

A YEAR OF ADVANCES

IN RESEARCH

AND PATIENT CARE



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# Three questions for Victor Dzau

Victor J. Dzau, MD, is chancellor for health affairs at Duke University and president and chief executive officer of Duke University Health System.



**As the leader of an academic health system with global presence, you've had opportunities to work with physicians, scientists, and policymakers from across the U.S. and around the world. What are common themes you're hearing today?**

At home and globally, we're all working to improve health care—along the principles of improved access, quality, and affordability. While many countries have achieved two of these elements, no one has been able to accomplish all three. I think there's a growing realization that we need to work together in new ways to achieve these goals. There is also agreement that through innovation, we may find future solutions that can transform medicine. At Duke Medicine, we seek to speed the translation of research discoveries into more effective prevention and treatment strategies, and work with both public and private partners to develop more efficient, more affordable, and more equitable ways of delivering care. We want to transform medicine and improve people's lives by developing and adopting innovative, evidence-based models of care.

**What makes these new approaches to care so innovative?**

They're all about reorienting medicine to focus on the individual patient, not the disease. That means advancing innovative research to define more effective and personalized patient care using genomic, proteomic, metabolomic, and integrated approaches. It also means developing innovative models of care delivery that are patient-centered and emphasize wellness and prevention. The ideal model should involve interdisciplinary

teams of care providers that bring care to people where they live and work, and utilize information technology to improve communication among patients and caregivers. Duke Medicine is moving forward on all of these fronts, and in fact many of our programs are being looked to as national models.

**What do you hope physicians will take from this publication?**

I hope that physicians, nurses, and others who work every day to create healthy communities will find in this publication stories of progress and hope that are informative and inspirational. The exciting thing about medicine is the chance to make a difference in people's lives, and I am very proud of what we've done toward that goal over the past five years—from making scientific discoveries to demonstrating new models of care that are high-quality, patient-centered, and cost-effective. Duke Medicine clinicians and researchers are working every day to advance the health and well-being of people everywhere, and we are pleased to share this progress with others who share our commitment to transform medicine and health care.



**DukeMedicine**  
**Review**  
**2009**

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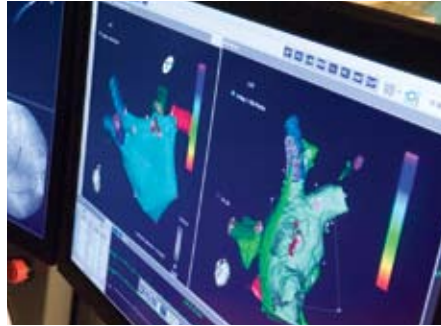
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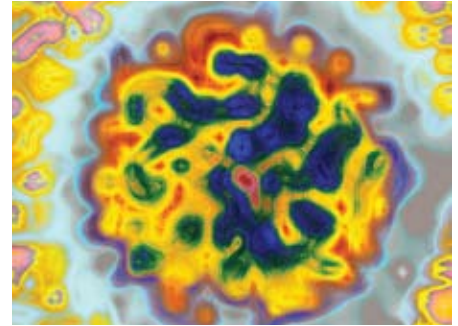
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2008

## Duke's health system turns 10

SEPTEMBER 2008

## A national model for heart attack care

### Bringing world-class care to a booming region

Duke University Health System, established in 1998 after **Duke forged partnerships** with Durham Regional Hospital, Raleigh Community Hospital, and other regional health care providers, celebrates 10 years. DUHS today includes three hospitals, ambulatory surgery centers, over 150 primary, specialty, and urgent care clinics, home care and hospice services, and affiliations with dozens of community hospitals across the Southeast.

“Patients come to us at the most vulnerable times of their lives. They expect the best, and it’s our job to deliver that.”

William J. Fulkerson Jr., MD,  
Senior Vice President for Clinical Affairs



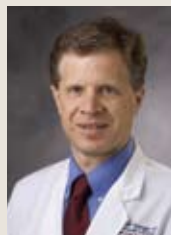
### Racing forward

A major Duke-based initiative called RACE-ER, designed to **speed up interventional care for heart attack patients**, launches a second phase of development to include all 100 North Carolina counties. The American Heart Association, which named the initiative one of the top 10 research advances in 2007, is currently taking the concept nationwide through a program called Mission: Lifeline.



“The beauty of the RACE-ER program is that it doesn’t require novel treatments that could cost millions of new dollars. It’s simply doing better and faster what we already know how to do.”

Christopher Granger, MD,  
Duke Cardiologist



“What are the barriers? How can we make things faster? How can we race forward? These are the questions we’re asking—and we have definitely shown that you can shorten the time it takes to get patients into comprehensive care when you follow the protocols of RACE-ER.”

Christopher O’Connor, MD,  
Director of the Duke Heart Center



OCTOBER 2008

## You are what your grandmother ate

NOVEMBER 2008

## Taking it to the treadmills

### Epigenetic detectives



Randy Jirtle, PhD



J. Hollingsworth, MD

In a study published this month, Duke researcher John Hollingsworth, MD, and others showed that pregnant mice whose diets were supplemented with methyl donors like folic acid had offspring with more severe allergic asthma than offspring from mice that consumed diets low in methyl-containing foods. This heritable risk of disease was detectable in the second generation. These findings suggest your grandmother's diet may affect your risk of developing asthma through epigenetic modifications. (*J Clin Invest.* 2008 Oct)

This study and other Duke research is advancing the field of epigenetics.

Duke epigenetics expert Randy Jirtle, PhD, proved in 2003 that while our genome is fixed, our epigenome—the collection of chemical switches that tell the genes what to do—is not. In his study, feeding mice a prenatal diet including folic acid prevented the expression of obesity, diabetes, and cancer in offspring with a flawed gene leading to susceptibility to those conditions. Jirtle reported a similar finding last year on folic acid countering the negative effects of BPA, a chemical found in many plastics.

(*Proc Natl Acad Sci U S A.* 2007 Aug)

### Exercise: Good for everyone

Late-breaking results of HF-ACTION, the largest clinical trial to date on the **benefits of exercise for heart failure patients**, are reported this month at the American Heart Association's 2008 Scientific Sessions. Heart failure patients who regularly exercise fare better and feel better than similar patients who do not exercise. The study is later published in the *Journal of the American Medical Association*, April 8, 2009.



**"This study has important implications for the 5 million Americans who have heart failure."**

Elizabeth G. Nabel, MD, Director of the National Heart, Lung, and Blood Institute of the National Institutes of Health, which funded the \$37-million study.



NOVEMBER 2008

Is care fair?

DECEMBER 2008

Colon cancer forecast

## Analyzing disparities

A new report released this month finds that most performance measures Duke University Hospital uses for treating inpatients for heart attacks and heart failure show **no inequality in care across race, ethnicity, or language.**

Duke University Hospital had been chosen—along with nine other U.S. medical centers—to participate in *Expecting Success: Excellence in Cardiac Care*, funded by the Robert Wood Johnson Foundation.

The program's goals were to identify and analyze care disparities among African American and Hispanic inpatients and community members seen by Duke clinicians for cardiac issues—and to develop and share tools to better serve those populations.

"Duke already provided outstanding care to our heart patients, and throughout the course of *Expecting Success*, we continued to improve incrementally in all categories," says cardiologist and principal investigator Eric Velazquez, MD. *Read more on Duke Medicine's Quality and Safety Web site, [dukehealth.org/quality](http://dukehealth.org/quality).*



Studies published in the *Proceedings of the National Academy of Sciences* show that Duke scientists have predicted with 90 percent accuracy which colon cancer patients will have recurrence after resection and which will not.

