BUILDING FOR THE FUTURE OF MEDICINE

Take a look inside at the big plan on campus *page 4*

Unearthing environmental cancer causes *page 32*

Atrial fibrillation: Helping patients keep the beat *page 40*

Colon cancer screening: What's best? *page 48*

VOLUME 9
ISSUE 2
FALL 2009

DukeMed MAGAZINE

ADVANCES IN RESEARCH, EDUCATION, AND PATIENT CARE AT DUKE

Ahead of the demographic curve

Preparing for the future—and working to make it a bright one

What will the future of health care look like? It's a question many are asking these days, as our government hammers out a plan for health care reform while providers around the country grapple with how best to prepare for challenging times ahead.

While none of us holds a crystal ball, a clear-eyed look at projected trends makes it easy to foresee what we can expect. Nationally, both the total population and the proportion of people over 65 will climb an upward curve—increasing demand for health care services. Health care reform could extend medical coverage to millions more people, further accelerating demand—particularly for primary care services. Yet futurists also project shortages of the physicians needed to care for this increasing caseload.

Duke Medicine faces particularly steep increases in demand for services from a growing population. Although the global economic crisis has caused rising unemployment in North Carolina as elsewhere, the Triangle area continues to attract newcomers at a prodigious pace. With our founding mission of improving health care in the Carolinas, and as a leading provider of specialty care in the Southeast, we are mindful of our responsibility to meet the needs of this region by expanding access to both high-quality preventive care and the most advanced interventions for the seriously ill.

In the face of looming imbalances between supply and demand, it's clear that future needs cannot be met without truly innovative approaches. At Duke Medicine, we see these challenges as an opportunity to make much-needed changes to strengthen the care delivery infrastructure, both across our own institution and nationally.

Among the most important steps we are urging our nation to take is to actively explore pioneering models of care that more effectively incorporate physicians, nurse practitioners, physician assistants, care managers, and even health coaches into patient-centered care teams. Such models hold great potential to expand access to care while controlling costs and improving outcomes. Through a Duke-Durham community partnership called "Just for Us," for example, teams are bringing health care to low-income seniors in their homes, with information technology supporting communication among the whole team regarding the patient's treatment plan. The program has measurably improved diabetes, hypertension, and weight management, while dramatically reducing hospital admissions and ER visits.

Developing these next-generation models of care will be critical to relieving the projected strain on primary care services—as will training the caregivers who ensure their success. In the past year, Duke's physician assistant (PA) program—the nation's first—moved to a new, larger facility, laying the groundwork for program expansion, while our School of Nursing announced plans to increase enrollment in its accelerated bachelor of science in nursing program. We are bringing together our medical, PA, physical therapy, and nursing students for training experiences that provide a solid foundation for team-based clinical models. And we have launched initiatives to train senior-level clinicians who can provide wise leadership in challenging times—becoming first in the state to offer a doctor of nursing practice program, and creating the novel Management and Leadership Pathway for Residents program to train physician executives (see page 16).

We believe these new models of care, coupled with supportive caregiver training, can provide a blueprint for addressing the coming spike in demand for health care nationwide.

We're also preparing to meet future needs on the local level, using blueprints of a more literal kind. As you can read in this issue of *DukeMed Magazine*, we are embarking on historic, multiyear projects that will transform our medical center campus—including building a major addition to Duke University Hospital that will add over 580,000 square feet, modernize 160 beds, and add 16 new operating suites; constructing a new 267,000-square-foot cancer center that will expand and enhance our cancer services; and planning a new medical school learning center. Together these projects will help us meet projected increases in demand for clinical services while providing our patients with the best possible care experience—and support the innovative training and research that will lead to further advances in care.

What will the future of medicine look like? At Duke Medicine, it's a question we've been asking—and answering—for nearly 80 years. In the midst of the daily hum of caring for patients, teaching students, and conducting research, we continually seek ways to do these things better tomorrow than we do today. It's a quest that continues to guide the evolution of our institution—and we look forward to sharing our progress with you over the years to come.

Victor J. Dzau, MD

Chancellor for Health Affairs,
Duke University

President and CEO,
Duke University Health System

James B. Duke Professor
of Medicine

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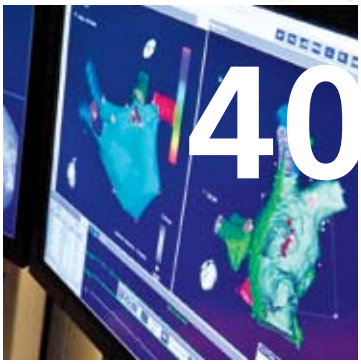

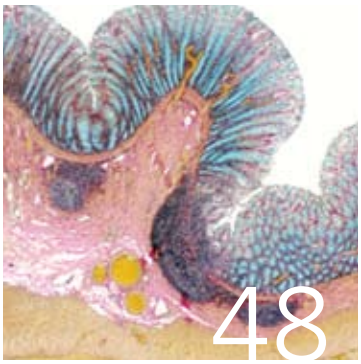

FEATURES

DEPARTMENTS

LETTERS

***DukeMed Magazine* welcomes comments** from our readers. Love something? Hate something? Have ideas or issues to share? Write to us via e-mail (dukemedmag@mc.duke.edu) or postal mail:

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Durham, NC 27710

We received these letters in response to the Controversies in Medicine essay "Rationing health care: Why we shouldn't always get what we need" by Gopal Sreenivasan, PhD, published in our Winter 2009 edition. To read this and other articles from previous issues, visit dukemedmag.duke.edu.

In reading your last issue, I was struck by the irony of countless articles extolling incredible progress in medicine and medical techniques [contrasted with] the essay "Rationing health care" (Winter 2009). In other words: rejoice for new cures and care, except for those elderly or otherwise peripheral members of society who won't be able to access them. [Rationing] is the "just get out of the way and die" idea. For who would make the hard choices required by rationing health care? Why, the "ruling classes," of course.

Nevertheless, the magazine is superlative.

Marilyn S. Newell
Lake Wales, Florida

The opinions expressed in Controversies in Medicine and in letters from our readers are those of the authors and do not necessarily reflect those of Duke Medicine as a whole.

I read with interest the recent opinion piece "Rationing health care" by Dr. Gopal Sreenivasan. A couple of thoughts resulted:

1. One baseline assumption is that the government is responsible for the health expenditures of our nation. This debate is certainly far from settled. Why is the individual not economically responsible for his or her own health care? It seems to me that the individual is far better able to determine the "ethics" of personal medical expense choices than is the rapidly bloating federal government.
2. Dr. Sreenivasan defines as "incompatible with justice" the act of "robbing Peter to pay Paul." He has therefore branded the entire entitlement system in the United States "incompatible with justice." I believe he is largely correct in this argument.
3. One reason for the relative growth of medical expenditures compared with GDP not mentioned is the population of aging baby boomers who are now accessing the health care system at an increased rate. Again, it seems the most efficient and ethical manner of rationing health care is to allow the individual to handle those ethical decisions. The individual can then specifically determine if he/she wants to rob Peter to pay Dr. Paul for his/her health care. We have already determined that robbery is incompatible with justice.

It seems that the argument for universal health care is that everyone should have health care. Dr. Sreenivasan correctly points out the major problem with universal health care is that it is unaffordable in the aggregate and will (must) lead to the understanding that some (all?) can't have health care (or some portion of health care that we agree is not sufficient for adequate health). It seems that universal health care is an ethical non-starter.

Mark McQuain, MD
Johnson City, Tennessee

Professor Sreenivasan's article in the latest issue of *DukeMed Magazine* was concise, timely, and well written. For these reasons as well as for the importance of his topic, the article was much appreciated when I circulated it among our senior management team. Thanks and keep up the good work!

Steve Worsley, MD
St. Joseph Hospital
Nashua, New Hampshire

I have just received a copy of *DukeMed Magazine*, and, as an 83-year-old Duke University graduate (Women's College '47) who has served for 40 years on hospital boards in the Metropolitan Detroit area, and as a retired chair of the Board of Visitors of the Wayne State University School of Medicine, I want to compliment you on the contents of this magazine.

Most particularly I was enormously impressed by the article "Rationing health care: Why we shouldn't always get what we need" by Gopal Sreenivasan. It is true that "the only feasible way to hold down cost is to ration health care." Rationing is not a dirty word, for we ration health care now when over 40 million people have no health care coverage. Further, we must diligently subject the introduction of new medical techniques to a cost/benefit ratio. Unvarnished scrutiny is demanded. Eliminating inefficiencies in our current systems will not do the job alone. That which we can do is disallowed because of infinite needs and finite resources.

Also, as a former chair of the Women's Studies Council, who, along with others, directed financial resources that enabled the establishment of the endowed Margaret Taylor Smith Directorship of Women's Studies, I am greatly pleased to note that 40 percent of the new physicians [depicted in the New Physicians section of this issue] are women.

Having served Duke as the chair of her Board of Visitors of the Trinity College of Arts & Sciences, and as the speaker at the 2001 Founders' Day celebration in the Duke Chapel, you can imagine how much I love and support Duke University.

Perilous times are upon us, and it will be necessary for all of us, both inside and outside the university, to be responsible for the way we spend our financial resources.

I wish you the best in all that you are doing.

Margaret Taylor Smith
Detroit, Michigan

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Duke Medicine's **Plan to Expand**

This fall, Duke Medicine launched the most ambitious expansion of its medical center in decades—a series of major construction projects that will transform not only the map of our main campus, but also the experience of every patient, student, and staff member it serves. Here's a preview of the changes in store—and how they'll help Duke meet the needs of a fast-growing region while advancing patient care, teaching, and research in the years to come.

Off-campus construction

Duke Medicine is expanding and upgrading facilities not only on campus, but across the region. Recent projects in Wake County include significant renovations at Duke Raleigh Hospital, the construction of Duke Medicine Plaza for outpatient specialty care, and the openings of Duke Medical Plazas in Morrisville, Brier Creek, North Raleigh, and Knightdale. In Durham, the new 12-bed Hock Hospice Family Pavilion and renovations to Durham Regional Hospital are similarly broadening the ways Duke Medicine meets the needs of our ever-growing number of patients.

Visit dukehealth.org/locations for details.

The new Duke University Medical Center: A bird's-eye view

Duke Medicine Quadrangle, a new "central park" at the heart of the medical center campus

Duke Medicine Cancer Center, a 267,000-square-foot, seven-story building devoted to cancer care and clinical research *(Expected opening: 2012)*

Duke Medicine Pavilion, a 580,000-square-foot, eight-story addition to Duke University Hospital to include 160 intensive- and intermediate-care inpatient rooms, 16 operating suites, and expanded imaging facilities *(Expected opening: late 2013)*

A two-story, climate-controlled **concourse** to allow easy movement between buildings

Renovations to 14,400 square feet within the existing Morris Cancer Clinic *(Expected completion: 2012)*

A School of Medicine learning center—planning is under way for an approximately 80,000-square-foot facility designed to provide a dedicated, state-of-the-art environment for medical student and interdisciplinary team training

Campus expansion: Making a good thing even better

Cranes, bulldozers, and a corps of construction workers have swarmed onto the Duke University Medical Center campus, signaling the start of an ambitious expansion project designed to dramatically enhance the experience of patients, families, students, and staff at Duke for decades to come. Following rigorous rounds of project reviews and approval by the State of North Carolina, Duke Medicine leaders announced in August 2009 their decision to move ahead with the historic initiative, which has been on the drawing board for several years. "Duke Medicine is all about people—it's about the patients we serve, it's about the people who work here to deliver the best care, discover new things, and train the next generation," says Victor J. Dzau, MD, chancellor for health affairs. "To support those people in the years to come, we must make sure that we have the state-of-the-art facilities we need to provide the best care and the best environment to work and learn in."

This vision is now becoming a reality with the official start of two landmark buildings. Together, the new Duke Medicine Cancer Center and the Duke Medicine Pavilion, along with related renovations, will add more than 800,000 square feet of space, with 160 intensive- and intermediate-care inpatient rooms, 16 new operating suites, 130 exam rooms and 75 infusion spaces dedicated to cancer care, and expanded and updated imaging platforms. Total project costs are estimated at more than $700 million. Planning is also under way for a new School of Medicine learning center that will provide an optimal environment for medical student and interdisciplinary team training.

The larger, modernized facilities are greatly needed not only to accommodate an increasing demand for patient care, but also to support the broader vision for medicine at Duke, according to administrators. The new facilities are thoughtfully designed to:

- **Improve the patient experience** by making clinic visits more efficient, increasing inpatient room size, better accommodating visitors and family members, and providing amenities such as resource centers, healing and spiritual spaces, and green spaces
- **Support multidisciplinary care** by co-locating a wide range of providers within fast-growing specialty services such as cancer and heart
- **Accommodate leading-edge clinical technologies** including advanced imaging and diagnostic equipment and linear accelerators for cancer radiation therapy
- **Enhance education and research** by providing state-of-the-art facilities that support training, facilitate study of new techniques and treatments, and bring clinical research teams closer to patients
- **Incorporate advances in information technology** to improve communications between clinical teams and individual patients—not only within each building, but across the continuum of Duke Medicine services and sites

Although the global economic crash in 2008 diminished Duke's capital reserves, Duke Medicine leaders remained committed to moving ahead—describing the efforts as a mission-critical investment in the future.

"Without expansion and modernization, the quality of our patient care could suffer and our long-term goals could be significantly stunted," Dzau says. "Years of conservative and prudent fiscal management, combined with careful cost-cutting measures, have put us in a strong position to move forward with these projects—which we believe are essential to our ongoing ability to meet the growing demand for patient care services and to conduct cutting-edge research and training in an era of population growth and accelerating innovation. At heart, we believe we have a responsibility to meet our patients' needs for high-quality health care in the years ahead."

In addition to institutional investment, fund-raising initiatives have been launched to raise $75 million toward the costs of the Duke Medicine Cancer Center, $50 million toward Duke Medicine Pavilion, and $15 million toward the learning center, which is also supported by a $35-million gift from The Duke Endowment.

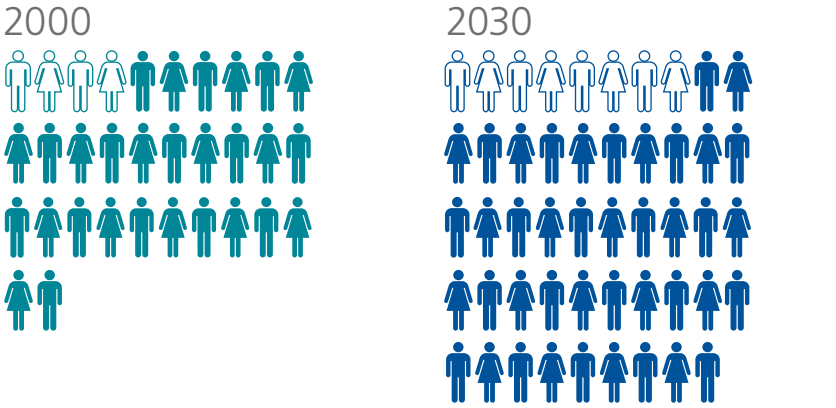
"The vision for the future of the campus is to continue to support what makes Duke Duke: excellence in clinical care, teaching the next generation of all kinds of providers, and generating innovations that we can push through the enterprise," says Kevin Sowers, RN, MSN, CEO of Duke University Hospital. "It's about supporting incredible people who work here every day and do incredible things in people's lives, by giving them facilities designed to enhance their efforts to care for Duke's surrounding communities, the residents of North Carolina, and beyond."

"This much-needed expansion will enable Duke Medicine to continue to further our missions in clinical care, teaching, and research—and to fulfill our commitment to all the people who depend on us to provide them with the best care available." —Victor J. Dzau, MD

A booming patient base

Duke Medicine is expanding its facilities to meet the needs of the region it serves. About 70 percent of Duke inpatients hail from the Greater Triangle—one of the nation's fastest-growing metro areas. An aging population will also drive future demand for health care services.

North Carolina projected population growth



Greater Triangle projected population growth

= 250,000 people = People age 65 and older

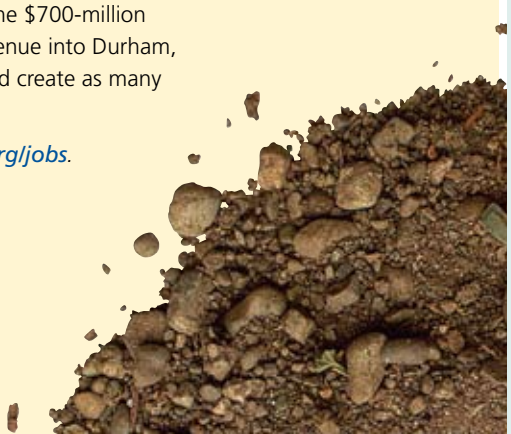
SOURCE: NC STATE DATA CENTER

Jobs for Duke—and North Carolina

The new hospital expansion and cancer facility will create around 1,000 new permanent jobs, including more than 300 nursing positions as well as jobs for physician assistants, imaging technicians, and other staff. Duke Medicine will also be recruiting some 200 physicians over the next five years to meet the increasing demand for services.

Over the next four years of construction, the $700-million projects will infuse a healthy stream of revenue into Durham, Triangle, and North Carolina economies and create as many as 500 construction jobs at a time.

Find career opportunities at dukehealth.org/jobs.



Training spaces

Besides serving hundreds of thousands of patients every year, Duke University Medical Center is also home base for one of the country's largest health-care training programs, with more than 900 medical residents and fellows on the house staff, plus more than a thousand students in the medical, nursing, physical therapy, and physician assistant programs. The planned campus expansion will benefit these next-generation caregivers as well as the patients they'll serve:

- **State-of-the-art technology** from new linear accelerators in the cancer center to interoperative imaging technologies in Duke Medicine Pavilion's surgical platform will allow clinicians to better practice—and therefore teach—to their full potential, facilitate research that will improve care and support training of academic physicians, and enable trainees to gain experience in cutting-edge care.
- **A School of Medicine learning center** located in the heart of the medical center campus—the first new building dedicated to medical education since 1930—is being planned to provide the team-oriented, technology-based experiences today's curriculum demands. "New learning space for our students was the top priority for our own leadership and the main recommendation during our recent accreditation process," says Dean Nancy Andrews, MD, PhD. "Medical education has changed dramatically since our current facilities were built. The vision for this new space is to provide our students with the laboratories and training facilities that will best help them prepare for their future careers."

The new buildings have been preceded by new facilities for the School of Nursing (completed 2006) and the physician assistant program, which in early 2009 moved into a freshly renovated building designed to accommodate future growth.

Read more about the planned learning center in the summer 2009 issue of DukeMed Alumni News, *online at medalum.mc.duke.edu.*

Duke Medicine Pavilion at a glance

The new 580,000-square-foot addition will enable Duke University Hospital to keep pace with a growing patient population—and with fast-changing technologies that are transforming surgical and inpatient care. Highlights include:

16 operating suites

interoperative MRI & CT imaging

plasma screens for review of x-rays and pathology specimens

1 expanded imaging center

streamlined access to MRI, CT, and nuclear testing

96 critical-care beds and 64 intermediate-care beds

flexibly designed rooms for future changes in patient flow

outfitted with the latest tracking and medical record technology

A patient-friendly design

from natural lighting and landscaping to a patient resource center and quiet space for reflection

Duke Medicine Pavilion

Answering demand for surgical and intensive-care services

Since its current bed tower opened in 1980, Duke University Hospital has grown not only in patient volume but also in reputation as one of the most advanced hospitals in the country. And frankly its success has the 29-year-old building bursting at the seams. From Monday through Friday, the hospital fills at least 90 percent of its 924 inpatient beds, many of them with critically ill patients sent here for the best medicine has to offer. A 2005 study showed Duke's OR usage to be 93 percent—compared to 80 percent for the average academic medical center. And with every upgrade to new technology, Duke electricians and IT experts have to figure out how to rearrange the guts of the building to support the state-of-the-art tools in play.

The plans for the new Duke Medicine Pavilion—a 580,000-square-foot addition to the hospital housing OR suites, intensive care units, step-down units, and diagnostic facilities—have focused on maximizing flexibility of space and technology, leaving Duke Medicine room to grow.

OPERATING SPACE

The 16 new OR suites will be larger than the current operating rooms in order to accommodate advances in technology that enhance precision and safety. The new suites are designed to be flexible, allowing both multipurpose and specialized use: interoperative MRI and CT are located between suites, for instant access that won't crowd the room when not in use. A hybrid OR is already under construction in the current hospital, and will open in 2010; it will allow interventional cardiologists and surgeons on-the-spot, highly detailed vascular imaging capabilities—and enable easy transition between catheter-based, minimally invasive, and open procedures within the same space.

Built-in technology will enable the surgical team to review critical information without going to multiple places or even stepping away from the table: multiple plasma screens will allow surgeons to review x-rays and other imaging studies, as well as pathology specimens.

"Duke's surgical faculty are nationally and in many cases internationally respected, and demand for their services is exhausting our current facility," says Danny Jacobs, MD, MPH, chair of the Department of Surgery. "The Duke Medicine Pavilion will be critically important to our ability to meet surgical demand and train the next generation of surgical leaders."

ROOMIER ROOMS

Duke Medicine Pavilion's 96 critical-care and 64 intermediate-care beds won't just add more space, but better space—reflecting dramatic changes in care since the hospital's Anlyan bed tower was built. Then, patients arrived for surgery the night before the procedure; their families awaited results in the waiting rooms and sat with their loved ones in brief stints during visiting hours. Today families want to stay with patients around the clock, and the new patient rooms are designed to accommodate more people—clinicians and family alike.

These and other features of Duke Medicine Pavilion reflect input from current patients, families, physicians, nurses, and other staff, says Mary Ann Fuchs, RN, Duke University Health System's chief nursing officer. "The building's entire layout will allow

patients much more access to their families, allow the staff more interaction with patients, and allow the staff to work in a more streamlined fashion. We strove to create a place where multidisciplinary teams could work well together and where patients could feel comfortable and cared-for."

HIGH-TECH HOSPITAL

In addition to upgrades in the OR, a high-tech, centrally located imaging center will streamline access to MRI, CT, and nuclear testing for patients and clinicians. The building will also accommodate new tracking and electronic medical record (EMR) technology, enabling better coordination of care within the hospital, across the health system, and beyond Duke. "Most medical errors and patient safety issues emerge when a patient transitions from a hospital to a primary care setting," says Asif Ahmad, chief information officer for the health system. "Our EMR technology already coordinates a patient's information among all three of our hospitals; our plan for this building is to go 'EMR-plus'—to use technology to improve patient education and help prevent glitches in the translation of information when they leave the hospital."

PATIENTS—AND PROVIDERS—IN MOTION

The layout of the hospital—as well as the cancer center—began with studying all the traffic that flows through current service areas, from shift changes to patient transport. For example, neurology patients have to go for CT scans frequently, so designers worked to locate the neurology ICU near CT. And all heart services throughout Duke University Hospital will be located on the same level, regardless of what building they are in.

A two-story concourse—just about the same width as an airport concourse—will be the "Main Street" that connects Duke Clinic to Anlyan Tower. The totally enclosed and climate-controlled concourse will simplify the journeys of patients and staff as they move around the medical center.

HEALTHFUL AND HEALING SPACES

Great care is being taken to create an environment that is pleasant and supportive for patients and their families. A major component of that philosophy is linking patients to the world beyond the facility walls—by providing green spaces that can be seen from patient rooms and waiting rooms alike.

The Duke Medicine Quadrangle: The doors of the cancer center and the new hospital addition will open onto a park designed by Laurie Olan, the landscape architect who redesigned both Columbus Circle in New York City and Philadelphia's Independence National Historic Park. Similarly designed courtyards within the hospital will provide more green views for patient rooms.

Patient resources: The main doors of the hospital addition will open into a two-story entryway that leads visitors to a patient library, a café, and a quiet meditation or reflection space.

Letting the sunshine in: The overall facility design brings natural light into staff and patient-care areas. "That actually is really helpful to patient and staff morale," says Fuchs, "just having a pleasant environment in which to do our work."

Green in more ways than one: Besides its visual connection to the outdoors, Duke Medicine Pavilion—targeted for LEED Silver status—is designed to be environmentally friendly, with green roof space, sustainable building materials, and energy-efficient mechanical systems.

COURTESY OF DUKE UNIVERSITY MEDICAL CENTER & HEALTH SYSTEM ARCHITECT'S OFFICE

The new Duke Medicine Pavilion (center) will expand the size of Duke University Hospital by more than 50 percent. The current hospital is shown in tan behind the pavilion.

"Many days, the demand for our services outstrips our capacity in the current facilities, so this is going to be an enormous improvement. The campus expansion will allow us to serve even more patients and to partner even more effectively with community physicians who refer patients here for specialty care."

—William J. Fulkerson Jr., MD, senior vice president for clinical affairs

Duke Medicine Cancer Center

Creating the optimal experience for cancer patients

When Harry Rhoads was diagnosed with stage 4 melanoma three years ago, his Duke oncologist told Rhoads he most likely had about 11 months to live—but that he could join a clinical trial of a promising new interleukin drug. The treatment schedule would be difficult: two weeks of treatment and two weeks off, for a total of six treatments. Each round of interleukin was followed by "six days of hell," Rhoads says—nausea, vomiting, hallucinations. "I was scared." But PET scans showed that the tumors were shrinking with each session. Despite a few setbacks, Rhoads is cancer-free today.

Rhoads's experience of cancer treatment isn't representative of all cancer patients; as every tumor type is unique, every cancer patient has his or her own treatment experience. But in many ways, Rhoads says, "every patient goes through the same thing"—a complex balancing act of fear and faith, suffering and grace.

Rhoads lives near Washington, DC, so his choosing Duke for his treatment went beyond the considerations of distance and convenience. William J. Fulkerson Jr., MD, Duke Medicine's senior vice president for clinical affairs, says patients like Rhoads travel to Duke for access to world-class specialists and the promise of the newest and most comprehensive treatments for the disease that threatens their lives. As one of only 40 National Cancer Institute-designated Comprehensive Cancer Centers in the nation, Duke offers options that simply aren't available in many hospitals. "There are two things that set academic medical centers like Duke apart from other health care organizations," says Fulkerson. "One is that highly focused specialists from many disciplines work together under one roof to provide comprehensive care; the other is that academic medical centers are in the business of bringing innovation to the table as quickly as possible."

The impetus for building Duke Medicine's new cancer center facility, say its leaders, is to continue to deliver on that promise to an ever-growing number of patients. By more closely integrating clinician and clinical research teams, the design of the building seeks to promote the best of academic medicine's multidisciplinary and research-driven nature. In addition, the space must provide the most healing, patient-centered environment possible to support patients like Rhoads as they go through the journey of fighting, living with, and surviving cancer. Combining these mandates of form and function is a tall order—and that's why the vision for the project goes far beyond adding square footage. In fact, leaders say, the goal is nothing less than to create the best possible cancer treatment experience.

WHAT MAKES "MULTI-D" WORK?

A key part of that is enhancing the multidisciplinary approach that distinguishes cancer care at Duke—and that studies show is associated with better patient outcomes. But the buzzword *multidisciplinary* has multiple meanings. Depending on the cancer type, multidisciplinary care at Duke might mean having different specialists working in the same space on parallel schedules for easy "collaboration on the fly," or it might mean scheduling clinicians around each patient—such as

COURTESY OF DUKE UNIVERSITY MEDICAL CENTER & HEALTH SYSTEM ARCHITECT'S OFFICE

in the Duke Prostate Center, in which a newly diagnosed patient is visited by a surgeon, radiation oncologist, and medical oncologist who confer with each other to develop a coordinated, comprehensive care plan. And then there is the expertise of specialized nurses, nutritionists, psychologists, social workers, and physical therapists, all of whom work in concert to provide Duke cancer patients with whole-person care.

If the fuel that powers these many modes of multidisciplinary care is the talent pool of the clinicians on staff, then the rate-limiting factor is space—which in Duke's current buildings is growing tighter due to swelling patient volume and the continual introduction of new and better imaging and radiotherapy technology. This is why the most talked-about feature of the new building is space: 267,000 square feet of it, including ample room to bring clinicians, counselors, and research staff from their current far-flung locations into dedicated space closer to patient exam rooms. "Physicians want their patients to have multidisciplinary care that doesn't require coming to Duke three or four times to see different doctors," says Carolyn Carpenter, the health system's associate vice president for oncology services. "Adding space to our facility will allow us to schedule patients and clinicians in a way that's more efficient—and that will lead to a better experience for the patient."

Getting ahead of the curve

14% North Carolina 21% Triangle

Projected growth in new cancer cases, 2006 to 2011

Beyond improving the patient experience, Duke's new cancer center building will make room for the region's climbing population of cancer patients and survivors. Already, cancer patients account for 9,000 inpatient discharges and more than 200,000 outpatient encounters at Duke every year—and the most recent projections from the N.C. Department of Health and Human Services (above) show that the pace will only pick up. Duke's state-approved construction plans, plus a new facility opened at the University of North Carolina, will just meet the anticipated demand, says Victor J. Dzau, MD, chancellor for health affairs. "I believe the combined clinical and research advancements at Duke and UNC, as well as the enhanced collaboration between the institutions, have the potential to turn the Research Triangle into one of the country's epicenters for excellence and advancements in cancer care."

How do you design cancer care to revolve around the patient—instead of the disease?

Duke's new cancer center will include innovative touches to ease the experience of cancer patients—from a homey fireplace in the lobby (above) to thoughtfully designed floor plans that will make receiving multidisciplinary care more convenient. A few examples:

Infusion al fresco: On the fourth floor of the new building, the chemotherapy infusion area will open onto a terrace (see photo of model at left), allowing some patients to receive their treatments outside. Plantings on the terrace will be carefully selected with regard to allergens and sunlight control, and a trellis will provide shade. Patients who opt for indoor chemotherapy will have a range of options, from community to secluded spaces, and all spaces will have a view to the green outdoors.

Room for healing: Small touches will make a big difference in the experience of cancer therapy:

- a quiet space where patients can go for relaxation and reflection
- conference rooms that can be used for support group meetings
- a boutique on the entry floor with specialty items for cancer patients
- an atrium in the middle of the building, with a skylight to let sunshine into the building (left, bottom image)

Putting the patient in charge: Kiosks and other self-directed information technology in registration areas will allow patients to do much of the "paperwork" at their own convenience. "We studied what other industries do to determine how many staff members we should have alongside the kiosks," says Duke's Carolyn Carpenter, noting that the human touch is still very much a part of the high-tech cancer center's design. "What was most interesting to me about the focus groups we conducted with patients," she says, "was that they said you know, you can build this building however you want, but if someone doesn't greet me with a smile, I'm not going to feel cared for."

Imaging technologies: One out of every four imaging studies done on Duke Medicine's main campus is for cancer patients, and the new building's dedicated imaging floor will lessen traffic and travel time for patients and for staff. The new infusion of imaging technologies will include PET, CT, ultrasound, and MRI—as well as three new linear accelerators, giving the cancer center a total of eight.

COURTESY OF DUKE UNIVERSITY MEDICAL CENTER & HEALTH SYSTEM ARCHITECT'S OFFICE

DESIGNED TO HEAL

Not only the exam rooms but the entire building is designed to deliver an ideal patient experience. Planners began by mapping out all the stops cancer patients have to make during a visit to Duke, from registration and the pharmacy to mammography, MRI, labs, chemotherapy, or radiation therapy. "Then we went to focus groups [of Duke cancer patients] and said, 'Here's what we think the experience is like. Do we have it right? And what would you change?'" says Kevin Sowers, RN, MSN, CEO of Duke University Hospital.

