of Medicine and a member of the UNC Lineberger Comprehensive Cancer Center, has been selected as one of seven national 2008 Rita Allen Foundation Scholars.

The three-year, $150,000 grant will support his research into childhood cancer.

The molecular switches that control which genes are turned on and off are frequently altered in several childhood solid tumors and leukemias. Davis' lab aims to understand how these molecular switches differ from their normal counterparts and hopes to capitalize on these differences to develop new therapies for such cancers.

The Princeton, N.J.-based Rita Allen Foundation established the scholars program to advance medical research. It has supported more than 80 scientists over the past 30 years.

UNC doctor recognized as a "Hero of Emergency Medicine"

The American College of Emergency Physicians has recognized Dr. Judith E. Tintinalli, professor and chair emeritus in the department of emergency medicine at the UNC School of Medicine, as a "Hero of Emergency Medicine."

The honor, announced as part of the college's 40th anniversary celebrations, recognizes emergency physicians who have made significant contributions to emergency medicine, their communities and their patients.

Tintinalli, the emergency department's founding chairman, is also an adjunct professor in the Department of Health Policy and Administration in the UNC School of Public Health, and a guest lecturer in medical journalism in UNC's School of Journalism and Mass Communication.

The college described Tintinalli is one of the world's leading emergency medicine educators and said that her dedication, passion and commitment embody the vision of its founders and the ideals of the specialty.

Tintinalli was elected to the National Academy of Sciences Institute of Medicine in 1997, was president of the American Board of Emergency Medicine from 1989 to 1990, and was the founding president of the Council of Emergency Medicine Residency Directors. She served as deputy editor of the *Annals of Emergency Medicine* from 1994 to 2005 and is editor of *Tintinalli's Emergency Medicine: A Comprehensive Study Guide*, first published in 1978 and now in its sixth edition.

The American College of Emergency Physicians is a national medical specialty society representing emergency medicine with more than 25,000 members.

Carey inducted into Johns Hopkins Society of Scholars

Dr. Lisa Carey, associate professor of medicine in the UNC School of Medicine and medical director of the UNC Breast Center, has been inducted into the Johns Hopkins University Society of Scholars.

Carey, one of 15 new inductees, was honored at a recent ceremony at the Johns Hopkins School of Medicine. She was recognized for her work with UNC colleagues to identify and tailor treatment for molecular subtypes of breast cancer.


Carey

The 521-member society is designed to honor individuals who did their training (in fellowships, postdoctoral training and early faculty positions) at Johns Hopkins and subsequently gained marked distinction elsewhere in their fields of physical, biological, medical, social or engineering sciences or in the humanities.

Carey, a member of the UNC Lineberger Comprehensive Cancer Center, is a medical oncologist dedicated to clinical and translational breast cancer research, which requires a multidisciplinary approach to cancer care to include scientists as well as clinicians.

Carey has authored or co-authored more than 70 manuscripts and book chapters. Currently, she is the principal investigator of a large-scale, multi-institution trial to test new treatments for a basal subtype of breast cancer, and is the principal investigator of a national cooperative group trial

examining targeted therapy for another subtype of breast cancer.

Carey earned her medical degree from Johns Hopkins, was a resident in internal medicine and then a fellow in oncology from 1990 to 1997. She earned an advanced degree in clinical research at the Johns Hopkins School of Public Health in 1998, and joined the UNC faculty in 1998.

Samulski wins achievement award from American Society for Gene Therapy

R. Jude Samulski, PhD, director of the Gene Therapy Center at UNC, has received the inaugural Outstanding Achievement Award given by the American Society for Gene Therapy.

Samulski, a professor in the School of Medicine's pharmacology department and member of the UNC Lineberger Comprehensive Cancer Center, received the award recently at the society's annual meeting in Boston. He was selected from a pool of 13 nominees from across the country.

The award recognizes an active member of the society who has achieved a pioneering research success, a specific high-impact accomplishment or a lifetime of significant scientific contributions to the field of gene therapy.

Samulski's research focuses on the study of the human non-pathogenic parvovirus adeno-associated virus (AAV). He has long pioneered methodologies for using viruses to deliver genes effectively and safely to various targets in the body, including the brain, lungs, heart and muscle. As a graduate student at the University of Florida in the early 1980s, his thesis project was developing AAV as a vector for therapeutic genes.