(Read more on page 23)

## Little patients, complex cases



**Duke's new Pediatric Cardiac Intensive Care Unit opens** and is full within days—demonstrating the immense need for this dedicated space. The state-of-the-art, 6,200-square-foot, 13-bed unit is staffed by highly experienced, specialized clinicians.

Duke Children's cardiothoracic surgeons performed more than 420 procedures in 2008—a 10 percent increase over 2007—and pediatric cardiac catheterization procedures have tripled over the last five years. The PICU team has earned national recognition for patient-safety and care-quality initiatives,

JANUARY 2009

## New pediatric cardiac unit shows its value instantly



decreasing readmission rates and improving surgery-to-ICU turnaround times.

With the largest and busiest pediatric cardiology program in North Carolina, Duke often handles complex cases—but with superb outcomes, says John F. Rhodes Jr., MD, chief of clinical cardiology in Duke's Department of Pediatrics. Out of dozens of U.S. programs involved in the Society of Thoracic Surgeons congenital heart national surgical database, Duke has one of the most complex patient populations but still has one of the lowest mortality rates.

FEBRUARY 2009

## Leading the fight against HIV

### Goal: Neutralizing HIV

**HIV research takes a step forward** this month with the publication of an important Duke study. Researchers found a 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. (*J Virol*. Epub 2009 Feb 4)

**“CHAVI came to Duke because of the realization that Duke is an international leader in the fight against AIDS. It’s an acknowledgment that Duke as an institution and the people at Duke are uniquely capable in leading this international effort.”**

Barton Haynes, MD, Professor of Medicine and Immunology; Director, Center for HIV/AIDS Vaccine Immunology (CHAVI)



### CHAVI: the biggest vaccine hunt in history

The Center for HIV/AIDS Vaccine Immunology (CHAVI) is a consortium of universities and academic medical centers under the direction of Barton Haynes, MD, Duke professor of medicine and immunology. The Center's goal is to solve major problems in HIV vaccine development and design.

CHAVI was established in July 2005 with a grant of up to \$300 million from the National Institute of Allergy and Infectious Diseases. In July 2006, CHAVI received an extra infusion of support from the Bill & Melinda Gates Foundation.

“We have all been frustrated by the slow pace of progress in HIV vaccine development, yet breakthroughs are achievable if we aggressively pursue scientific leads and work together in new ways,” says José Esparza, MD, PhD, senior advisor on HIV vaccines for the Gates Foundation. “CHAVI is the first major initiative launched to support the Global HIV Vaccine Enterprise, and it is showing how a large collaborative network can complement the creativity of individual investigators to accelerate the development of an HIV vaccine.”



Kilimanjaro Christian Medical Centre—a CHAVI site—is devoted to clinical research and care of people with HIV/AIDS in Tanzania.

FEBRUARY 2009

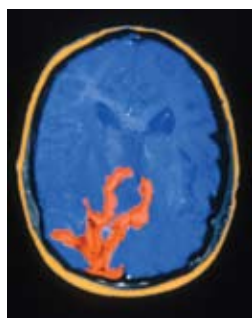
Knowing the enemy

FEBRUARY 2009

Unearthing the genomic roots of chronic diseases

Duke researchers find that mutations in two genes (IDH1 and IDH2) could help distinguish between types of **glioblastoma multiforme**. This finding could directly dictate treatment strategy since the two types of this deadly brain cancer have different progressions and outcomes. (N Engl J Med.

2009 Feb) Read more on page 14.



## MURDOCK: A landmark study



Philanthropist David Murdock pledged to invest up to \$1 billion in the North Carolina Research Campus in Kannapolis, N.C.

**"The new technology in Kannapolis is giving us a chance to connect personalized medicine with public health because we can measure what is happening in the blood in ways that simply weren't possible**

**before."** Robert Califf, MD, MURDOCK's Lead Investigator and Director of the Duke Translational Medicine Institute



Researchers begin enrolling patients in the landmark MURDOCK study. This unprecedented undertaking promises to re-write medical textbooks by identifying **genomic linkages within and across chronic diseases** that are some of today's leading causes of illness and death.

Philanthropist David H. Murdock gave Duke a \$35-million gift to support this massive biomedical research project at the North Carolina Research Campus (NCRC) in Kannapolis, North Carolina. The gift was the largest in the history of Duke University School of Medicine.

MURDOCK (Measurement to Understand the Reclassification of Disease of Cabarrus and Kannapolis) will focus on several high-impact diseases, including cancer, heart disease, high blood pressure, obesity, diabetes, hepatitis, osteoarthritis, and mental illness. It will enroll thousands of patients over time and enable investigators to compare data from populations across the world, from North Carolina to Singapore.

**"For the first time, we will be able to generate a global database of human health and disease that will provide us the opportunity to clearly transform medicine."**

Victor J. Dzau, MD, Duke Chancellor for Health Affairs, on the \$35-million MURDOCK study



MARCH 2009

## Parents go nuts

## New technology for brain tumors



### Have a PB&J

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. The findings are presented at the American Academy of Asthma and Immunology meeting in Washington, DC.

“It appears these children have lost their peanut allergy.”

Wesley Burks, MD, Chief of Duke's Division of Pediatric Allergy and Immunology



Duke becomes **the first medical center to use the Novalis Tx system to treat patients with brain tumors**. This next-generation radiosurgery system destroys diseased tissue by focusing high-energy, precisely shaped beams of radiation from multiple directions.

## Patient-centered care is "Connected Care"

In early 2009 Duke's Division of Family Medicine became one of the first in the country to be recognized by the National Committee for Quality Assurance for operating a "Patient-Centered Medical Home."

Duke has been a leader in the national patient-centered care movement and has generated several successful programs aimed at helping patients receive the preventive care and chronic-disease management services they need. One of the earliest models—a program that reimburses caregivers to coordinate services for Medicaid patients—was one of the sources of "Community Care of North Carolina," a program that saved North Carolina Medicaid an estimated \$154 million in fiscal year 2007.

Duke has dubbed its patient-centered approach to health care "Connected Care." The iconoclastic initiatives are becoming a national and international model for reforming health care by improving outcomes while controlling costs.



"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, above left, Medical Director of Just for Us, a Duke community medicine program that provides free or low-cost health care to low-income seniors in their homes

"We envision a very different way of taking care of people. Ideally, these projects will lead to changes such as more widespread and convenient screening, education, and clinical care—and also better tracking about how and where people access the health care system, what care they need, what it costs, and what the outcomes are."

Lloyd Michener, MD, Chair, Duke Department of Community and Family Medicine



APRIL 2009

## Educating tomorrow's leaders

Duke's new Management and Leadership Pathway for Residents (MLP-R) program—one of the first of its kind in the nation—is announced. Begun in fall 2009, it provides Duke residents with hands-on experience in running an academic health care enterprise.

**"These residents will experience the universe of health system operations in a way that typically is reserved for senior leadership."**

William J. Fulkerson Jr., MD, Senior Vice President for Clinical Affairs at Duke University Health System and MLP-R Program Director



APRIL 2009

## A new fix for fibroids

### First in focused ultrasound

Duke University Medical Center becomes the first in North Carolina to offer **focused ultrasound for the treatment of uterine fibroids**. This treatment uses precise, high-intensity ultrasound waves to burn away fibroids without harming normal surrounding tissues.

While the exact etiology of fibroids is still unclear, physician-scientists at the Duke Center for Uterine Fibroid Biology

and Therapy have co-authored several of the most recent studies examining the underlying disease process that leads to the formation of uterine fibroids. These studies indicate that fibroids grow by accumulation of collagen and components of the extracellular matrix. This fibrosis is similar to that observed in the formation of keloid scars.

The center, which includes physician-investigators, basic scientists, and epidemiologists, is currently involved in several studies to elucidate the molecular biology of uterine fibroid growth and etiology for associated bleeding and subfertility.