The central premise behind every focus group—and there were several—was how to make cancer care revolve around the patient instead of the patient's disease. In the case of radiology, for example, patients didn't want to have to walk to one part of the building to get a CT and then another to get an MRI, as they do in the current facility; in the new building a full floor of the cancer center hosts all of the radiology platforms in one consolidated area.

When patients enter the new building, they'll be welcomed by a resource center—no long registration queues or full waiting rooms in sight. The boutique, food court, and outdoor spaces are designed to provide pleasant options for patients who are waiting before or between appointments. And the waiting areas themselves are designed to accommodate comfortably both the patients and the family members who travel with them. "We did studies of how many people typically accompany a clinic patient and an infusion patient," says Carpenter. "And we used that information to determine how big our waiting areas should be."

Betty Lamar, a member of Duke Comprehensive Cancer Center's Citizens Advisory Council, says the intangible effects of a patient-friendly atmosphere make all the difference—and she should know. Her first husband died of leukemia, while her second had bladder cancer, and she experienced the full spectrum of cancer care in a variety of clinical settings. As a veteran caregiver, Lamar says she's seen how cancer treatment has shifted over the years to a patient focus. "At Duke they are now really treating the whole person and not the disease," she says. "It didn't use to be like that, it was all focused on the disease." Lamar serves as a volunteer at Caring House, a home away from home for many Duke cancer patients. She says she has seen many patients and families who reflected her own experience. "They would arrive so afraid and anxious," she says. "They came from all over the country and world. They were desperate for help."

ROOM TO ADVANCE

The draw for these patients is often the clinical trials offered at Duke, such as the interleukin trial Rhoads is part of. In fact, Duke is currently conducting more than 700 cancer trials. "Cancer care, almost more than anything else that we do at Duke Medicine, is a fast-evolving field—new treatments and new understandings emerge all the time," says Fulkerson. Clinical trials are what drive these discoveries into cancer care practice, and the studies are "fundamentally intertwined with clinical care," says breast oncologist P. Kelly Marcom, MD. "We need efficient clinical space to ensure a seamless approach to clinical research, as well as patient care. With the new building, we will have additional space to educate patients about clinical trials and accrue individuals to participate in these trials."

The new building will include dedicated space for clinical trial consultation and coordination, making standard what was previously a rare luxury for clinical trial coordinators—complete privacy and uninterrupted quiet space near patient exam rooms to discuss clinical trials, informed consent, and any questions a patient has about clinical research. Also, says radiation oncologist and Duke oncology services medical director Christopher Willett, MD, the new building will house brand-new, first-in-world imaging and radiotherapy technologies that will supplement both patient care and research. "In addition to expanding the space and bringing in more tools, we are intensifying our focus on the patient's experience. The new building will be more efficient for them and for us—and very user-friendly. I think that all of us feel extraordinarily positive about the plans for it."

Lamar made the first gift to the Cancer Center building fund, which Duke hopes will raise $75 million toward the project's estimated $220-million cost. "Where you're treated is a very important part of treatment and cure—it's important to be in a happy place," she says. "And the new building will really make you feel that way. It's a place that makes you realize that you're being considered as a whole person."

SEE THE SITES: Visit *dukemedicine.org/construction* for construction updates, videos, and live Webcam views of the Duke Medicine Pavilion and Cancer Center sites—plus tributes to the historic Bell Building, which was dismantled this year to make way for new construction.

An honorific examined: Why does Magnet matter?

HOSPITALS THAT ACHIEVE MAGNET DESIGNATION can boast many accomplishments—including completing some 3,000 pages' worth of successful application materials. This exhaustive documentation is required by the American Nurses Credentialing Center to prove that a Magnet-designated hospital meets and maintains certain standards for high-quality nursing. Right now just 5 percent of U.S. hospitals have achieved the honor—including, as of this spring, all three Duke University Health System hospitals. But what does it all mean, practically speaking?

COMPARED TO NON-MAGNET HOSPITALS:

Patients in Magnet hospitals have:	Nurses in Magnet hospitals have:	Referring physicians can expect:
More time with nurses	Lower burnout	High-quality nurses on their patients' teams
Increased likelihood of a shorter hospital stay	Higher job satisfaction	Improved patient quality outcomes and satisfaction
Care from the most highly qualified and committed nurses	Direct impact on decisions that affect care delivery	Lower mortality rates, fewer errors

Duke Raleigh Hospital recently joined Duke University and Durham Regional Hospitals in gaining Magnet designation, and the three hospitals will apply as a total health system for Magnet status in 2013. Mary Ann Fuchs, RN, chief nursing officer for Duke University Hospital and Health System, notes that getting Magnet designation is not an end point. "Once you are a Magnet hospital or health system, you have to maintain or exceed that level of achievement," she says.

Stimulating competition:

ARRA gives medical research a shot in the arm

AFTER THE AMERICAN RECOVERY and Reinvestment Act of 2009 (ARRA) was set in motion, it seemed as though every researcher on campus went sprinting toward his office to apply for a portion of the now $15 billion in new federal research funding released by the act. "There was a lot of pent-up demand," says Sally Kornbluth, PhD, Duke's vice dean for research. "For several years now, people have been writing a lot of good grants that have not been funded, and they have a lot of ideas that until now they haven't been able to pursue because of tight federal funding."

Duke scientists and administrators put in new applications for every aspect of the ARRA funding, including the $200-million chunk dedicated to a new program called NIH Challenge Grants in Health and Science Research. School of Medicine faculty submitted nearly 700 ARRA proposals worth more than $500 million—and the university as a whole submitted more than 800 grant proposals.

The efforts have paid off: as of October 2009, among institutions nationwide who competed for ARRA awards, Duke ranked fifth in total funding from the NIH. Projects funded so far range from comparing the effectiveness of chest pain diagnostic tests to researching potential environmental contributors to Alzheimer's disease to preventing certain cases of spina bifida.

While it's understood that this cash infusion is finite—a temporary boost, not a permanent solution to the decade-long decline in federal funding for biomedical research—it's a much-needed infusion of funds, says Nancy Andrews, MD, PhD, dean of the School of Medicine. "NIH funding has been flat for six years—the longest plateau in its history—even though the costs of research have continued to rise," she says. "Our faculty's success in competing for these grants is helping us maintain our commitment to excellence in research and the education of future physicians, health care scholars, and basic and clinical research scientists."

To learn more about Duke scientists who have received ARRA funding for their research, visit news.duke.edu/2009/11/stimulus.html.

STIMULUS STATS

$15 billion in new science and technology research funding created by 2009 ARRA stimulus package to promote job growth and retention as well as scientific advancement

689 ARRA proposals submitted by Duke University School of Medicine, worth more than $514 million

171 School of Medicine proposals funded, totaling more than $123 million

More than **165** full-time jobs created by ARRA funding to Duke University

*All figures as of October 23, 2009

Vertical campus: The new Duke-NUS medical education and research building (above) was dedicated September 28 at a ceremony featuring Singapore Prime Minister Lee Hsien Loong (photo at right, center), Victor J. Dzau, MD, chancellor for health affairs (right), R. Sanders Williams, MD, senior vice chancellor for academic affairs (left), Duke University President Richard Brodhead, PhD, and other leaders from Duke and Singapore.

Soaring in Singapore

THE FOUR-YEAR-OLD Duke-National University of Singapore Graduate Medical School (Duke-NUS) now has a permanent place to call home—the 11-story, state-of-the-art Khoo Teck Puat Building. Named in honor of the late Singaporean philanthropist whose estate donated S$80 million to the school, the medical education and research facility was dedicated this fall. It boasts technologically advanced research laboratories, modern teaching and education spaces, and a designated research center for genomic study and computational biology, and is located close to Singapore General Hospital.

Established in 2005, Duke-NUS offers a joint MD degree from Duke and the National University of Singapore. Its curriculum reflects the Duke University School of Medicine's innovative approach to medical education, which features a year dedicated to independent scholarship. With designated signature research programs in emerging infectious diseases, cancer and stem cell biology, neuroscience and behavioral disorders, cardiovascular and metabolic disorders, and health services and systems research, Duke-NUS has rapidly attracted leading researchers and educators from around the globe, including several who also continue as faculty at Duke in the United States. The school, now led by Dean Ranga Krishnan, MB ChB, currently enrolls 130 students from 17 countries, and will graduate its first class in 2011.

Read more about Duke-NUS in the fall 2009 issue of DukeMed Alumni News, *available online at medalum.duke.edu.*

DUKE-NUS AT A GLANCE

Founded **2005**

130 students from **17** countries

Offers **joint MD degree** from Duke and National University of Singapore

5 signature research programs:

- emerging infectious diseases
- cancer & stem cell biology
- neuroscience & behavioral disorders
- cardiovascular & metabolic disorders
- health services & systems research

PHOTOS COURTESY OF DUKE-NUS

West Campus meets Far East
Complementing the contemporary exterior of the Khoo Teck Puat Building is a wall of the famous "Duke stone" used to build Duke's Gothic West Campus—a gift from the university to Duke-NUS.

Hospital School keeps kids on course

FOR DUKE CHILDREN'S PATIENT Stephen Kirchner and his family, it was a relief to know that when he got back to school, he would be right on target with his studies. "It's hard enough to miss school because of a cold or flu, but can you imagine being in the hospital for two months?" says Stephen's father Robb. "Stephen is in advanced classes and is very goal-oriented. He would never have been able to catch up and would have had to repeat the year."

Kirchner kept up with the help of the Hospital School at Duke Children's, which has been providing a reassuring bridge between home and the hospital since 1959. The Hospital School, part of Durham Public Schools and staffed by North Carolina certified teachers, enables patients to continue their studies while undergoing medical treatment.

Each year, the school serves about 420 children with chronic illnesses, traumatic brain injuries, psychiatric and behavioral disorders, and physical rehabilitation needs, including students who are outpatients or staying at the Ronald McDonald House. Most of the work is done at bedside for one to two hours per patient, per day, and may include testing and direct instruction. International patients can take advantage of their time in the hospital to learn English and American culture. The Hospital School staff also helps children transition back to their regular schools.

In addition to being an academic lifeline—not to mention an effective distraction from the tubes, beeping machines, and medicine that often fill a young hospital patient's days—the school also symbolizes hope for leaving the hospital behind and returning to a normal life. "If you are away from school as a child, you are missing what you are supposed to do as a child, which is to continue to learn," says Hospital School principal Rick Lemke, PhD. "We're here to support the educational process and maintain academic progress. These children are forced to lose time because of their illnesses. We feel it is essential to help them stay on track with their learning."

HOSPITAL SCHOOL BY THE NUMBERS

50 years in operation: 1959 to 2009
30 to 40 students enrolled at a time
8 teachers (Pre-K through 12th grade)
2 teachers available year-round
1 secretary/bookkeeper
1 principal
$0 cost to the patient

In a nutshell, crisis averted

Peanuts put product recall system to the test

WHEN PEANUT PRODUCTS were first linked to a nationwide salmonella outbreak early this year, the logistical implications for protecting patient safety immediately registered on the radar of Brooke Berson, director of clinical resource management at Duke University Health System. "At first the recall involved a few brands, but then it became apparent that this was going to be ongoing and massive in scope," she says.

Berson learned of the contamination and subsequent recall through the Risk and Safety Management Alert System (RASMAS), an online subscription-based clearing-house for product alerts and recalls. Duke uses RASMAS to oversee updates in 15 different categories relevant to a health care institution, from lab supplies and prosthetic limbs to the toys found in pediatrics units and the food served in hospitals.

While other health care systems have used RASMAS with mixed results, Duke took the extra step of adding an inventory control process to apply the recalls with accuracy and expediency. The action proved prescient during other headlining recalls—for human tissue in 2006 and heparin in 2008.

With this year's alert from RASMAS, Food Services immediately pulled all recalled peanut items from cafeteria lines and pantry shelves throughout the health system. And as more brands and more food products joined the FDA's recall list on a daily basis—eventually ballooning to nearly 4,000 products—vending machines and even the gift shops were checked for affected food. Erring on the side of caution and in anticipation that some patients and family members would have questions about the extent of the recall, most peanut-containing items were removed—and many remain out of the health system today.

"The RASMAS initiative makes sure that the threat of any recalled products is one less thing for patients and their families to worry about," Berson says.

Read about Duke research to help peanut-allergy sufferers on page 25.

The Nearly New Shoppe

Turning recycled wares into scholarship funds

BETWEEN PARENTS, faculty, and financial aid staff, it takes a village to get a student through medical school. But at Duke, it's really a family affair.

For 41 years, an effort begun by Duke medical faculty wives has helped fund the educations of hundreds of Duke medical students, including 60 in the 2009 graduating class.

It started in 1968, when Ethel Wyngaarden (now Ethel Teer), then wife of chair of medicine James Wyngaarden, MD, had an idea for a thrift shop. She wanted to build a sense of community among the faculty and their wives by working together on a service project to benefit the School of Medicine. Each of the 17 department chairs' wives contributed $25, raising $425 in seed money.

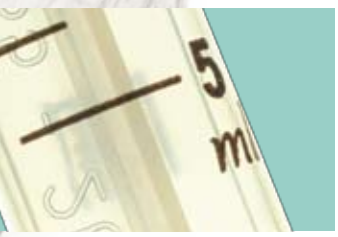
Current president and founding volunteer Mary Wilkinson (pictured above at left), wife of professor emeritus of radiology Robert H. Wilkinson Jr., says not everyone thought a thrift shop was a great idea. But despite remarks about "silly women," she says, the women secured rent-free an abandoned Erwin Road grocery store on land donated to Duke University.

With more sweat equity than they bargained for and help from local businessmen, they cleaned, painted, and decorated it, got free furniture from Duke Surplus, sewed table covers, and hung a new awning to transform the old grocery store into The Nearly New Shoppe. They invited donations and consignments, and began a labor of love that would become a thriving business.

"I don't think a day has gone by that we haven't had customers and donations," says founding treasurer Cecelia Spach (pictured above, right), wife of Madison Spach, T'50, MD'54, professor emeritus of pediatrics. "We've served the community and built friendships that are still strong today. Every bit of our profit goes back to Duke for scholarships—I don't think you can say that about many charities!"

The original grocery store location was home to the Nearly New for 10 years. Situated among Erwin Road dormitories, it was a favorite place for students to find and recycle clothes and furnishings. Now in its third location on Pratt Street at the rear of Hock Plaza, the shop has 75 volunteers and three paid staff, with a scholarship endowment worth more than $15 million as of June 2009. Another scholarship fund was established in 1998 for School of Nursing students.

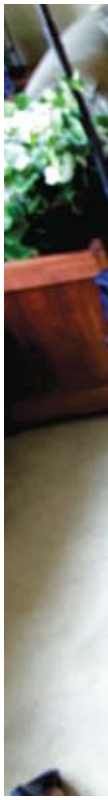
"Most of our husbands were not graduates of Duke, but most of them did receive scholarships," says Wilkinson. "We knew how important scholarships were for their education, and we thought that would be a good way to invest our profits."



Investment strategies: Banking on community health

WHEN FOUNDER JAMES B. DUKE established The Duke Endowment in 1924, he also established a mandate of community service for the hospital, medical school, and nursing school he helped to build: "I very much hope that the people will see to it that adequate and convenient hospitals are assured in their respective communities, with especial reference to those who are unable to defray such expenses of their own." Though that spirit hasn't changed since Duke Medicine's beginnings, the way community service is defined has—specifically, the federal definitions of what constitutes community benefit and how the financial value of those services may be calculated. This year Duke published a new community benefits report, detailing Duke University Health System's community benefit investments (as defined by the IRS) and other investments in support of local health care delivery. In the fiscal year ending June 30, 2009, that support totaled more than $252 million (see the chart below for a breakdown).

To learn more, and to read a few stories of the people and communities who benefit from Duke's outreach programs, visit dukemedicine.org/partnersincare.



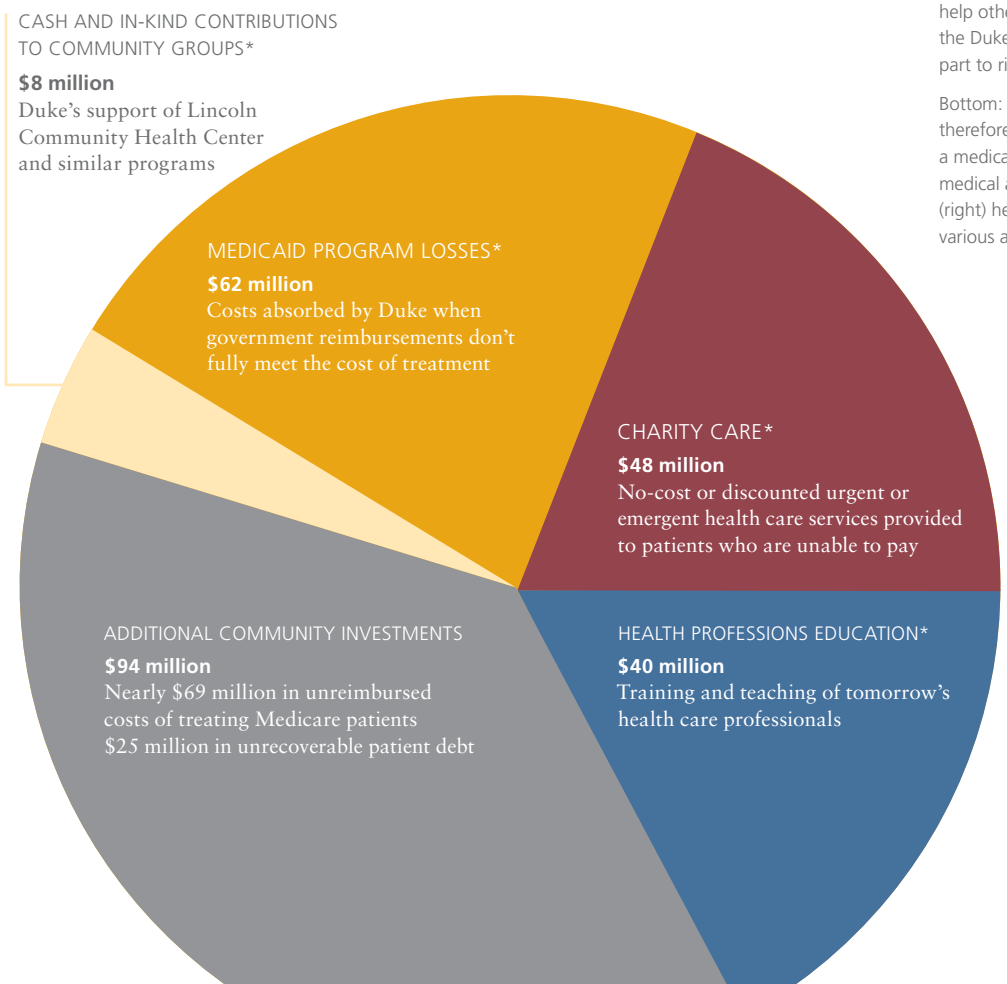
Top: The **Rev. Dr. James E. Brown's** Jacksonville, North Carolina congregation is partnering with Duke researchers to bring findings about brain health and preventing cognitive decline to their community. "When my mother had Alzheimer's and was going through the ravages of that illness, I prayed that God would allow me to help others," says Brown. "When I talked with the Duke people, I saw an equal passion on their part to rid us of this terrible disease."

Bottom: **Marti Martin** was between jobs—and, therefore, insurance coverage—when she had a medical crisis related to a chronic illness. Duke medical assistance counselor Jean Strickland (right) helped Martin and her family navigate the various assistance programs available to them.

TOTAL $252 MILLION

For the fiscal year ending June 30, 2009

* Components of community benefit as defined by the U.S. Internal Revenue Service



Christopher Elleby (below) was uninsured after losing his job in a layoff—and he needed treatment for lung cancer. When he went to Duke Raleigh Hospital for treatment in 2008, he learned about Project Access, through which specialists donate time and expertise to provide health care to low-income and uninsured people at discounted or no cost. Elleby says Duke Raleigh and Project Access worked with him to help him get the care he needed, without landing him in "a world of debt."

"A sector of our community has disabilities, a lack of access to care, and inadequate social support. There's only so much you can do in the four walls of your clinic to address those problems." **—Robin Ali, MD**

Ali (above left), medical director of Just for Us, pays a visit to Durham resident Marietta Moore (right). Just for Us is a partnership between Duke and the Durham community that provides free or low-cost health care to low-income seniors in their homes.

Duke Medicine program updates

Duke Dermatology: Our newest department

ON JULY 1, 2009, Duke University School of Medicine elevated its dermatology division to the Department of Dermatology, the first new clinical department created at Duke since 1991. The Division of Dermatology was established in 1939 as the third division in the Department of Medicine at Duke.

Read a history of the department online at dukemedicine.org/magic, search term "dermatology."

New program fits physicians to lead

DUKE RESIDENTS with an eye toward administrative careers can now apply for a piece of the action. Duke's new Management and Leadership Pathway for Residents (MLP-R) program—one of the first of its kind in the nation—began this fall and will provide physicians in training with hands-on experience in running an academic health care enterprise.

The program allows selected residents to take formal, project-based rotations during their clinical training years. During these rotations they join management teams led by senior administrators that are addressing pressing issues in areas from finance and planning to quality improvement and patient safety to global health care.

"Our MLP-R residents will experience the universe of health system operations in a way that typically is reserved for senior leadership. We expect them to combine the problem-solving skills from their clinical training with their graduate management education and blend these in ways that will provide innovative solutions to a variety of management projects."

—William J. Fulkerson Jr., MD, MBA, senior vice president for clinical affairs and MLP-R program director

For more information visit residency.medicine.duke.edu.

A DAY IN THE LIFE OF

A Duke hospitalist

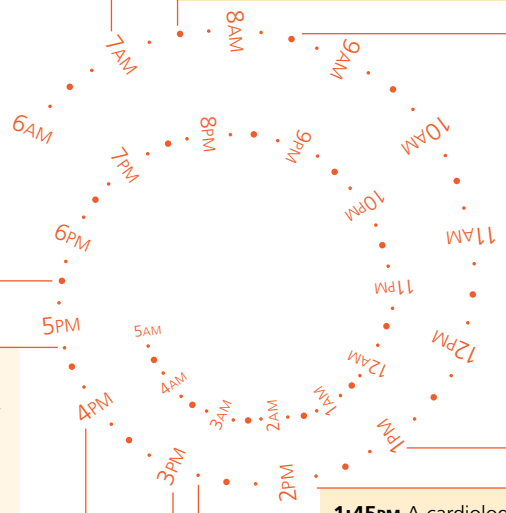
Following hospitalist **Vernee Belcher, MD,** through one day makes you wonder: what did we do before there was such a person?

Duke Medicine hospitalist Vernee Belcher, MD, is one of 23 full-time hospitalists who serve Durham Regional Hospital. Duke University Hospital employs 18 full-time hospitalists, and Duke Raleigh Hospital has 13.

HOSPITAL MEDICINE is such a new specialty that the term *hospitalist* wasn't even coined until 1996; but in the past decade the field has flourished. All three Duke Medicine hospitals now employ these specialists to provide the inpatient care that was previously provided by primary care physicians, and to serve as liaisons between the patients and their physicians. At Durham Regional Hospital, where Belcher works, 23 full-time and 12 part-time hospitalists provide around-the-clock coverage for 70 percent of the hospital's patients. They typically work in nine-day blocks, with the first six being 12-hour shifts. And during those 12 hours, Belcher is in constant motion…

7AM Belcher arrives at her office and picks up her list of patients and the report of overnight events. Today she has 11—a light day, she says.

7:30AM Belcher visits two of her new patients. Initial visits are usually longer, as doctor and patient get to know each other. "Some patients may remember models of care when visits occurred early in the morning," she says, "so I explain that hospitalists round throughout the day—and that enables us to spend additional time with patients when they need it. If I had to get back to a clinic (like primary-care physicians do), that would be a challenge." After each patient's discharge from the hospital, a summary of the hospital course is sent to their primary care doctor and any appropriate follow-up is scheduled.



8:30AM Belcher moves on to visit the rest of her patients and those due to be discharged.

1PM She visits a patient admitted previously with a GI bleed; he needs a colonoscopy but is not interested in drinking the laxative (despite the allure of its euphemistic name, Golytely).

1:45PM A cardiologist returns Belcher's call about a patient with chest pain who was admitted from the Emergency Department. Belcher had found the doctor's name on the patient's record and called to alert the community physician about his patient's status.

2:45PM The wife of the GI patient calls Belcher directly for an update.

3PM A nurse gives the good news about the GI patient. His wife has coaxed him to down the Golytely, so he'll be ready for his colonoscopy soon. Belcher then spends some time with an elderly patient who has been under her care for a few days; she tells Belcher, with obvious affection, "You are a good listener." This patient receives care from Lincoln Community Health Center, but hospitalists care for patients from a number of medical practices and nursing homes, and also those without insurance.

4PM A patient will be coming onto Belcher's ward from the ICU later in the day. Belcher goes to the ICU to introduce herself to the patient and talk to her own ICU counterpart, the intensivist. The patient had been admitted with a pulmonary embolism after having knee surgery—preventing blood clots, says Belcher, is a major priority in the field of hospital medicine.

4:45PM A patient recovers from hip surgery. Belcher's face is one of the first she sees when she wakes. At 5:00, Belcher takes a call from the orthopaedic surgeon, who tells her the surgery went very well. She uses a computer in the recovery room to review the postsurgical x-rays.

5:30PM A call from the fifth floor lets her know the patient from ICU has arrived. Belcher will help her get settled before checking in with the rest of her patients and handing off notes to the next shift at 7:00.

LIT REVIEW

Questioning authority

Robert Harrington, MD, director of the Duke Clinical Research Institute, says two recent DCRI papers offer different approaches to the same central question: is clinical research doing its best to answer the questions that will actually improve people's health?

Ethical and scientific implications of the globalization of clinical research.

Glickman SW, McHutchison JG, Peterson ED, Cairns CB, Harrington RA, Califf RM, Schulman KA. N Engl J Med. 2009 Feb 19;360(8):816-23.

This paper reviewed 300 articles reporting clinical trial results appearing in the *New England Journal of Medicine*, the *Journal of the American Medical Association*, and the *Lancet* in 1995 and 2005. Researchers found that over that decade, the number of clinical trial sites abroad doubled, while the number in the United States and Western Europe declined. It also found that developing countries in Eastern Europe and Asia are the sites of many of the trials—including trials for drugs that will likely never be marketed to or prescribed in those populations (think fibromyalgia, overactive bladder, and allergic rhinitis drugs). "As clinical research moves to the global stage, there are a lot of questions that need to be asked about how trials are conducted," says Harrington, "and not all of these questions are immediately obvious. If we are a country of 300 million people, why is so much of the research being done elsewhere? Who is deciding what questions are important to American health? Who is deciding where these things are studied? Who is deciding when it's acceptable for a drug studied in Southeast Asia to be applied to American populations? These are questions that we need to ask."

Scientific evidence underlying the ACC/AHA clinical practice guidelines.

Tricoci P, Allen JM, Kramer JM, Califf RM, Smith SC Jr. JAMA. 2009 Feb 25;301(8):831-41. Erratum in: JAMA. 2009 Apr 15;301(15):1544.

This paper was a systematic review of the quantity and quality of scientific evidence underlying clinical practice guidelines endorsed by the American College of Cardiology and the American Heart Association. It found that only a minority of recommendations for cardiology care in the United States rest upon scientific evidence from large, randomized clinical trials, the gold standard of research. "There are many things we do as clinicians for which we don't have good evidence," Harrington says. "That can come as a surprise to laypeople, and even to other clinicians. Cardiology is really looked at as being at the forefront of the evidence-based movement. The Tricoci paper shows, in a quantifiable way, that even in a field like cardiology, where there is such a rich evidence base, there are still tremendous gaps in having high-quality evidence to inform clinical decision-making."

A COMMON THEME in both papers is the commoditization of clinical research. Many cardiology studies are undertaken to test specific endeavors—instead of asking broad questions about overall care and best practices, they seek to examine the effectiveness of one new device or drug. Likewise, many decisions regarding the globalization of clinical trials are based on feasibility and cost-effectiveness of the study—it's simply easier and cheaper to conduct research outside the United States.

"We got some feedback [on the globalization paper] that we were being hard on industry people, on the CROs [contract research organizations] and the big pharmaceutical companies, suggesting that there was something nefarious in our intention with this whole project," says Harrington. "That wasn't our point; our point was that we want people to realize that moving these trials outside the U.S. carries consequences that ought to be discussed. CROs are growing like crazy in Eastern Europe, Southeast Asia, and parts of Latin America. Is that OK? And do we want clinical research to be a commodity-based enterprise? Most people have never really thought of it that way. And that's our point."

Both articles, says Harrington, lend voice to the idea that a lot of choices in clinical research—and thus in clinical care—are being made on a case-by-case basis, but may need reviewing from a higher vantage.

EXTRA CREDIT

Learn more about the latest evidence to inform clinical practice in cardiology, endocrinology, gastroenterology, and other fields through the Duke Clinical Medicine Series, online at dcri.org/research/dcms.jsp. CME credit is available.

"Clinical research consumes billions of dollars of our federal budget—we ought to be looking at what we might be missing, at how to improve it," says Duke Clinical Research Institute director Robert Harrington, MD.

SECOND OPINIONS

To screen or not to screen? Sorting through the evidence on PSA and ovarian cancer screening

Ovarian cancer: Betting on the wrong horse

GYNECOLOGIC ONCOLOGIST Andrew Berchuck, MD, doesn't consider the results of his latest study disheartening—he describes them as "expected." He is the lead author of a paper published in *Clinical Cancer Research* that found that ovarian cancers detected at an early stage almost always have gene expression profiles that correlate with favorable outcomes—they are most likely to be slow-growing and non-aggressive. This also means that the most aggressive ovarian cancers are not being found early, at a stage where current treatments could be curative.

This study was published on the heels of a European study appearing in March in *Lancet Oncology*, which showed improvement in detection of ovarian cancers when women are screened using a combination of two current—though not particularly effective—screening tools: testing for the blood marker CA125 and transvaginal ultrasound. While combining the two tests does enhance detection of some cancers, Berchuck says earlier detection does not necessarily translate into a reduction in deaths, especially if screening is most likely to detect less aggressive cancers. He notes that data from the ongoing Prostate, Lung, Colon, and Ovarian (PLCO) Cancer Screening Trial, conducted by the National Cancer Institute to assess the effect of screening on mortality, has yielded similar conclusions.

Another major obstacle to screening, says Berchuck, is the relative rarity of ovarian cancer in the population. "It's much harder to develop an effective screening tool for rare diseases," he says. "There will inherently be many more false positive screening results that must be investigated further, often at considerable expense." The bottom line, he says, is that "in the framework of existing technology, the evidence weighs against the utility of ovarian cancer screening." Berchuck believes that the better prospects for decreasing ovarian cancer mortality in the coming decade lie with improvements in treatment, and with an increased understanding of causative factors for the disease—which could better target women at high risk and make preventive approaches (such as prophylactic removal of the ovaries) more useful.

"Earlier detection of ovarian cancer does not necessarily translate into a reduction in deaths, especially if screening is most likely to detect less aggressive cancers."