This work eventually led to development of AAV type-2 as a viral vector, which has been used for gene therapy trials in cystic fibrosis, hemophilia, Parkinson's disease, retinal disorders and in several other settings, including the first clinical trial of gene therapy for muscular dystrophy in the United States. That trial is currently under way, led by a university biotech start-up that Samulski co-founded with Xiao Xiao, PhD, who is now the Fred Eshelman Distinguished Professor of Gene Therapy in the UNC School of Pharmacy molecular pharmaceutics division.

Samulski

Samulski was recruited to UNC as director of the Gene Therapy Center in 1993. In addition to his work at UNC, Samulski has founded the Chapel Hill Project, a non-profit organization focused on facilitating gene therapy clinical trials for orphan diseases. Orphan diseases are life-threatening or chronically debilitating diseases affecting relatively few people. As a result, pharmaceutical companies do not generally invest significant funds toward their research and development and most sufferers lack sufficient treatments.

Sandler named president of American Gastroenterological Association Institute

Dr. Robert S. Sandler, chief of the Division of Gastroenterology and Hepatology in UNC's School of Medicine, began a one-year term in May as president of the American Gastroenterological Association (AGA) Institute.

Sandler is the Nina C. and John T. Sessions Distinguished Professor in the School of Medicine and professor of epidemiology in the UNC School of Public Health. He joined the UNC faculty in 1981 and has been division chief since 2003. He is also the longstanding director of the Center for Gastrointestinal Biology and Disease, an NIH-funded Digestive Disease Research Core Center that is based at UNC and NC State University.

Sandler

As a researcher, Sandler has long been nationally recognized in the field of cancer epidemiology and outcomes research. He was the principal investigator in a widely cited study published in the *New England Journal of Medicine* that found patients who had colorectal cancer might reduce their risk of developing future colorectal adenomas (colorectal cancer precursors) by taking an aspirin daily.

Sandler received his medical degree from Yale University School of Medicine and was an intern and resident in internal medicine at George Washington University Hospital in Washington, DC. After clinical and research fellowships in gastroenterology at UNC, Sandler was an NIH Clinical Cancer fellow at NC Memorial Hospital (now part of UNC Hospitals). He was a trainee in cancer epidemiology, and he earned his MPH in epidemiology from the UNC School of Public Health.

Sandler was honored in 2004 with the Foundation for Digestive Health and Nutrition's Fiterman Foundation Joseph B. Kirsner Clinical Research Award in Gastroenterology. He has dedicated himself to several organizations by serving on committees and review panels, including the AGA Institute, National Institute of Diabetes and Digestive and Kidney Diseases, National Cancer Institute, and the Crohn's and Colitis Foundation of America. For the AGA Institute, he has worked tirelessly for a number of councils, committees, task forces and the Governing Board. Dr. Sandler also has served on five editorial boards, and was an associate editor of *Gastroenterology*, the leading peer-reviewed journal in the field.

The American Gastroenterological Association is the largest and most prestigious professional organization in gastroenterology. Founded in 1897, the association is the oldest medical-specialty society nationwide, and its more than 14,500 members include physicians and scientists who research, diagnose and treat disorders of the gastrointestinal tract and liver.

Evanosky Foundation gift to help families facing rare disease

The Chicago-based Evanosky Foundation has given $10,000 for the treatment of children diagnosed with metachromatic leukodystrophy (MLD) at UNC's Clinical Center for the Study of Development and Learning (CDL).

Dr. Maria Escolar and Bob Evanosky

The John, Christopher and Jack Evanosky MLD Treatment Fund is named after Bob and Sonya Evanosky's three children, all of whom have the disease. Bob is director of the Evanosky Foundation. The fund will be used solely to provide financial assistance to families with children diagnosed with MLD who are seeking care under Dr. Maria Escolar, director of the Neurodevelopmental Function in Rare Disorders Program at the CDL. Funds may be used for travel and lodging expenses, medical evaluations and testing, parking fees and other expenses when all other forms of financial support have been exhausted.