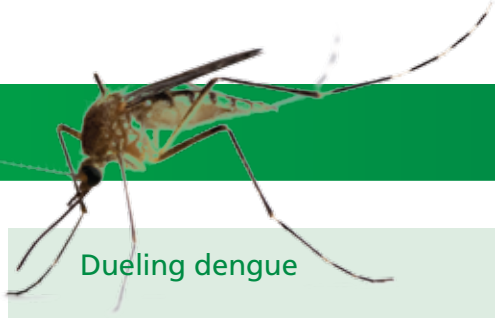


Millie Behera, MD, of the Duke Fertility Center (part of Duke's Department of Obstetrics and Gynecology) is leading the way in the treatment of uterine fibroids.



APRIL 2009

## Global collaborations



MAY 2009

## Patients come to Duke—online

### Dueling dengue

Scientists at Duke and the Duke-National University of Singapore (NUS) Graduate Medical School have **identified dozens of proteins the dengue virus depends upon** to grow and spread among mosquitoes and humans. This discovery could eventually be used to prevent or treat the disease. The study is indicative of the value of the research partnership between Duke University Medical Center and the Duke-NUS Graduate Medical School in Singapore, founded in 2005. (Nature. 23 April 2009.)

**“I was born in Puerto Rico, where dengue thrives, but Singapore is my classroom. The faculty there have given me the support to translate their knowledge about dengue into application in Duke’s laboratories, where the RNAi studies were done. Both schools benefitted from each other.”**

Mariano Garcia-Blanco, MD, PhD,  
Professor of Molecular Genetics and Microbiology,  
Duke University Medical Center/Duke-NUS  
Graduate Medical School Singapore



HealthView.DukeHealth.org, a Duke-created Web site that lets Duke patients schedule appointments, view their lab results, and pay their bills online, reaches the milestones of 100,000 registered patients and **1 million lab results delivered online**. Six months later, the number of registered patients reaches 150,000 and the lab results, 1.5 million.



Duke is building upon its foundation of excellence—literally. Within the next few years, Duke Medicine will open a new cancer center and a significant hospital expansion, ushering in a new era of patient care, research, and education.

The Duke Medicine Cancer Center, a state-of-the-art building devoted entirely to cancer care and research, will open in 2012.

The building will bring science into the clinic more effectively by providing space where patients can learn about and participate in Duke’s cancer clinical trials (currently numbering over 700). The facility will offer state-of-the-art training facilities for Duke’s top-ranked educational programs, and enable providers from many specialties to work together more efficiently in delivering care—thus furthering the multidisciplinary team approach to treatment that Duke is

MAY 2009

## Duke receives state approval for a new cancer center and a major hospital addition

JUNE 2009

## Bariatric surgery effective for diabetes

Duke Medicine broke ground this fall on a new 267,000-square-foot cancer center (interior rendering below). A 580,000-square-foot major hospital addition, Duke Medicine Pavilion, is also planned.



Courtesy Duke Medicine Architect's Office

famous for. At the heart of the vision for this space is to provide the best possible patient outcomes and the most positive patient and family experiences.

Duke Medicine Pavilion, a major addition to Duke University Hospital to open in 2013, will greatly expand the capacity for intensive care to meet growing demand. Sixteen new operating rooms and an expanded diagnostics platform will also be included. A high-tech surgical platform will not only enhance Duke's medical education programs and facilitate innovative research, but provide the capacity to meet surgical demands. When it opens, Duke Medicine Pavilion will sit at the heart of Duke University Medical Center.

Together, the new cancer facilities and the major hospital addition will help further Duke's goal of transforming care.

### A treatment with low complications

A Duke study presented at a meeting of the American Society for Metabolic and Bariatric Surgery is the first conducted on the **world's largest clinical dataset regarding bariatric surgery patients.**

Duke researchers reviewed data from nearly 60,000 patients and found that weight-loss surgery has low complications and mortality rates and can be an effective treatment for diabetic patients.

Duke's Christopher Newgard, PhD, director of the Sarah W. Stedman Nutrition & Metabolism Center, is conducting a separate study to determine why patients who undergo bariatric surgery show improved insulin sensitivity very quickly—within two to four weeks. He is working in collaboration with Eric DeMaria, MD, chief of endosurgery, and Laura Svetkey, MD, director of clinical research at the Stedman Center. (A Duke 2004 meta-analysis published in *JAMA* found that over time diabetes was completely resolved in 76.8 percent of patients who underwent bariatric surgery.)



Christopher Newgard, PhD, Director of the Sarah W. Stedman Nutrition & Metabolism Center

The pancreas was once thought to be the primary producer of hormones that regulate metabolism, but now scientists know that fat tissue itself, as well as the gastrointestinal tract, makes hormones that regulate energy balance and appetite.

"So if you've rerouted the stomach and the intestinal system through bariatric surgery, it stands to reason that you may have altered the production of hormones that are normally produced in the gut during food ingestion," Newgard says.

If this is really what's happening, he, DeMaria, and Svetkey want to find out exactly why. To do so, they will measure metabolites and other markers in patients both before and after bariatric surgery, and compare them to patients who lose weight by other means.

"We think this is going to be a very exciting model for understanding biochemical changes that drive improved insulin action," Newgard says.

Thousands of Duke bariatric surgery patients like Sue Dunham of Oxford, N.C., have contributed to the world's largest clinical dataset of bariatric patients, which showed that the surgery can be an effective treatment for diabetes.



## Selected national leadership positions currently held by Duke faculty

**Natalie Afshari, MD**, councilor, American Academy of Ophthalmology

**David M. Albala, MD**, executive committee, Society of Robotic Surgery

**Rand Allingham, MD**, vice president, Chandler Grant Society

**Solomon Aronson, MD**, president-elect, Society of Cardiovascular Anesthesiologists

**Deborah Attix, PhD**, board of directors, American Board of Clinical Neuropsychology; executive committee, Clinical Neuropsychology division, American Psychological Association

**Richard C. Becker, MD**, national spokesperson, American Heart Association

**Rick Bedlack, MD, PhD**, chair-elect, North American ALS Research Group

**Andrew Berchuck, MD**, chair, Scientific Advisory Committee of the Ovarian Cancer Research Fund; head of the steering committee of the Ovarian Cancer Association Consortium

**George Bisset, MD**, chairman of the board, Radiological Society of North America

**Salvador Borges-Neto, MD**, president, Southeastern Chapter of the Society of Nuclear Medicine; president, Cardiovascular Council of the Society of Nuclear Medicine; others

**Rebecca Buckley, MD**, Health Resources and Services Administration Advisory Committee on Heritable Disorders in Newborns and Children

**Thomas Coffman, MD**, president, American Society of Nephrology

**Coleen Cunningham, MD**, National Institutes of Health Council of Councils; Office of AIDS Research Advisory Council

**Toni Cutson, MD**, National Hospice and Palliative Care Organization Board

**Thomas D'Amico, MD**, vice chairman, board of directors, National Comprehensive Cancer Network (NCCN); PI, NCCN, Non-Small Cell Lung Cancer National Outcomes Database Project; chair, NCCN Governance Committee; NCCN Guidelines Steering Committee and Guidelines Committee for Lung Cancer and Esophagus Cancer; others

**Patricia M. Dieter, PA-C**, executive committee of the board of directors, International Association for Interprofessional Education and Collaborative Practice

**David Epstein, MD**, board of trustees, Association of University Professors of Ophthalmology

**Ramon Esclamado, MD**, at-large clinical council member, American Head and Neck Society

**Stephen J. Freedland, MD**, national primary investigator, Shared Equal Access Regional Cancer Hospital Database Study Group (SEARCH)