Prostate cancer: PSA's bad rap

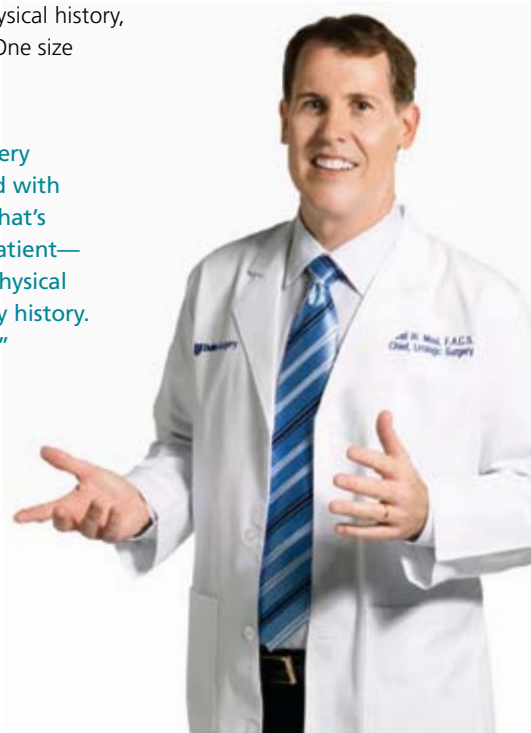
EARLIER THIS YEAR, the *New England Journal of Medicine* published two long-awaited trials on the utility of PSA screening: the early results from the PLCO study, which showed that PSA screening did not affect patient outcomes; and the European Randomized Study of Screening for Prostate Cancer (ERSPC) showing that it reduced deaths by up to 27 percent. These conflicting results have stoked the embers of controversy surrounding the screening tool, which is believed by some to be a lifesaver and by others to be too prone to false positives to be suitable for widespread use.

Duke urologic oncologist Judd W. Moul, MD, director of the Duke Protate Center, says that further scrutiny of the PLCO study has raised concerns about its methodology, and that many experts feel the European study is a more accurate reflection of clinical reality. Moreover, he notes that the American Urological Association's 2009 guidelines not only firmly endorse PSA testing, but also recommend a baseline PSA test for all men beginning at age 40.

"The recommendations use the concept of age-adjusted PSA velocity—measuring the rate of change of PSA over time—to give a better picture of prostate cancer and its advancement," a concept Moul says the Duke Prostate Center has been championing for more than two years. "If you have a baseline PSA on a young man, you can tell from that number whether to watch him as a high- or low-risk patient," he says. "Then you can watch how his PSA changes during his 50s and 60s—the years when a man is at highest risk for the disease. It's a smarter way to use PSA."

Moul says the debate over PSA screening is unlikely to end soon, but he believes that the growing database of patient information at the Duke Prostate Center will bear out the effectiveness of PSA. "Two years ago we were the first to publish on age-adjusted PSA velocity," Moul says. "We believe in this measure as an important tool that can be very useful when it's applied with an understanding of what's appropriate for each patient—given their age, their physical history, and their family history. One size doesn't fit all."

"PSA screening can be very useful when it's applied with an understanding of what's appropriate for each patient—given their age, their physical history, and their family history. One size doesn't fit all."



Bigger, faster, closer, better

Duke Medicine clinical service updates

Colorectal surgery

Access expands: Duke has expanded its colorectal surgery program with the recruitment of two colorectal surgeons, John Migaly, MD, and Julie Marosky Thacker, MD. Both surgeons are trained in open and laparoscopic management of colorectal cases.

Otolaryngology Head and neck surgery

Duke Otolaryngology has added new subspecialists in ear, nose, throat, and head-and-neck problems: Adam Becker, MD, rhinology and endoscopic skull base surgery; Eileen Raynor, MD, pediatric otolaryngology; and Matthew Ellison, MD, James Ross, MD, and Sheila Ryan, MD, pediatric and adult.

Small bowel transplant

With the arrival of surgeons Debra Sudan, MD, and Abigail Martin, MD, Duke is beginning the only small-bowel transplant program in the region, expanding options for adult and pediatric patients who are permanently dependent on parenteral nutrition and suffering complications due to parenteral nutrition or short bowel syndrome. The program will also offer non-transplant intestinal failure management, to minimize the need for transplantation.

Minimally invasive gynecologic surgery

Options in Wake County: A multidisciplinary clinic is open on Blue Ridge Road in Raleigh that specializes in minimally invasive gynecologic surgery as well as the management of patients with abnormal menstrual bleeding, chronic pelvic pain, endometriosis, and uterine fibroids. Physicians Amy Broach, MD, Stanley J. Filip, MD, Craig Sobolewski, MD, and Patrick Yeung, MD, will continue to offer minimally invasive procedures, including single-incision laparoscopic surgery (SILS) for hysterectomy, through their flagship location at 3116 North Duke Street in Durham, in addition to the Raleigh location. These Duke gynecologic surgeons are among the first in the country to apply SILS to hysterectomy cases.

Excision for endometriosis: Patrick Yeung, MD, is the director of the Duke Center for Endometriosis Research and Treatment. The group's preferred surgical technique is complete surgical excision for the removal of endometriosis. Unlike medical management and surgical ablation or vaporization of endometriosis, laser excision offers a precise removal of tissue, which is believed to be a more effective approach for the treatment of endometriosis-associated pain. Also, tissue that is removed is sent to pathology, so patients can have a definitive diagnosis immediately after the surgery. *Learn more at dukehealth.org.*

Gynecologic oncology

Specialty services in Raleigh: Duke Raleigh Hospital is expanding toward a comprehensive gynecologic oncology program, including both minimally invasive surgery and, most recently, chemotherapy infusion. Advanced laparoscopy and robotic surgery are both offered on site; Duke surgeons Paula Lee, MD, Fidel Valea, MD, and Laura Havrilesky, MD, offer minimally invasive options for cervical cancer, endometrial cancer, and pelvic mass evaluation. Angeles Alvarez Secord, MD, who heads the clinical research program for Duke gynecologic oncology, notes that Duke Raleigh Hospital was recently approved as a clinical research site for the national Gynecologic Oncology Group, and the team is actively opening research trials for patient enrollment.

Spine

Cervical disk replacement: Orthopaedic surgeon Christopher Brown, MD, recently performed the region's first artificial cervical disk replacement surgery, a new option for patients with intractable pain in their cervical spine.

Learn more about Duke Medicine's newest physicians and clinic locations beginning on page 58.
For more information, patients can call 1-888-ASK-DUKE; providers call 1-800-MED-DUKE.

Questions of the heart

A FLURRY OF FINDINGS out of Duke this year brought new evidence to bear on long-standing controversies in many areas of heart care—though some of the findings lead to as many questions as answers.

PERCUTANEOUS CORONARY INTERVENTION

Drug-eluting stents vindicated

The latest riposte in the debate over drug-eluting stents is a paper that shows them to be safe—and also superior to bare metal stents in preventing death and heart attacks. Researchers in the Duke Clinical Research Institute (DCRI) followed 262,700 patients who were enrolled in a nationwide registry of cardiovascular disease, making it the largest study of its kind to date; study authors hope that it will end years of controversy over the safety of the devices. (*Journal of the American College of Cardiology*, May 2009)

Better late or never?

One-third of people who experience a heart attack don't receive treatment until 12 hours or more after the attack—sometimes days after. The question of how to treat these patients was addressed in a DCRI study of about 1,000 patients, half of whom received optimal medical therapy and half who received optimal medical therapy plus a stent. According to the study, though stenting offered some relief from chest pain early on, it had no long-term benefits for patients, and it cost much more. (*New England Journal of Medicine [NEJM]*, April 2009)

ANTICOAGULANT MEDICATION

Timing is everything…sometimes

For a decade, debate has worn on over the best timing for administering an anti-clotting drug called eptifibatide (Integrilin) to prevent potentially life-threatening complications in high-risk patients with coronary artery disease when they require invasive procedures such as angiograms. Practice guidelines are not clear on when the drug should be used—in the emergency room, when patients are first diagnosed with acute coronary disease, or later, if needed, during procedures to open blocked arteries? An international study was undertaken to resolve the question, and in April it published an answer: It doesn't matter. According to findings from the Duke-led Early Glycoprotein IIb/IIIa Inhibition in Non-ST-Segment Elevation Acute Coronary Syndrome (EARLY-ACS) trial, the timing of the drug doesn't appear to make much difference at all. (*NEJM*, April 2009)

An alternative to clopidogrel

A head-to-head study of two anti-clotting medications for heart patients has found that the investigational drug ticagrelor (Brilinta) was more effective at reducing cardiovascular death than the current standard of care, clopidogrel (Plavix). Though the study—which followed more than 18,000 patients from 862 sites in 43 countries for one year—showed no significant difference between the drugs in terms of life-threatening bleeding, there was a significant difference in the number of deaths, heart attacks, and strokes among patients taking ticagrelor compared to clopidogrel (9.8 versus 11.7 percent). Ticagrelor more effectively reduced total death rates (4.5 versus 5.9 percent). The researchers note that clopidogrel is a well-established and effective therapy, so this study paves the way for a thorough, evidence-based discussion of risks and benefits of the two drugs. (*NEJM*, September 2009)

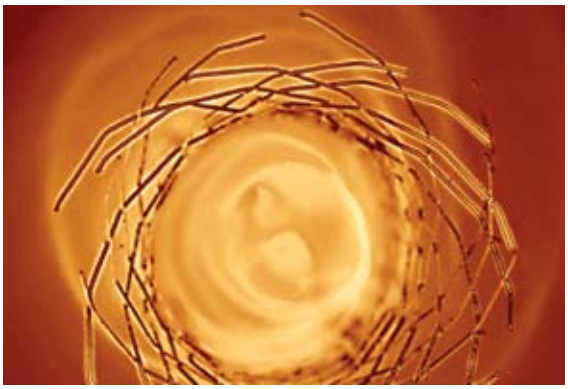
Research news from Duke Medicine

Read more about these Duke research papers—and many others—at **dukemednews.org**.

Surprising findings on periodontal disease and preterm birth

ONE OF THE LARGEST randomized trials to date on the relationship between gum disease and preterm birth has yielded surprising results. Despite the apparent link between the two conditions, standard periodontal treatment in pregnant women does not decrease the risk of preterm birth—nor is the treatment enough to halt periodontal disease progression in pregnant women.

Presented January 2009, annual meeting of the Society for Maternal-Fetal Medicine



BYPASS SURGERY

The STICH is in

This spring, researchers from the Duke Clinical Research Institute (DCRI) published and presented results from the STICH trial (Surgical Treatment for Ischemic Heart Failure), a multi-center, international clinical trial that is the first to compare clinical outcomes among 1,000 heart failure patients who either had bypass surgery alone or had bypass combined with surgical ventricular reconstruction (SVR), a well-established procedure used in heart-attack patients who develop large scars, which lead to heart failure. SVR helps restore the heart chamber to a more normal size and shape. While the procedure appeared to be beneficial based on observational registry data, findings from STICH show that the procedure doesn't offer patients any additional benefit in terms of key clinical outcomes (death and cardiac hospitalization) or quality of life—and adds significant cost—compared to treatment with bypass procedure alone. (*NEJM*, April 2009; *American Heart Journal*, May 2009)

Vein harvesting: Use endo, or no?

Because of clear short-term benefits, endoscopic vein harvesting is used in about 70 percent of the 450,000 bypass surgeries performed each year in the United States. The practice eliminates the need for long incisions in the leg required by traditional, manual removal of the vein, thereby reducing the risk of wound infection and other complications. Patients also prefer the practice because it is less painful and requires shorter hospital stays. But in the largest and longest study conducted to date, Duke researchers found that patients who underwent endoscopic removal of the healthy veins needed for coronary bypass surgery were 22 percent more likely to require another revascularization procedure, have a heart attack, or die within three years of the procedure compared to patients who underwent the traditional procedure. (*NEJM*, July 2009)

Rare and potent HIV-1 antibody is found

RESEARCHERS HAVE FOUND natural occurrence of a broadly neutralizing antibody that would be important to induce in a successful HIV vaccine strategy. In theory, if produced early on in the infection process, the antibody could neutralize 80 percent of HIV strains.

Journal of Virology, February 2009

New genetic target for brain cancer

MUTATIONS IN TWO GENES could help distinguish between types of glioblastoma multiforme (GBM). The finding could directly dictate treatment strategy since the two types of this deadly brain cancer have two different progressions and outcomes. The mutations, which are frequently found in cancer cells but not in non-tumor tissues, could also present a unique opportunity to develop new therapeutic approaches.

New England Journal of Medicine, February 2009

Long-term peanut tolerance proven

A CAREFULLY ADMINISTERED daily exposure to miniscule amounts of peanuts has been so successful as a therapy for peanut allergies that a select group of children is now off treatment and eating peanuts daily. This is the first demonstration of long-term peanut tolerance in study participants, measured via immunologic indicators in the body.

Presented March 2009, American Academy of Asthma and Immunology

Hepatitis C: Fine-tuning treatment

A trifecta of Duke-led studies have cracked some of the hepatitis C code while highlighting the long road ahead in conquering the virus.

Genomics makes it personal

A genetic marker to predict individual treatment response is found.

In April, the Duke-led IDEAL study, the largest randomized clinical study comparing the leading available therapies for hepatitis C, was published in the *New England Journal of Medicine* (*NEJM*). The researchers found no clinically meaningful differences in overall viral response among the regimens. But a subsequent genetic study of 1,671 IDEAL participants has uncovered something remarkable: a genetic marker that predicts, with significant accuracy, an individual patient's response to current hepatitis C treatments.

According to the study results, 80 percent of people who have this particular marker—the "good" genotype—eradicated the virus after receiving treatment, compared to only about 30 percent without the marker. "With differences of that magnitude, patients considering therapy may want to know what their genotype is before they start treatment, which is associated with unpleasant side effects," says the study's senior author, David Goldstein, PhD, director of the Center for Human Genome Variation in Duke's Institute for Genome Sciences & Policy.

The biomarker—a single letter change, of a C instead of a T in a tiny segment of DNA near the IL28B gene—not only predicts who is most likely to respond to treatment, but also begins to explain a long-standing mystery: why African Americans are less likely to respond to treatments than Caucasians, while East Asian patients seem to respond the best. The study showed that the "good" genotype is found significantly more often among East Asian and Caucasian populations than it is among African populations. Goldstein notes that this genotype proved beneficial to patients in all population subgroups—a proof, he says, that "individual genetic makeup is a much more important determinant of response to treatment than is race or ethnicity."

The research team is interested in finding a way to routinely test for the new marker. John McHutchison, MD, associate director of the Duke Clinical Research Institute and lead investigator on the IDEAL study, cautions that this study pertains only to patients with genotype 1 infection. "We now need to evaluate the polymorphism among patients with less common hepatitis C genotypes," he says.

"For geneticists, understanding response to treatment for hepatitis C infection has been almost like a holy grail," says Goldstein. "This discovery enables us to give patients valuable information that will help them and their doctors decide what is best for them. This is what personalized medicine is all about." (*Nature*, August 2009)

> "With differences of this magnitude, patients considering therapy may want to know what their genotype is before they start treatment."
>
> *—David Goldstein, PhD*

A better blood clot solution?

A NEW DRUG derived from magnolia trees has a nuanced ability to prevent potentially damaging blood clots while preserving the beneficial functions of the pro-clotting protein thrombin to minimize bleeding risk. If phase 3 studies confirm these recent findings, the drug could complement or replace clopidogrel in the current standard regimen of percutaneous coronary intervention (PCI) therapy for patients with acute coronary syndrome, because it will help prevent blood clots without increasing the risk of bleeding events.

Lancet, March 2009

Getting dengue fever virus against the ropes

SCIENTISTS AT DUKE and the Duke-NUS Graduate Medical School in Singapore have identified dozens of proteins that the dengue fever virus depends upon to grow and spread among mosquitoes and humans—all chinks in the virus's armor that could eventually be exploited to prevent or treat the disease, which infects millions of people around the globe every year.

Nature, April 2009

Patient-centered plan works in older cancer survivors

OLDER CANCER SURVIVORS are at increased risk for functional decline, which is often compounded by poor diet and lifestyle behaviors. This study shows that reaching out to older cancer survivors in their homes and giving them tools to improve their diet and exercise habits can lead to meaningful improvements in physical function.

Journal of the American Medical Association (JAMA), May 2009

Sweetening the treatment cocktail

A new pairing of hepatitis C drugs could cut treatment duration and boost its effectiveness.

Researchers have found a magic ingredient that dramatically increases the number of hepatitis C patients who respond to therapy—and shortens the duration of therapy for all. A 37-center study coordinated by investigators from the Duke Clinical Research Institute (DCRI) has shown that the addition of the anti-viral drug telaprevir to a standard treatment for hepatitis C can shorten the duration of therapy by 50 percent—and increase the number of patients who can be cured of their disease to 67 percent.

Standard treatment for the most common type of hepatitis C is 48 weeks of a combination of two drugs, peginterferon alfa-2a and ribavirin, which has significant side effects—severe flu-like symptoms, depression, fatigue, insomnia, and anemia—that make it very difficult for some patients to complete their treatment. What's worse, says John McHutchison, MD, associate director of the DCRI and lead investigator on this study, is that even when patients are able to complete the treatment course, only 40 percent of those patients are cured of their disease.

Telaprevir is a protease inhibitor that works by blocking an enzyme that the hepatitis C virus needs in order to replicate itself. "Even though telaprevir does produce side effects of its own, its advantages when added to standard therapy are significant in terms of response rates and shortened treatment duration," says McHutchison. "Either one alone would have been an advance, and to be able to achieve both is a significant step in the right direction when it comes to treating hepatitis C." The study was funded by Vertex Pharmaceuticals, the maker of the drug telaprevir. (*NEJM*, April 2009)

Arrhythmia after a heart attack may be foreshadowing

AN INTERNATIONAL STUDY of nearly 6,000 heart attack patients has shown that those who develop serious arrhythmia in connection with procedures to open blocked arteries face a significantly higher risk of death for several months after the procedure, when compared to similar patients who do not develop such complications. The findings suggest that physicians should reassess the importance of these episodes, which until now weren't thought to have much impact on long-term outcomes.

JAMA, May 2009

Niacin could make a comeback

MOLECULAR DETECTIVE WORK suggests that scientists may soon be able to resurrect niacin as one of the best and cheapest ways to manage cholesterol. By identifying the discrete molecular pathways that are triggered when niacin enters the body, the researchers believe they will be able to develop niacin-based treatments that don't cause uncontrollable, intense flushing—the reason most patients won't take the drug.

Journal of Clinical Investigation, May 2009

Monkeys wonder what might have been

DUKE RESEARCHERS HAVE FOUND the first evidence that monkeys, like people, have "would-have, could-have, should-have" thoughts. They studied the brain activity of monkeys playing a game similar to *Let's Make a Deal* and found that their brains register missed opportunities and learn from their mistakes.

Science, May 2009

A spinal solution for Parkinson's disease?

WHAT GOES AROUND COMES AROUND, even in research. Duke neuroscientist Miguel Nicolelis, MD, PhD, was analyzing the brain activity of mice with Parkinson's disease when it hit him: "Suddenly it reminded me of some research I'd done in the epilepsy field a decade earlier," he says. The rhythmic brain activity in the animals with Parkinson's disease resembled the mild, continuous, low-frequency seizures that are seen in those with epilepsy.

The ideas began to flow from there. One effective therapy for treating epilepsy involves stimulating the peripheral nerves, which facilitate communication between the spinal cord and the body. Nicolelis's team has used that concept to develop a modified stimulation approach—the first potential therapy to target the spinal cord instead of the brain.

The researchers developed a prosthetic device that applies electrical stimulation to the dorsal column in the spinal cord, which is a main sensory pathway carrying tactile information from the body to the brain. The device was attached to the surface of the spinal cord in mice and rats with depleted levels of the chemical dopamine—mimicking the biologic characteristics and impaired motor skills of people with advanced Parkinson's disease. Small leads were implanted over the spinal cord and then connected to a portable generator, a small device capable of producing mild electrical currents.

When the device was turned on, the dopamine-depleted animals' slow, stiff movements were replaced with the active behaviors of healthy mice and rats. Improved movement was typically observed within 3.35 seconds after stimulation. "We see an almost immediate and dramatic change in the animal's ability to function when the device stimulates the spinal cord," says Nicolelis.

For the initial rodent trials period—results of which were published in March in *Science*—the generator was external; as a human therapy, it would be implanted below the skin. "This technique is easy to use, significantly less invasive than other alternatives to medication such as deep brain stimulation, and has the potential for widespread use in conjunction with medications typically used to treat Parkinson's disease," says Nicolelis, who is now testing the device in primate models prior to beginning human clinical trials. "If we can demonstrate that the device is safe and effective over the long term in primates and then humans, virtually every patient could be eligible for this treatment in the near future."

You can find a video about this research at dukehealth.org.

"This technique is easy to use, significantly less invasive than other alternatives to medication such as deep brain stimulation, and has the potential for widespread use in conjunction with medications typically used to treat Parkinson's disease."

—Miguel Nicolelis, MD, PhD

Double quit-smoking success

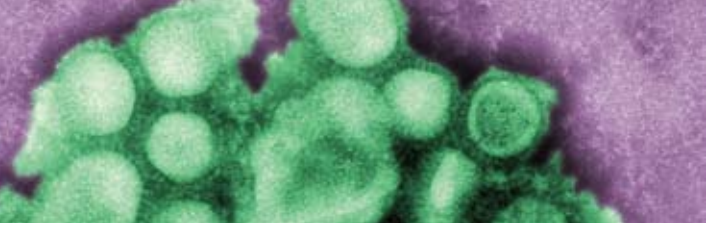
ALTHOUGH THE NICOTINE PATCH is only recommended for use after the quit date, Duke researchers say their newest study demonstrates that using a nicotine patch before quitting smoking can double success rates. A literature review found that concurrent use of a nicotine patch and cigarette smoking appears to be safe.

Nicotine and Tobacco Research, July 2009

Check up on heavy bleeding

A DUKE-LED INTERNATIONAL expert consortium has released new guidelines for helping physicians—and patients—detect signals of a bleeding disorder in women. The most obvious sign of a clotting disorder in a woman is a heavy menstrual period, but doctors and patients alike don't often link the two. Study authors estimate that as many as 25 percent of women with heavy menstruation may have an undiagnosed bleeding disorder; previous studies report that women who ultimately were treated for a bleeding disorder wait 16 years, on average, before being diagnosed. Signs that may reflect a clotting disorder include: heavy blood loss during menstruation, family history of bleeding disorder, notable bruising without injury, minor wound bleeding that lasts more than five minutes, and prolonged, excessive, or unexpected bleeding after dental extractions, surgeries, or childbirth.

American Journal of Obstetrics and Gynecology, July 2009



Virus trackers

H1N1 gives a genomic discovery its first test drive

AS THE SECOND WAVE of H1N1 influenza stormed the Southeast this fall, North Carolina clinics reported in September the number of flu cases they usually see in January or February—the traditional peak months of flu season. But in the midst of increased media coverage and an apprehensive public, the Duke Institute for Genome Sciences & Policy (IGSP) has found a silver lining in the ongoing presence of H1N1 by way of a brand-new genomic discovery.

In August, Duke IGSP scientists published the discovery of a genomic "signature" that reveals the body's exposure to common upper respiratory viruses, like the cold or flu, hours or even days before symptoms appear. The signature presents itself as a set of changes in gene expression, strong enough in symptomatic individuals to clearly reveal the presence of infection and whether the infection is viral or bacterial—all from a single tube of blood.

"This work is still in a relatively early phase of discovery, but we are optimistic that these findings may lead to a whole new way of diagnosing infectious disease," says Geoffrey Ginsburg, MD, PhD, director of the Center for Genomic Medicine in the IGSP and the senior author of the study appearing in the journal *Cell Host & Microbe*.

The current H1N1 season presents a timely opportunity to measure the practical applications of the discovery; researchers hope to recruit 500 to 800 Duke freshmen for a yearlong study, collect their blood samples for genomic analysis, and monitor the spread of viral infections in a close-quarters environment.

"It is highly likely that many of our students will be exposed to some sort of upper respiratory infection in the coming months," says Christopher Woods, MD, a member of the IGSP team involved in the discovery and the lead physician who will oversee the health of the students who enroll in the study. "We're asking them to be aware of how they are feeling and to check in with us every day via a Web interface to record and alert us at the earliest moment they feel they may be getting sick."

The discovery emerged from research funded by the U.S. Department of Defense and its research arm, the Defense Advanced Research Projects Agency (DARPA). In September the agency awarded Duke researchers another $19.5 million to advance the second phase of the project: designing a portable, easy-to-use diagnostic device that can reveal who is infected with an upper-respiratory virus before the first cough or sneeze. DARPA could utilize such a device in the field by gaining valuable information about which soldiers are likely to become sick and potentially unfit for duty.

"Pre-symptomatic detection of a cold or flu would be a significant advance in maintaining the health of our troops and will certainly be a breakthrough for the public's health and well-being, as well," says Ginsburg.

The interdisciplinary and international effort that led to the discovery will continue in the second phase with input from the Universities of Michigan, Virginia, and Wisconsin, as well as the National Center for Genome Resources, Retroscreen Virology Ltd., and Duke's own biomedical engineers in the Pratt School of Engineering. Duke engineers have already designed a prototype of the device that can "read" the genomic signatures of infection. Over the next two years, researchers will refine the probe and further validate the genomic signature of infections by additional pathogens, including the seasonal H1N1 virus.

H1N1—stay informed: *Duke Medicine has launched a Web site to help patients keep up with the latest news on H1N1; visit dukehealth.org/flu.*

Binge drinking in older adults

DUKE RESEARCHERS REPORTING on the National Survey on Drug Use and Health, one of the largest surveys of substance use, found that 22 percent of men and 9 percent of women aged 50 to 64 reported binge drinking (five or more drinks at a time) within the last month. At-risk drinking (two or more drinks per day) was found among 19 percent of the men and 13 percent of the women. The group aged 65 and up reported binge drinking in 14 percent of men and 3 percent of women, while at-risk drinking was found among 13 percent of men and 8 percent of women.

The American Journal of Psychiatry, August 2009

Chemotherapy and hypertension

SCIENTISTS AT DUKE may have figured out why up to a third of all patients who take anti-angiogenesis drugs develop high blood pressure. These chemotherapies, which work by inhibiting vascular endothelial growth factor (VEGF), cause hypertension by disrupting the nitric oxide pathway, which regulates blood vessel health.

Hypertension, August 2009

Drugs in reverse

DUKE RESEARCHERS have engineered a new way to reverse the effects of the aptamer drug family. In a just-completed series of clinical trials, heart-disease patients taking blood-thinning aptamers were successfully given customized first-generation antidotes to undo their effects. A second generation of universal antidotes reversed the activity of all eight drugs studied—an advance that could help physicians quickly halt the effects of anticoagulation or other therapies when patients experience side effects such as bleeding. This second-generation approach, called RNA-based aptamer-antidote technology, in principle offers the opportunity to make safer drugs by providing additional control over drug action.

Nature Medicine, October 2009

Genetics in translation (or not)

A new direction in human genetic research may be the slower—but steadier—way to truly bring genetic discovery to the clinic.

Genome-wide association studies—heralded as the promise of the $3-billion human genome project made good—analyze thousands of genetic samples from patients to look for common variants that can be linked to a particular disease. In the last five years, these studies have generated high enthusiasm and delivered myriad results. Unfortunately, says Duke's David Goldstein, those results aren't really amounting to much.

DAVID B. GOLDSTEIN, PHD, WANTS to dispel an ugly rumor—that current human genome discoveries aren't playing a bigger role in clinical care because physicians are "not smart enough" to know how to apply them. "Really," he says, "most of these discoveries aren't in the clinic because they don't belong there."

"The human genome has been cracked wide open in recent years and is spilling many of its secrets," wrote Goldstein, who directs the Duke Institute for Genome Sciences & Policy's Center for Human Genome Variation, in a commentary in the April 23 *New England Journal of Medicine*. He was referring to genome-wide association studies (GWAS), more than 100 of which have already been published, with hundreds more currently under way around the world. These studies—heralded as the promise of the $3-billion human genome project made good—analyze thousands of genetic samples from patients to look for common variants among the samples that can be linked to a particular disease. In the last five years, GWAS have generated high enthusiasm and delivered myriad results.

Unfortunately, says Goldstein, those results aren't really amounting to much. As he wrote in *NEJM*, "These initial studies… are worth doing, since common variants do appear to explain a sizable fraction of the heritability of certain conditions—notably, exfoliation glaucoma, macular degeneration, and Alzheimer's disease." But, he argues, there will be only diminishing returns from conducting more and ever-larger versions of these expensive studies, because it's become disappointingly clear that these common variations have little clinical relevance.

The proof is in the primary care physician's office. "Take type 2 diabetes," Goldstein says. "There are about 20 genes that have been inarguably linked to type 2 diabetes," but none of these discoveries has proven useful either in helping clinicians predict who will develop the disease or in customizing treatment for those who have it. "The clinical recommendations [improving diet and exercise behaviors] are still essentially the same for everybody."

Much of the problem comes from the fact that the premise of GWAS underestimates the power of natural selection. If any one gene variant (or small group of variants) becomes powerful enough to dictate a disease, it is most often quickly and effectively selected out of the population. So the variations uncovered by GWAS are usually too weak-acting to be directly responsible for an illness, making them irrelevant to practical matters such as prevention or treatment. Moreover, these common variants are still uncommon enough to be meaningless for an individual patient's prognosis. "We're talking about studying thousands of genetic samples to find variations that are a percent-and-a-half more common" in populations with the disease than in those without, Goldstein says. "You can't use this information to say anything about one person, or dozens of people, even hundreds of people. It only applies to groups of thousands."

The technology developed to conduct GWAS has brought an unprecedented level of precision to the analysis of seemingly endless gluts of genetic code. But Goldstein says GWAS can't yet overcome the limitations of studying very small sections of the genome. A December 2008 study out of his lab showed that expressions of the same gene can vary widely depending on the tissue type being studied. The protein a gene signals in blood cells might be quite different than the proteins that same gene triggers in brain tissue—and the proteins, ultimately, may have more relevance for the progression of disease.

As an alternative to the paling promise of GWAS, Goldstein is leading a livening group of researchers who want to ditch the thousand-strong cadres of genetic samples and focus on a new mode of analysis: studying the full genomes in carefully selected patients, to look for rare variants that have clear, causative relationships with disease.

By this philosophy, the number of "a-ha!" discoveries would be much smaller—but the impact of each a-ha would be much greater. For example, last year a team led by Goldstein found that some schizophrenia patients have huge deletions in their genetic code. These deletions—unlike the scores of previously discovered, smaller variants in schizophrenic populations—give a clear explanation for why these particular patients are sick. The specificity of these findings (published in February 2009 in *PLoS Genetics*) will ultimately be directly useful to diagnosis and treatment strategies, and Goldstein expects findings from other current studies, in diseases ranging from epilepsy to HIV, will generate similar results: explaining small numbers of cases, but explaining them well.