Metachromatic leukodystrophy is a rare, genetic, degenerative, neurometabolic disorder that affects approximately one in 40,000 people (primarily children) worldwide. It is an inherited disease, but parents are typically not affected. At present, it is a disease for which there is no cure. Those affected with MLD are deficient in the arylsulfatase-A enzyme, which is responsible for breaking down fatty substances called sulfatides into harmless chemicals. A person with MLD cannot break down these sulfatides, causing them to accumulate in the body. This accumulation causes the destruction of myelin (demyelination), which is the protective covering on the nerve fibers that enables communication between the nerves and the brain.

California family contributes to Crohn's disease research

Michael and Donna Greenberg, of Atherton, Calif., have made a generous gift of $10,000 to support the research of Scott Plevy, MD, an associate professor of medicine, microbiology and immunology in the UNC School of Medicine. This is the fourth gift the couple has made to support Plevy's research.

The Greenburg's young daughter was diagnosed with Crohn's disease nearly 20 years ago, and the family sought Plevy's help when he was on a fellowship at Cedars-Sinai Medical Center in Los Angeles. Plevy and his colleagues were able to return the Greenburg's daughter to a relatively normal life.

"Just as importantly, he offered a humanity that is hard to find in the halls of world-class medical treatment," said Greenburg. "At times of crisis, we have found ourselves seeking his help even though it meant traveling across the country."

"It is our desire to help, in our small way, Scott further his research so that other desperate families can be similarly helped," said Michael. "Making a direct contribution to a working researcher who we believe deeply in provides us with a feeling of participation in the effort."

Plevy has contributed significantly to the medical literature on Crohn's disease and ulcerative colitis. He is the author of numerous original articles, abstracts, and book chapters. His work has appeared in the *Journal of Experimental Medicine*, *Journal of Biological Chemistry*, *Immunity*, *Science*, *Molecular and Cellular Biology*, *Gastroenterology*, and *The Journal of Immunology*. Plevy has served as basic science section editor for *Inflammatory Bowel Diseases* and is a reviewer for numerous scientific and clinical journals.

Lucas professorships in biomedical engineering created

Janie M. Fouke, of Gainesville, Fla., has signed a letter of intent to establish the Carol N. Lucas Professorship in Biomedical Engineering.

Fouke has set aside $333,000 in her estate plan to honor Lucas, her mentor. Separately, Lucas is creating the Lucas Family Professorship in Biomedical Engineering, through a gift of life insurance, in honor of several of her immediate family members who have received academic degrees from UNC.

Janie Fouke and Carol Lucas

Fouke, senior advisor to the president for international affairs at the University of Florida, earned graduate degrees in biomedical mathematics and engineering from UNC. She served as dean of the College of Engineering at Michigan State University from 1999 to 2005. Prior to that, she was the inaugural division director of the newly created Division of Bioengineering and Environmental Systems with the National Science Foundation in Washington, DC. From 2005 to 2008, Fouke was provost and senior vice president for academic affairs at the University of Florida.

Lucas, of Chapel Hill, NC, is a professor emerita of biomedical engineering, surgery, and applied and materials sciences in the Department of Biomedical Engineering at UNC. She retired in 2007 after more than 30 years on the faculty.

ALUMNI NOTES

40s

Ira A. Abrahamson, Jr., CMED '46, was recently honored with a Distinguished Alumni Award by the University of Cincinnati College of Medicine. Abrahamson founded the Abrahamson Pediatric Eye Institute at Cincinnati Children's Hospital Medical Center in 1995. In addition to many other well-deserved awards and recognitions, Abrahamson also holds a Distinguished Alumnus Award from UNC, as well as a University of Toledo Medical Mission Hall of Fame Award, which he received in 2007.

50s

Daniel A. Martin, CMED '50, medical director of the Hopkins County (KY) Health Department and a board member of the Trover Health System in Madisonville, retired as director of the Trover Health System's education division three years ago. While at that post, he developed: a program for full-time third- and fourth-year students (at the Univ. of Louisville), the first family practice residency in the state, the state's only CRNA program, and an allied health campus for Madisonville Commuity College. He is now working on a smoking ban for his entire county through the health department.

60s

Charles E. Fitzgerald, Jr, MD '60, and his wife, Dana, moved to Farmville in spring 2007 "to escape the Florida tourists and hurricanes." Although they left three families of children and 10 grandchildren behind, they have a married son and two grandchildren in Chapel Hill. The latter gives them reason to visit "ol' Chapel College" regularly. Fitzgerald's current professional interest is promoting patient advocacy through faith-based organizations. He says, "These organizations are an untapped resource to assist patients through the healthcare maze. I'd love to hear from any other alumni with similar interests."