**Sharon Freedman, MD**, board of directors, American Association for Pediatric Ophthalmology and Strabismus

**Allan H. Friedman, MD**, president-elect, The Society of Neurological Surgeons

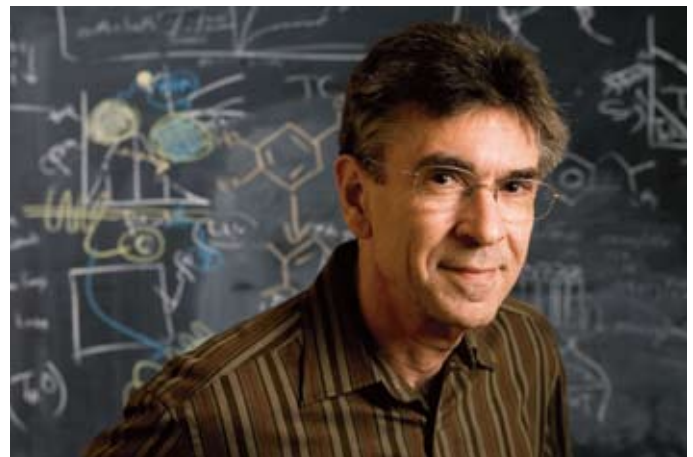
**Donald Frush, MD**, trustee, American Board of Radiology; first vice president, Society of Pediatric Radiology; board of directors, SPR; others

**William E. Garrett, Jr., MD, PhD**, Task Force for ABOS Orthopaedic; Sports Medicine certification exam; chair, Physical Fitness, Sports Medicine, and Research Committee, United States Soccer Federation

**Linda George, PhD**, chair, Mental Health Section, American Sociological Association

## National Medal of Science presented to Duke investigator

**September 29, 2008:** At a White House ceremony, President George W. Bush presented Robert J. Lefkowitz, MD, Howard Hughes Medical Institute investigator at Duke University Medical Center, with the nation's highest honor for science. Lefkowitz received the National Medal of Science for contributions to the biological sciences, in honor of a lifetime of research devoted to understanding the largest, most important, and most therapeutically accessible receptor system that controls the body's response to drugs and hormones.



**Larry B. Goldstein, MD**, board of directors and administrative cabinet, American Heart Association; leadership committee, Stroke Council, AHA; Advocacy Coordinating Committee, AHA; International Stroke Conference program committee, American Stroke Association; practice committee, American Academy of Neurology; vascular neurology examination committee, American Board of Psychiatry and Neurology; others

**Christopher Granger, MD**, vice-chair, American Heart Association's Mission: Lifeline

**Katherine P. Grichnik, MD**, chair, CME and Oversight Committee, American Society for Echocardiography; vice chair, CME Committee, Society of Cardiovascular Anesthesia

**David H. Harpole Jr., MD**, director, American Board of Thoracic Surgery; program committee co-chair, NCI Lung Cancer Steering Committee; others

**Robert A. Harrington, MD**, chair, Food and Drug Administration Cardiovascular and Renal Drugs Advisory Committee; board of trustees, American College of Cardiology

**Barton Haynes, MD**, Collaboration for AIDS Vaccine Discovery; director, Center for HIV/AIDS Vaccine Immunology; others

**R. Phillips Heine, MD**, oral board examiner, American Board of Obstetrics and Gynecology; membership committee and council member, Infectious Diseases Society for Obstetrics and Gynecology

**Leon Herndon, MD**, executive board, American Glaucoma Society

**Steven Hill, MD**, board of directors, Society for the Advancement of Blood Management

**Andra James, MD**, chair, Women's Health Issues Scientific Subcommittee of the International Society on Thrombosis and Haemostasis

**Vern C. Juel, MD**, chair, Neuromuscular Self-Assessment Examination Committee, American Association of Neuromuscular and Electrodiagnostic Medicine

**Priya S. Kishnani, MD**, member, National Advisory Child Health and Human Development Council

**Harold G. Koenig, MD**, board of advisors, The John Templeton Foundation

**Jeffery Kuller, MD**, board examiner, American Board of Obstetrics and Gynecology, Division of Maternal Fetal Medicine

**Paul P. Lee, MD**, boards of directors, Prevent Blindness America, American Board of Ophthalmology, ARVO Foundation for Research

**Jennifer S. Li, MD**, co-chair, Pediatric Drugs and Devices Committee, Child Health Oversight Committee of the Clinical and Translational Science Awards

**Anne Drapkin Lyerly, MD**, program chair, American Society of Bioethics and Humanities

**H. Kim Lyerly, MD**, National Cancer Advisory Board; chair, Cancer Centers Standing Subcommittee of the NCAB

**G. Burkhard Mackensen, MD, PhD**, research committee, Society of Cardiovascular Anesthesiologists; International Relations Task Force, American Society of Echocardiography; others

**P. Kelly Marcom, MD**, core member, breast committee, CALGB (The Cancer and Leukemia Group B); member, Breast Cancer Guidelines Panel, National Comprehensive Cancer Network (NCCN); Genetic/Familial High-Risk Assessment: Breast and Ovarian (NCCN)

**Daniel B. Mark, MD**, editor, American Heart Journal

**Janice M. Massey, MD**, director for neurology, American Board of Psychiatry and Neurology; finance committee, American Association of Neuromuscular and Electrodiagnostic Medicine; board of trustees, Abilene Christian University; others



**Joseph Mathew, MD**, abstract review committee, education liaison committee, Society of Cardiovascular Anesthesiologists

**Rex M. McCallum, MD**, board of governors, American College of Physicians; governor, American College of Physicians NC Chapter

**Brooks McCuen, MD**, executive committee, The Retina Society

**James McNamara, MD**, Institute of Medicine of the National Academy of Science; scientific advisory board, the Klingenstein Foundation; awards committee, American Neurological Association

**Michael Merson, MD**, member, Institute of Medicine Board on Global Health; chair, UNAIDS Reference Group on HIV Prevention; technical advisory group, Merck-Gates Foundation African Comprehensive HIV/AIDS Partnerships, Botswana; others

**Mohamad Mikati, MD**, Standing Committee for the International Special Societies, International Pediatric Association; WHO Advisory Group for Revision of the International Classification of Disease KD-10 Diseases of the Nervous System

**Joel Morgenlander, MD**, chair, Graduate Education Subcommittee, Association of University Professors of Neurology; second vice president, Association of University Professors of Neurology; Mild Traumatic Brain Injury Committee, National Football League

**Michael Morse, MD**, American Society of Clinical Oncology Scientific Program Committee

**Judd W. Moul, MD**, chair, Public/Patient Education Council, American Urological Association Foundation; localized prostate cancer guidelines committee, American Urological Association; physician advisor, Men's Health magazine; board of directors, National Association for Continence; others

**Amy Murtha, MD**, Infectious Disease Society for Obstetrics and Gynecology Council

**Rendon Nelson, MD**, president, Society of Computed Body Tomography/Magnetic Resonance

**L. Kristin Newby, MD, MHS**, chair-elect, AHA Council on Clinical Cardiology

**James Nunley, MD**, president, Southern Orthopaedic Society; others

**Manesh R. Patel, MD**, writing committee chair, ACCF/SCAL/STS/AATS/ASNC 2009 Appropriateness Criteria for Coronary Revascularization

**Mihai V. Podgoreanu, MD**, Basic Cardiovascular Sciences Council, Council on Cardiovascular Surgery and Anesthesia, Functional Genomics and Translational Biology Interdisciplinary Working Group, American Heart Association; others

**Thomas Polascik, MD**, symposium director, Third International Symposium on Focal Therapy and Imaging in Prostate and Kidney Cancer, Washington DC, February 2010; co-chair, Consensus Meeting on Focal Therapy for Prostate Cancer, Amsterdam, The Netherlands, June 2009; others

**Glenn M. Preminger, MD**, secretary-elect, American Urological Association; chair, American Urological Association Guidelines Panel on Nephrolithiasis; secretary/treasurer, International Society of Uroliathiasis; others

**William Rafferty, OD**, board of directors, president-elect, Association of Regulatory Boards of Optometry

**John F. Rhodes Jr., MD**, topic chair, Congenital Cardiology Section, ACC

**Henry Rice, MD**, chairman, education committee, American Pediatric Surgical Association

**Catherine Bowes Rickman, PhD**, scientific advisory board, Foundation Fighting Blindness



“We want to culture stem cells in a live piece of brain and see how they behave. I think sometimes you take small steps forward in science, and most of us are accustomed to doing that. But once in a while, you say, you know, the field’s moving a little bit too slowly—can we take a leap? And see if it works? So, this is one of those moments where we’re taking that leap.”