Not everyone agrees that the resources put to GWAS are misspent—two other premier geneticists writing in the same issue of *NEJM* largely agree with Goldstein's assessment of GWAS, but they advocate awaiting improved results that will come from fine-tuning of the technology and methodology. And Goldstein himself led a study published this summer in

Gene studies

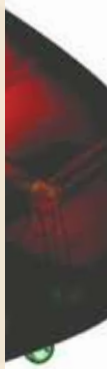
Recent findings from Duke researchers

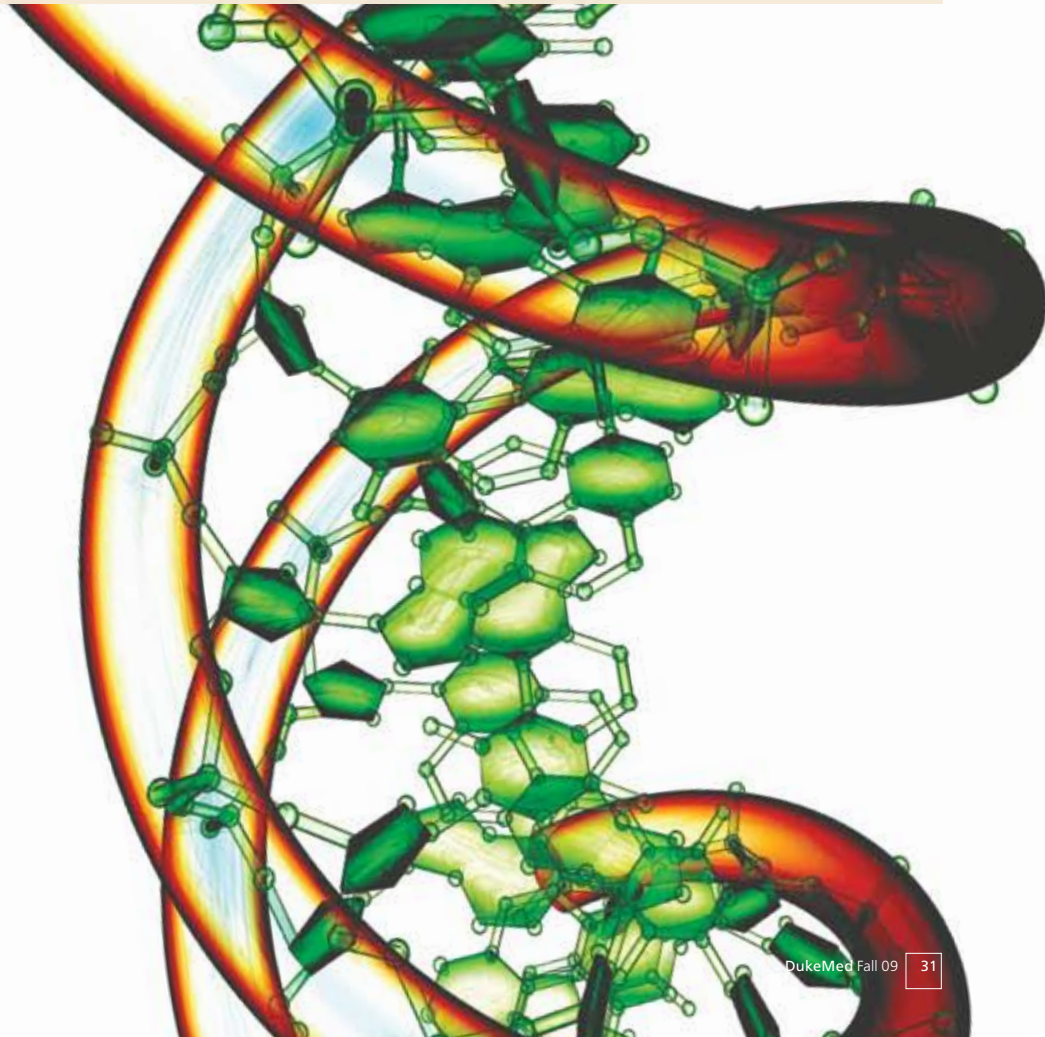
ALZHEIMER'S ONSET: A Duke group has used an unusual tactic—phylogenetic analysis—to study the evolution of genes implicated in late-onset Alzheimer's disease. They found that the TOMM40 gene, along with the APOE gene, may account for 85 to 90 percent of the genetic effect in the disease. Moreover, according to early studies, the gene appears to predict the age of onset within a five- to seven-year window among people over age 60. (Presented, International Conference on Alzheimer's Disease, July 2009)

COPD RISK: The first genome-wide association study of chronic obstructive pulmonary disease (COPD) suggests that people who carry two particular genetic markers have a significantly higher risk of developing COPD—and that they may be able to reduce their risk if they quit smoking before the first symptoms of COPD occur. (*PLoS Genetics*, March 2009)

ANGELMAN SYNDROME: Researchers at Duke and the University of North Carolina collaborated on a study that showed in mice how a single disrupted gene can cause a form of severe mental retardation known as Angelman syndrome. The study found that the gene, UBE3A, is needed so that neurons in the brain can form and adjust their connections to other neurons for storing sensory information. They found that when these UBE3A-mutated mice were deprived of sensory stimulation, their brain connections could be recovered—a finding that indicates a pharmaceutical or behavioral treatment might be possible in the future. (*Nature Neuroscience*, May 2009)

STATIN RESISTANCE AND SIDE EFFECTS: Gender, race, age, and smoking status are known to influence how patients respond to statin drugs, but recent Duke studies suggest that genetic variations may play a more powerful role. One study indicates that some patients may not see lower LDL cholesterol levels from taking statins—no matter what the dose—because of their genetic composition. The findings of the study suggest that switching statin-resistant patients to the most potent statin available, instead of raising the dosage, is the better option. A second Duke study linked a common genetic mutation to muscle aches in patients taking statins—a side effect that is a major reason why up to half of patients prescribed the drugs stop taking them. Geoffrey Ginsburg, MD, PhD, director of the Center for Genomic Medicine in Duke's Institute for Genome Sciences & Policy and leader of both studies, says that the findings could be used to design a pharmacogenetic test to predict how an individual will respond to a statin and ultimately help to increase compliance. (*Circulation: Cardiovascular Genetics,* December 2008; *Journal of the American College of Cardiology,* October 2009)





which a GWAS of hepatitis C patients yielded very valuable information about what patients are most likely to respond to current therapies (see page 26).

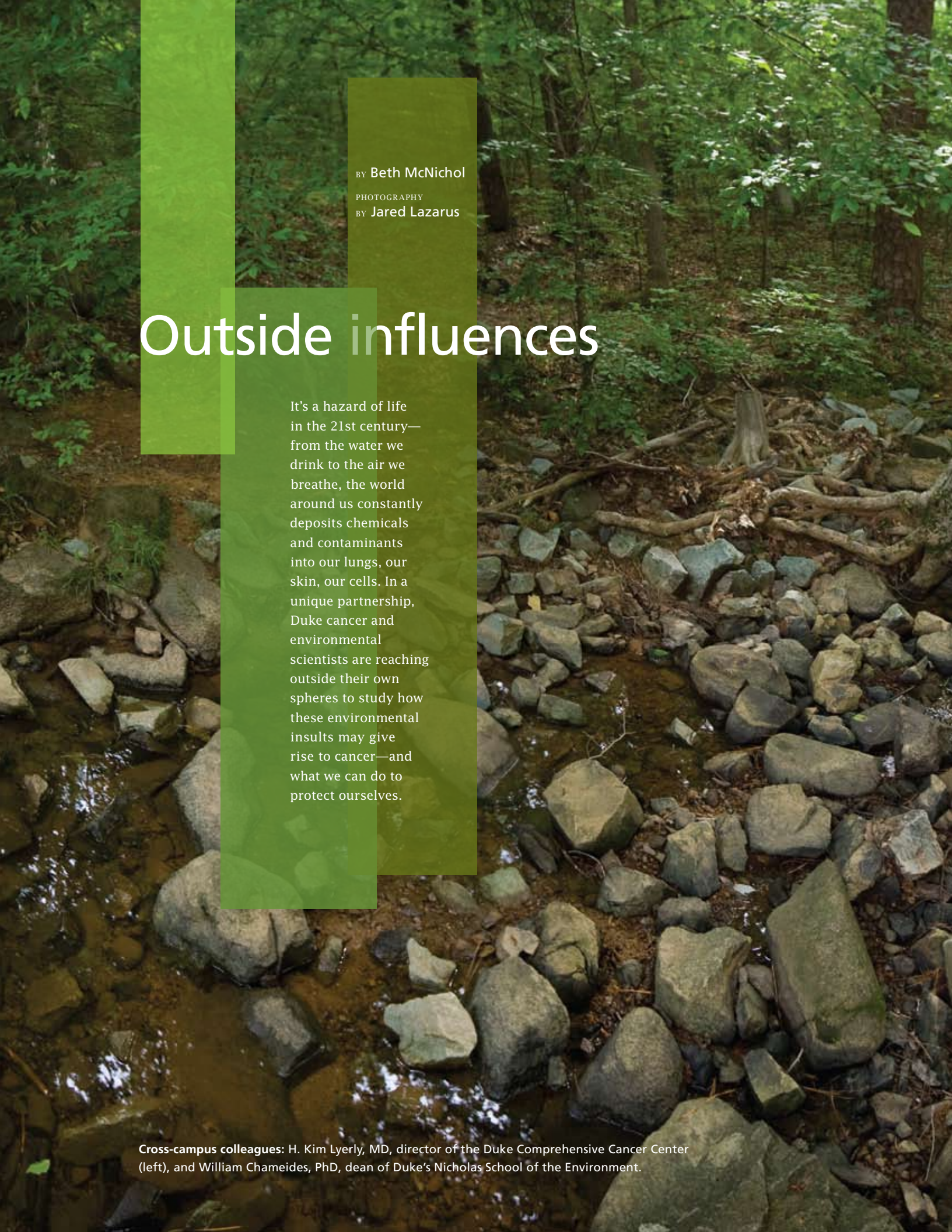
"My argument is not that GWAS always fails, but that most traits are not much influenced by common variation," he says. "For those traits, instead of overselling the modest returns from GWAS, we should accept that, having done the experiment and done it well to test for the effects of common variation, it's time to move on to more rare genetic differences. I'm convinced those are the ones that are most important for the most common diseases." Goldstein says that the whole-genome tactic will—by necessity of its patient-by-patient approach—likely catch on slowly, but that it will ultimately lead to the long-awaited translation of genetic research into clinical practice. "It starts with finding a cause in just a few people," he says. "And as that number increases, we'll start to see a return."

BY Beth McNichol

PHOTOGRAPHY BY Jared Lazarus

Outside influences

It's a hazard of life in the 21st century—from the water we drink to the air we breathe, the world around us constantly deposits chemicals and contaminants into our lungs, our skin, our cells. In a unique partnership, Duke cancer and environmental scientists are reaching outside their own spheres to study how these environmental insults may give rise to cancer—and what we can do to protect ourselves.



Cross-campus colleagues: H. Kim Lyerly, MD, director of the Duke Comprehensive Cancer Center (left), and William Chameides, PhD, dean of Duke's Nicholas School of the Environment.

She was standing at the kitchen sink, washing dishes, just as she had dozens of times in my childhood when I had walked in with a question about something I didn't understand. But the question we were discussing was not one between a young mother and a curious kindergartner; it was between a 50-year-old woman whose breast cancer had been in remission for a year and her college-aged daughter who wondered what sort of fortunes might await her own body, yet to be told.

My mother was convinced that stress—losing her father, moving to a new state—had caused her disease, for there was no history of it in our family. I was thinking about the other tapestries of her life: the coal mining she grew up around; the chemical plants that billowed clouds of smoke and dotted the landscape of the region where we made our home for the first 16 years of my life. Could any or all of these factors have caused her cancer? Would they one day haunt me or my children?

For most of us—even for many researchers—the relationships between nature and nurture remain murky. But scientists at the Duke Comprehensive Cancer Center and the Nicholas School of the Environment believe that such questions are answerable, that our lifestyles, our environments, even the possible effects of what's stored underneath that kitchen sink, can be shrunk from imposing questions to understandable relationships, from theory to therapy, from *perhaps* to prevention.

The partnership is one-of-a-kind: No other institution in the country boasts such a level of collaboration between environmental and cancer researchers. The effort began in 2005, seeded with a series of joint projects funded by Fred and Alice Stanback of Salisbury, North Carolina (who have since contributed an additional $6 million to the cause). Over the years the initiative has grown and given rise to new research in both domains, with scientists coming together to explore questions that once ended where another discipline's research lab began. Researchers are visiting their neighboring schools, borrowing the proverbial cup of sugar, and getting personal—just like the disease itself.

"You can find the big answers if you have the culture and the willingness to work together," says William Chameides, PhD, dean of the Nicholas School. "You have to be willing to say, 'Yeah, I'm going to stretch a little bit, and I'm going to get a little bit out of my element, because I see the big payoff.'"

In pinpointing our environmental enemies more precisely, the eventual payoff could indeed be huge—and more than a little alarming. "I have three kids: an eight-year-old, a six-year-old, and a four-year-old," says H. Kim Lyerly, MD, director of the Duke Comprehensive Cancer Center. "So there's stuff in the backseat of the car. There are plastic drinking cups, toys, balls, and other man-made things." To contemplate the spectrum of dyes, paints, and coatings on the endless odds and ends that we dig out from between the car seats and behind the sofa cushions, all the materials that end up on our skin or—more likely—in our children's mouths, it's easy to spin into paranoia or a sense of futility. But the goal, says Lyerly, is not to "panic about the things we find; it's to discover what kind of impact they have. If something is harmful, we want to know why. We want to link actual biology with detection in the environment.

"Let's say we find a new type of molecule that causes cells to duplicate themselves uncontrollably," he explains. "That's a new insight that might help us understand cancer and therapies for the disease. But it's also an insight we can give to the Nicholas School and say, 'Do you find this molecule in populations that are at greater risk based on your screening?'"

Maps as medical tools: Marie Lynn Miranda and Amy Abernethy are using Miranda's mapping techniques to track cancer incidence in North Carolina—and potentially uncover associations with environmental carcinogens. Abernethy says the maps could become clinical tools to educate patients about their risk for certain cancers, and to guide clinicians' recommendations in preventive measures such as screening.

Mapping cancer risk

New tools such as geospatial mapping are making these collaborations efficient for both sides. Researcher Marie Lynn Miranda, PhD, who leads the Nicholas School's Children's Environmental Health Initiative, has helped advance this mapping technique—which uses a range of spatial data layers—in North Carolina and nationally through her work on environmental contributors to maternal and child health. Now, geospatial mapping is being expanded to other fields as well, including cancer.

The mapping tools herald an age of "personalized environmental health," paving the road to a better grasp on where cancers occur and why, says Amy Abernethy, MD, associate director for IT and informatics at the Cancer Center, who often works with Miranda. Using a database of Duke cancer patients, Abernethy says, researchers are compiling where patients with different kinds of tumors live and then correlating their information with geographic maps of known heavy metals or other kinds of exposures considered potential carcinogens—arsenic, radon, and even the sun itself.

As more and more information is gathered and other databases are folded in, those maps will be not only heavy-duty tools for research, says Abernethy, but eventually clinical tools to help drive home the importance of proper screening. Like the old picture of lungs blackened from smoking, physicians can pull out a map during an office visit that details their patients' risk based on geography. "It allows people to see that, 'Wow, I live in Johnston County and these are the things that I need to worry about, and this is based on real-life data,'" Abernethy says. "It becomes much more meaningful.

"I think ultimately we'll become more and more sophisticated in our risk-modeling. We'll be saying: 'This is a 33-year-old woman living in Johnston County, near Highway 242, who has lived in Wake and Durham counties at prior points in her life, and her risk of having this type of cancer by the time she turns 70 is *x*.' And it may influence the screening we recommend."

What's in the water

Cancer is an intimate foe; when you have it, and even when you no longer do, reminders of its presence pockmark your body and your psyche. And many of the environmental insults that are linked with oncogenesis, as Nicholas School professor Avner Vengosh, PhD, knows, also pockmark the landscape that surrounds us.

Vengosh is a geochemist who is known internationally for his expertise on the chemical and isotopic composition of water contaminants, developing tracers for contaminants in water supplies from the Middle East to the mountains of western North Carolina, where harmful

Of coal and cancer: Avner Vengosh's studies of major water contaminants—including last year's Tennessee coal-ash spill—will ultimately help researchers understand more subtle influences of the environment on human health.

Hundreds of coal-ash retention ponds exist in the United States; if high levels of carcinogens are found in Tennessee, those data could ultimately unlock clues about cancer incidence in other areas of the country.

As more is learned about epigenomic switches, clinicians will have to ask their patients to sidle up to the responsibility trough and get smart about their lifestyle and environment choices based on the findings. "What you eat, what you drink, and so on can affect not only yourself, but generation upon generation after you," says Randy Jirtle, PhD.

On the upside: Epigenetics expert Randy Jirtle believes that once the ties between gene activation and disease are better understood, therapies might be developed to turn off disease-causing genes and turn on protective mechanisms.

radon in groundwater was exposed. He has collected samples of the coal-ash waste that spilled from the Tennessee Valley Authority's Kingston coal-burning plant on December 22, 2008, covering 300 acres of land and water with sludge and damming a tributary of the Emory River there. Coal ash has relatively high levels of toxic elements such as radium and arsenic; long-term exposure to either has been deemed a cancer risk by the Environmental Protection Agency.

"The massive coal-ash spill contaminated associated surface water—specifically with arsenic—but the good news is, we detected only trace amounts of arsenic in waters beyond the dammed tributary," Vengosh says. "The data suggest that river flow has diluted the arsenic content. The river is relatively clean, but the water from areas like the dammed tributary, where the coal ash accumulated, still contains high arsenic levels." The Tennessee coal-ash spill is a wake-up call, as about 70 million tons of coal ash are stored around the United States. Avner and fellow Nicholas School investigators worked with Julia Kravchenko, MD, PhD, of the Cancer Center on a paper (published in May in *Environmental Science & Technology*) that examines the link between environmental contaminants found in the Kingston coal ash, contaminated water, and health risks—the first of several planned studies of the biomedical implications of environmental disasters.

Chameides is particularly interested to see what the Vengosh team finds as its research into these links unfolds during the coming year; hundreds of coal-ash retention ponds exist in the United States, he says, and if high levels of carcinogens are found in Tennessee, those data could ultimately unlock clues about cancer incidence in other areas of the country. "If you try to understand in general the impact of environmental pollution on human health," Chameides says, "it's sometimes useful to look at places where you see a really high impact, a larger signal such as the coal-ash spill, and then work backward from that to see what's happening in a more subtle way in other places."

The hopeful science

In 2003, Duke epigenetics expert Randy Jirtle, PhD, proved that while our genome is fixed when we're born, our epigenome—the collection of chemical switches that tell the genes what to do—is not. If the genome is the hardware of our bodies, the epigenome is the reprogrammable software capable of yielding to outside influences, says Jirtle.

In his study, baby mice suffered from a flawed gene that led to increased susceptibility to obesity, diabetes, and cancer—except among those whose mother had been fed a prenatal diet including folic acid. In that group, the extra nutrients acted at the molecular level to latch onto the troubled gene, resulting in its appropriate regulation. Those mice were born healthy. Jirtle reported a similar finding last year on

Clinical cautions: Donald McDonnell discovered that certain environmental agents—including the common cleaning agent EGME and the drug valproic acid (Depakote)—enhance progesterone and estrogen activity in cells. This discovery may have significant clinical implications for certain populations, such as women taking tamoxifen.

folic acid countering the negative effects of BPA, a chemical found in many plastics.

What's more, says Jirtle, once this good-guy methylating gang does its work in the embryo, the genomes of those mice's offspring are permanently mended, carrying the good alteration throughout the individual's life. It is, he says, a hopeful new way of looking at life, and at medicine.

Of course, it also means that, as more is learned about the epigenomic switches, clinicians will have to ask their patients to sidle up to the responsibility trough and get smart about their lifestyle and environment choices based on the findings. "What you eat, what you drink, and so on can affect not only yourself, but generation upon generation after you," Jirtle says. That is why, although researchers continue to study the effects of nutrition and lifestyle on cancer incidence, Jirtle believes doctors should urge their pregnant patients—and women thinking of starting a family—to start limiting their exposure to BPA now by avoiding food from cans coated in plastic and water from plastic containers made from BPA, which may mimic estrogen(s) in the body.

Along with oncologist Victoria Seewaldt, MD, Jirtle also is working with a subset of our genome called "imprinted genes" to learn more about the influence of environment on breast cancer. Unlike other genes we're born with, in imprinted genes, only one of the two copies inherited from the mother and the father works. This non-working gene is epigenetically switched off, or methylated, in a normal gene. But, if either both copies or no copies are working, susceptibility to disease increases. Jirtle estimates that only about 200 of the 25,000 genes in our makeup are imprinted, but these are the ones Jirtle believes will unlock the mysteries behind many diseases, especially cancer.

The researchers are looking at people with a high risk of breast cancer to see if there are epigenetic changes in the KCNK9 imprinted gene, a potassium channel that has been shown in previous studies to result in breast cancer when overexpressed. Jirtle says they have already seen some evidence of a relationship at the epigenetic level.

Jirtle's studies even investigate how the environment within the body may affect the epigenome—specifically, he's researching the link between neurological disorders and cancer, because patients with schizophrenia are known to have low incidence of cancer. He believes that one day, when these ties are better understood, therapies might be introduced to turn off disease-causing genes and turn on protective mechanisms at the cellular level.

"With epigenetics," he says, "for the very first time, the word *prevention* comes into cancer. To get to the answers, though, you have to bring together groups of people that possibly have never been brought together before; and in fact, that's what's happening right now between the Nicholas School and the Cancer Center."

Disrupting the status quo

BPA is one of several known endocrine disruptors—though it has received by far the most attention, causing certain plastic water bottles, baby bottles, and other goods to be shunned almost overnight. But Jirtle's colleague, Duke molecular cancer biologist Donald McDonnell, PhD, discovered startling information regarding endocrine disruptors and pharmaceuticals that should give pause to doctors prescribing medications with hormonal components.

McDonnell's team showed why a common solvent used in industrial cleanrooms and one of the most popularly prescribed drugs in the country could lead to increased risk of cancer in some individuals. His team tested a cleaning agent known as ethylene glycol methyl ether (EGME) that's used in varnishes, paints, dyes, fuel additives, and the semiconductor industry; and valproic acid (Depakote), a drug with a similar chemical makeup that is prescribed for migraines, seizures, and attention deficit and bipolar disorders.

They discovered that EGME, when metabolized, and valproic acid both act as hormone sensitizers—they enhance progesterone and estrogen activity inside cells. When that hormonal activity is accelerated in a person who is already ingesting a drug that contains synthetic progestin and estrogen (such oral contraceptives or hormone replacement therapy), the extended, double exposure of hormones in the body is likely to increase cancer risk.

McDonnell says the results are a break from more traditional thinking on the work of endocrine disruptors, where the focus has been on agents that mimic estrogen in the body rather than those that change the way cells see estrogen. That mimicking also has been the main focus of drug testing for such disruptors, and until testing strategies take this new mechanism into account, he says, physicians need to act cautiously before prescribing any drug in combination with hormone-containing pharmaceuticals.

"This adds fuel to the debate as to the effectiveness of the currently used tests for endocrine disrupters," says McDonnell. "The drug-testing programs are outdated and do not adequately incorporate our current understanding of hormone action." McDonnell suggests taking particular caution with tamoxifen, which is widely used in the treatment and prevention of breast cancer but is chemically altered from an antagonist to an agonist in the presence of EGME and valproic acid. And while he has received some feedback from oncologists who do check with their patients about valproic acid use, for the most part, he says, "the message hasn't yet hit home" in the medical community.

McDonnell adds that there's no doubt in his mind that the environment contributes in a very significant manner to cancer susceptibility. "Endocrine disruptors have received a lot of attention of late but there are likely to be hundred of other types of agents in the environment that impact cancer risk."

Ready for its close-up

Environmental effects on cancer are taking center stage in the medical research community and likely will become a greater topic of conversation around dinner tables, too. It's precisely that growing curiosity among the public about what's safe around us and what isn't that is fueling the partnership between the Nicholas School and the Cancer Center. Patients want answers; researchers want to give doctors the right tools to provide those answers.

In the coming months, Lyerly and Chameides will see the connections they're making at Duke unfold nationally. The President's Cancer Panel, a group Chameides spoke to last fall which is tasked with appraising the National Cancer Program, will focus its annual report to President Barack Obama on the links between the environment and cancer. Lyerly and Chameides also are co-chairs of a state cancer-plan task force on the same topic, and the foundation Susan G. Komen for the Cure also will be putting a brighter spotlight this year on environmental links to breast cancer.

"When I first called Bill to get directions to his office, he told me, 'Just follow the Birkenstocks to the Levine Center,'" Lyerly says. Now that trail has becoming a well-beaten path—and a road that the two hope others may follow. "The more we work with the School of the Environment, the more we understand that there are few people at the Cancer Center who couldn't find ways to interact with their expertise," says Lyerly. "We're hoping this will be a model for other places, for balancing individual research accomplishments with the collective good. We can find the answers if we work together."

The results of McDonnell's studies are a break from more traditional thinking on the work of endocrine disruptors, where the focus has been on agents that mimic estrogen in the body rather than those that change the way cells see estrogen. Until testing strategies take this new mechanism into account, he says, physicians need to act cautiously before prescribing any drug in combination with hormone-containing pharmaceuticals.

NEW ANGLES ON AFib

by KELLY RAE CHI *photography by* JARED LAZARUS

Atrial fibrillation is the most common heart arrhythmia. It's also among the most challenging to control—first-line therapies don't work for up to half of patients, raising their risk of heart failure and stroke. By pinpointing the often-mysterious origins of AFib, fine-tuning drug strategies, and pushing the boundaries of catheter ablation, physicians in Duke's new Center for Atrial Fibrillation are now restoring healthy heartbeats in more than 90 percent of patients—and counting.

The heart's beat begins with an impulse. The sinoatrial node—our natural pacemaker—generates electrical signals that travel through the atria and into the ventricles. These signals set off synchronized contractions in each chamber of the heart, creating the comforting *lub-dub* sound of the heart's pumping as it trades spent blood for a freshly oxygenated supply.

Atrial fibrillation (AFib) is the most common disruption of this powerful rhythm, affecting around 2.2 million Americans. It can stem from coronary artery disease, high blood pressure, structural heart defects, or even arise seemingly out of the blue. Whatever the cause, abnormalities in the heart's electrical system make the atrial chambers contract too quickly—up to 350 times per minute. This quivering in the atria causes chaos in the ventricles, which react with a flurry of rapid, irregular beats. The *lub-dub* becomes more like a *pitter-pat*—one that is disconcerting at best, life-threatening at worst.

For some patients, AFib is barely noticeable: they have mild symptoms, such as fatigue, or no symptoms at all. Others feel their hearts racing or experience frightening episodes of heart palpitations. These individuals often live in dread of such events: they don't want to travel or go to work or school. Others give up exercise and other activities that could trigger the irregular beats. "AFib symptoms and the anticipation of the episodes are so dramatic for some patients that it almost turns their lives upside down," says James Daubert, MD, the new director of the Duke Heart Center's electrophysiology (EP) program.

Even worse than unpleasant symptoms, says Daubert, the irregular rhythm can contribute to heart failure, while ineffective pumping allows blood to pool in the ventricles and atria—turning the chambers of the heart into a breeding ground for blood clots. In fact, atrial fibrillation is responsible for about 15 percent of strokes.

Managing these symptoms and sequelae has long been a hit-or-miss proposition. The usual front lines of defense—drug therapy to alleviate the arrhythmia and prevent stroke—are often ineffective or fraught with complications. But recent advances in understanding the physiology of AFib are leading to new treatment strategies, including safer, more effective medical management and sophisticated catheter ablation techniques that are providing a new alternative to drug treatment.

At Duke, electrophysiologists, cardiologists, cardiovascular surgeons, and other specialists on the forefront of these efforts are banding together to mount a new attack on AFib—the Duke Center for Atrial Fibrillation (DCAF). "The spectrum of therapies necessary to treat AFib today falls under different specialties, and we created the DCAF to draw on our depth of resources," says the center's director, electrophysiologist Tristram Bahnson, MD. "As treatment for AFib becomes more precise and personalized, we are bringing together a convergence of specialists to formulate how best to care for each individual patient."

A NEW APPROACH TO AFIB

Treatment of AFib usually begins with a constellation of drugs, each selected to slow the heart rate, restore the heart's normal rhythm, or prevent stroke. But medical management of AFib can be problematic. More than half of patients treated with antiarrhythmic drugs report recurrences of atrial fibrillation within a year of the start of treatment, according to several nationwide studies. And when not used carefully, these drugs can actually trigger dangerous heart rhythms or other serious side effects.

Four decades ago, Duke's heart surgeons became first to cure heart arrhythmias with ablation—strategically decommissioning areas of heart tissue. Today, Duke Heart Center physicians perform around 1,200 EP procedures each year, including more than 150 catheter ablations to treat AFib.

For example, one of the most effective antiarrhythmics, amiodarone, can produce side effects such as skin discoloration, photosensitivity, thyroid imbalance, liver inflammation, or decreased lung function in as many as 30 percent of patients who take the drug for long periods. It also can interfere with the action of anticoagulant drugs, which most AFib patients should take to help prevent stroke (see sidebar, facing page). And while antiarrhythmic drugs may improve symptoms, they do not improve mortality rates compared with those of AFib patients treated with rate-control drugs such as beta-blockers.

Catheter ablation, which cauterizes and neutralizes small spots of heart tissue that generate abnormal electrical patterns, is gaining ground as a strategy to help AFib patients who don't respond to antiarrhythmic medication. According to a collective review of six smaller studies published in 2003 and 2004, roughly 80 percent of patients in their 50s and 60s who received the minimally invasive procedure were free from recurrent episodes.

"In the past, people who could not get good control of their AFib with medication just had to suffer the symptoms as best they could or perhaps undergo major surgery," says Bahnson. Today, with catheter ablation as a proven alternative for patients who have failed drug therapy, the Duke team is able to control symptoms in more than 90 percent of people seeking treatment, he says. The DCAF currently performs the highest volume of AFib catheter ablations in North Carolina, and Bahnson expects the procedure's popularity to grow.

Although it's just coming into its own as a treatment for AFib, ablation to treat other abnormal heart rhythms has been around for several decades. In fact, cutting or removing pieces of heart tissue to cure arrhythmia was pioneered at Duke. In 1968, a Duke team performed the first successful ablation surgery to treat abnormal heartbeats in a 32-year-old fisherman who had Wolff-Parkinson-White syndrome—a disorder that causes AFib or other fast heart rhythms.

In 1987 James Cox, MD, a cardiothoracic surgeon at Barnes-Jewish Hospital in St. Louis who had trained at Duke, showed that he could cure AFib by making and

THIN IS IN

Most AFib patients need anticoagulant therapy—but can blood thinners be made safer?

BECAUSE ATRIAL FIBRILLATION is strongly associated with strokes, the majority of AFib patients should be taking anticoagulants to thin the blood and prevent clot formation, says Thomas Ortel, MD, PhD, director of Duke's Clinical Coagulation and Platelet Immunology Laboratories and the anticoagulation management service.

Ortel

Warfarin (often prescribed as Coumadin) is currently the only oral anticoagulant available, and those taking it must minimize their risk of bleeding by monitoring their blood and maintaining a steady amount of vitamin K in their diets. Even certain medications can disrupt the coagulation balance—including amiodarone, an antiarrhythmic drug commonly prescribed to AFib patients. Thus, a medical juggling act ensues.

Current practice for using anticoagulants in AFib patients is "all over the place," Ortel says. "There is a general assessment that the higher the risk for thrombosis, the greater the need for anticoagulants," but individual physicians can vary quite a bit in how they manage these drugs. Newer anticoagulants are now in development to treat venous thrombosis as well as atrial fibrillation, and such drugs may reduce the need for close monitoring. But they aren't available yet and when they are, they could be costly, Ortel says.

For now, clinical staff use handheld monitors to test the patient's international normalized ratios (INR), which provide a measure of the tendency for blood to clot. In Ortel's clinic, the staff enter the values into an Internet-based system called CoagCare that Ortel helped develop and test. The CoagCare system helps health care providers track patient INR values and offers the opportunity for certain patients to test their own INR and enter the data. He believes this type of tracking, along with more choices for anticoagulants, will ultimately allow for a more personalized approach to medication management. "I think that in a few years, with more drug development, we're going to be very flexible in how patients on anticoagulants are managed," he says.