James Rose, MD '64, of Madison, Wisc., welcomed his fourth grandchild, Adam Broder Rose, into the world on June 14, 2008.

70s

Dwight L. Evans, MD (Housestaff '76-'79), Ruth Meltzer Professor and chairman of the Department of Psychiatry, professor of psychiatry, medicine, and neuroscience at the University of Pennsylvania School of Medicine, is the new president-elect of the American College of Psychiatrists. He also recently completed a three-year term as president of the American Foundation for Suicide Prevention. In addition, he is the recipient of the American Psychiatric Association AACDP (American Association of Chairmen of Departments of Psychiatry) Research Mentorship Award, which was presented last May at the American Psychiatric Association Annual Meeting in Washington, DC.

Paul Woodard, MD '79, was recently inducted into the Order of the Long Leaf Pine by North Carolina Governor Michael Easley. Woodard was recognized for his service to the community by the award, the highest civilian honor given by the governor. Woodard helped establish the Raleigh School of Nurse Anesthesia, where he has served as medical director and board president for the past 18 years. Woodard, an anesthesiologist at WakeMed Hospital in Raleigh, also serves as president of Critical Health Systems at the Wake Practice Center.

80s

Charles S. Stinson, MD '83, medical director for Forsyth Medical Center's Palliative Care Services and a major advocate of the Hospice & Palliative Care Center, has been awarded the prestigious End of Life Care Leadership Award for his innovative and significant contributions to improving end of life care. The award is given annually by the Carolinas Center for Hospice & End of Life Care, an association which represents more than 100 hospice providers in North and South Carolina.

90s

Scott Keenan Garrison, MD '92, and Suzanne McDowell Garrison are delighted to announce the birth of a baby boy, Keenan Secrest Garrison. He was born on May 17, 2007, and weighed 8 lbs., 4 oz. Big sister Bailey is also thrilled with her new little brother.

Alexander M. Wilgus, MD '93, director of patient care for the Lynchburg Family Medicine Residency Program, has been selected to participate in the 2008-2009 class of the Medical Society of Virginia Foundation's Claude Moore Physician Leadership Institute. Now entering its third year, the Institute helps physicians strengthen their leadership abilities and gain the skills necessary to improve health care in Virginia. Twenty physicians have been chosen for the program. Wilgus also volunteers at the Free Clinic of Central Virginia and has agreed to serve on the Lynchburg Academy of Medicine Board of Directors starting in September 2008. He is married, has four children, and is a former foster parent.

00s

Rich Vinroot, Jr, MD '04, has accepted a position as a physician with Doctors Without Borders/Médecins Sans Frontières. He is currently the clinical supervisor of a tuberculosis prevention and treatment program in the Mathare Slum, Nairobi, Kenya, East Africa. On completion of this mission, he will return to New Orleans, where he will work as an emergency medicine physician.

Eric Chen, MD '07, recently completed his intern year and was named chief resident for his class. He plans on pursuing an OB fellowship immediately after completing his residency. His wife, Lauren, is an attorney in the newly-formed public defender's office that serves Henderson, Polk, and Transylvania counties.

In Memoriam

Anna Louise Williams, MD '80, 54, diagnostic radiologist, died March 2, 2008 of a pulmonary embolism at her home in Washington, DC. Williams was born in Durham, NC, and grew up in the home of an older sister, Lauriette W. West-Hoff, and her sister's husband, David West.

She received her undergraduate ('76) and medical ('80) degrees from UNC and completed her residency in radiology in New Orleans. Williams moved to Washington in 1984 after receiving a postdoctoral fellowship from Georgetown University Hospital. She joined Washington Radiology Associates, where she worked until 1996.

She also served as staff radiologist at the Columbia Hospital for Women and Washington Hospital Center. At the time of her death, she was a staff radiologist for Kaiser Permanente's West End Medical Center in the District. One of her medical concentrations was helping minority women receive mammograms.

Williams was a member of the Radiological Society of North America, the American Institute of Ultrasound in Medicine and the DC Metropolitan Radiological Society. She attended Trinity Episcopal Church in Washington and enjoyed jazz, travel, and spending time with friends.

Survivors include her husband of 25 years, Wayne B. McLurkin of Washington; four sisters; and two brothers.