—CHAY KUO, MD, PHD, on his current research, for which he received three prestigious awards from the NIH, the Sontag Foundation, and the David and Lucile Packard Foundation in September 2008.

**Cary Robertson, MD**, NCCN Kidney/Testicular Cancer Panel for Clinical Practice Guidelines; others

**Matthew T. Roe, MD, MHS**, chair, ACTION Get With the Guidelines Registry Research and Publications Subcommittee

**David S. Ruch, MD**, president, Southeastern Hand Club; program chairman, American Society for Surgery of the Hand; secretary-elect, American Orthopaedic Association

**Kenneth Schmader, MD**, chair, American Geriatrics Society Research Committee; AGS liaison officer to Advisory Committee on Immunization Practices, Centers for Disease Control

**Angeles Secord, MD**, 2010 program and education committees, Society of Gynecologic Oncologists; Gynecologic Oncology Group Developmental Therapeutics Committee

**Andrew D. Shaw, MD**, research and program committees, Society of Critical Care Medicine; program committee, Society of Cardiovascular Anesthesiologists

**Maria Small, MD**, patient education committee, Society for Maternal-Fetal Medicine; Maternal Mortality Review Committee, American College of Obstetrics and Gynecology, District IV

**Peter K. Smith, MD**, chair, Joint American Association for Thoracic Surgery/Society of Thoracic Surgeons Nomenclature and Coding Committee; member, AMA Relative Value Update Committee; surgeon member, Writing Committee, ACCF/SCAL/STS/AATS/ASNC 2009 Appropriateness Criteria for Coronary Revascularization

**Craig Sobolewski, MD**, national advisor, American Association of Gynecologic Laparoscopists

**Mark Stacy, MD**, executive committee, Movement Disorders Section, American Academy of Neurology

**Mark Stafford-Smith, MD**, associate editorial board, Anesthesia and Analgesia

**Madhav Swaminathan, MD**, interoperative council board, American Society of Echocardiography; Advanced PTEeXAM Committee, NBE; others

**Paul Szabolcs, MD**, co-chair, Center of International Bone Marrow Transplant Registry Infection and Immune Reconstitution Working Committee

**Lynda A. Szczech, MD**, president-elect, National Kidney Foundation

**Debara Tucci, MD**, board of directors, American Academy of Otolaryngology - Head and Neck Surgery

**James Urbaniak, MD**, president, International Federation of Societies for Surgery of the Hand

**Fidel Valea, MD**, Society of Gynecologic Oncologists competencies subcommittee, education committee

**David Wallace, MD**, vice-chair, Pediatric Eye Disease Investigator Group

**David Witsell, MD**, coordinator for research, American Academy of Otolaryngology - Head and Neck Surgery

**Terence Wong, MD, PhD**, board, Society of Nuclear Medicine, PET Center of Excellence; chair, Abdominal Committee, ACRIN

**Jennifer Wu, MD, PhD**, American Urogynecologic Society Research Committee; National Institute of Child Health and Human Development, Pelvic Floor Disorders Network

**Patrick Yeung Jr., MD**, National Research Scientific Committee of the American Association of Gynecologic Laparoscopists

**Terri L. Young, MD**, American Academy of Ophthalmology Annual Meeting Program Subcommittee on Pediatric Ophthalmology; chair, Myopia Genetics program committee, International Myopia Conference; chair, Molecular Genetics program committee, Asia ARVO; others

# Brain Tumors

## “At Duke, there is hope”

The Preston Robert Tisch Brain Tumor Center at Duke, established in 1937, is one of the longest-standing and largest brain tumor research and clinical programs in the United States.

**A**t Duke, more than 250 clinicians, researchers, and staff are dedicated solely to investigating and treating brain cancer—including one of its most deadly forms, glioblastoma multiforme (GBM).

Historically, the standard treatment of surgery, radiation, and chemotherapy for GBM has had modest success. Most patients with this form of brain tumor survive approximately one year after diagnosis, and less than 10 percent survive beyond two years. These statistics provide the impetus for groundbreaking Duke investigations in search of new treatments, and several important studies are showing unprecedented promise.

### The potential of vaccines

Some of the most encouraging studies in the treatment of GBM are those involving immunotherapies.

“This vaccine represents a very promising therapy for a cancer that comes out of the blue and robs people of something most of us take for granted—time.”

John Sampson, MD, PhD, Duke neurosurgeon and lead investigator of a vaccine study

Recent advances in the understanding of immune function within the central nervous system have allowed for the development of these therapies.

One of the hallmark genomic changes in GBM cells is the amplification and over-

expression of the Epidermal Growth Factor Receptor (EGFR) gene, which occurs in approximately 50 percent of tumors. Of those tumors, 50 percent also acquire an oncogenic mutation in the EGFR gene, known as the EGFRvIII variant.

An early stage clinical trial carried out at Duke and the University of Texas M. D. Anderson Cancer Center in Houston showed the potential of EGFRvIII as a primary target for the immune system by using an EGFRvIII-targeted vaccine to standard treatment for newly diagnosed GBM. The addition of the vaccine produced a substantial increase in both progression-free and overall survival when compared to historical outcomes of surgery followed by radiation and chemotherapy alone. (*J Immunol Methods*. 339 2008)

### A new use for a powerful drug

In 2003, a national clinical trial led by Duke researchers was the first to show that the drug bevacizumab (Avastin) was effective in treating cancer in humans. Six years later, Duke researchers were instrumental in the Food and Drug Administration's approval of bevacizumab to treat GBM.

Duke conducted the first clinical trials that showed that bevacizumab shrinks the majority of recurrent malignant gliomas. (*Clinical Cancer Research*. 2007 Feb 15) Duke is conducting in phase 2 trials of bevacizumab plus bortezomib for recurrent GBM.

Duke researchers are also studying the use of bevacizumab in newly diagnosed GBM. “When we combined Avastin with radiation and the drug temozolomide (Temodar) for the treatment of newly diagnosed disease, we saw a significant improvement in progression-free survival,” says Duke's James Vredenburgh, MD, professor of medicine and the study's principal investigator. “It's exciting preliminary data. I think this is really going to change the survival outlook for patients with GBM.”

### Getting to know the enemy

One of the main goals of Duke's pioneering genomics research is to identify genomic profiles that are associated with specific characteristics of a disease. To this end, scientists at Duke and Johns Hopkins University have discovered mutations in two genes that appear to define a specific subtype of secondary GBM that is less aggressive.

These mutations could become therapeutic targets, and allow a patient to be treated with a more individualized approach.

The two genes, IDH1 and IDH2, are both involved in cellular metabolism and may be good targets for therapeutic intervention based on the findings that the variant protein is only expressed in gliomas and not normal tissue. The findings are published in the February 19, 2009 *New England Journal of Medicine*.