Balancing medications to minimize risk of both clots and bleeding events is especially complex in patients who will require surgery. Ortel is currently enrolling AFib patients in a multi-site study called BRIDGE, which will investigate the use of low-molecular-weight heparin—a blood thinner that works and wears off more quickly than warfarin—as a bridge before and after elective procedures.

> "We could see patients go from having all these symptoms to not having AFib and not needing medications—to having a nice, regular rhythm all the time. Just to see patients' satisfaction and improvement in their quality of life—that was really the 'a-ha' moment." JAMES DAUBERT, MD, *director of electrophysiology, Duke Heart Center*

then suturing multiple incisions in a grid-like pattern of lines through the atrial chamber walls—a technique known as the Cox maze procedure, or simply "maze." The idea was that the incisions would leave lines of scar tissue that could act as barricades, blocking impulse propagation in the heart chamber and preventing AFib from being sustained. Maze surgery is still performed to treat AFib, but usually in conjunction with other major open-heart surgery.

The maze surgery was complex and daunting to imitate with a catheter, says Daubert, who was in training at Duke around that time. When Cox introduced the surgery, many assumed that the electrical source of atrial fibrillations originated within the atria itself. That idea was challenged as other doctors tried maze and discovered that the pulmonary veins were usually "the money spot" for the origin of the abnormal heartbeat. "The discovery that it was coming from the pulmonary veins made catheter-based treatment a more feasible target," Daubert says.

Other strategies were also being tested, such as the use of implantable cardio-verter defibrillators, or ICDs, to shock the heart and restore normal rhythms. For patients with ventricular arrhythmias, which are sometimes accompanied by atrial fibrillation, ICDs are commonly used, and the devices have been shown to reduce the incidence of sudden cardiac death in patients with heart failure. In the late 1990s, researchers tried ICDs as a therapy for atrial fibrillation. While the devices worked to shock the heart back into normal rhythm and to reduce the frequency of AF episodes, the shocks were painful and were needed too often to make the treatment practical, Daubert says.

High-tech treatment: To accommodate a growing number of patients with arrhythmias, Duke Heart Center opened two new electrophysiology labs in 2009. The labs house state-of-the-art technology for treating AFib, including the Hansen Sensei X Robotic Catheter System (above). Available nowhere else in North Carolina, the system is designed to improve the safety and efficacy of catheter ablation procedures by reducing radiation exposure and enabling extremely precise catheter movement within the heart.

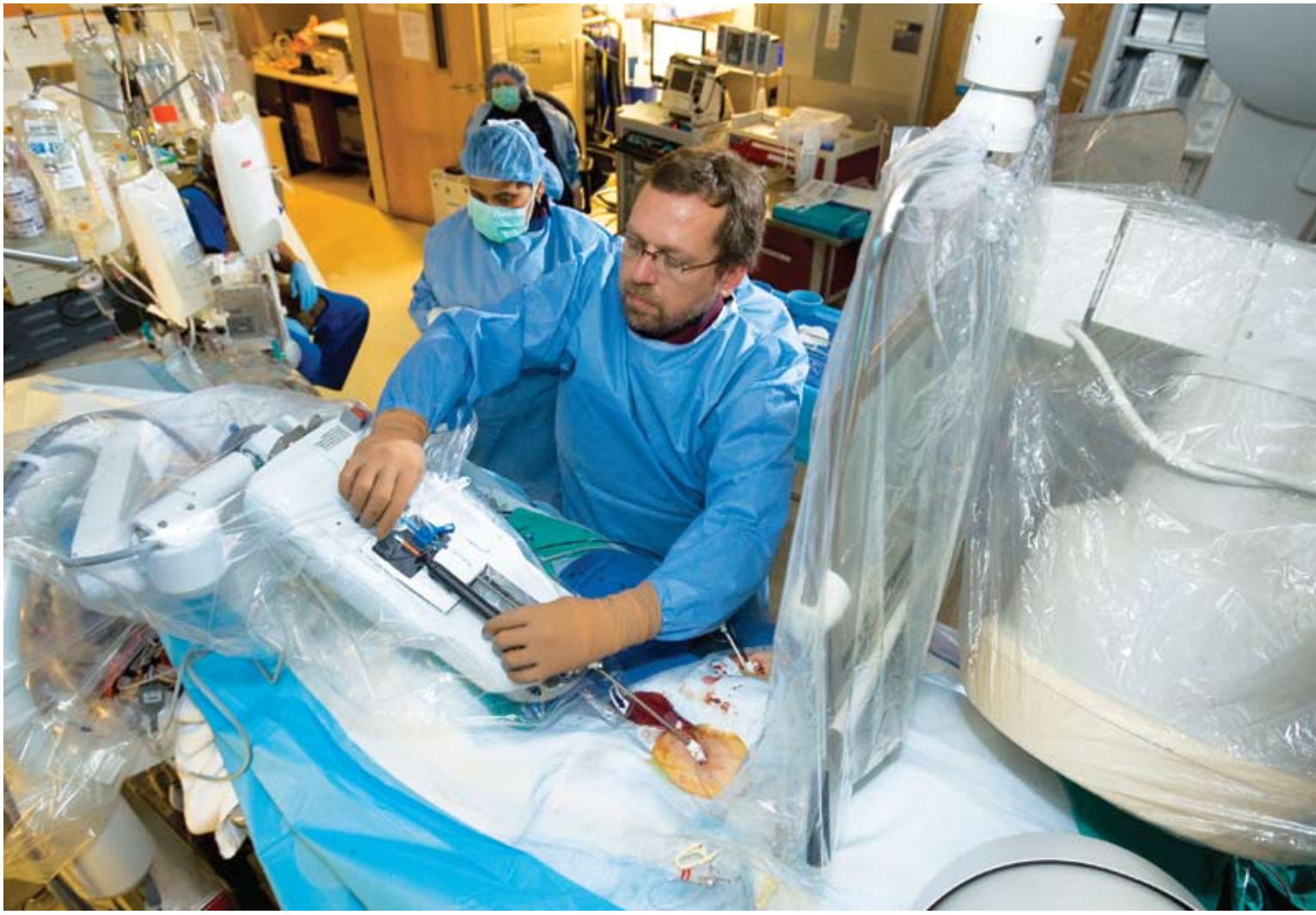
In the late 1990s, Daubert and others did their first catheter ablations to treat atrial fibrillation. It was slow going in this early stage of the technique: they would put the catheters in the heart and wait for the first signs of abnormal activity. Was it coming from the left pulmonary vein, or the right? The doctors would leave the catheters in different regions of the heart, sometimes for hours. They tried to speed the process along by artificially pacing the heart into AFib and then restoring normal rhythm with a shock, hoping to stir up the sites that led to a recurrence of AFib. "The problem was that sometimes [the fibrillation] wouldn't happen during that procedure," Daubert says. "Sometimes, it would come from one vein and we'd ablate there, but another day it would come from a different vein and we hadn't ablated there."

Over the next few years, it became clear that electrophysiologists needed to ablate around all four pulmonary veins, regardless of where initiating arrhythmias were observed. By then the potential benefits of the treatment began to crystallize.

BETTER ABLATION

Bahnson is also encouraged by the rapid development of ablation and the potential for the technique to improve lives. In fact, the results are so promising that they raise the question of whether ablation could become a first-line therapy for atrial fibrillation. However, Bahnson cautions, a few important unknowns remain about the procedure's long-term effectiveness.

Bahnson is one of the principal investigators of a large, multi-site investigation coordinated by the Duke Clinical Research Institute that will compare catheter ablation with drug therapies for initial treatment of atrial fibrillation. "This study will likely be a definitive one to determine whether mortality or stroke rates in AFib patients are improved by catheter ablation as compared to treatment with medications only," says Bahnson. Meanwhile, Daubert is beginning research that will look at outcomes of ablation treatment in older patients. "Most patients with AFib are in their 70s or even 80s," he says. "We don't have a lot of data as to whether the ablation is as safe or effective in this group as it is in younger patients."



Tristram Bahnson, MD, director of the Duke Center for Atrial Fibrillation, performs a catheter ablation procedure in the new EP labs.

Catheter ablation does come with risks and challenges. For example, in rare cases, the ablation procedure itself can cause blood clots and subsequent stroke. In other rare instances, parts of the body, such as the esophagus, can be injured during the procedure. Researchers in the DCAF are investigating a range of novel technologies to make catheter ablation safer and more effective. For example, Duke recently began working with a new system, Hansen Medical's Sensei X Robotic Catheter System, which allows catheters to be manipulated with greater control and precision within the heart. Outcomes research is under way to establish the value of this system and develop it further.

Other DCAF research is testing arrhythmia-mapping techniques to identify areas that should be targeted for ablation and to determine when enough ablation energy has been delivered at any given site within the heart. "A big question in the catheter-ablation arena is how do you know when you've created a lesion in the heart that's sufficient?" says Bahnson. The DCAF group is now assessing catheter-created lesions in real time, working with Duke bioengineers on intracardiac ultrasound techniques that image the heart from within.

Various types of catheters in development might also make ablation safer and easier. Duke physicians are working on one new type that freezes heart tissue instead of cauterizing it, as with radiofrequency ablation. Daubert says the technique, called cryoablation, may make ablation safer than with traditional methods. "If we're ablating too close to the pulmonary vein, we could cause it to scar or narrow," Daubert says. "With the cryoablation, that problem is almost completely eliminated." Another new type, an irrigated catheter, has six pin-sized holes at the tip that can be flushed with saline to prevent the catheter tip from overheating, thereby reducing the risk of blood clots. Both new catheter types, Daubert says, may help minimize the risk of stroke.

New techniques may also make catheter ablation for AFib more efficient.

DETECTING (AND CORRECTING) EARLY ARRHYTHMIAS: PEDIATRIC EP

FAINTING AND HEART PALPITATIONS can signal an abnormal heart rhythm in a young person, but so can a range of other, more nebulous symptoms, such as suddenly feeling hot or cold, difficulty breathing, or hyperventilating. Duke electrophysiologist Ronald Kanter, MD, says that a thorough personal and family history can make the difference in detecting childhood arrhythmias—some of which are life-threatening.


Kanter

Arrhythmias in children are typically related to congenital heart defects, but they can also occur in otherwise normal hearts. Underlying conditions that increase a child's risk for sudden cardiac arrest and death—such as long QT syndrome—are being discovered more frequently now than in the past, but they still aren't always top of mind for primary care providers, or even specialists. "Recognizing who is at risk and who isn't is very important," Kanter says, "particularly when you're talking about young athletes," whose hearts are regularly stressed during training and games.

In young patients with arrhythmias, ablation strategies have largely replaced chronic drug therapy, and in many cases the treatment is curative. Placement of pacemakers and implantable defibrillators can be done even in early infancy, and Duke's pediatric electrophysiology program now offers a heart rhythm clinic three times every month for patients with pacemakers or ICDs. "We have a broad-based program to care for a range of heart rhythm problems," Kanter says.

Duke Children's offers cardiac diagnostic and treatment services for patients from infancy through young adulthood—and for patients of any age who develop arrhythmias as a result of a congenital heart defect. Learn more about the Duke Children's EP program at dukehealth.org/Services/ChildrensHeart.

> "There's a clear difference in the mechanism of AFib in a 30-year-old marathon runner as opposed to an 80-year-old with a long-standing history of hypertension—these differences involve not only what sustains it but what initiates it."
>
> PATRICK HRANITZKY, MD, *director of the EP fellowship program at Duke*

Daubert is currently experimenting with inflating a balloon at the opening of the pulmonary vein, which allows physicians to ablate all the way around the vein using radiofrequency energy or freezing techniques, rather than having to make small lesions, point by point, sometimes over the course of several treatments.

PERSONALIZED RHYTHMS

Despite the impressive advances in catheter ablation, the procedure may not be necessary or appropriate for all patients. "There are so many players that act in the development and continuation of AFib," says Patrick Hranitzky, MD, director of the EP fellowship program at Duke, who is leading research to better understand the condition. "It's very difficult to decipher what all the contributors are," which can make it tough for physicians to select the best treatment.

For example, Hranitzky says, "There's a clear difference in the mechanism of AFib in a 30-year-old marathon runner as opposed to an 80-year-old with a long-standing history of hypertension—these differences involve not only what sustains it but what initiates it."

In the marathoner, extreme physical stress can cause changes in electrical properties within the heart, triggering episodes of AFib in athletes predisposed to the condition. In contrast, an elderly person might develop AFib because of age-related structural changes in the heart muscle. The heart becomes less flexible, and can develop tiny scars or fibrosis that can worsen with time, especially if high blood pressure is not controlled. This fibrosis can cause atrial fibrillation.

For the marathoner, doctors aim to prevent the triggering of the arrhythmia, Hranitzky says. If the triggers can be identified—usually they are found near the junction of the pulmonary veins and the left atrium of the heart—the arrhythmia can often be effectively treated with antiarrhythmic medications that abate the triggers, or cured with catheter ablation. The elderly person, however, has a more complex situation. His heart cells have undergone a process of "remodeling," and merely eliminating the triggers

Patrick Hranitzky, MD, with several other members of Duke's EP team, including Donald Hegland, MD; Tristram Bahnson, MD; and Kevin Thomas, MD. James Daubert, MD (top), is the new director of electrophysiology at Duke.

AFIB: WHEN TO CALL A SPECIALIST

Many cases of atrial fibrillation can be managed in the primary care arena. Consider referring patients to specialty care when first-line medical management is insufficient, and the patient is experiencing symptoms.

Duke heart rhythm services are offered at Duke University Medical Center, Duke Health Center at Southpoint, and Duke Raleigh Hospital. Learn more at ***dukehealth.org/Services/HeartRhythm*** *or by calling* ***1-888-ASK-DUKE (275-3853)****.*

Referring physicians call ***1-800-MED-DUKE (633-3853)*** *or* ***1-877-4AFibRx (877-423-4279)****.*

does not suffice. "We must also alter the remodeled substrate," Hranitzky says, using either drugs or ablation to target the affected heart tissue.

The researchers are now probing deeper into what makes AFib different in each person. "Clearly there are people who have genetic predispositions to AFib," says Hranitsky, but "it's not going to be a single gene that determines whether someone will have AFib or not." To help untangle the complex causes of the condition, Hranitzky and his colleagues began assembling a biorepository and clinical database for arrhythmia research in 2006—collecting DNA, messenger RNA, and protein from consenting patients in the electrophysiology lab. By identifying alterations in these molecules, the researchers hope to find new clues about the underlying mechanisms of atrial fibrillation. They plan to look for genetic or molecular predispositions based on gender, age, and race differences, as well as for differences in the way individuals respond to treatment. The findings could lead to better prevention strategies and more targeted treatments.

Researchers at other institutions are working on these same types of studies. "In reality it's going to take a collaborative effort among many centers," Hranitzky says. "We're not going to have all the answers, but personalized treatment for arrhythmias is something that we're moving toward."

Daubert, who created and led the University of Rochester's heart rhythm program until he returned to Duke this summer, says the range of new AFib treatment techniques and technologies introduced over the course of his career is heartening—just a decade ago, for his patients with AFib that didn't respond to medical therapy, he could do little more than watch their hearts quiver. He says he's pleased to be back at his alma mater to tackle the next frontiers in atrial fibrillation. "Coming back to head up the program that pioneered some of these ideas that have brought us this far is really an awesome opportunity. This is a team with the expertise and drive to truly make a difference in people's lives."

Dueling guidelines

Gastroenterologist Joanne Wilson and radiologist Erik Paulson discuss the ongoing debates about the best way to screen for colon cancer.

BY ANGELA SPIVEY


WILSON


PAULSON

Although colon cancer has been well-publicized as the second leading cause of cancer deaths in the United States, only about half of the people who should get screened for the disease actually do.

It's not hard to imagine why: colonoscopy, the current gold standard for screening, is no fun. The rigors of "bowel prep." Sedation. An endoscope inserted into the colon. But in 1993 a less invasive option came on the scene—"virtual colonoscopy," or CT colonography, which involves the same bowel prep as colonoscopy, but neither sedation nor scope. "We insufflate the colon with carbon dioxide, and in a single breath-hold take a CT scan of the abdomen," says Erik Paulson, MD, chief of abdominal imaging at Duke. "Then the study is over. After the procedure, patients can return to work."

Physicians at Duke offer CT colonography as a clinical option, participate in its development, and train physicians in its use. Some studies suggest that CT colonography is comparable with colonoscopy in terms of effectiveness for most patients, especially when weighed in terms of its comparative ease. But it isn't perfect; even the major organizations that promote colon cancer screening have not yet recommended it as the procedure of choice for routine screening for average-risk adults.

In 2008, in the first-ever joint guidelines for colon cancer screening, the American College of Radiology, the American Cancer Society, and the U.S. Multi-Society Task Force on Colorectal Cancer specifically included CT colonography among several recommended options for screening and prevention in average-risk adults. These guidelines differ from those issued that same year by the U.S. Preventive Services Task Force, which express doubt about the widespread accuracy of CT colonography because most physicians still have little experience with it.

A big change in coverage

For some patients, the dueling guidelines won't matter because of a practical issue—payment. Medicare and Medicaid, as well as some insurance companies, still do not cover CT colonography for patients at average risk for colon cancer. Medicare and Medicaid pay for the procedure only for patients whose condition makes a standard colonoscopy riskier than usual, such as if they're taking anticoagulants or can't be sedated for some reason. It may be covered for patients who have had an attempted colonoscopy that wasn't completed because of bowel blockage. Those rules aren't likely to change soon. In a final decision released in May 2009, Medicare and Medicaid announced they would not cover CT colonography for routine screening.

But some private insurance companies have begun paying for CT colonography for routine screening for patients 50 and older. "That's a big change," Paulson says. Multiple studies showing that CT colonography rivals colonoscopy are what have turned the tide. Paulson points in particular to a multi-institutional trial published September 18, 2008, in the *New England Journal of Medicine*. "That study showed that the sensitivity and specificity of CT colonography is competitive with colonoscopy," Paulson says. In the study, 2,800 patients underwent CT colonography and then a colonoscopy, and the CT version identified 90 percent of patients with polyps or cancers that were 10 millimeters or more in diameter.

Some previous studies, including one at Duke in which Paulson was involved (published in *Lancet* in 2005), showed that while CT colonography was good at detecting actual cancers, it was not as good as colonoscopy at detecting polyps. But Paulson says the technology has since made big leaps thanks to advances in bowel preparations, the three-dimensional technology used to interpret the scans, computer-aided detection software which increases the accuracy of interpretation, and the ability to label residual fecal matter in the colon so it doesn't show up on the test. He and other Duke researchers continue to study the technique—leading research including multi-institutional clinical trials, the causes of false-negative and false-positive interpretations, and evaluation of computer-aided detection software.

Duke Radiology has for the past five years offered CT colonography as part of its routine clinical practice. "We have six radiologists in our department who are skilled and experienced at CT colonography," Paulson says. "We're doing more of them now than we've ever done."

Colonoscopy: Still the gold standard

Duke gastroenterologist Joanne Wilson, MD, does think that less-invasive tests can increase screening rates. "Definitely the biggest impact something like CT colonography will have is getting more people screened who are at average risk," Wilson says.

JOANNE WILSON, MD, is a professor of medicine in Duke's Division of Gastroenterology and a former secretary of the American Gastroenterological Association (1997 to 2003).

ERIK PAULSON, MD, is a professor of radiology and chief of the Division of Abdominal Imaging.

But she sees the technology as one that's not ready to be widely implemented. "CT colonography has promise, but there probably needs to be some further development of the technology," she says. Also, many current physicians aren't prepared to offer the procedure. "One of the points raised in the literature is that radiologists who were trained just in standard CT would need to gain additional training in order to conduct and read CT colonographies," Wilson says. "When new technology is introduced, there's always a concern about how you're going to train currently practicing physicians."

Wilson also points out that if alternative tests such as CT colonography or stool tests come back positive, the patient likely will have to have a colonoscopy anyway in order to remove or sample the lesion. "The colonoscopy is both diagnostic in the sense that you can see polyps, and it's therapeutic because you can take them out, or you can mark them or sample them. The final diagnosis of cancer is a histological diagnosis; you want to look at the tissue with the microscope," she says. She also emphasizes that colonoscopy will remain the recommended test for patients at high risk for colon cancer—those with a prior history of colon polyps and colon cancer and those with a family history of polyps and cancer.

Paulson acknowledges that colonoscopy is still the tried-and-true gold standard. "There's no doubt that colonoscopy is a great test," he says. "For many people it makes all the sense in the world. But as good as it is, it has some risk and requires sedation and is more invasive." And, he says, while colonoscopy is a mature technology, the virtual version can be expected to continue to make technological leaps.

Colon screening options:
The rundown

Colonoscopy is still the gold standard test, included in 2008 guidelines from the U.S. Preventive Services Task Force (USPSTF) as well as 2008 joint guidelines from the American College of Radiology, the American Cancer Society (ACS), and the U.S. Multi-Society Task Force on Colorectal Cancer. "Right now most of the organizations consider colonoscopy to be the recommended test for screening for colon neoplasia as opposed to looking specifically for cancerous lesions. So that's generally considered to be the best test," says Joanne Wilson, MD.

Some of the other options:

COMPUTED TOMOGRAPHIC COLONOGRAPHY (virtual colonoscopy) is recommended by the joint ACS guidelines as an option for preventing and detecting cancer, to be conducted every five years. The USPSTF says the evidence is insufficient (see main story).

DOUBLE-CONTRAST BARIUM ENEMA (conducted every five years) is recommended as an option for preventing and detecting cancer by the joint ACS guidelines, but the USPSTF says its use is declining and it hasn't been subjected to appropriate screening trials.

FLEXIBLE SIGMOIDOSCOPY (conducted every five years) is recommended as an option by both sets of guidelines.

HIGH-SENSITIVITY FECAL OCCULT BLOOD TESTING: These blood tests are sensitive for cancer only, not polyps. If used alone they must be conducted every year. Both sets of guidelines mention high-sensitivity blood tests as an option; the USPSTF guidelines suggest they can be conducted only every three years if a flexible sigmoidoscopy is performed every five years. They can be an option for patients who can't afford a colonoscopy, Wilson says. "The general recommendation, if you go that route, has been fecal occult blood testing along with a flexible sigmoidoscopy," she says.

FECAL DNA TESTING is included in the joint ACS guidelines as an option for detecting cancer, not preventing it; the USPSTF says the evidence is insufficent to determine its value.

Erik Paulson, MD, says most patients can find an appropriate option in either colonoscopy, CT colonography, or contrast barium enema (in patients for whom third-party payors will not cover the cost of CT colonography). Wilson says that when colonoscopy is not available, or people are not appropriate for it—they can't have the sedation, for example—testing for blood in conjunction with a CT colonography, or testing for blood in conjunction with other imaging or flexible sigmoidoscopy, may be used, but they are less optimal. "You're going to miss a lot of the lesions that are higher up or flat," she says, "particularly in the elderly."

SAYING THANK YOU

DUKE MEDICINE faculty and leadership welcomed more than 350 benefactors and business and community leaders to the Washington Duke Inn on April 30 for the first Chancellor's Dinner.

Jonathan Tisch, chair and CEO of Loews Hotels and author of two bestselling business books, *Chocolates on the Pillow Aren't Enough: Reinventing the Customer Experience* and *The Power of We: Succeeding through Partnerships*, was the keynote speaker. He and his family recently announced a new gift of $4 million to the Preston Robert Tisch Brain Tumor Center at Duke, bringing their total support for Duke's brain tumor research to $14 million.

Earlier in the day about 250 community supporters and volunteers for Duke Medicine attended an educational event, Medicine Made Personal, which featured talks by faculty members Robert Califf, MD, Joanne Kurtzberg, MD, Robert Lefkowitz, MD, and Tracy Gaudet, MD, and Duke cancer survivor Lori Lober.

Chancellor for Health Affairs Victor J. Dzau, MD, thanked all of Duke Medicine's philanthropic partners, saying partnerships are key to Duke Medicine's vision to transform the practice of health care in this country and improve the health of people in North Carolina and around the world.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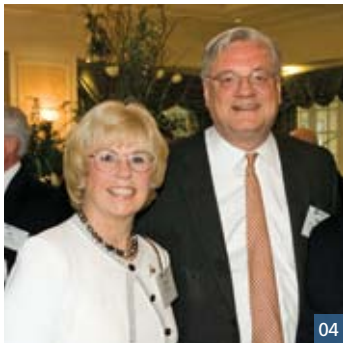
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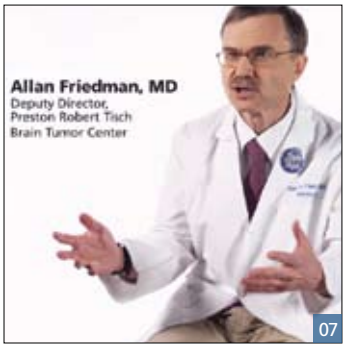
Duke Medicine video now online

A special video produced for the Duke Medicine Chancellor's Dinner event is now available for viewing online. Beginning with the inspiring story of Gordon Weeks, a patient from Massachusetts who underwent successful lung transplant surgery at Duke, the video tells the story of how Duke is transforming medicine, saving lives, and bringing new hope and healing to patients.

Watch the video at dukemedicine.org/transformingmedicinevideo.



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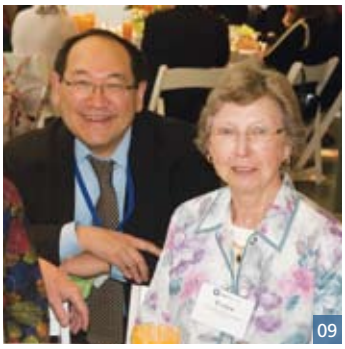

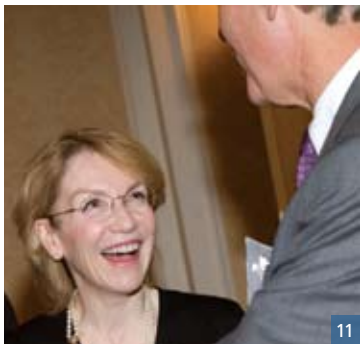







01 Haywood Brown, MD, chair, Duke Department of Obstetrics and Gynecology, Belinda Louie, Brandt Louie

02 Renee Snyderman, G'03; Barbara Yowell, N'62; Ralph Snyderman, MD, H'65-'67, Duke chancellor emeritus for health affairs; Bob Yowell, MD'61, H'64-'69

03 Jonathan Tisch; Victor Dzau, MD

04 Leslie Bains, chair, Duke Medicine Board of Visitors; Bill Fulkerson, MD, H'87, B'02, Duke senior vice president for clinical affairs

05 Thad Wester, T'46, MD'51, HS'51-'54, Lee Wester, WC'50, Barbara Smith

06 Tom Lawrence, Leon Levine, Ruth Dzau

07 Video still of Allan Friedman, MD, H'74-'80 from *Transforming Medicine* video

08 Inna Shapiro; Eugene Brown, Durham city councilman; Sandy Williams, MD'74, H'77-'80, Duke senior vice chancellor for academic affairs; Stephen Freedland, MD, Duke associate professor of surgery

09 Paul Lee, MD, professor of ophthalmology, Duke Eye Center; Evelyn Longdon

10 Ralph Coonrad, MD'47, H'47-'50, '52; Allan Friedman, MD, H'74-'80; Alex Anlyan; Bill Anlyan, MD, H'49-'55, Duke chancellor emeritus; Mary D.B.T. Semans

11 Susan Meister, PhD, RN, chair, Duke University School of Nursing Board of Advisors

12 Linda Hubert, MD; Joe Tynan, JD, director of gift planning, Duke Medicine Development; Richard Hubert, T'57

13 Bill Bell, mayor, city of Durham

14 Kim Lyerly, MD, H'83-'90, director, Duke Comprehensive Cancer Center; Louise Chut; Frank Chut

15 Howard Clement, Durham county commissioner; Victor Dzau, MD

16 Lori Lober, Joann Grimes

17 Lydia Califf; Rob Califf, T'73, MD'78, H'78, '83, director, Duke Translational Medicine Institute; David Murdock; Lynne Scott Safrit

18 Victor Dzau, MD; Ruby Wilson, EdD'69, RN, dean emerita of nursing; Bill Anlyan, MD

19 Nancy Andrews, MD, PhD, dean, Duke University School of Medicine; Nancy Shaw, WC'70, L'73

SAYING THANK YOU

Gift from Sandy Williams helps launch Learning Center Campaign

During Duke Medical Alumni Weekend in October, alumni and friends joined (from right) Dean Nancy Andrews, MD, PhD; Duke Endowment trustee K.D. Weeks Jr., MD'74; Senior Vice Chancellor R. Sanders "Sandy" Williams, MD'74, HS'77-'80; Chancellor Victor Dzau, MD; and fund-raising co-chair Jonathan Christenbury, MD'81, HS'81-'85 (not pictured), for a celebration to kick off a five-year campaign to raise $15 million for a new learning center for the Duke University School of Medicine. Williams is the first person to make a gift toward the new learning center, with a $100,000 contribution. Initially funded with $35 million from The Duke Endowment, the new building will be located in the heart of the Duke medical campus, beside the Searle Center and Medical Center Library and convenient to Duke Clinic, Duke University Hospital, laboratory facilities on Research Drive, and two new patient care facilities, the Duke Medicine Pavilion and Duke Medicine Cancer Center (see page 2).


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01 Williams gift launches Learning Center Campaign
02 Cynthia A. Toth, MD
03 Steven M. Scott, MD, and Rebecca Scott

Hartwell Foundation Award goes to infant eye imaging research

Cynthia A. Toth, MD, professor of ophthalmology and biomedical engineering, has received the Hartwell Foundation Biomedical Research Award for her work to revolutionize imaging of infants' eyes. She is one of 12 individuals from 12 different institutions to win the award of $100,000 a year for three years.

Toth is working to perfect a handheld high-definition eye scanner designed specifically to meet the challenges of examining infants' eyes for retina-related problems. While high-definition scanning has been available to adults for years, it has proven unusable for infants because of the challenge of keeping them still.

"The new system is called Spectral Domain OCT and it is very fast," says Toth. "We're now working on ways to improve imaging while the eyes are moving." The device was designed by Bioptigen, a firm based in North Carolina's Research Triangle Park.

'Duke family' inspires $3.69M gift from the Scott family

Steven M. Scott, MD, HS'74-'78, and his wife, Rebecca, A'79, have pledged $3.69 million over the next seven years to establish the Haywood Brown Professorship in the Department of Obstetrics and Gynecology, provide program funding for the department, establish the Steven and Rebecca Scott Fellowship in Women's Health, and contribute annual gifts to the School of Medicine Annual Fund and Davison Club.

The Scotts are longtime contributors to Duke Medicine, with a 33-year giving history. "As alumni, as we approach retirement age we should think back about our careers and education and reflect on who helped us get where we are today," Steven Scott says. "When Dr. Dzau shared his vision with us for the medical center, it was an easy choice for us to want to participate. Duke OB-GYN is ranked fourth in the country and that makes us all proud."

For Scott, the most encouraging and significant person during his Duke years was Department of Obstetrics and Gynecology chair Roy T. Parker, MD, HS'49-'51, whom Scott says "always was available for us. We could walk into his office any time and he always made time for us to talk about personal or professional problems. We all loved and cared for him."

Today Scott is chairman of Scott Holdings, LLC, an entrepreneurial medical investment company. He is the founder of VISTA Healthplan, a nationwide HMO that he built after purchasing and consolidating five troubled HMO plans. VISTA, with revenues of $1.2 billion and 300,000 members, was sold in 2007 to Coventry Health Care, Inc.