William Henry White, Jr., MD '61, passed away on Thursday, March 20, 2008, at NC Memorial Hospital, surrounded by family.

After receiving a bachelor of science degree in medicine from UNC in 1958, he graduated from the UNC School of Medicine in 1961. Following a one-year internship at the Medical College of South Carolina in Charleston, he returned to Chapel Hill for a four-year residency in obstetrics and gynecology. White served in the US Air Force at Andrews Air Force Base for two years, and practiced obstetrics and gynecology in Wilmington for one year. In 1969, White opened a OB-GYN practice in his hometown of Sanford. During his career of almost 38 years, he delivered more than 6,000 babies.

White was an active member of the Lee County Medical Society and recently retired as an OB-GYN physician at Central Carolina Hospital, where he was chief of staff twice. White was a member of the UNC Alumni Association and served as the Lee County representative to the UNC Rams Club Executive Committee for several terms. White's professional organizations include: The Robert A. Ross Society, serving as president for one term; NC OB-GYN Society serving as arrangements chairman for several years; the Southern OB-GYN Society; and a board-certified member of the American College of OB-GYN.

He was preceded in death by his sister, Margaret Ann White Rankin. He is survived by his beloved wife of 47 years, Faye Mewborn White, a nursing student whom he met in 1955 at UNC; their three daughters, Sarah, Kathy, and Elizabeth; seven grandchildren and many nieces and nephews. White served St. Luke United Methodist Church as a member of the administrative board, Staff Parish Relations Committee, Board of Trustees, Methodist Men, and the Moffitt Sunday School Class.

Bertram Watts Coffer, MD '69, 66, died April 10, 2008, at Rex Hospital in Raleigh, NC. A native of Sanford, he spent the last 33 years of his career at Rex Hospital. He graduated from North Carolina State University in 1964 and the UNC School of Medicine in 1969. He completed a surgical residency at Duke in 1971, as well as an anesthesia residency at UNC in 1975.

During the Vietnam War, he was commissioned as a lieutenant commander and was stationed at Jacksonville (Fla.) Naval Air Station as an anesthesiologist. In 1974, he worked with Project Hope at the University of the West Indies in Jamaica. He began practicing in 1975 when he joined Raleigh Anesthesia Associates, which he eventually incorporated and developed into Critical Health Systems. He served as CEO there from 1975 to 1996. Coffer had a vision for the advancement of anesthesiology into new areas, such as intensive care, critical care, pain management, and total patient care. He was a member of numerous boards, including the Rex Hospital Executive Committee and the Ravenscroft Board of Directors. He was also president of the Wake County Medical Society in 1986. He had an active role in politics and public policy. Many elected officials, including US senators and members of Congress, often sought his advice.

Coffer is survived by his wife of 42 years, Jeanne Coffer; two daughters, Dr. Natalie Coffer and Holly Coffer Fuller; one son, Bertram Coffer Jr.; two sisters, Marilyn Lambe and Helen Gupton; one brother, Newlin Coffer; and three grandchildren. He was predeceased by a sister, Carol Thompson.

Charles Ivey Loftin III, MD '63, 70, of Roanoke, died Thursday, April 24, 2008, after a courageous three-year battle with cancer. He retired last November following 37 years of practice with Internal Medicine Associates. He was a graduate of Davidson College and the UNC School of Medicine.

Loftin completed a general medicine internship at the Medical College of Georgia, followed by two years of service as a captain in the US Air Force medical corps. He completed an internal medicine residency at the Bowman Gray School of Medicine.

He was a member of the Roanoke Valley Medical Society, the Medical Society of Virginia, and the American Society of Internal Medicine. He was a member of Second Presbyterian Church where he served as deacon, elder, youth leader, Sunday School teacher and member of the Chancel Choir. He also sang with the Roanoke Valley Choral Society, the St. John's choir and the Opera Roanoke Chorus. He was a past president of the Arthritis Foundation and a founding board member of the Pastoral Counseling Center. He also served on the board of Opera Roanoke.

He is survived by his wife of 46 years, Alice; his daughter Catherine; son Christopher; and four grandchildren. He is also survived by two brothers, David and Bruce.