“All GBMs are basically considered the same and are treated in the same way,” says Hai Yan, MD, PhD, lead author of the study and assistant professor in Duke's Department of Pathology. “Our studies clearly demonstrate that we need to start thinking about them as different.”



John Sampson, MD, PhD



Darell D. Bigner, MD, PhD



Allan Friedman, MD



Henry Friedman, MD

## Duke cancer services at a glance

- Each year approximately **40,000 patients** with cancer seek care from Duke
- Duke currently receives **\$458 million** annually in cancer research funding from a variety of sources, a 97 percent increase over 2004
- More than **360 clinical trials** of novel cancer treatments are currently open at Duke. Fifty-four percent of patients who enrolled in clinical trials in 2008 were in Duke investigator-initiated trials
- Duke is a member site of and houses the statistical center for **Cancer and Leukemia Group B**, a national clinical research group that brings together clinical oncologists and laboratory investigators to develop better treatments for cancer
- Duke's **melanoma program** has been rated by the National Cancer Institute as one of the leading specialty clinics in the United States
- Duke, which aided the discovery of the breast cancer gene BRCA-1, continues to lead in breast cancer with **one of only two preventive breast cancer clinics in the country**
- The Duke Thoracic Oncology Program is **one of eight U.S. programs involved with the largest quality-improvement project** in lung cancer in the country—the NCCN lung cancer outcomes database project



“The idea is that you’ll start getting therapies that are aimed just at your tumor, which will be different than the person’s in the next room . . . .And there is hope. I mean, there’s just no question about it.” ALLAN FRIEDMAN, MD

Friedman, Deputy Director of The Preston Robert Tisch Brain Tumor Center at Duke is pictured above

along with Director Darell Bigner, MD, PhD, and Deputy Director Henry Friedman, MD.



Hai Yan, MD, PhD, helped discover mutations in two genes that appear to define a specific subtype of GBM.



# Parkinson's Disease: Pushing the boundaries

Duke investigators are exploring innovative approaches to a stubborn disease

Current treatments for Parkinson's disease, including dopamine-replacing medications and deep brain stimulation, relieve symptoms for years, but do little to slow progression of the disease. While continually improving pharmacologic treatments, Duke clinician-scientists also are making headway toward developing novel treatments that may come closer to a cure.

## Parkinson's: A spinal solution?

A novel stimulation method developed by Miguel Nicolelis, MD, PhD, the Anne W. Deane Professor of Neuroscience at Duke, is the first potential Parkinson's therapy to target the spinal cord instead of the brain and may offer an effective and less invasive approach for treatment. A March 2009 *Science* paper showed that the device restored locomotion and disrupted aberrant neuronal activity in mouse and rat models of the disease. "We see an almost immediate and dramatic change in the animal's ability to function when the device stimulates the spinal cord," says Nicolelis. "The device has the potential for widespread use in conjunction with medications typically used to treat Parkinson's disease."

## Gene therapy gets closer

Mark Stacy, MD, director of Duke's movement disorders program, is serving as co-principal investigator of a new national gene therapy trial using an improved method to deliver neurturin (a neurotrophic factor) to the neurons of Parkinson's disease patients. After proof-of-principle testing in six patients, 24 patients will be considered for a larger trial. "Gene therapy trials are an exciting next step in trying to actually slow progression of this disease," Stacy says.

Stacy earlier co-authored the pivotal trial leading to the 2008 FDA approval of Ropinirole 24-hour prolonged release. The trial showed that the medication yielded an improvement in both motor and non-motor symptoms, while permitting a reduction in adjunctive levodopa dose (*Neurology*. 2007 April 3).

## 20+ clinical trials for movement disorders

Currently, Duke offers patients enrollment in more than 20 clinical trials for Parkinson's disease and movement disorders, including:

- Trials to determine if the nutritional supplement creatinine can slow disease progression. The trial is part of NET-PD, a large effort funded by the National Institute of Neurological Disorders and Stroke to find medications to slow Parkinson's progression
- A trial testing whether coenzyme Q10 can slow disease progression
- A trial using SPECT scanning to visualize neurologic changes, possibly enabling physicians to diagnose and treat Parkinson's earlier

For more information about these trials, physicians may call 919-668-3597.



Mark Stacy, MD



Miguel Nicolelis,  
MD, PhD



Larry Goldstein, MD

## Extending the window for treating stroke

When a young woman was rushed to Duke recently with a stroke caused by a blood clot closing off a brain artery, she was already completely paralyzed on her left side. To try to prevent permanent paralysis or worse, doctors at the Duke Stroke Center raced the clock to open the artery.

Duke doctors performed a minimally invasive procedure with the MERCI (Mechanical Embolus Removal in Cerebral Ischemia) Retrieval System. A microcatheter was threaded from the patient's groin to her brain, and a "corkscrew" on the catheter's tip enabled doctors to grasp and remove the clot.

"Duke has advanced capabilities available 24/7 to remove clots from brain arteries in selected stroke patients who have passed the time window for dissolving clots with drugs such as tPA," says Larry Goldstein, MD, director of Duke's Stroke Center and a member of the board of directors of the American Heart Association.

Hundreds of patients each year receive treatment at the Duke Stroke Center, which includes an advanced multidisciplinary program to expertly treat patients with both microsurgical and minimally invasive endovascular procedures, as well as with radiosurgery.

### Other treatment options range from the simple to the complicated:

- Aneurysm clippings and coilings
- Embolizations
- Microsurgical resection of AVMs
- Cerebral bypasses
- Cardiac stand-still surgeries for complicated aneurysms

Duke is one of three universities in the country to receive an American Heart Association/Bugher Foundation Stroke Prevention Research Center award. The award is funding research to determine if there are genetic factors associated with small-vessel stroke.

"Gene therapy trials are an exciting next step in trying to actually slow progression of this disease." MARK STACY, MD



# Electrophysiology: New fronts on AFib

Atrial fibrillation (AFib) is the most common heart arrhythmia, and it's among the most frustrating to control. Long the leaders in EP, Duke Heart Center physicians have launched a Center for Atrial Fibrillation that offers new ways to help AFib patients keep the beat.

James Daubert, MD, joined Duke as director of electrophysiology (EP) in summer 2009, and his arrival coincided with an expansion of the EP program, including the new Duke Center for Atrial Fibrillation (DCAF). “The spectrum of therapies necessary to treat AFib falls under different specialties,” says DCAF director Tristram Bahnson, MD. “We created the DCAF to be a convergence of specialists, which enhances the depth of resources and makes it easy for faculty to draw on one another to formulate how best to care for each individual patient.”

## A new contender for first-line therapy

A major focus in the DCAF is catheter ablation, which is gaining ground as a strategy to help patients who don't respond to medication. According to a collective review of six smaller studies, roughly 80 percent of patients in their 50s and 60s who received ablation were free from recurrent episodes. Bahnson, who is director of catheter ablation services at the Duke Heart Center, has seen the proof up close. “There are many patients—probably more than half—who cannot get good control of their AFib despite use of the first-line therapies,” Bahnson says. With advanced catheter ablation techniques, Duke electrophysiologists can control symptoms in more than 90 percent of people seeking treatment.

These promising results lead to the question of whether ablation could become a first-line therapy for AFib. But a few important unknowns remain about its long-term effectiveness. Bahnson is one of the principal investigators of a large, multi-site investigation that will compare catheter ablation with drug therapies for initial treatment of AFib. “This study seeks 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.”

## Personalized promise?

One of the toughest aspects of AFib treatment is that there's no uniform strategy to manage the dysrhythms in the growing group of people with the disorder, says Patrick Hranitzky, MD, director of clinical cardiac electrophysiology at Duke. “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 longstanding history of hypertension—these differences involve not only what sustains it but what initiates it.”