In 2003 Scott founded Phoenix Physicians, which provides emergency department physicians for hospitals and municipalities throughout the country.

He and Rebecca have five children: Rob; Marc; Daniel, a first-year Duke medical student; Greg; and Elizabeth, a Duke sophomore. They live in Boca Raton, Florida.

—JIM ROGALSKI

DUKEMED HONORS

Duke University Health System received "Full Accreditation" from the Association for the Accreditation of Human Research Protection Programs (AAHRPP) in March. The AAHRPP is a nonprofit independent agency that measures human-subject research programs against rigorous standards for ethics and quality. **Duke is the first academic medical center in North Carolina to receive AAHRPP accreditation**, the culmination of 10 years of work and progress.

For the 20th year in a row, Duke University Medical Center was **named as one of the top 10 U.S. hospitals** in the annual *U.S.News & World Report* "Best Hospitals" edition, released in July. In the latest report, Duke tied for 10th place overall and ranked among the top 10 in eight of the 16 specialties measured. Duke was the only hospital in North Carolina and the Southeast ranked in the top 10.

Rankings for individual specialties are:

- Cancer #9
- Endocrinology #22
- Gastroenterology #17
- Geriatrics #5
- Gynecology #4
- Heart/Heart Surgery #8
- Kidney Disease #11
- Neurology and Neurosurgery #18
- Ophthalmology #7
- Orthopaedics #6
- Psychiatry #13
- Respiratory Disease/Pulmonary #6
- Rheumatology #17
- Urology #6

In April, *U.S.News & World Report* released its annual rankings of graduate schools, and Duke University School of Medicine **ranked sixth in the research medical school category**, tied this year with Stanford, University of Washington, and Yale. Medical school deans and senior faculty from across the country selected Duke's programs in internal medicine, AIDS, family medicine, and geriatrics as among the top 10 in each of those specialty categories.

In August the **Centers for Medicare & Medicaid Services (CMS) rewarded Duke University Health System's high-quality care** with nearly $250,000:

Duke University Hospital was named a top performer and received eight monetary awards totaling $175,097; Durham Regional Hospital was named a top improver and received six monetary awards totaling $51,740; and Duke Raleigh Hospital was also named a top improver and received four monetary awards totaling $20,815.

The four-year-old project, called the Hospital Quality Incentive Demonstration, tracks voluntarily provided data in five clinical areas from 250 hospitals. More than 30 nationally defined, standardized, risk-adjusted measures representing process of care and patient outcomes are tracked to evaluate whether the care provided consistently meets or exceeds accepted evidence-based practice standards.

Duke University Hospital **received two national awards** in 2009 from the Thomson Reuters 100 Top Hospitals program: **the National Benchmarks Award and the Everest Award for National Benchmarks**.

The National Benchmarks Award recognizes hospitals with the highest hospital-wide performance compared with national peers, based on an overall score on Thomson Reuters' 100 Top Hospitals National Balanced Scorecard. Selection was based on objective statistical performance measurement across five critical areas: clinical process and outcomes, patient safety, patient perception of care, operational efficiency, and financial stability.

Duke was only one of 23 hospitals selected for the Everest Award, a new honor that recognizes hospital leaders that have developed and executed strategies to drive the highest rate of long-term improvement, resulting in the highest performance in the nation at the end of five years.

Duke University Hospital was **one of three U.S. hospitals to be recognized by the American Hospital Association** (AHA) for leadership and innovation in quality, safety, and commitment to patient care. The 2009 American Hospital Association-McKesson Quest for Quality awards were announced in July, and Duke was selected as the recipient of the Citation of Merit. The award recognized Duke's leadership engagement and the use of various process-improvement tools and health information technology, as well as the strong nursing presence and staff enthusiasm observed during the selection committee's visit.

Duke University Health System was named **one of the "N.C. Family-Friendly 50 Companies"** in the September issue of *Carolina Parent*. The magazine partnered with the UNC Kenan-Flagler Business School to measure and recognize companies' efforts to create a healthy work-life balance for their employees.

Durham Regional Hospital's Davis Ambulatory Surgical Center and Duke Raleigh Hospital **received the Hallmarks of Healthy Workplaces recognition** from the North Carolina Nurses Association in June. The Hallmarks program recognizes organizations for their support of nurses' professional development, delivery of quality service, and roles within operations and governance.

APPOINTMENTS

DeLong is chair of Biostatistics and Bioinformatics

Elizabeth DeLong, PhD, has been named chair of the Department of Biostatistics and Bioinformatics. She had been serving as interim chair since January 2008.

DeLong will continue to serve as the statistical director of risk-modeling and -analysis initiatives for three national cardiovascular registry databases. Her research interests are in the field of cardiovascular outcomes and quality-of-care research, and she sits on several editorial boards and national task forces. She also serves as co-director of the Cardiovascular Outcomes Research group in the Duke Clinical Research Institute.

Sowers named CEO of Duke University Hospital

Kevin Sowers, RN, MSN, was appointed chief executive officer of Duke University Hospital in June. In his previous service as chief operating officer for six years and interim chief executive officer over the past year, Sowers was responsible for implementing the hospital's strategic objectives in collaboration with faculty, administrators, and staff, and had responsibility for the management of the hospital's clinical service units. He also led several major expansion and renovation projects, including major expansion to the emergency department, a modernization and expansion of hospital operating rooms, development of the state's only pediatric cardiac care unit, and expansion of the intensive care nursery.

New vice dean for research

Sally Kornbluth, PhD, James B. Duke Professor of Pharmacology and Cancer Biology, was named vice dean for research in August. She replaces Gene Oddone, MD, who stepped down to focus on his work as program director for the Center for Health Services Research in Primary Care at the Durham VAMC. Kornbluth joined the Duke faculty in 1994 and has been vice dean for basic sciences for the past three years.

New sights for pediatric ophthalmology

Sharon Freedman, MD, has been named service chief of the pediatric eye division at Duke Eye Center, succeeding Edward G. Buckley, MD, who was named vice dean for education at Duke University School of Medicine.

Kontos to lead MD-PhD program

Christopher Kontos, MD, was named director of the Medical Scientist Training Program (MSTP) in March. MSTP students earn both MD and PhD degrees over seven to eight years. Most continue on with postgraduate clinical training before launching careers in academic medicine.

Kontos has worked closely with the MSTP for the past few years, both on the admissions committee and as a mentor and thesis committee member for MSTP students.

New leadership for Molecular Genetics and Microbiology

Joseph Heitman, MD, PhD, James B. Duke Professor of Molecular Genetics and Microbiology, was named chair of that department effective September 1.

Heitman's research focuses on the evolution of sex in fungi and the roles of sexual reproduction in microbial pathogens. He has been a faculty member at Duke since 1992, first in the Section of Genetics, which expanded to become the Department of Molecular Genetics and Microbiology in 2002.

Heitman is also the director of the Center for Microbial Pathogenesis and the Duke University Program in Genetics and Genomics. He succeeds Thomas Petes, PhD, who served as the department's chair since October 2004.

New leadership at Durham Regional

Lisa Pickett, MD, was appointed chief medical officer for Durham Regional Hospital, effective April 1. In addition to continuing her general surgery and clinical practice, Pickett, in her new role, will oversee the implementation of several of the hospital's strategic initiatives, including clinical patient care, physician relations, and a continuing improvement in surgical services.

Sudan to direct bariatric surgery

Ranjan Sudan, MD, has been appointed as the medical director of the Duke Center for Metabolic & Weight Loss Surgery. Sudan has previously served as director of bariatric and robotic surgery programs at Creighton University and the University of Nebraska.

TOM WOOTERS

Durham Regional Hospital chief nursing officer

Victoria K. Orto, RN, was appointed chief nursing officer at Durham Regional Hospital, effective September 28. She has more than 20 years of experience in nursing leadership and most recently served as senior director of medical–surgical nursing for Rochester General Health System in New York.

Interim leadership appointments

Gregory S. Georgiade, MD, was appointed interim chief of the Division of Plastic and Reconstructive Surgery, effective July 1. Georgiade has been a Duke faculty member since 1980 and will work closely with the chair of Duke Surgery, Danny O. Jacobs, MD, to address the core missions and faculty endeavors within the division.

Russell P. Hall III, MD, J. Lamar Callaway Professor of Dermatology, was appointed interim chair of the newly created Duke Department of Dermatology, effective July 1. Hall was formerly the division chief and joined the Duke faculty in 1984.

R. Sanders "Sandy" Williams to become president of Gladstone Institutes

R. Sanders "Sandy" Williams, MD, senior vice chancellor for academic affairs at Duke University, has been named the new president of The J. David Gladstone Institutes, an independent nonprofit biomedical research institute affiliated with the University of California–San Francisco. He will assume his new role in March 2010.

Williams, who earned his medical degree from Duke in 1974, served as dean of the School of Medicine from 2001 to 2007 and as senior vice chancellor from 2007 to the present. He played a key role in creating the Duke-NUS Graduate Medical School in Singapore in 2006, serving as the school's founding dean from 2006 to 2008. In 2008, he served as Duke's senior advisor for international strategy, a role in which he advised President Richard Brodhead and Provost Peter Lange on global initiatives.

In Williams' nearly 40 years at Duke, he made progress in advancing women and minorities as both students and faculty within the School of Medicine, and stressed the strategic importance of the basic sciences and medical education in tandem with Duke's well-known clinical enterprise.

"Sandy has been a driving force behind the continued growth and recognized excellence of Duke Medicine over the past eight years, and has established himself as one of the important figures in the history of Duke Medicine," says Victor J. Dzau, MD, Duke chancellor for health affairs. "While we are losing a great friend and colleague, I'm quite certain that Gladstone found the ideal person to take their research enterprise to the next level."

President Brodhead called Williams an "extraordinary citizen of Duke University" in addition to an outstanding scientist and leader of Duke Medicine. "His clear thinking and depth of judgment have made him a major advisor on issues across the university, including most recently our international initiatives…Duke owes him our profound thanks."

HONORS & AWARDS

Lorena S. Beese, PhD, James B. Duke Professor of Biochemistry, is one of 72 newly elected members of the National Academy of Sciences, a society of scientific and engineering scholars which frequently advises the U.S. president and Congress.

Vann Bennett, MD, PhD, James B. Duke Professor of Cell Biology, was inducted as a fellow of the American Academy of Arts & Sciences in October. The prestigious honorary society serves as a center for independent policy research, and its membership comprises leaders in science, law, philanthropy, and the arts, among others.

Debra Brandon, PhD, RN, associate professor of nursing, was inducted as a fellow of the American Academy of Nursing during the academy's annual meeting in November. Brandon was the first researcher in any field to compare the effects of cycled lighting on the development and growth of premature infants. Cycled lighting is now widely used in neonatal intensive care units worldwide.

Chad Cook, PhD, associate professor in community and family medicine, received the Dorothy E. Baethke–Eleanor J. Carlin Award for Excellence in Academic Teaching from the American Physical Therapy Association.

Pamela Woods Duncan, PhD, professor of community and family medicine, was recognized by the American Heart Association for her service as chair of the AHA Stroke Council and for her membership on its Leadership Committee. She was the first woman and first non-physician to chair the council.

E. Harvey Estes Jr., MD, professor emeritus in the Department of Community and Family Medicine, received the inaugural Eugene A. Stead Award of Achievement from the American Academy of Physician Assistants. The award is named for Duke pioneer Eugene Stead, MD, who in 1965 established the nation's first PA program. Estes succeeded Stead as director of the program in 1967 and retired from Duke in 1990.

Larry Goldstein, MD, professor of medicine and director of the Duke Stroke Center, was honored by the American Stroke Association with the William Feinberg Award for Excellence in Clinical Stroke. The Feinberg Award recognized Goldstein's many contributions in the field of cerebrovascular disease.

Daniel Mark, MD, professor of medicine, received the American College of Cardiology's 2009 Distinguished Scientist Award for his professional excellence and contributions in the field of cardiology.

Rex M. McCallum, MD, professor of medicine and associate director of the Private Diagnostic Clinic, was elected governor of the North Carolina Chapter of the American College of Physicians (ACP), the national organization for internists. Working with a local council, McCallum will supervise ACP chapter activities, appoint members to local committees, and preside at regional meetings during his four-year term. He will also represent members by serving on the ACP Board of Governors.

Judd Moul, MD, James H. Semans, MD, Professor of Surgery and chief of the Division of Urology, was honored by former senator Bob Dole at the 56th Annual Kimbrough Urological Seminar in Washington, DC. Dole thanked Moul for helping provide care related to his prostate cancer treatment from 1991 to 2004.

Moul was also one of three physicians nationwide who received the 2009 Clinical Excellence Award from Castle Connolly Medical Ltd., publisher of *America's Top Doctors*. The award recognizes physicians who exemplify excellence in clinical medical practice.

Dorothy Powell, EdD, RN, associate dean for global and community health initiatives at the Duke University School of Nursing, was inducted into the National Black Nurses Association Institute of Excellence in August. Powell was honored for her work to eliminate health care disparities.

Lynda A. Szczech, MD, associate professor of medicine, has been named president-elect of the National Kidney Foundation. The first female president in the foundation's 60-year history, Szczech will assume her two-year term beginning in October 2010.

Theresa "Terry" Valiga, EdD, RN, director of the Institute for Educational Excellence at the Duke University School of Nursing, was inducted as a fellow of the National League for Nursing Academy of Nursing Education in September.

Ruby Leila Wilson, EdD, RN, has been named a 2009 Living Legend by the American Academy of Nursing (AAN). Each year the academy names a select group of fellows as "living legends" in recognition of their extraordinary lifetime achievements, including sustained contributions to nursing and health care and continuous influence on the profession.

Bryan Cullen, PhD, James B. Duke Professor of Molecular Genetics and Microbiology, and **Thomas Petes, PhD**, Minnie Geller Professor for Research in Genetics, were recently elected as fellows in the American Academy of Microbiology in recognition of their scientific achievement and original contributions that have advanced microbiology.

Three Duke Eye Center faculty members were honored by the Association for Research in Vision and Ophthalmology:

Scott W. Cousins, MD, Robert Machemer, MD, Professor of Ophthalmology, was named a Silver Fellow

David L. Epstein, MD, Joseph A.C. Wadsworth Clinical Professor of Ophthalmology and chair of the Department of Ophthalmology, was named a Gold Fellow

Terri L. Young, MD, professor of ophthalmology and pediatrics, was named a Silver Fellow

The Collaboration for AIDS Vaccine Discovery (CAVD) recognized two young scientists at the Duke Human Vaccine Institute (DHVI) as Young and Early Career Investigators for significant contributions toward the organization's goal of developing a vaccine to control the spread of HIV/AIDS:

Sunhee Lee, PhD, assistant professor of medicine and director of the Laboratory of Mycobacteriology and **Laurent Verkoczy, PhD**, assistant professor of medicine and director of the Laboratory of B-cell Immunoregulation.

Kenneth Poss, PhD, associate professor of cell biology, and **Ryohei Yasuda, PhD**, assistant professor in neurobiology, were named as 2009 Howard Hughes Medical Institute Early Career Scientists. As part of their award, they will each receive a research budget of $1.5 million over six years.

In September, two Duke scientists won prestigious awards from the National Institutes of Health to pursue novel research: **Michel Bagnat, PhD**, assistant professor of cell biology, won an NIH Director's New Innovator Award for his research of the fluid secretion that depends on a gene known to have several mutations linked to cystic fibrosis. **Tannishtha Reya, PhD**, associate professor of pharmacology and cancer biology, won an NIH Director's Pioneer Award for her research into the behavior of stem cells under physiological conditions. Each of the 18 Pioneer Awards provides $2.5 million in direct costs over five years. The 55 New Innovator Awards provide $1.5 million in direct costs, also for five years.

Six Duke Medicine employees were recognized as 2009 Health Care Heroes by the *Triangle Business Journal*:

Page Anderson, MD, professor of pediatrics* (Judges' Special Award)

Michael D. Ehlers, MD, PhD, George Barth Geller Professor of Neurobiology (Innovator/Researcher)

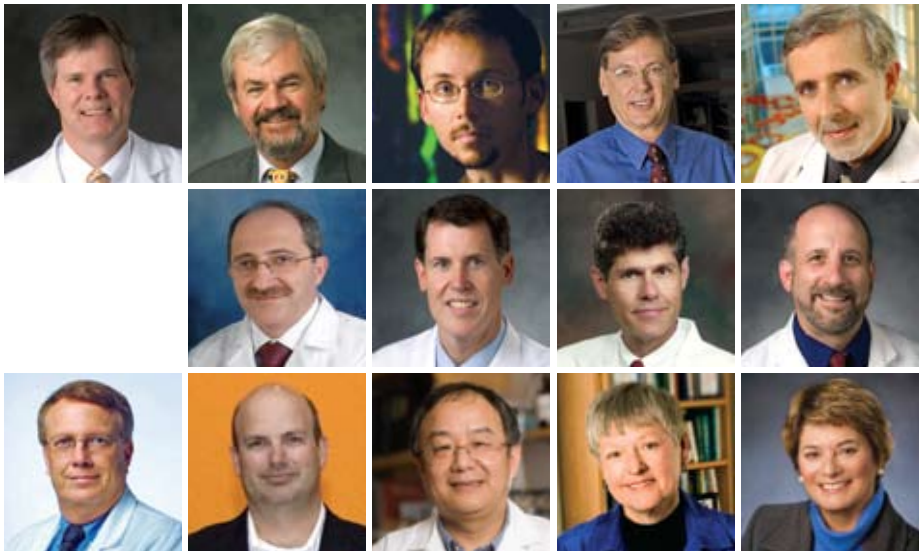
Tracy Hausfeld, staff infusion nurse at Duke Raleigh Hospital (Nurse)

DaiWai Olson, PhD, assistant professor in medicine (Nurse)

Louise Saladino, nurse manager of operations at Durham Regional Hospital (Health Care Manager)

Ralph Snyderman, MD, James B. Duke Professor of Medicine and chancellor emeritus (Lifetime Achievement)

*Dr. Anderson died on November 8, 2008.



2009's distinguished professors

At the 47th annual dinner in honor of Duke University's distinguished professors in April, the newest class was formally announced. Pictured above from top left are:

School of Medicine

R. Rand Allingham, MD, Richard and Kit Barkhouser Professor of Ophthalmology

Edward G. Buckley, MD, Banks Anderson Sr. Professor of Ophthalmology

Michael D. Ehlers, MD, PhD, George Barth Geller Professor of Neurobiology

David Fitzpatrick, PhD, James B. Duke Professor of Neurobiology

Michael S. Freemark, MD, Robert C. Atkins, MD, and Veronica Atkins Professor of Nutrition and Metabolism

Mohamad A. Mikati, MD, Wilburt C. Davison Professor of General Pediatrics

Judd W. Moul, MD, James H. Semans, MD, Professor of Surgery

Theodore N. Pappas, MD, Duke Minimally Invasive Surgery Professor of Surgery

Henry Elliott Rice, MD, Paul H. Sherman, MD, Associate Professor of Surgery

Kent J. Weinhold, PhD, Joseph W. and Dorothy W. Beard Professor of Surgery

John D. York, PhD, Cancer Biology Professor of Pharmacology and Cancer Biology

Xiao-Fan Wang, PhD, Donald D. and Elizabeth G. Cooke Professor of Experimental Oncology

School of Nursing

Mary T. Champagne, PhD, RN, Laurel Chadwick Professor of Nursing

Catherine L. Gilliss, DNSc, RN, Helene Fuld Health Trust Professor of Nursing

On May 7, the 2009 Spring Faculty Meeting was held to honor faculty members for the 2008–2009 academic year. The following awards were presented:

Master Clinician/Teacher Award

Joseph Govert, MD, associate professor of medicine

Richard McCann, MD, professor of surgery

Howard A. Rockman, MD, Edward S. Orgain Professor of Cardiology

Leonard B. Tow Humanism in Medicine Award

Malcolm Stanley Branch, MD, associate professor of medicine

Leonard Palumbo Jr., MD, Faculty Achievement Award

Thomas D'Amico, MD, professor of surgery

Gordon G. Hammes Faculty Teaching Award

David C. Richardson, PhD, professor of biochemistry

Ruth and A. Morris Williams Jr. Faculty Research Prize

Erich D. Jarvis, PhD, associate professor of neurobiology and Howard Hughes Medical Institute investigator

Research Mentoring Awards

Clinical: **Harvey Jay Cohen, MD**, Walter Kempner Professor of Medicine

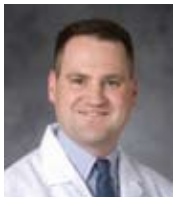
Laboratory-Based: **Howard A. Rockman, MD**, Edward S. Orgain Professor of Cardiology

Translational: **John R. Perfect, MD**, professor of medicine, and **Bruce A. Sullenger, PhD**, Joseph W. and Dorothy W. Beard Professor of Surgical Sciences

DUKE WELCOMES NEW PHYSICIANS

ANESTHESIOLOGY

Joshua Dooley, MD
Regional Anesthesia
Particular Clinical Interests and Skills: Regional anesthesia, acute postoperative pain, academic anesthesia
MD Degree: University of Pittsburgh School of Medicine (Pennsylvania), 2004
Residency: Anesthesiology, Duke University Medical Center, 2008
Fellowship: Regional/Ambulatory Anesthesia, Duke University Medical Center, 2009



Mitchell E. Fingerman, MD
Regional Anesthesia
Particular Clinical Interests and Skills: Regional anesthesia, acute pain management, resident/student education
MD Degree: University of Connecticut School of Medicine, 2004
Residency: Anesthesiology, Barnes-Jewish Hospital (Missouri), 2004-2007
Chief Resident, Anesthesiology, Barnes-Jewish Hospital (Missouri), 2007-2008
Fellowship: Ambulatory and Regional Anesthesia, Duke University Medical Center, 2008-2009

Maria D. Fritock, MD
Particular Clinical Interests and Skills: Cardiothoracic anesthesia, transesophageal echocardiography
MD Degree: Wake Forest University School of Medicine (North Carolina), 2004
Residency: Transitional Year, York Hospital (Pennsylvania), 2004-2005; Anesthesia, Mayo Clinic (Minnesota), 2005-2008
Fellowship: Cardiothoracic Anesthesia, Mayo Clinic (Minnesota), 2008-2009

Joern A. Karhausen, MD, PhD
Cardiothoracic Anesthesiology
Particular Clinical Interests and Skills: Cardiothoracic anesthesiology
MD Degree: RWTH Aachen University (Germany), 1996
Residencies: Pathology, University of Ulm (Germany), 1996; Internal Medicine, Technical University of Munich (Germany), 1997-2000; Anesthesiology, University of Tübingen (Germany), 2005-2009
Fellowship: Research Fellowship, Anesthesiology, Brigham and Women's Hospital, Harvard Medical School (Massachusetts), 2001-2005
Other Degree: PhD, RWTH Aachen University (Germany), 1997

G. Burkhard Mackensen, MD, PhD
Particular Clinical Interests and Skills: Critical care medicine and cardiothoracic anesthesiology, transesophageal echocardiography
MD Degree: University of Hamburg Faculty of Medicine (Germany), 1994
Residency: Anesthesiology, Technical University of Munich (Germany), 1997
Fellowships: Cardiothoracic Anesthesia, Duke University Medical Center, 1998-2000; Intensive Care Medicine, Technical University of Munich (Germany), 2001-2002
Other Degree: PhD, Technical University of Munich (Germany), 2005

COMMUNITY AND FAMILY MEDICINE

Leal K. Hsiao, MD
Family Medicine
Particular Clinical Interests and Skills: Complete care for the entire family, including acute problems and chronic disease management, pediatric, adolescent, and adult preventive health care
MD Degree: Stanford University School of Medicine (California), 2006
Residency: Family Medicine, Duke University Medical Center, 2009

Priscilla Tu, DO
Family Medicine
Particular Clinical Interests and Skills: Non-operative musculoskeletal medicine, sports medicine, osteopathic manipulative medicine
DO Degree: Kirksville College of Osteopathic Medicine (Missouri), 2005
Residency: Family Medicine, Carilion Clinic (Virginia), 2008
Fellowship: Primary Care Sport Medicine, Duke University Medical Center, 2009
Other Degree: Master of Science, Physiology and Biophysics, Georgetown University (Washington, DC), 2001

Donna M. Tuccero, MD
Family Medicine
Particular Clinical Interests and Skills: Complete care for the entire family, including acute problems and chronic disease management; pediatric, adolescent, and adult preventive health care
MD Degree: Wayne State University School of Medicine (Michigan), 1989
Residency: Obstetrics and Gynecology, Providence Hospital (Michigan), 1989-1990; Family Practice, Duke University Medical Center, 1990-1993

DERMATOLOGY

Jane S. Bellet, MD
Dermatology
Particular Clinical Interests and Skills: Pediatric dermatology, excisional surgery, laser surgery, hemangiomas, port wine stains, nevi (moles)
MD Degree: University of Cincinnati College of Medicine (Ohio), 2001
Residency: Pediatrics, Duke University Medical Center, 2004; Dermatology, Duke University Medical Center, 2007
Fellowship: Pediatric Dermatology, Children's Memorial Hospital, Northwestern University School of Medicine (Illinois), 2008

Priya Venkatesan, MD
Dermatology
Particular Clinical Interests and Skills: Inpatient consultative dermatology, medical dermatology including the care of patients with autoimmune mediated skin diseases, acute care dermatology, infectious disease in dermatology, and general dermatology
MD Degree: Duke University School of Medicine, 2005
Residency: Medicine, Preliminary Program, Duke University Medical Center, 2006; Dermatology, Duke University Medical Center, 2009

HOSPITAL MEDICINE

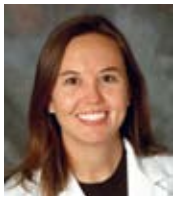
Jonathan G. Bae, MD
Duke Hospital Medicine Program
Particular Clinical Interests and Skills: General internal medicine and pediatric hospital care, resident and medical student education
MD Degree: Virginia Commonwealth University School of Medicine, 2005
Residency: Internal Medicine and Pediatrics, Duke University Medical Center, 2005-2009

Aubrey D. Jolly-Graham, MD
Duke Hospital Medicine Program
Particular Clinical Interests and Skills: General internal medicine, hospitalist medicine, hematology–oncology, medical education, medical education research
MD Degree: University of Florida College of Medicine, 2006
Residency: Internal Medicine, Duke University Medical Center, 2006-2009

Christine D. Jones, MD
Durham Regional Hospital Medicine Program
Particular Clinical Interests and Skills: Hospital Medicine
MD Degree: Emory University School of Medicine (Georgia), 2003
Residency: General Internal Medicine, University of New Mexico, 2006
Chief Resident, Internal Medicine, University of New Mexico, 2006-2007

Matthew S. McKinney, MD
Duke Hospital Medicine Program
Particular Clinical Interests and Skills: Hospital medicine, internal medicine consultation, preoperative consultation
MD Degree: Duke University School of Medicine, 2006
Residency: Internal Medicine, Duke University Medical Center, 2006-2009

Aaron S. Nadon, MD
Durham Regional Hospital Medicine Program
Particular Clinical Interests and Skills: Hospital medicine
MD Degree: University of Colorado School of Medicine, 2006
Residency: Internal Medicine, Duke University Medical Center, 2006-2009



Katherine N. Neal, MD
Duke Hospital Medicine Program
Particular Clinical Interests and Skills: Providing compassionate and quality care to patients admitted to the hospital
MD Degree: Wake Forest University School of Medicine (North Carolina), 2006
Residency: Internal Medicine, Beth Israel Deaconess Medical Center (Massachusetts), 2006-2009

Christopher M. O'Donnell, MD
Durham Regional Hospital Medicine Program
Particular Clinical Interests and Skills: Hospital medicine
MD Degree: Georgetown University School of Medicine (Washington, DC), 2006
Residency: Internal Medicine, Georgetown University Medical Center (Washington, DC), 2009

Vikesh S. Patel, MD
Durham Regional Hospital Medicine Program
Particular Clinical Interests and Skills: Hospital medicine
MD Degree: Ross University School of Medicine (West Indies), 2006
Residency: Internal Medicine, Flushing Hospital Medical Center (New York), 2009

Alan R. Tesson Jr., MD
Durham Regional Hospital Medicine Program
Particular Clinical Interests and Skills: Hospital medicine
MD Degree: University of Florida College of Medicine, 2006
Residency: Internal Medicine, Duke University Medical Center, 2006-2009

Adam C. Wachter, MD
Durham Regional Hospital Medicine Program
Particular Clinical Interests and Skills: Hospital medicine
MD Degree: University of Arizona College of Medicine, 2006
Residency: Internal Medicine, Duke University Medical Center, 2006-2009

Jesse J. Waggoner, MD
Duke Hospital Medicine Program
Particular Clinical Interests and Skills: Hospital medicine
MD Degree: Duke University School of Medicine, 2006
Residency: Internal Medicine, Duke University Medical Center, 2009

Tracy L. Wogan, MD
Durham Regional Hospital Medicine Program
Particular Clinical Interests and Skills: Hospitalized adult patients
MD Degree: Louisiana State University School of Medicine, Shreveport, 2005
Residency: Internal Medicine-Pediatrics, Louisiana State University Health Sciences Center, Shreveport, 2009

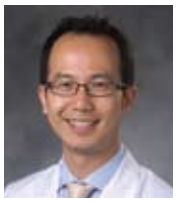
MEDICINE

Heather D. Adkins, MD
Neurology
Particular Clinical Interests and Skills: Clinical trials in migraine and other headaches, treatment of migraine, face pain, occipital neuralgia, cluster headache, trigeminal neuralgia, menstrual migraine, migrainous vertigo, and other headaches
MD Degree: University of Louisville School of Medicine (Kentucky), 2002
Residency: Neurology, UNC Hospitals, 2006
Fellowship: Headache and Face Pain, UNC Hospitals, 2007

Maleka Z. Ahmed, MD
Medical Oncology
Particular Clinical Interests and Skills: General medical oncology and hematology, palliative care
MD Degree: Dhaka Medical College (Bangladesh), 1982
Residency: Internal Medicine, North General Hospital (New York), 1983-1986
Fellowship: Hematology–Medical Oncology, Long Island Jewish Medical Center (New York), 1988-1991

Deborah A. Bradley, MD
Medical Oncology
Particular Clinical Interests and Skills: Investigation of novel therapies for treatment of bladder, kidney, and prostate cancers, care of patients with advanced bladder, kidney, prostate, and testicular cancers
MD Degree: University of Cincinnati College of Medicine (Ohio), 2002
Residency: Internal Medicine, University of Cincinnati (Ohio), 2002-2005
Fellowship: Medical Oncology, University of Michigan, 2005-2008

Alejandra I. Castillo Roth, MD
Gastroenterology
Particular Clinical Interests and Skills: Use of therapeutic endoscopy for the diagnosis and management of pancreatic disorders, biliary disorders, and gastrointestinal malignancies
MD Degree: Medical School Luis Razetti, Central University of Venezuela, 1998
Residency: Internal Medicine, State University of New York-Downstate, 2001-2004; Chief Resident, Internal Medicine, State University of New York-Downstate, 2004-2005
Fellowship: Gastroenterology, State University of New York-Downstate, 2005-2009



Luke F. Chen, MBBS
Infectious Diseases
Particular Clinical Interests and Skills: Multi-drug resistant organisms, drug-resistant gram-negative pathogens, health care epidemiology, HIV medicine, infection control and prevention, health care-associated infections including bloodstream infections and surgical site infections
MBBS Degree: University of Melbourne (Australia), 1999
Residency: Internal Medicine, St. Vincent's Hospital (Australia), 2000-2004
Fellowships: Infectious Diseases, The Alfred Hospital (Australia), 2004; Infectious Diseases, Monash Medical Center (Australia), 2005; Infectious Diseases, NCHECR HIV Clinical Research, The Alfred Hospital (Australia), 2006; Infectious Diseases, Duke University Medical Center, 2007-2009
Other Degree: FRACP, Fellow of the Royal Australasian College of Physicians (Australia), 2006

Leonor Corsino, MD
Endocrinology, Metabolism, and Nutrition
Particular Clinical Interests and Skills: Diabetes mellitus, primary hyperparathyroidism, thyroid disorders, lipid disorders, pituitary/adrenal disorders, prevention of diabetes mellitus type 2 and its complications
MD Degree: Pontifical Catholic University Mother and Teacher (Dominican Republic), 1999
Residency: Internal Medicine, Wayne State University (Michigan), 2005
Chief Resident, Wayne State University (Michigan), 2006
Fellowship: Endocrinology, Metabolism, and Nutrition, Duke University Medical Center, 2009
Other Degree: MHS, Clinical Research, Duke University Medical Center, 2009

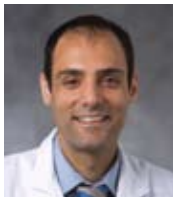
ON THE SPOT

What do you consider the most promising advance in treating migraines?