Christopher C. Fordham III, MD

November 28, 1926 – August 14, 2008

Christopher Columbus Fordham III, MD, former dean of the School of Medicine and chancellor emeritus of UNC-Chapel Hill who led Carolina during a span of major success in the 1980s, died August 14, 2008 at UNC Hospitals. A longtime Chapel Hill resident, he was 81.

"Our hearts and prayers go out to the Fordham family and their friends," said Chancellor Holden Thorp. "Chancellor Fordham was one of this University's greatest leaders.

"As a graduating senior, I couldn't appreciate the challenges he faced as chancellor," Thorp said. "Today, I know that for him it was a labor of love, and that we all are so fortunate to continue benefitting from his wisdom and decisive action. Chancellor Fordham is rightly regarded as the driving force behind a period of extraordinary success at Carolina. We will never forget his deep love for this place."

As chancellor from 1980 to 1988, Fordham oversaw a major revision of the undergraduate curriculum and led the push to significantly boost faculty research funding, which grew from $56 million to $105 million. Under his leadership, the state increased the University's budget. He renewed the focus on private fundraising, putting Carolina among the nation's top 20 public institutions for contributions and increasing the endowment from $30 million to $130 million.

A native of Greensboro, Fordham devoted five decades of service to the University, including his tenure as chancellor. Fordham began as a UNC undergraduate before earning a pre-medical degree as well as a certificate in medicine in 1949. He received a medical degree from Harvard University in 1951.

After an internship at Georgetown University Hospital and a residency at Boston City Hospital, Fordham returned to Carolina as a senior assistant resident in medicine and a fellow at the new four-year medical school. After two years as a medical officer in the US Air Force, he started a private practice in Greensboro. He came back to Chapel Hill as an instructor, professor and associate dean in the medical school. The Medical College of Georgia recruited him in 1969 to become vice president for medicine and dean. Fordham returned to Carolina in 1971, becoming dean of the School of Medicine and a professor in the school until 1979.

Under his leadership as dean, the NC Area Health Education Centers (AHEC) Program was established, linking the University with other in-state medical schools to provide service opportunities to physicians and increase the ratio of health professionals to North Carolina's population. Today, AHEC remains headquartered at the School of Medicine and is considered a successful national model.

During part of Fordham's tenure as dean, he also served the University as vice chancellor for health affairs. In 1977 he was named acting assistant secretary for health and acting Surgeon General of the United States at the request of President Jimmy Carter.

UNC President William C. Friday hired Fordham to succeed Chancellor N. Ferebee Taylor, who took office in 1972. Fordham is the only medical doctor to serve as the University's chancellor.

Fordham's honors include induction as a fellow of the American Association for the Advancement of Science, the American Medical Association Award and the NC Hospital Association's Distinguished Service Award. In 2002, Fordham received the William Richardson Davie Award, the highest honor bestowed by the University's Board of Trustees, for his dedication, commitment, loyalty and service. The University also presented him with its Distinguished Alumnus Award, given for outstanding contributions to humankind.

Christopher and Barbara Fordham established the Fordham Fund for Diversity in the Health Professions through the Medical Foundation of North Carolina, Inc., the private fundraising arm supporting the School of Medicine. In 1988, the University's biotechnology building was named Christopher C. Fordham Hall. The Christopher Fordham Award recognizes a graduating student for outstanding and creative leadership at the School of Medicine. He also received the General Alumni Association's Distinguished Service Medal and was selected for membership in the Order of the Golden Fleece, a campus honorary society. The US 15-501 Bypass in Chapel Hill is named Fordham Boulevard in his honor.

Fordham is survived by his wife, Barbara, of Chapel Hill and a Carolina alumna; and three daughters: Pam Fordham Richey of Durham, Susan Fordham Crowell and husband James Crowell of Myersville, Md.; and Betsy Fordham Templeton and husband Michael Maloney of Durham, as well as six grandchildren and seven great-grandchildren.

In lieu of flowers, the family requests that donations be made to the Orange United Methodist Church Building Fund, 1220 Martin Luther King Blvd., Chapel Hill, NC 27514; the Fordham Fund for Diversity in the Health Professions, Medical Foundation of North Carolina Inc., 880 Martin Luther King Jr. Blvd., Chapel Hill, NC 27514; or the National Multiple Sclerosis Society, PO Box 4527, New York, NY, 10163.