Since 2006, Hranitzky and his colleagues have been assembling a biorepository and clinical database that will help them understand the underlying molecular mechanisms of AFib and other arrhythmias. The researchers will analyze cellular samples and use the information to search for genetic and molecular predispositions in various populations; they'll also use it to study patients' response to different treatments. “In reality it's going to take a collaborative effort among many centers,” he says. “We're not going to have all the answers, but personalized treatment for arrhythmias is something that we're moving toward.”

*Learn more about the Duke Heart Center at [dukemedicine.org/heartreport](http://dukemedicine.org/heartreport).*



James Daubert, MD



Patrick Hranitzky, MD



“We’re not going to have all the answers, but personalized treatment for arrhythmias is something that we’re moving toward.” PATRICK HRANITZKY, MD



Tristram Bahnon, MD, uses a Hansen Medical Sensei X Robotic Catheter System that allows catheters to be manipulated with greater control and precision within the heart. Outcomes research is under way at Duke to establish the value of this system and develop it further.

### Improving practice

Duke researchers are developing and employing a range of tools and techniques to make catheter ablation for AFib more efficient, effective, and safe, including:

- New ways to track and improve guidance of catheters, such as **3D ultrasound and intracardiac ultrasound**
- **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
- **Intracardiac ultrasound techniques** to make images of the heart from within, in order to assess catheter-based lesions in real time
- New types of catheters—such as **cryoablation catheters and irrigated catheters**—as well as new techniques such as balloon catheterization

### Duke Heart Center at a glance

- Duke Heart Center has the **nation’s top myocardial infarction care unit**, and developed the groundbreaking RACE-ER model to expedite heart attack treatment on a statewide level (see page 2)
- Duke has the **top heart failure program** in the United States, based on volume, funding, and publications
- The world-renowned **Duke Clinical Research Institute** houses the Duke Databank for Cardiovascular Disease, a repository of outcomes data from more than 200,000 heart patients
- Duke operates the **world’s largest cardiovascular MRI program**, based on clinical volume and research funding
- Duke has **the largest** heart transplant, congestive heart failure, adult valvular disease, and congenital heart disease programs in the Southeast
- Longest-running **post-CABG cardiac rehab program** in the country

# Sound Plans

Marrying state-of-the-art engineering and pioneering medical science, Duke's new Hearing Center is turning up the volume for millions who suffer from hearing loss

**R**achael Ragin was 45 years old before she knew that fizzy soda bubbles make noise.

Profoundly hearing-impaired from infancy, Ragin navigated the hearing world for years with the help of two powerful hearing aids and, in college, sign language and an interpreter. In 2003, she underwent cochlear implant surgery, performed by Duke neurotologist Debara L. Tucci, MD. Within several weeks, her hearing comprehension had soared to 95 percent.

"The world became magical with all the sounds it made," Ragin says. "Being able to better communicate with my family, hearing the wind in the trees, listening to rain fall...it was thrilling."

### "A flat miracle"

The cochlear implant is arguably the most significant advance to date in the treatment of hearing loss. "Thirty years ago, there were simply no treatments for someone who was deaf or had a severe hearing loss," says Duke-trained electrical engineer Blake S. Wilson, an adjunct professor in otolaryngology who also serves as the chief strategy advisor for MED-EL GmbH, a developer and manufacturer of cochlear implants. Wilson is internationally recognized for developing cochlear implant components.

In 1984 Wilson and Duke otolaryngology chief emeritus Joseph C. Farmer Jr., MD, established the Duke Cochlear Implant Program as one of the nation's first. Tucci has led the program since coming to Duke in 1993.

Not everyone with hearing loss is a candidate for an implant, and outcomes vary. But, says Wilson, "most of today's implanted patients can understand speech with hearing alone, without lip reading—many in noisy environments, some even on the telephone. To me, that's a flat miracle."

Many people who were born deaf—or who became so early in life—find fulfillment and pride in deaf culture. But for many others, the economic and emotional costs of hearing loss can be enormous. For those who became deaf before they learned to

speak, experts estimate a lifetime cost of more than \$1 million per person to address hearing-related challenges. Many of these people say their hearing deficit makes them feel disconnected, socially isolated, and discriminated against.

In January 2009, Duke's efforts to help these individuals were galvanized with the official launch of the Duke Hearing Center.

### Engineering solutions for hearing loss

Part of the plan for the new center, says Wilson, is to take advantage of an "explosion of knowledge" that's occurred in the fields of otology, neurotology, and engineering, particularly in the past 10 years.

"Duke has awesome resources and capabilities across the spectrum needed to develop new treatments for hearing loss, and we're highly unusual in that respect," Wilson says. "The combination of all these capabilities is what's so powerful."

Co-directed by Tucci and Wilson, both of the Department of Surgery's Division of Otolaryngology-Head and Neck Surgery, the center is fostering collaborations among faculty in the School of Medicine, the Pratt School of Engineering, the Duke Center for Cognitive Neuroscience, the Division of Neurology, the Duke Global Health Institute, and the Duke Institute for Genome Sciences & Policy.

For example, says Wilson, "about 60 percent of congenital hearing loss is caused by genetic defects, and there's huge potential to identify additional defects that lead to hearing loss and develop molecular repairs for them."

Another area of investigation the center plans to pursue is cellular-regeneration therapies. Some aquatic animals and birds regenerate their damaged inner-ear receptor cells with the help of nearby cells that act as stem cells. "We hope to build upon a rapidly growing body of knowledge to better understand the biology of the mammalian inner ear, with the goal of inducing hair-cell and neural regeneration and thereby restoring hearing," Tucci says.



“We hope to build upon a rapidly growing body of knowledge to better understand the biology of the mammalian inner ear, with the goal of inducing hair-cell and neural regeneration and thereby restoring hearing.”

DEBARA L. TUCCI, MD, DIRECTOR, DUKE HEARING CENTER



“Most of today’s implanted patients can understand speech with hearing alone, without lip reading—many in noisy environments, some even on the telephone.

To me, that’s a flat miracle.” BLAKE S. WILSON,

INTERNATIONALLY RECOGNIZED COCHLEAR IMPLANT ENGINEER



David Kaylie, MD

### Balancing act

Duke’s Vestibular Disorders Clinic—one of the few in the nation—helps patients with vertigo and other inner-ear disorders.

Led by neurotologist David M. Kaylie, MD, the program evaluates and treats children and adults suffering from Meniere’s disease, dizziness, vertigo, poor balance, and other inner-ear conditions, both suspected and confirmed.

The state-of-the-art facility offers a full array of testing and diagnostic services, and employs three sophisticated techniques to evaluate the physiological and functional status of patients’ vestibular systems: videonystagmography (VNG/caloric testing), rotary chair testing, and vestibular-evoked myogenic potentials (VEMP). The service also offers rehabilitative care to patients likely to benefit from it.

### Hearing and vocal problems among the elderly

Hearing loss and voice disorders are common among the elderly. But according to Duke researchers, they occur together more frequently than previously thought, and can increase the likelihood of depression.

In a study Seth Cohen, MD, found that nearly 11 percent of the 248 participants with a median age of 82.4 not only had both hearing and voice problems, they also had greater depression scores. He presented his findings at the American Laryngological, Rhinological, and Otological Society meeting in May 2009.

“It’s important to realize these disabilities often occur concurrently,” says Cohen, an otolaryngologist at the Duke Voice Care Center. “And when they do, they can increase the likelihood of depression and social isolation.”

Physicians at the Duke Voice Care Center treat a wide range of vocal problems, including aging voice, medically based voice disorders, singing voice problems, and more.



# Hepatitis C: A New Era

## Duke discoveries may soon give doctors the ability to tailor care for individual patients

Today's standard treatment for hepatitis C usually requires 48 weeks of treatment, is frequently accompanied by severe side effects, and has less than a 50 percent chance of a cure. So determining which of the current treatments to use, and even whether to treat now or wait, involves some complicated decisions.