Currently, the most promising advances are in calcitonin gene-related peptide (CGRP) antagonist drugs, which are acute migraine-specific treatments like the triptans. CGRP is a neuropeptide that provokes the release of inflammatory agents involved in the production of pain during migraine. Unlike the triptans, CGRP antagonists do not cause blood-vessel constriction, so it's anticipated that they can be used in patients with very limited treatment options, such as patients with vascular disease, stroke, and basilar migraine, as well as elderly patients. I was involved in one of the early clinical trials that studied the use of a CGRP antagonist drug in patients with cardiovascular disease. Published results comparing CGRP drugs to some of our current triptan drugs are very promising, and I am looking forward to their use in clinical practice. **—Heather D. Adkins, MD**

James P. Daubert, MD
Cardiology
Particular Clinical Interests and Skills: Catheter ablation of the spectrum of arrhythmias including atrial fibrillation, ventricular tachycardia, Wolff-Parkinson-White syndrome, AV nodal reentrant tachycardia, atrial flutter, pacemaker and ICD lead extraction and implantation, consultation regarding inherited arrhythmia and sudden death syndromes (long QT syndrome, Brugada, catecholaminergic polymorphic ventricular tachycardia), certain inherited cardiomyopathies prone to arrhythmias (hypertrophic cardiomyopathy, arrhythmogenic RV dysplasia [ARVD]), general electrophysiology
MD Degree: Jefferson Medical College of Thomas Jefferson University (Pennsylvania), 1984
Residency: Internal Medicine, Duke University Medical Center, 1984-1987; Chief Resident, Duke University Medical Center, 1988-1989
Fellowships: Cardiology, Duke University Medical Center, 1987-1991; Electrophysiology, Duke University Medical Center, 1991-1992; Cardiac Pacemaker, Duke University Medical Center, 1991-1992

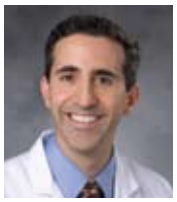
Matthew J. Ellis, MD
Nephrology
Particular Clinical Interests and Skills: General nephrology, renal transplantation including the evaluation of living donors, recipients, postoperative transplant care, and post-transplant follow-up
MD Degree: Duke University School of Medicine, 2002
Residency: Internal Medicine, Duke University Medical Center, 2002-2005
Fellowship: Nephrology, Duke University Medical Center, 2005-2008



Afshin Farzaneh-Far, MD, PhD
Cardiovascular Medicine
Particular Clinical Interests and Skills: All areas of adult cardiology, pericardial diseases, valvular heart disease, cardiac imaging including cardiac MRI, echocardiography, cardiac CT, and nuclear cardiology
MD Degree: University of Edinburgh (United Kingdom), 1992
Residencies: Internal Medicine, Royal Brompton Hospital (United Kingdom), 1995; Internal Medicine, Brigham and Women's Hospital, Harvard Medical School (Massachusetts), 2007
Fellowships: Cardiology, NewYork-Presbyterian, University Hospital of Columbia and Cornell, 2005; Cardiology, Duke University Medical Center, 2009; Cardiac MRI, Duke University Medical Center, 2009

Camille G. Frazier-Mills, MD
Cardiovascular Medicine
Particular Clinical Interests and Skills: Heart rhythm disorders, implantation of pacemakers, defibrillators, cardiac resynchronization therapy, heart failure management, device parameters for heart failure
MD Degree: Case Western Reserve University School of Medicine (Ohio), 1999
Residency: Internal Medicine, Duke University Medical Center, 1999-2002;
Chief Resident, Internal Medicine, Duke University Medical Center, 2003-2004
Fellowships: Cardiovascular Disease, Duke University Medical Center, 2002-2003, 2004-2007; Electrophysiology, Duke University Medical Center, 2007-2009
Other Degree: MHS, Duke University, 2007

Katherine S. Garman, MD
Gastroenterology
Particular Clinical Interests and Skills: Cancer screening and detection and treatment of premalignant conditions of the gastrointestinal tract, screening and surveillance for patients with familial gastrointestinal cancer syndromes
MD Degree: Duke University School of Medicine, 2002
Residency: Internal Medicine, Duke University Medical Center, 2005
Fellowship: Gastroenterology, Duke University Medical Center, 2009



Ziad F. Gellad, MD
Gastroenterology
Particular Clinical Interests and Skills: General gastroenterology, diagnostic and therapeutic endoscopy, colon cancer screening and surveillance, health services research specifically quality of care in colorectal cancer screening, surveillance, and treatment
MD Degree: Johns Hopkins University School of Medicine (Maryland), 2003
Residency: Internal Medicine, Duke University Medical Center, 2003-2006
Fellowship: Gastroenterology, Duke University Medical Center, 2006-2009
Other Degree: MPH, Johns Hopkins School of Public Health (Maryland), 2002

David P. Holland, MD
Infectious Diseases
Particular Clinical Interests and Skills: HIV infection and mycobacterial diseases, primarily tuberculosis
MD Degree: Emory University School of Medicine (Georgia), 1995
Residency: Internal Medicine, Emory University Hospital (Georgia), 2001
Fellowship: Infectious Diseases, Duke University Medical Center, 2009

Sangeeta P. Joshi, MD, MBBS
Pulmonary, Allergy, and Critical Care
Particular Clinical Interests and Skills: Critical care, sepsis, ARDS, diffuse lung diseases, general pulmonary medicine
MBBS, MD Degree: B.J. Medical College (India), 1996
Residency: Internal Medicine, University of Massachusetts, 2005
Fellowship: Pulmonary and Critical Care, Duke University Medical Center, 2008

Robert T. Keenan, MD
Rheumatology and Immunology
Particular Clinical Interests and Skills: Gout and other crystal arthroscopies, vasculitis, myositis, scleroderma, clinical outcomes research
MD Degree: St. George's University School of Medicine (West Indies), 2004
Residency: Internal Medicine, Saint Louis University Hospital (Missouri), 2007
Fellowship: Rheumatology, NYU Hospital for Joint Diseases, 2009
Other Degree: MPH, University of North Carolina at Chapel Hill, 2000

Kathleen E. Lambert, MD
Medical Oncology
Particular Clinical Interests and Skills: Multiple myeloma, Waldenstrom's macroglobulinemia, amyloidosis, plasma cell disorders, hematologic malignancies
MD Degree: Virginia Commonwealth University School of Medicine, 2002
Residency: Internal Medicine, Duke University Medical Center, 2002-2005
Fellowship: Hematology–Medical Oncology, Duke University Medical Center, 2006-2009

Nancy M. McGreal, MD
Gastroenterology/
Pediatric Gastroenterology, Hepatology, and Nutrition
Particular Clinical Interests and Skills: Inflammatory bowel disease, transition of adolescents with chronic gastrointestinal illness to the adult health care realm
MD Degree: University of Maryland School of Medicine, 2000
Residency: Internal Medicine–Pediatrics, University of California-San Diego, 2004
Fellowship: Adult and Pediatric Gastroenterology, University of Chicago (Illinois), 2009

Ara D. Metjian, MD
Hematology
Particular Clinical Interests and Skills: Disorders of hemostasis and thrombosis, red cell and platelet disorders
MD Degree: MCP-Hahnemann School of Medicine (Pennsylvania), 2001
Residency: Internal Medicine, UNC Hospitals, 2004
Fellowships: Hematology–Oncology, University of Pennsylvania, 2008; Hematology–Oncology, Duke University Medical Center, 2008

Gregory M. Metz, MD
Pulmonary, Allergy, and Critical Care
Particular Clinical Interests and Skills: Nasal allergy, asthma, skin allergy, immunotherapy

MD Degree: University of Oklahoma College of Medicine, 2004
Residency: Internal Medicine, Duke University Medical Center, 2004-2007
Fellowship: Allergy and Immunology, Duke University Medical Center, 2007-2009

Cynthia A. Moylan, MD
Gastroenterology
Particular Clinical Interests and Skills: General and transplant hepatology, general gastroenterology, research interest in hepatocellular carcinoma, liver transplantation, racial disparities in liver disease
MD Degree: University of Miami Leonard M. Miller School of Medicine, 2002
Residency: Internal Medicine, Duke University Medical Center, 2002-2005
Fellowships: Gastroenterology, Duke University Medical Center, 2005-2008; Transplant Hepatology, Duke University Medical Center, 2008-2009
Other Degree: MS, Environmental Health Science, Harvard School of Public Health (Massachusetts), 1997

Susanna Naggie, MD
Infectious Diseases
Particular Clinical Interests and Skills: HIV hepatitis coinfections, with a particular interest in HIV-HCV coinfection
MD Degree: Johns Hopkins University School of Medicine (Maryland), 2002
Residency: Internal Medicine, Duke University Medical Center, 2002-2005
Chief Resident, Internal Medicine, Durham VA Medical Center (North Carolina), 2006-2007
Fellowship: Infectious Disease, Duke University Medical Center, 2007-2009

Jennifer M. Perkins, MD
Endocrinology, Metabolism, and Nutrition
Particular Clinical Interests and Skills: Women's health, PCOS, gestational diabetes, endocrine disease in pregnancy, general endocrine
MD Degree: Dartmouth Medical School (New Hampshire), 2003
Residency: Internal Medicine, Virginia Commonwealth University, 2003-2006
Fellowship: Endocrinology, Vanderbilt University (Tennessee), 2006-2009

Katherine B. Peters, MD, PhD
Neurology
Particular Clinical Interests and Skills: Treatment of patients with primary central nervous system tumors, clinical research on neurocognitive side effects seen in patients with cancer, primarily patients with primary central nervous system tumors
MD Degree: Stanford University School of Medicine (California), 2003
Residencies: Internal Medicine, Johns Hopkins Bayview Medical Center (Maryland), 2003-2004; Neurology, Johns Hopkins University School of Medicine (Maryland), 2004-2007
Fellowships: Cognitive Neurosciences, Johns Hopkins University School of Medicine (Maryland), 2007-2008; Neurooncology, Duke University School of Medicine, 2008-2009

William M. Plonk, MD
Geriatrics
Particular Clinical Interests and Skills: Medical overutilization and iatrogenesis, artificial hydration and nutrition, hospice and palliative care
MD Degree: University of Virginia School of Medicine, 1989
Residency: Family and Community Medicine, University of Missouri-Columbia, 1989-1992
Fellowship: Geriatrics, University of Virginia, 2003-2004

Jyothi P. Rao, MD
Endocrinology, Metabolism, and Nutrition
Particular Clinical Interests and Skills: Thyroid disorders, type 1 and type 2 diabetes, gestational diabetes, calcium disorders, pituitary disorders, adrenal disorders
MD Degree: Kasturba Medical College (India), 1997
Residency: Internal Medicine, Michael Reese Hospital and Medical Center (Illinois), 2000-2003
Fellowship: Endocrinology, Diabetes, and Metabolism, University of Minnesota, 2003-2006

ON THE SPOT

What are some of the latest strides in treating epilepsy?

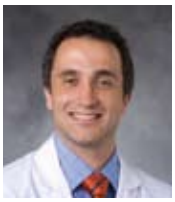
The options for patients with hard-to-control seizures are growing. We have new medications with unique mechanisms and improved tolerability, and we're learning more about how to better combine existing medications to improve effectiveness and tolerability. There are also several implantable devices, called neural stimulators, which can reduce the number of seizures. One such device—the vagus nerve stimulator—is already available. Others, such as deep brain stimulators and responsive neural stimulators, are being used in research trials. In children with very severe epileptic seizures and in some adults, dietary therapies such as the ketogenic diet or the modified Atkins diet may be effective. **—Saurabh R. Sinha, MD, PhD**

Bimal R. Shah, MD
Cardiology
Particular Clinical Interests and Skills: Advanced coronary disease and ischemic heart disease, heart failure management, and secondary prevention of cardiovascular disease
MD Degree: Duke University School of Medicine, 2002
Residency: Internal Medicine, Stanford University Medical Center (California), 2005
Fellowship: Cardiology, Duke University Medical Center, 2009

Damian Silbermins, MD
Medical Oncology
Particular Clinical Interests and Skills: General hematology and oncology
MD Degree: University of Buenos Aires (Argentina), 2002
Residency: Internal Medicine, Albert Einstein Medical Center (Pennsylvania), 2006
Fellowships: Hematology–Oncology, Washington Hospital Center/Georgetown University Hospital (Washington, DC), 2007; Hematology–Oncology, Duke University Medical Center, 2009

Saurabh R. Sinha, MD, PhD
Neurology
Particular Clinical Interests and Skills: Epilepsy, epilepsy surgery with emphasis on difficult-to-control/-treat patients
MD Degree: Baylor College of Medicine (Texas), 1999
Residency: Neurology, Johns Hopkins Hospital (Maryland), 2003
Fellowship: Clinical Neurophysiology, Johns Hopkins Hospital (Maryland), 2004; Epilepsy, Johns Hopkins Hospital (Maryland), 2005
Other Degree: PhD, Neuroscience, Baylor College of Medicine (Texas), 1997

Alexander N. Starodub, MD, PhD
Medical Oncology
Particular Clinical Interests and Skills: Gastrointestinal cancers and early clinical trials, translational research to improve cancer therapy and identify new predictive and prognostic biomarkers
MD Degree: Ohio State University College of Medicine, 2003
Residency: Internal Medicine, Ohio State University, 2003-2006
Fellowship: Hematology–Oncology, Duke University Medical Center, 2006-2009
Other Degree: PhD, Biophysics, Ohio State University, 1999



Daniel M. Wild, MD
Gastroenterology
Particular Clinical Interests and Skills: General gastroenterology, colon cancer screening, small bowel, endoscopy, gastrointestinal bleeding
MD Degree: Jefferson Medical College of Thomas Jefferson University (Pennsylvania), 2003
Residency: Internal Medicine, Mount Sinai Medical Center (New York), 2003-2006
Fellowship: Gastroenterology, Tufts Medical Center (Massachusetts), 2006-2009

Andrew I. Wolf, MD
Gastroenterology
Particular Clinical Interests and Skills: General gastroenterology with an interest in hereditary colon cancer
MD Degree: Jefferson Medical College of Thomas Jefferson University (Pennsylvania), 2003
Residency: Internal Medicine, Duke University Medical Center, 2006
Fellowship: Gastroenterology, Duke University Medical Center, 2009

Richard K. Wood, MD
Gastroenterology
Particular Clinical Interests and Skills: Esophageal motility disorders, management of Barrett's esophagus, general gastroenterology, colon cancer risk reduction
MD Degree: Mount Sinai School of Medicine of New York University, 2002
Residency: Internal Medicine, Boston University Medical Center (Massachusetts), 2002-2006
Fellowship: Gastroenterology, University of Pennsylvania, 2006-2009

OBSTETRICS AND GYNECOLOGY

Ravindu P. Gunatilake, MD
Maternal-Fetal Medicine
Particular Clinical Interests and Skills: Critical maternal illness in pregnancy, maternal obesity in pregnancy, maternal diabetes, fetal growth assessment, maternal cardiac disease in pregnancy, cervical insufficiency, higher-order multi-fetal gestation
MD Degree: University of Hawaii John A. Burns School of Medicine, 2005
Residency: Obstetrics and Gynecology, Banner Good Samaritan Medical Center (Arizona), 2005-2009
Fellowship: Maternal-Fetal Medicine, Duke University Medical Center, 2009-2012

Daniel M. Kraus, MD
Maternal-Fetal Medicine
Particular Clinical Interests and Skills: Maternal-fetal medicine
MD Degree: University of Pittsburgh School of Medicine (Pennsylvania), 2005
Residency: Obstetrics and Gynecology, Duke University Medical Center, 2005-2009
Fellowship: Maternal-Fetal Medicine, Duke University Medical Center, 2009-2012

Carla E. Ransom, MD
Maternal-Fetal Medicine
Particular Clinical Interests and Skills: High-risk obstetrics, preterm premature rupture of membranes, preterm birth
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 2005
Residency: Obstetrics and Gynecology, Duke University Medical Center, 2005-2009
Fellowship: Maternal-Fetal Medicine, Duke University Medical Center, 2009-2012

OPHTHALMOLOGY

Mays A. El-Dairi, MD
Neuro-Ophthalmology and Pediatric Ophthalmology and Strabismus
Particular Clinical Interests and Skills: Diagnosis and medical treatment of various types of neurological conditions affecting the eyes of both adults and children, pediatric and adult strabismus, multiple sclerosis, idiopathic intracranial hypertension, research interest in ocular imaging technologies, particularly optical coherence tomography
MD Degree: American University of Beirut (Lebanon), 2001
Residency: American University of Beirut (Lebanon), 2005
Fellowships: Pediatric Ophthalmology and Strabismus, Duke Eye Center, 2005-2007; Neuro-Ophthalmology, Duke Eye Center, 2007-2009

PATHOLOGY

Diana M. Cardona, MD
Particular Clinical Interests and Skills: Gastrointestinal and liver pathology, hepatocellular cancer research
MD Degree: University of Miami Leonard M. Miller School of Medicine (Florida), 2004
Residency: Pathology, University of Florida, 2004-2008
Fellowship: Gastrointestinal and Liver Pathology, University of Florida, 2008-2009

Krys B. Johnson, MD
Particular Clinical Interests and Skills: Anatomical and clinical pathology, gastrointestinal and hepatobiliary pathology
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 2005
Residency: Anatomical and Clinical Pathology, Duke University Medical Center, 2005-2009

PEDIATRICS

Ray C. Barfield, MD, PhD
Hematology-Oncology
Particular Clinical Interests and Skills: Research focused on improving therapeutics for neuroblastoma; improving the quality of life of children with complex, chronic, or fatal illnesses; study of areas where medical and theological interests intersect
MD Degree: Emory University School of Medicine (Georgia), 1993
Residency: Pediatrics, Emory University (Georgia), 1993-1996
Fellowship: Pediatric Hematology, Oncology and Bone Marrow Transplantation, St. Jude Children's Research Hospital (Tennessee), 2000-2004
Other Degree: PhD, Philosophy, Emory University (Georgia), 2001

Megan W. Butler, MD
Gastroenterology, Hepatology, and Nutrition
Particular Clinical Interests and Skills: General pediatric gastroenterology, pediatric hepatology, pediatric transplant hepatology
MD Degree: University of Mississippi School of Medicine, 2003
Residency: Pediatrics, University of Mississippi, 2003-2006
Fellowship: Pediatric Gastroenterology, University of Miami/Jackson Memorial Hospital (Florida), 2006-2009

Michael Cohen-Wolkowiez, MD
Infectious Diseases
Particular Clinical Interests and Skills: Pharmacokinetics and pharmacodynamics of drugs used in children and critically ill infants
MD Degree: Central University of Venezuela, 2001
Residency: Pediatrics, Miami Children's Hospital (Florida), 2002-2005
Chief Resident, Pediatrics, Miami Children's Hospital (Florida), 2005-2006
Fellowship: Pediatric Infectious Diseases, Duke University Medical Center, 2006-2009

Denis M. Diaz, MD
Primary Care Pediatrics
Particular Clinical Interests and Skills: General pediatrics, care of the term and near-term newborn, children with complex and special health care needs, child maltreatment, LGBT health
MD Degree: University of South Florida College of Medicine, 2002
Residency: Pediatrics, Naval Medicine Center (Virginia), 2002-2005

Diana H. Dolinsky, MD
Primary Care Pediatrics
Particular Clinical Interests and Skills: Prevention and treatment of childhood obesity
MD Degree: Washington University in St. Louis School of Medicine (Missouri), 2006
Residency: Pediatrics, Duke University Medical Center, 2006-2009
Fellowship: Snyderman Foundation Fellowship in Childhood Obesity, Duke University Medical Center, 2009-2011

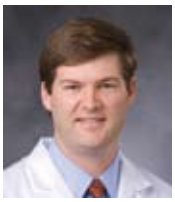
Brian H. Eichner, MD
Primary Care Pediatrics
Particular Clinical Interests and Skills: General pediatrics, community-level care, anemia, iron deficiency
MD Degree: State University of New York at Buffalo School of Medicine and Biomedical Sciences, 2006
Residency: Pediatrics, Duke University Medical Center, 2009

Donald T. Ellis II, MD
Hospital and Emergency Medicine
Particular Clinical Interests and Skills: Emergency ultrasound, pediatric trauma, procedural sedation, medical education, quality improvement
MD Degree: University of Maryland School of Medicine, 2000
Residency: Pediatrics, University of Maryland Medical Center, 2000-2003
Fellowship: Pediatric Emergency Medicine, University of Tennessee Health Science Center, 2006-2009

Prem Fort, MD
Neonatology
Particular Clinical Interests and Skills: Infections affecting preterm infants, pulmonary medicine of neonates
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 2006
Residency: Pediatrics, Duke University Medical Center, 2006-2009

Christopher N. Fortner, MD, PhD
Pulmonary and Sleep Medicine
Particular Clinical Interests and Skills: All pediatric respiratory disorders, special interest in diseases of the airways such as asthma or cystic fibrosis
MD Degree: University of Cincinnati College of Medicine (Ohio), 2002
Residency: Pediatrics, Duke University Medical Center, 2002-2006
Fellowship: Pediatric Pulmonary, Duke University Medical Center, 2006-2008
Other Degree: PhD, Molecular and Cellular Physiology, University of Cincinnati (Ohio), 2001

James W. Fox, MD
Hospital and Emergency Medicine
Particular Clinical Interests and Skills: Medical education of medical students and residents, evidence-based clinical practice, emergency airway management
MD Degree: University of Cincinnati College of Medicine (Ohio), 1999
Residency: Internal Medicine and Pediatrics, Duke University Medical Center, 1999-2003
Fellowship: Pediatric Emergency Medicine, Columbus Nationwide Children's Hospital (Ohio), 2003-2006



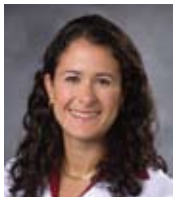
James C. Fudge Jr., MD
Cardiology
Particular Clinical Interests and Skills: Pediatric interventional cardiac catheterization, pediatric exercise physiology, cardiac critical care
MD Degree: Medical College of Georgia, 2001
Residency: Pediatrics, Medical College of Georgia, 2004
Fellowship: Pediatric Cardiology, Duke University Medical Center, 2008

Kevin D. Hill, MD
Cardiology
Particular Clinical Interests and Skills: All aspects of pediatric cardiology, including congenital and acquired heart disease affecting neonates, children, and adolescents, special interest in interventional catheterization including device closure of defects, balloon dilation, and stent placement
MD Degree: Wake Forest University School of Medicine (North Carolina), 2002
Residency: Pediatrics, Wake Forest University, Brenner Children's Hospital (North Carolina), 2005
Fellowships: Pediatric Cardiology, Vanderbilt University (Tennessee), 2008; Pediatric Cardiac Catheterization, Vanderbilt University (Tennessee), 2009
Other Degree: MS, Clinical Investigation, Vanderbilt University (Tennessee), 2008

Eric N. Horowitz, MD
Neonatology
Particular Clinical Interests and Skills: Endocrinology of maternal health and fetal growth/development during pregnancy, hypothalamic-pituitary-adrenal axis in the premature neonate, neonatal radiographic imaging, prenatal consultation
MD Degree: SUNY Upstate Medical University, 2003
Residency: Pediatrics, Children's Hospital of Pittsburgh of UPMC (Pennsylvania), 2006
Fellowship: Neonatal-Perinatal Medicine, Duke University Medical Center, 2009
Other Degree: RD, National Institutes of Health (Maryland), 1999

Sihong Huang, MD
Neonatology
Particular Clinical Interests and Skills: General pediatrics, pediatric infectious diseases with research interests in immunologic responses to HIV infection in the pediatric population, neonatology-perinatology
MD Degree: Boston University School of Medicine (Massachusetts), 2002
Residency: General Pediatrics, Massachusetts General Hospital, (Massachusetts), 2002-2005
Fellowship: Pediatric Infectious Diseases, Children's Hospital Boston, (Massachusetts), 2005-2008
Other Degree: MMSc, Harvard Medical School (Massachusetts), 2006-2008

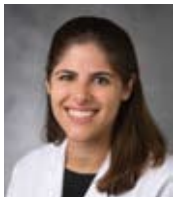
Nancie J. MacIver, MD, PhD
Endocrinology
Particular Clinical Interests and Skills: Caring for children with disorders of growth, development, or hormonal regulation such as adrenal, thyroid, pituitary, pubertal, growth, or metabolic disorders
MD Degree: Mayo Medical School (Minnesota), 2003
Residency: Pediatrics, Duke University Medical Center, 2003-2006
Fellowship: Pediatric Endocrinology, Duke University Medical Center, 2006-2009
Other Degree: PhD, Mayo Graduate School (Minnesota), 2003



Gabriela M. Maradiaga Panayotti, MD
Primary Care Pediatrics
Particular Clinical Interests and Skills: Health care for Hispanic populations, global health, primary care pediatrics
MD Degree: Georgetown University School of Medicine (Washington, DC), 2006
Residency: Pediatrics, University of California-San Francisco, 2006-2009

Shashi K. Nagaraj, MBBS, MD
Nephrology
Particular Clinical Interests and Skills: Chronic renal failure, dialysis, transplantation, hypertension, glomerulonephritis, nephrotic syndrome, urinary tract infections, congenital genitourinary anomalies, lupus nephritis, hematuria and proteinuria in children
MD Degree: MBBS, Kasturba Medical College (India), 1982
MD, Pediatrics, Bangalore University (India), 1986
Residencies: Pediatrics, Vani Vilas Hospital, Bangalore Medical College (India), 1983-1986; Pediatrics, North Carolina Baptist Hospital, 1990-1992
Fellowship: Pediatric Nephrology, University of Virginia, 1992-1995
Other Degrees: Specialty Certification, Royal College of Physicians and Surgeons (Canada), 1993; MRCP, Pediatrics, Royal College of Physicians and Surgeons (United Kingdom), 1988

Jennifer A. Rothman, MD
Hematology–Oncology
Particular Clinical Interests and Skills: Pediatric sickle cell, hematologic disorders in children, anemias, and bone marrow failure syndrome
MD Degree: University of Medicine and Dentistry of New Jersey–Robert Wood Johnson Medical School, 2003
Residency: Pediatrics, Children's Hospital of Philadelphia (Pennsylvania), 2006
Fellowship: Pediatric Hematology–Oncology, Pediatrics, Children's Hospital of Philadelphia (Pennsylvania), 2009



Alyssa M. Stephany, MD
Neonatology
Particular Clinical Interests and Skills: Improving communication with referring providers and primary care providers, clinical education of residents/medical students and other medical providers, neurodevelopment of premature infants/high-risk infants, quality improvement
MD Degree: SUNY Upstate Medical University, 2004
Residency: Internal Medicine–Pediatrics, Duke University Medical Center, 2008

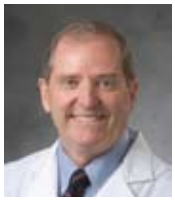
Purnima Valdez, MD
Child Development and Behavioral Health
Particular Clinical Interests and Skills: Assessment and management of children with developmental disorders, including speech and language delay, learning disabilities, general developmental delay, autism spectrum disorders, Asperger's syndrome, disruptive behavior disorders, and attention deficit hyperactivity disorder
MD Degree: Northeastern Ohio Universities Colleges of Medicine and Pharmacy, 2000
Residency: Pediatrics, Maimonides Medical Center (New York), 2003
Fellowship: Developmental-Behavioral Pediatrics, NYU School of Medicine, 2006

PRIMARY CARE

Barbara D. Aldridge, MD
Duke Primary Care Mebane
Particular Clinical Interests and Skills: General family practice which includes well-women care, well-child checks, and routine chronic medical problems for the general population
MD Degree: East Carolina University Brody School of Medicine (North Carolina), 1999
Residency: Family Practice, East Carolina University (North Carolina), 2002

Brian J. Benjamin, MD
Duke Urgent Care Brier Creek
Particular Clinical Interests and Skills: Family medicine and urgent care including adults, geriatrics, pediatrics, sports medicine, and wound care, integration of computers and informatics in medicine
MD Degree: University of Rochester School of Medicine and Dentistry (New York), 1991
Residency: Family Medicine, Duke University Medical Center, 1991-1994

Cari D. Combs, MD
Wake Forest Family Physicians
Particular Clinical Interests and Skills: Care of the entire family including pediatrics and women's health, preventive health care, newborn care
MD Degree: University of Oklahoma College of Medicine, 2004
Residency: Family Practice, University of Oklahoma, 2004-2007



Frank W. Conn, MD, PhD
Duke Urgent Care Knightdale
Particular Clinical Interests and Skills: Urgent care
MD Degree: Medical College of Pennsylvania
Residency: Rotating Internship/ Surgical Residency, Walter Reed Army Medical Center (Washington, DC)
Other Degree: PhD, Neurophysiology, University of Pittsburgh (Pennsylvania)

Ann Marie H. Edwards, MD
Durham Pediatrics
Particular Clinical Interests and Skills: Primary pediatrics
MD Degree: Medical University of South Carolina College of Medicine, 2006
Residency: Pediatrics, UNC Hospitals, 2009

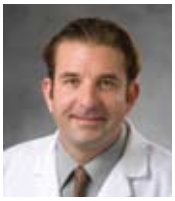
Peter J. Foote, DO
Duke Primary Care Brier Creek
Particular Clinical Interests and Skills: General family medicine, preventive care
DO Degree: Philadelphia College of Osteopathic Medicine (Pennsylvania), 2002
Residency: Family Medicine, Hunterdon Medical Center (New Jersey), 2005

Joshua E. Garriga, MD
North Hills Internal Medicine
Particular Clinical Interests and Skills: Primary care, hypertension, type 2 diabetes, preventive care
MD Degree: University of Texas Medical Branch School of Medicine, 1997
Residency: Internal Medicine, Baystate Medical Center (Massachusetts), 1997-2000; Chief Resident, Internal Medicine, Baystate Medical Center (Massachusetts), 2000-2001

Robert T. Harris, MD
Duke Primary Care Creedmoor Road
Particular Clinical Interests and Skills: General internal medicine with emphasis on preventive health, interest in psychosomatic medicine—the mind-body interaction
MD Degree: Emory University School of Medicine (Georgia), 1978
Residency: Internal Medicine, Georgia Baptist Medical Center, 1978-1981
Other Degree: MHS, Johns Hopkins School of Public Health (Maryland), 1974