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A Bit of Salt, A Trace of Life

Continued from page 11

probably also withstand radiation levels like those on Mars better than other macromolecules would. Scientists already suspect that Mars and other planets have evaporites—mineral sediments created when surface water evaporates. Griffith says that scientists should explore halite in these evaporites.

"Who knows?" he says. "Cellulose might just be the electron microscoper's version of little green men."

Griffith used a stipend from his Kenan Distinguished Chair award to fund this research. He is now seeking a grant from the National Science Foundation to research older salt deposits around the world; there's a 400-million-year-old halite formation thousands of feet below Detroit.

This article originally appeared in the Spring 2008 issue of Endeavors *magazine. Used with permission from* Endeavors.

CORRECTIONS

In the Spring 2008 issue of the *Bulletin*, Dr. Leigh Callahan was incorrectly identified as the current associate director of UNC's Thurston Arthritis Research Center in the story titled "Trialed and True" (p.4). Callahan served in that capacity from 1995 until 2000.

Also in the Spring 2008 issue, Harriet Farb's age at the time of her initial cancer diagnosis was incorrectly reported in the story titled "Climbing for Cancer" (p. 14). She was 47 at the time.

Paso a Paso

Continued from page 14

service to patients in Spanish with proper supervision."

With the inauguration of the UNC Institute of Global Health and Infectious Diseases under the direction of Dr. Myron Cohen, and the launch of the SOM office to organize global rotations, it is anticipated that the School of Medicine will deepen and broaden its efforts in Latin America. These global health partnerships, particularly in the teaching function, directly benefit the population of North Carolina.

"There is a natural synergy between our global health collaborations in Latin America and what we are trying to do for our Latino population here," Morgan says.

Paso a Paso

CELAH, with the CAMPOS program, is expected to help catalyze efforts in the health system in the clinical care of the state's Hispanic-Latino population, while providing an infrastructure for research and teaching. The Center of Excellence design attempts to move beyond an 'interpreter model' for the provision of care. It is a reasonable model for health systems in transition, such as in the southeast, wherein there has been a significant change in the Spanish-speaking population. Certainly, a goal is to help position UNC as a national leader in Latino health.

We are all **mutants**

Health care delivery in the age of genetic medicine

By James P. Evans, MD, PhD

Occasionally, the emergence of new technology or knowledge propels medicine across a threshold so monumental that it mandates changes in the structure of health care delivery. In the 20th century, a deep understanding of infectious diseases and of cardiovascular risk factors triggered such changes, stimulating action at the governmental and population levels with the creation of organizations like the Centers for Disease Control and Prevention (CDC) and departments of public health.

Today, medical science is at another such threshold with the advent of "individualized medicine." Driven by advances in genomics, emerging insight into each individual's unique susceptibility to disease promises to transform patient care. However, such advances will also compel a fundamental restructuring of the way medical care is delivered in the US.

There are many reasons to pursue a rational, just and workable system of health care in the US. Millions of Americans live without health insurance; and even for those with insurance, the cost of medical care is a constant threat to financial security. The potential success of genomic medicine provides a series of additional compelling arguments to embrace a system of care that provides universal coverage and broadly pools risk. It is no small irony that the emergence of individualized medicine ultimately mandates a shared approach to its delivery.

Genomic undermining of health insurance

Modern health insurance is based on the tenet that it is possible to accurately predict aggregate risk but much more difficult to predict individual risk. Insurance actuaries can reliably estimate the percentage of a population that will develop breast cancer, but since we cannot predict precisely which individuals will develop it, resources are pooled, enrollees pay similar premiums, and all benefit. However, the rise of individualized medicine undermines this traditional system. By learning to identify an individual's risk, that individual becomes less attractive to insure for the very maladies for which they require coverage. The recently-passed Genetic Information Non-Discrimination Act will help limit genetic cherry-picking by insurers. However, in a fragmented health care system, such fixes ultimately run the risk of simply shifting the inequity by enabling individuals to select coverage based on their own specific risks. Either way, the foundation of the system is fatally undermined. The only solution is for all to pool their risks.

Individualized medicine and prevention

One of the promises of individualized medicine is the possibility of engaging in a level of preventive care that far exceeds current abilities. Screening programs are, by their very nature, inefficient, since an entire population is subjected to screening while relatively few individuals benefit and some are actually harmed. This inherent inefficiency is expensive for both the individual (in terms of suffering) and for society (in terms of cost).