John J. Hart, MD
Duke Urgent Care Knightdale
Particular Clinical Interests and Skills: Broad-spectrum family medicine focusing on urgent care, particular interests in musculoskeletal sports-related injuries
MD Degree: Georgetown University School of Medicine (Washington, DC), 2000
Residency: Family Practice, Lancaster General Hospital (Pennsylvania), 2000-2003
Other Degree: MS, Medical Physiology, Georgetown University (Washington, DC), 1996

William B. Hebda, MD
Duke Primary Care Knightdale
Particular Clinical Interests and Skills: Management of common medical conditions (hypertension, diabetes, heart problems, high cholesterol, etc.), minor surgical procedures (joint infections, skin biopsies, lesion removals), well-women exams (Pap smears), children's health care, physicals, acute childhood illnesses, patients' input and participation in their care
MD Degree: Oral Roberts University School of Medicine (Oklahoma), 1984
Residency: Family Medicine, Naval Hospital Charleston (South Carolina), 1984-1987



Ronald D. Krull, MD
Duke Urgent Care Knightdale
Particular Clinical Interests and Skills: Acute care and urgent care medicine, family medicine, community medical care
MD Degree: University of Texas Health Science Center at San Antonio, 2000
Residencies: Family Medicine, University of Texas Health Science Center at Tyler, 2000-2001; Family Medicine, Corpus Christi Family Practice Residency (Texas), 2001-2003

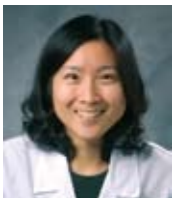
William W. Lawrence, MD
Durham Pediatrics
Particular Clinical Interests and Skills: General pediatrics, health care administration and health disparities
MD Degree: Bowman Gray School of Medicine, Wake Forest University (North Carolina), 1993
Residency: General Pediatrics, Children's National Medical Center (Washington, DC), 1993-1996; Chief Pediatric Resident, National Medical Center (Washington, DC), 1996-1997

John T. Marucheck, MD
North Hills Internal Medicine
Particular Clinical Interests and Skills: General internal medicine with emphasis on evidence-based, outcome-oriented delivery of primary care
MD Degree: University of Oklahoma College of Medicine, 1978
Residency: Internal Medicine, University of Oklahoma Health Science Center, 1978-1981

Richard Clay Noble, MD
North Hills Internal Medicine
Particular Clinical Interests and Skills: General internal medicine including preventive medicine and chronic disease management
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 1984
Residency: Internal Medicine, Medical College of Virginia Hospitals, 1984-1987

Scott M. Sheflin, MD
Duke Urgent Care Morrisville
Particular Clinical Interests and Skills: Sports medicine, preventive care
MD Degree: Hahnemann University School of Medicine (Pennsylvania), 1990
Residencies: Internal Medicine, Hahnemann University Hospital (Pennsylvania), 1990-1991; Emergency Medicine, Long Island Jewish Medical Center (New York), 1991-1992; Family Medicine, Duke University Medical Center, 1992-1994
Fellowship: Sports Medicine, Ohio State University, 1994-1995

Matthew T. Sproul, MD
Duke Primary Care Brier Creek
Particular Clinical Interests and Skills: Preventive medicine, evidence-based medicine, pediatric and adolescent medicine, women's health, sports medicine, travel/wilderness medicine
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 2005
Residency: Family Medicine, Carolinas Medical Center (North Carolina), 2005-2008



Connie C. Stewart, MD
Duke Primary Care Brier Creek
Particular Clinical Interests and Skills: Family medicine
MD Degree: University of Texas Southwestern Medical School, 2005
Residency: Family Medicine, McKay-Dee Family Medicine (Utah), 2005-2008

Barbara J. Stiehl, MD
Duke Urgent Care
Particular Clinical Interests and Skills: Critical care medicine, emergency medicine, internal medicine, urgent care, EMS
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 1981
Residencies: Internal Medicine, Dartmouth-Hitchcock Medical Center (New Hampshire), 1981-1984; Anesthesiology, Dartmouth-Hitchcock Medical Center (New Hampshire), 1985-1987
Fellowship: Critical Care Medicine, Dartmouth-Hitchcock Medical Center (New Hampshire), 1987-1988

Lisena G. Verka, MD
Sutton Station Internal Medicine
Particular Clinical Interests and Skills: Preventive medicine, women's health, general internal medicine
MD Degree: Iuliu Hatieganu Cluj-Napoca University of Medicine and Pharmacy (Romania), 1991
Residency: Internal Medicine, Case Western Reserve University/Saint Vincent Charity Hospital (Ohio), 2005-2008

Wynne E. Woodyear, MD
Sutton Station Internal Medicine
Particular Clinical Interests and Skills: Primary care, preventive medicine
MD Degree: West Virginia University School of Medicine, 1987
Residency: Internal Medicine, Duke University Medical Center, 1987-1990

RADIATION ONCOLOGY

Junzo P. Chino, MD
Radiation Oncology
Particular Clinical Interests and Skills: Gynecologic, breast, and central nervous system cancers
MD Degree: Indiana University School of Medicine, 2004
Residency: Radiation Oncology, Duke University Medical Center, 2009

David S. Yoo, MD
Particular Clinical Interests and Skills: Head and neck, gastrointestinal genitourinary malignancies, general radiation therapy
MD Degree: Duke University Medical Center, 2004
Residencies: Internship, Duke University Medical Center, 2004-2005; Radiation Oncology, Duke University Medical Center, 2005-2009

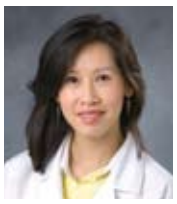
RADIOLOGY

Tedric D. Boyse, MD
Community Radiology
Particular Clinical Interests and Skills: Musculoskeletal imaging
MD Degree: Vanderbilt University School of Medicine (Tennessee), 1998
Residency: Diagnostic Radiology, University of Michigan, Ann Arbor, 1999-2003
Fellowship: Musculoskeletal Radiology, Mallinckrodt Institute of Radiology, Washington University in St. Louis (Missouri), 2003-2004

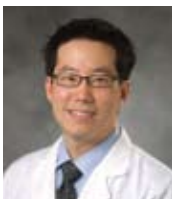
Morgan D. Camp, MD
Community Radiology
Particular Clinical Interests and Skills: Body imaging, hepatobiliary, pancreatic, and gynecological MRI, gastrointestinal and genitourinary CT, image-guided percutaneous biopsies and drainages
MD Degree: University of South Carolina School of Medicine, 2003
Residency: Diagnostic Radiology, University of Florida, 2008
Fellowship: MRI-Predominant Body Imaging, Northwestern University (Illinois), 2009

Marc A. Finkel, MD
Community Radiology
Particular Clinical Interests and Skills: Neuroradiology, MRI, interventional radiology, diagnostic radiology
MD Degree: Albert Einstein College of Medicine (New York), 1983
Residency: Diagnostic Radiology, Duke University Medical Center, 1988
Fellowship: Neuroradiology, Duke University Medical Center, 1989

Rajan T. Gupta, MD
Abdominal Imaging
Particular Clinical Interests and Skills: Abdominal imaging with CT, MRI, and ultrasound, MRI of the hepatobiliary system
MD Degree: Northwestern University Feinberg School of Medicine (Illinois), 2003
Residency: Diagnostic Radiology, Advocate Illinois Masonic Medical Center, 2008
Fellowship: Abdominal Imaging, Duke University Medical Center, 2009



Jenny K. Hoang, MBBS
Neuroradiology
Particular Clinical Interests and Skills: Head and neck imaging, head and neck oncology, DCE-MRI, FDG-PET, head and neck anatomy, sinus imaging, orbital imaging, CT-guided spine procedures, central epidural, transforaminal epidural (nerve root block), facet joint injections
MBBS Degree: University of Melbourne (Australia), 1999
Residencies: Internal Medicine, St. Vincent's Hospital (Australia), 2000-2001; Radiology, St. Vincent's Hospital (Australia), 2002-2006
Fellowships: Breast Imaging, St. Vincent's Hospital (Australia), 2006; Cardiothoracic Imaging, Duke University Medical Center, 2007; Neuroradiology, Duke University Medical Center, 2008
Other Degree: Graduate Certificate, Clinical Research Methods, Monash University (Australia), 2006; Fellow, Royal Australian and New Zealand College of Radiologists (FRANZCR), 2007

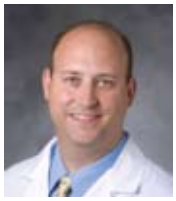


Charles Y. Kim, MD
Vascular and Interventional Radiology
Particular Clinical Interests and Skills: Interventional oncology-embolization, radiofrequency ablation, and cryoablation of solid tumors, central venous pathology imaging and endovascular management, general vascular and interventional radiology, magnetic resonance angiography
MD Degree: Columbia University College of Physicians and Surgeons (New York), 2001
Residency: Surgery, Yale University Medical Center (Connecticut), 2002
Radiology, Duke University Medical Center, 2009
Fellowships: Vascular and Interventional Radiology, St. Luke's-Roosevelt Hospital (New York), 2005; Integrated Vascular and Interventional Radiology, Duke University Medical Center, 2009

Peter G. Kranz, MD
Neuroradiology
Particular Clinical Interests and Skills: Stroke and neurovascular imaging, CT-guided pain procedures, diagnosis and treatment of CSF leaks, evidence-based radiology
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 2003
Residency: Internal Medicine, University of Maryland Medical Center, 2003-2004
Radiology, Duke University Medical Center, 2004-2008
Fellowship: Neuroradiology, Duke University Medical Center, 2008-2009

Vernon W. Pugh III, MD
Community Radiology
Particular Clinical Interests and Skills: Endovascular treatment for peripheral vascular disease, venous thrombosis and insufficiency, embolization of uterine fibroid, pain management, MRI and CT vascular imaging
MD Degree: Jefferson Medical College (Pennsylvania), 1986
Residencies: Surgery, Graduate Hospital (Pennsylvania), 1986-1987; Radiology, Mercy Catholic Medical Center (Pennsylvania), 1987-1991
Fellowship: Vascular Interventional Radiology, Wake Forest University Baptist Medical Center (North Carolina), 1991-1992

Alan L. Rosen, MD
Community Radiology
Particular Clinical Interests and Skills: Cross-sectional imaging, specifically CT and ultrasound
MD Degree: University of Rochester School of Medicine and Dentistry (New York), 1979
Residency: Radiology, Cornell University Medical Center (New York), 1980-1983
Fellowship: CT and Ultrasound, Duke University Medical Center, 1983-1984



David R. Sopko, MD
Vascular and Interventional Radiology
Particular Clinical Interests and Skills: Vascular and interventional radiology
MD Degree: Northeastern Ohio Universities Colleges of Medicine and Pharmacy, 2003
Residencies: Transitional Year, Grand Rapids Medical Education and Research Center (Michigan), 2004; Diagnostic Radiology, Rochester General Hospital (New York), 2008
Fellowship: Vascular and Interventional Radiology, Duke University Medical Center, 2009

Robert C. Vogler, MD
Community Radiology
Particular Clinical Interests and Skills: Diagnostic radiology, neuroradiology
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 1991
Residency: Radiology, UNC Hospitals, 1995
Fellowship: Neuroradiology, Mallinckrodt Institute of Radiology, Washington University in St. Louis (Missouri), 1997

SURGERY

Adam M. Becker, MD
Otolaryngology-Head and Neck Surgery
Particular Clinical Interests and Skills: Otolaryngology-head and neck surgery with specific focus on endoscopic sinus surgery and endoscopic anterior skull base surgery
MD Degree: Eastern Virginia Medical School, 2003
Residencies: General Surgery, Medical College of Georgia, 2003-2004; Otolaryngology-Head and Neck Surgery, Medical College of Georgia, 2004-2008
Fellowship: Rhinology, Stanford University (California), 2008-2009

Fred E. Benedict, MD
Orthopaedic Surgery
Particular Clinical Interests and Skills: Primary and revisions in hip, knee, and shoulder replacements, arthroscopic and open surgery on knee and shoulder injuries and degenerative conditions
MD Degree: University of Cincinnati College of Medicine (Ohio), 1983
Residency: Orthopaedics, Indiana University Medical Center, 1984-1988

Mark F. Berry, MD
Cardiovascular and Thoracic Surgery
Particular Clinical Interests and Skills: Thoracic oncology with a focus on minimally invasive treatments of lung and esophageal cancer, general thoracic surgery, benign and malignant diseases of the lung, esophagus, mediastinum, and chest wall
MD Degree: University of Pennsylvania School of Medicine, 1999
Residency: General Surgery, Hospital of the University of Pennsylvania, 1999-2006
Fellowship: Thoracic Surgery, Duke University Medical Center, 2006-2009

Scott L. Buckel, DO
Orthopaedic Surgery
Particular Clinical Interests and Skills: General orthopaedics with emphasis in sports medicine, shoulder and elbow surgery
DO Degree: Nova Southeastern University College of Osteopathic Medicine (Florida), 2002
Residency: Orthopaedic Surgery, Philadelphia College of Osteopathic Medicine (Pennsylvania), 2007
Fellowship: Shoulder and Elbow Surgery, St. Francis Orthopaedic Institute (Georgia), 2008

George M. Charron, MD
Orthopaedic Surgery
Particular Clinical Interests and Skills: General orthopaedics, spine surgery
MD Degree: Louisiana State University School of Medicine, 1984
Residency: Orthopaedics, Louisiana State University (Shreveport) Affiliated Hospitals, 1985-1989
Fellowship: Orthopaedic Spine Surgery, Methodist Hospital (Texas), 1990
Orthopaedic Spine Surgery, Baylor University (Texas), 1991

Michael C. Comstock, MD
Orthopaedic Surgery
Particular Clinical Interests and Skills: General orthopaedic surgery with a special interest in foot and ankle surgery, sports medicine, joint replacement, arthritis treatment, and fracture fixation
MD Degree: George Washington University School of Medicine (Washington, DC), 1986
Residency: Orthopaedic Surgery, University of Florida, 1987-1992
Fellowship: General Orthopaedics, University of Florida, 1992-1993

Mitchell W. Cox, MD
General Surgery
Particular Clinical Interests and Skills: Minimally invasive and surgical treatment of all aspects of peripheral arterial and venous disease to include aortic aneurysm, carotid stenosis, and lower extremity occlusive disease as well as arterio-venous access for hemodialysis
MD Degree: Case Western Reserve University (Ohio), 1996
Residency: General Surgery, Wright State University (Ohio), 2001
Fellowship: Vascular Surgery, Baylor College of Medicine (Texas), 2004

Lee H. Diehl, MD
Orthopaedic Surgery
Particular Clinical Interests and Skills: Orthopaedic sports medicine, operative and nonoperative treatment of the injured athlete, high school and intercollegiate team coverage
MD Degree: University of Colorado School of Medicine, 1992
Residency: Orthopaedic Surgery, UNC Hospitals, 1996-2000
Fellowship: Sports Medicine, University of Chicago (Illinois), 2000-2001

Matthew D. Ellison, MD
Otolaryngology-Head and Neck Surgery
Particular Clinical Interests and Skills: Providing care to adults and children for all ear, nose, and throat problems, special interest in sleep apnea, allergic rhinitis, and common pediatric problems
MD Degree: Medical College of Wisconsin, 1994
Residency: Otolaryngology-Head and Neck Surgery, Medical College of Wisconsin, 1999

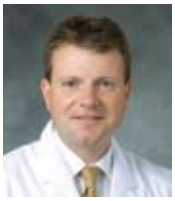
Sarah R. Farris, MD
Emergency Medicine
Particular Clinical Interests and Skills: Medical student and resident education, research on testing for acute coronary syndrome in the emergency department, simulation training
MD Degree: University of Cincinnati College of Medicine (Ohio), 2006
Residency: Emergency Medicine, Henry Ford Hospital (Michigan), 2006-2009

Michael N. Ferrandino, MD
Urology
Particular Clinical Interests and Skills: Minimally invasive treatment of benign and malignant urologic conditions, robotic, laparoscopic, and endourologic approaches, as well as the medical and surgical management of stone disease
MD Degree: New York University School of Medicine, 2001
Residency: Urology, SUNY Downstate Medical Center, 2007
Fellowship: Laparoscopy, Robotics, and Endourology, Duke University Medical Center, 2009

Andre C. Grant, MD
Orthopaedic Surgery
Particular Clinical Interests and Skills: Sports medicine, joint replacement, gender-specific knee replacement, fracture care, carpal tunnel and trigger finger release, special interest in shoulder and knee reconstruction, including arthroscopic rotator cuff and labral repair, cartilage restoration and all-inside ACL reconstruction
MD Degree: Howard University College of Medicine (Washington, DC), 2001
Residency: Internship, Johns Hopkins Hospital (Maryland), 2002; Orthopaedic Surgery, University of Colorado, 2008
Fellowship: Sports Medicine, Union Memorial Hospital (Maryland), 2009

Ian B. Greenwald, MD
Emergency Medicine
Particular Clinical Interests and Skills: Emergency preparedness, resuscitation medicine
MD Degree: University of Vermont College of Medicine, 1999
Residency: Emergency Medicine, University of Pittsburgh (Pennsylvania), 2002
Fellowship: EMS/Disaster Medicine, Fire Department of New York, 2003

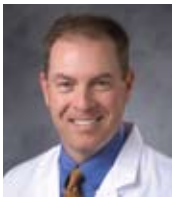
Michael S. Kerzner, DPM
Orthopaedic Surgery
Particular Clinical Interests and Skills: Wound management and limb salvage, utilizing established standards and current techniques with a team approach
DPM Degree: Temple University School of Podiatric Medicine (Pennsylvania), 1989
Residency: Podiatry, Temple University (Pennsylvania), 1991



Fraser J. Leversedge, MD
Orthopaedic Surgery
Particular Clinical Interests and Skills: Hand, upper extremity, and microvascular surgery, clinical conditions affecting the upper extremity distal to the shoulder, including trauma, arthritis, nerve/tendon repair and reconstruction, pediatric/congenital disorders, sports injuries, and post-traumatic reconstruction
MD Degree: Dartmouth Medical School (New Hampshire), 1995
Residency: Orthopaedic Surgery, Emory University School of Medicine (Georgia), 2000
Fellowship: Hand and Upper Extremity Surgery, Washington University School of Medicine (Missouri), 2001

Charles E. Murphy, MD
General Surgery
Particular Clinical Interests and Skills: Intensive care medicine, critical care quality measures and bundles
MD Degree: Duke University School of Medicine, 1982
Residency: General Surgery, Duke University Medical Center, 1989
Fellowships: Cardiothoracic Surgery, Duke University Medical Center, 1991; Surgical Critical Care, Duke University Medical Center, 2009

Eric Mowatt-Larssen, MD
General Surgery
Particular Clinical Interests and Skills: Endovenous laser ablation, sclerotherapy techniques for the treatment of vein disease
MD Degree: Medical College of Virginia/Virginia Commonwealth University, 1998
Residency: Emergency Medicine, Geisinger Medical Center (Pennsylvania), 2001



Donald F. O'Malley Jr., MD
Orthopaedic Surgery
Particular Clinical Interests and Skills: General orthopaedics, including sports medicine, joint replacement, fracture care, and hand surgery; sports medicine for baby boomers; computer-navigated and gender-specific knee replacement; arthroscopic rotator cuff repairs
MD Degree: University of Pittsburgh School of Medicine (Pennsylvania), 1990
Residency: Orthopaedics, University of Pittsburgh (Pennsylvania), 1995

Selene G. Parekh, MD
Orthopaedic Surgery
Particular Clinical Interests and Skills: Athletic foot and ankle disorders, traumatic injuries of the foot and ankle, tendon reconstruction, total ankle replacement/arthroplasty
MD Degree: Boston University School of Medicine (Massachusetts), 1999
Residency: Orthopaedic Surgery, University of Pennsylvania, 1999-2005
Fellowships: Wharton Health Care Entrepreneurship, 2002-2006; Foot and Ankle, University of Pennsylvania, 2005-2006
Other Degree: MBA, Boston University Graduate School of Management (Massachusetts), 1999

ON THE SPOT

Which patients can benefit most from computer-assisted knee replacement?

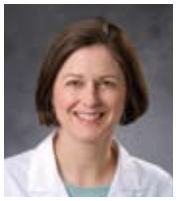
Computer-assisted total knee arthroplasty is most beneficial to the more active patients, whether they are competitive athletes, weekend warriors, or otherwise lead a vigorous lifestyle. These groups place high energy demands on their knee replacement and have high expectations of regaining full activity. The procedure offers more exact placement of the prosthesis, and such precision may lead to a longer-lasting, more durable prosthesis. However, it's important to note that all patients can benefit from the computer navigation's precision alignment and the decreased blood loss associated with the navigated procedure. **—Donald F. O'Malley Jr., MD**

Shalini Ramasunder, MD
Orthopaedic Surgery
Particular Clinical Interests and Skills: Evaluation and treatment of both benign and malignant soft tissue and bone tumors involving all parts of the musculoskeletal system
MD Degree: University of Medicine and Dentistry of New Jersey–Robert Wood Johnson Medical School, 2003
Residency: Orthopaedic Surgery, Drexel University College of Medicine (Pennsylvania), 2003-2008
Fellowship: Musculoskeletal Oncologic Surgery, Jackson Memorial Hospital and University of Miami (Florida), 2008-2009

Eileen M. Raynor, MD
Otolaryngology-Head and Neck Surgery
Particular Clinical Interests and Skills: Pediatric airway, neck masses, endoscopic procedures, multidisciplinary management of complex problems
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 1993
Residency: Otolaryngology, Medical College of Georgia, 1998

James G. Ross, MD
Otolaryngology–Head and Neck Surgery
Particular Clinical Interests and Skills: Surgical and medical management of adult and pediatric ear, nose, and throat disorders in a community setting, including endoscopic sinus surgery, hearing loss, balance disorders, allergic sinusitis, voice disorders, pediatric tonsillitis and ear infections, sleep apnea, thyroid and salivary tumors
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 1986
Residencies: General Surgery, Johns Hopkins Hospital (Maryland), 1986-1988; Otolaryngology–Head and Neck Surgery, Johns Hopkins Hospital (Maryland), 1988-1992, 2003-2007; Interventional Cardiology, Duke University Medical Center, 2007-2008

Sherry Sedberry Ross, MD
Urology
Particular Clinical Interests and Skills: Reconstructive surgery of congenital anomalies of the genitourinary tract (hypospadias, cryptorchidism, intersex, obstructive uropathies [hydronephrosis], vesicoureteral reflux, exstrophy); management of urinary tract infections, incontinence, and enuresis in children; management of neuropathic bladders in children; general pediatric urology; consultation for fetal uropathies; urologic neoplasms in children
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 2001
Residencies: General Surgery, George Washington University (Washington, DC), 2001-2003; Urology, George Washington University (Washington, DC), 2003-2007
Fellowship: Pediatric Urology, Children's National Medical Center (Washington, DC), 2007-2009



Sheila E. Ryan, MD
Otolaryngology–Head and Neck Surgery
Particular Clinical Interests and Skills: Surgical and medical management of pediatric and adult ear, nose, and throat disorders in a community setting, treatment of sinusitis, nasal obstruction, allergies, ear infections, hearing loss, tonsillitis, hoarseness, neck masses including thyroid and salivary gland tumors
MD Degree: University of Vermont College of Medicine, 1989
Residency: Otolaryngology–Head and Neck Surgery, University of Colorado, 1994

Pedro E. Santiago, DMD
Plastic and Reconstructive Surgery
Particular Clinical Interests and Skills: Orthodontics for children, adolescents, and adults, Invisalign and clear braces, pre-surgical orthodontics for orthognathic surgery and dental implants, pre-surgical orthopaedics (nasoalveolar molding) for cleft lip and palate and other craniofacial disorders
DMD Degree: University of Puerto Rico School of Dental Medicine, 1989
Residency: Orthodontics, Eastman Dental Center, University of Rochester (New York), 1993
Fellowship: Craniofacial Orthodontics, New York University Medical Center, Institute of Reconstructive Plastic Surgery, 1995

Ronald Alan Summers, MD
Orthopaedic Surgery
Particular Clinical Interests and Skills: Orthopaedic care for a variety of injuries and problems, special interest and expertise in the care of sports medicine
MD Degree: University of Kansas School of Medicine, 1992
Residency: Orthopaedics, St. Mary's Medical Center (California), 1993-1997
Fellowship: Orthopaedic Sports Medicine, Hughston Sports Medicine Foundation (Georgia), 1997-1998

Betty C. Tong, MD
Cardiovascular and Thoracic Surgery
Particular Clinical Interests and Skills: Thoracic oncology, including lung cancer and mesothelioma, esophageal cancer, chest wall tumors, diseases of the mediastinum and pulmonary metastases, minimally invasive thoracic surgery (VATS), benign conditions of the lung and chest
MD Degree: Duke University School of Medicine, 1999
Residency: General Surgery, Johns Hopkins Hospital, 1999-2005
Fellowship: Thoracic Surgery, Duke University Medical Center, 2005-2008
Other Degree: Graduate Training Program, Clinical Investigation, Johns Hopkins Bloomberg School of Public Health, 2008-2009

NEW CLINIC OPENINGS

Capital Orthopaedics and Sports Medicine
1108 Dresser Court
Raleigh, NC 27609
919-876-8300

401 Keisler Drive, Suite 100
Cary, NC 27518
919-851-5880

Duke Radiology of Raleigh
(formerly Capital Radiology)
3480 Wake Forest Road
Raleigh, NC 27609
919-862-5200

Duke Children's Consultative Services of Raleigh
(at Duke Medicine Plaza)
3480 Wake Forest Road,
Suite 310
Raleigh, NC 27609
919-668-4000

North Hills Internal Medicine
3320 Wake Forest Road
Raleigh, NC 27609
919-855-8911

Duke Medical Plaza Brier Creek:
Fertility
Urgent Care
Primary Care
Physical Therapy
Duke Women's Health Associates
10211 Alm Street
Raleigh, NC 27617
919-484-8345

Duke Physical Therapy at Dresser Court
1108 Dresser Court, Suite 201B
Raleigh, NC 27609
919-876-8302

Duke Physical Therapy at Keisler Drive
401 Keisler Drive, Suite 101B
Cary, NC 27518
919-233-7229

Duke Orthopaedics of Vance County
511 Ruin Creek Road, Suite 106
Henderson, NC 27536
252-436-1655

CONTINUING MEDICAL EDUCATION AT DUKE

For more information on the courses listed below, please contact the Duke Office of Continuing Medical Education at 919-401-1200 or visit cme.mc.duke.edu.

2009-2010 DUKE CME CALENDAR

ON-SITE COURSES

	DATE	LOCATION	CREDIT
ANESTHESIOLOGY			
Ultrasound-Guided Regional Anesthesia Preceptorship	December 7–9, January 11–13, February 8–10, March 8–10, April 12–14, May 10–12, June 14–16	Durham, NC	20 credits
Regional Anesthesia & Acute Pain Management	December 4–6	Indian Wells, CA	12 credits
Anesthesia Camp St. Thomas	January 27–30	St. Thomas, U.S. Virgin Islands	22 credits
4th Annual Winter Anesthesia & Critical Care Review	February 28–March 5	Park City, UT	26 credits
Carolina Cadaver Course	May 22–23	Durham, NC	12 credits
CARDIOLOGY			
Preceptorship in Intraoperative Transesophageal Echocardiography	December 7–9, January 11–13, February 22–24, March 15–17, April 12–14, May 17–19, June 7–9	Durham, NC	27 credits
Duke Cardiovascular Research Symposium	May 24	Durham, NC	8 credits
INTERDISCIPLINARY			
4th Annual Pain Symposium for Non-Pain Specialists	February 13–16	Durham, NC	9.5 credits
RADIOLOGY			
Musculoskeletal MRI & Neuroimaging Update 2010	January 16–19	Paradise Island, The Bahamas	18 credits
Comprehensive Review of Musculoskeletal MRI	February 13–16	Orlando, FL	18 credits
3rd International Symposium on Focal Therapy & Imaging of Prostate and Kidney Cancers	February 24–27	Washington, D.C.	24.75 credits
SURGERY			
2nd Annual Duke Venous Disease Meeting	December 10–12	Durham, NC	15.75 credits

LIVE WEBCASTS

Archived for on-demand viewing at *dcri.duke.org*.

	DATE	PRESENTER
DUKE CLINICAL MEDICINE SERIES: NEPHROLOGY		
Vascular Calcification	Noon, December 4	Peter McCullough, MD
Renal Biomarkers in AKI	Noon, December 11	Uptal Patel, MD
Sudden Death and Kidney Disease	Noon, December 18	Patrick Pun, MD
CLINICAL MEDICINE SERIES: CARDIOLOGY		
Management of Refractory Angina: Drugs, Devices, or Both	Noon, December 25	Magnus Ohman, MB ChB

2009-2010 DUKE CME CALENDAR

ONLINE COURSES	DATE	CREDIT
Antithrombotic Therapy for Medically Managed STEMI Patients	Through December 4	1 credit
Medical and Interventional Management Issues in UA/STEMI	Through January 20, 2010	1 credit
Successful Management of IBS-C in Primary Care	Through March 15, 2010	2 credits
Irritable Bowel Syndrome with Constipation: Improving Primary Care Assessment and Management	Through April 30, 2010	3.25 credits
Incidence and Outcomes of Nuisance Bleeding in Patients Treated with Oral Antiplatelet Therapy	Through May 6, 2010	0.75 credits
TeamSTEPPS e-Fundamentals	Through May 31, 2010	1.5 credits
TeamSTEPPS e-Guide to Action	Through May 31, 2010	0.5 credits
TeamSTEPPS e-Refresher	Through May 31, 2010	1 credit
14th Annual Duke ACS Symposium: Management Challenges in ACS	Through June 28, 2010	2.25 credits
Patient Safe Hand-Off of Care	Through June 30, 2010	1 credit
Disruptive Clinician Behavior	Through July 16, 2010	1 credit
Prostate Cancer Etiology: Approaching Prevention Through Education	Through June 25, 2010	0.75 credits
The Council on Menopause Management: Clinical Challenges and Quality-of-Life Issues	Through August 2, 2010	1 credit
TeamSTEPPS e-Essentials	Through August 10, 2010	1 credit
Management of Diabetic Neuropathy and Glycemic Control in Long-Term Care Facilities	Through January 14, 2011	1.75 credits
Insertion of Central Venous Catheters Online Module	Through February 28, 2011	2 credits
Dissecting Diabetic Dyslipidemia: Understanding Causes and Implementing Solutions	Through March 19, 2011	1.5 credits
Management of Parkinson Disease in the Primary Care Setting	Through June 11, 2011	1 credit

CONTINUING MEDICAL EDUCATION AT DUKE

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TURNING LIVES RIGHT SIDE UP

More than two million Americans suffer from atrial fibrillation (AFib)—the most common heart rhythm disorder, and among the most frustrating to tame. This year, James Daubert, MD, took the helm of the Duke Electrophysiology Program, where physicians are on the crest of the next big wave in AFib treatment—minimally invasive catheter-based ablation. Today, with advancing techniques and technologies, Duke specialists can restore normal rhythm in as many as 90 percent of AFib patients. "AFib symptoms and the anticipation of the episodes are so dramatic for some patients that it almost turns their lives upside down," says Daubert. "Now, we can watch patients go from having all these symptoms to essentially not having AFib at all."

Read how Duke physicians are helping patients keep the beat, page 40.

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