Genomic medicine promises more efficient tailoring of screening programs—which would save time and money and reduce morbidity for the population as a whole. However, the current health care delivery system is poorly equipped to incentivize prevention. Most US citizens who have medical insurance stay with a given carrier for an average of less than 6 years. Thus, since individual insurers are unlikely to be paying for an enrollee 10 or 20 years hence, they have little motive to engage in long-term preventive care. A system of universal coverage with broadly shared risk is the only way to reap the benefits of individualized medicine at the population level.

We are all mutants

The rise of individualized medicine will amplify

inequities of birth so that those born with disease-predisposing mutations will bear the brunt of increased costs, whereas those without such predispositions can seek less expensive care. An individual's attitude might be: "Tough, I'll take my savings and run." Setting aside the ethical implications of such an attitude, it is flawed by one of modern genetics most piercing insights: we are all mutants.

Each individual carries (eventually identifiable) genomic risks for something. With our growing ability to analyze your genome, all will likely discover that their risk for some future malady is increased; i.e., we all have pre-existing conditions. This inevitable bad news for individuals is actually good news for the common lot and represents a compelling inducement to share risk: because all of us are flawed at the level of the genome, we need one another.

The rise of pharmacogenomics

Pharmacogenomics offers the potential to use genetic profiling to individualize our choice of drugs and their optimal doses, thereby saving lives and money. But successful application of pharmacogenomics will inevitably fragment markets for pharmaceuticals. Under the present balkanized system of health care financing, such a situation will burden patients, insurers and the pharmaceutical industry with challenges that will increase in direct proportion to this new field's success. Since each individual's insurance plan cannot be expected to have the broad formularies necessary to reap the practical benefits of pharmacogenomics, patients will often be insured by plans that lack a drug that could result in significantly improved care. This situation is undesirable from the perspective of the patient and insurer alike and argues strongly for pooling both risk and resources so patients have access to an increasingly individualized formulary while insurers are spared endless petitions by patients for off-formulary drugs.

Irrational rationing

The fear that the US will end up rationing medical care is commonly expressed. However, healthcare in the US is already rationed, but in an irrational and unjust manner based on circumstances of birth and income. The rise of individualized medicine could make matters worse. Despite hopes to the contrary, genetically-based medicine may actually increase health care costs, in part by identifying risks which require clinical intervention, usually in the form of high-tech surveillance. Such a situation will only add to widespread demands for universal coverage as more individuals seek to mitigate their genetically identified risks. On the other hand, individualized medicine has the potential to reduce the aggregate cost of health care through better prevention. But if such cost savings materialize, they will be primarily population-based and thus most readily realized within a non-fragmented health care system. Thus, whether individualized medicine results in cost savings or not, either way it will provide potent stimuli for universal care and shared risk.

A genetic underclass

Embracing individualized medicine within our current system threatens to create a genetically defined underclass which has inherited excess risk and thus is unable to afford adequate care. This new genetically defined underclass will transcend all social strata and, except for those few with truly exceptional resources, the cost of medical care will be beyond reach. To prevent a blossoming of irrational rationing and the emergence of a biologically defined group precluded from obtaining proper care, it will be necessary to share our risks and resources so that regardless of genetic makeup, a basic level of medical care will be available to all.

Because all of us are flawed at the level of the genome, we need one another.

A moral imperative

While universal healthcare will hardly be a panacea for all the complex problems that plague health care delivery in the US, there are compelling practical reasons to pursue it. The rise of individualized medicine forcefully adds to this imperative. But our burgeoning genetic knowledge also has a profound moral dimension. The science of medical genetics starkly illuminates our common lot, revealing in the most vivid way possible that we are all flawed and that we are all in the same boat. We must insist that the boat we share be a just one to which all have access.

Evans is an associate professor in the Department of Genetics at the UNC School of Medicine.

Spring Medical Alumni Weekend

April 24-25, 2009 - Chapel Hill, N.C.

Classes from years ending in "4" and "9" will celebrate reunions, however all alumni are encouraged to attend the events.

1949 1954 1959
1964 1969 1974
1979 1984 1989
1994 1999

For more information, visit http://www.med.unc.edu/alumni or call (919) 962-8891. Please make sure that you make your hotel reservations early, as area hotels will fill up quickly as the date approaches.

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