Clinical studies this year from Duke stand a good chance of changing that. One finding arms physicians with the evidence they need to make those choices, and another promises to usher in a new era of shorter, more effective treatment.

### Informing decisions about therapy

Published online July 22, 2009, in the *New England Journal of Medicine (NEJM)*, results from the IDEAL study—the largest randomized clinical study comparing the leading available therapies for hepatitis C—showed no overall difference in sustained viral response to the most widely used treatments, says John McHutchison, MD, associate director of the Duke Clinical Research Institute (DCRI) and lead author of the study.

In addition, most patients in the study responded equally well to the standard dose of peginterferon alfa-2b (1.5 microgram per kilogram of body weight per week) and a reduced dose (1.0 microgram per kilogram). “This study tells us that if we need to decrease the dose of this drug in order to manage side effects, we haven’t significantly impacted the patient’s chances of response,” says Andrew Muir, MD, clinical director of hepatology at Duke and a co-author of the study. “That gives doctors the ability to tailor care to individual patients with the data and the literature behind them.”

### Mixing a better drug cocktail

A separate *NEJM* study from Duke showed that adding a protease inhibitor (telaprevir) to the current standard therapy shortens the duration of treatment and increases the percentage of patients who can be cured of the disease from 41 percent to 67 percent.

When the study was published April 30, 2009, an accompanying *NEJM* editorial called telaprevir a new era in hepatitis C treatment. The medication is now undergoing phase 3 clinical trials at medical centers nationally and internationally, including Duke.

“Right now, I can sit down with you as a patient and tell you we’ve got less than a toss of the coin’s chance of curing you with 48 weeks of our current therapy. In 2011, when this class of drugs will likely be approved, I could tell you that we’ve got a two out of three chance of curing you, and we will have to treat you for six months, not 12 months,” says McHutchison, lead author of the study.

### The latest: Genetically tailored treatment

A new study led by Duke clinicians and genetic scientists identifies a strong and significant genetic variant in the IL28B gene, associated with successful response to the standard therapy for hepatitis C—a groundbreaking finding that may rapidly lead to a diagnostic test that enables personalized treatment for hepatitis C patients.

Based on their findings, the Duke doctors and scientists envision a diagnostic test that would help predict each patient’s likelihood of responding well to treatment—a powerful tool to help patients and their clinicians decide whether to seek treatment, what kind, and with what success rate.

“The distinction among patients that this genotype allows us to make is truly dramatic,” says David Goldstein, PhD, of Duke’s Institute for Genome Sciences & Policy, the senior and lead author of the study published in the September 17, 2009 *Nature*. “It’s stronger than any of the previously known predictors of response to hepatitis C treatment.”

Given the brutal side effects and heretofore unpredictable efficacy of current therapeutic regimens, that kind of guidance would be invaluable, says McHutchison: “I think there’s a need for a test to be developed and produced quickly.”

The study also partly explains the notable differences in treatment response among patients of different races. For instance, previous research led by Muir showed that African Americans were less likely to respond to treatment. In the new study, the genetic variant associated with a higher treatment response was more common in whites than in African Americans.

The paper analyzed data and genetic samples from the IDEAL trial participants using a genome-wide association platform.

“We can now greatly increase the information available to clinicians about who is going to respond best to this treatment.” —DAVID GOLDSTEIN, PHD

JAMES CAVALLINI / PHOTO RESEARCHERS, INC



Andrew Muir, MD



John McHutchison, MD



David Goldstein, PhD



Anna Mae Diehl, MD



Debra Sudan, MD

## Duke offers small bowel transplants

In July 2009, with the arrival of surgeon Debra Sudan, MD, Duke launched a program offering small bowel transplants as well as intestinal lengthening procedures—lifesaving treatments that restore function for patients with irreversible damage to their native intestines. Highlights:

- Sudan has the **largest published experience** of lengthening procedures in the world literature
- The **only small bowel transplant program** in the Southeast
- One of **fewer than 10 such programs** in the country

- **Fewer than 200** intestinal transplants are performed in the U.S. each year
- Nationally, the **one-year survival rate** for intestinal transplant recipients is 79.8% (Source: United Network for Organ Sharing, transplants performed 1997-2004).

## Individualizing treatment for colon cancer

Researchers in the Duke Institute for Genome Sciences & Policy have developed a model for predicting risk of recurrence in early-stage colon cancer patients and have used the model to predict sensitivity to chemotherapy and targeted therapy regimens. In the study published December 2008 in the *Proceedings of the National Academy of Sciences*, the model predicted risk of recurrence with 90 percent accuracy.

## Revealing the causes of non-alcoholic liver disease

Duke clinician-scientists have found new clues to the causes behind liver injury that happens in non alcoholic steatohepatitis (NASH)—a crucial step leading to better management of this disease.

### NASH and the hedgehog pathway

- Duke clinician-scientists found that patients with NASH who show activation of a particular genetic pathway (hedgehog) are more likely to have advanced liver disease, including cirrhosis. Published online July 2009 in *Gastroenterology*, this study is the first to examine this pathway in patients with NASH. “Our findings identify a novel potential therapeutic target that might be exploited to keep people with NASH from developing cirrhosis. The next steps are to develop drugs that modulate the activity of this pathway. In addition, we plan to use this discovery to help develop new biomarkers to identify NASH patients who are at particularly high risk for developing cirrhosis and liver cancer,” says Anna Mae Diehl, MD, chief of Duke’s Division of Gastroenterology and senior author of the study.

### NASH Clinical Research Network

- One of only eight U.S. medical centers in the Clinical Research Network (CRN), Duke was one of the top enrollers of patients for the network’s patient history database and tissue repository. Funded by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), the NASH CRN conducts clinical studies on prevention and treatment of NASH.
- Results of a large NASH CRN treatment trial comparing pioglitazone, vitamin E, and placebo are expected to be announced in late 2009.

### NASH tissue repository

- Duke has created its own nonalcoholic fatty liver disease database and tissue repository with more than 800 patients currently enrolled. Participants donate small blood and tissue samples that Duke scientists use to develop new diagnostic tests and treatments for NASH.



## About Duke Medicine

As a world-class academic health care system, Duke Medicine strives to transform medicine and health locally and globally through innovative scientific research, rapid translation of breakthrough discoveries, educating future clinical and scientific leaders, advocating and practicing evidence-based medicine to improve community health, and leading efforts to eliminate health inequalities.

Consistently recognized as one of the nation's leading medical institutions, Duke is noted for generating new knowledge across the spectrum of basic and clinical sciences and rapidly translating those findings into improved patient care. Among our robust research programs are:

- The **Duke Translational Medicine Institute** (DTMI), established with a \$52.7-million NIH grant to expedite the translation of new scientific discoveries into clinical practice, promote measurable improvements in community health, and make personalized medicine a reality (see related story on page 6)
- The **Duke Clinical Research Institute**, part of the DTMI and the world's foremost academic clinical research organization. DCRI has conducted studies at nearly 3,600 sites in 64 countries and enrolled more than 580,000 patients; its faculty publish more than 600 research findings in peer-reviewed journals each year
- The \$200-million **Institute for Genome Sciences & Policy**, a campus-wide initiative to address the broad challenges of the genomic revolution
- The **Duke Global Health Institute**, a university-wide institute that works with all ten schools at Duke in the areas of research, education, service, and policy to reduce health disparities in our local community and worldwide

Through the Duke University Health System, we deliver these advances to a large and growing patient population in one of the country's fastest-growing regions. With more than 60,000 inpatient stays and 1.6 million outpatient visits annually, our clinical sites include the flagship Duke University Hospital, community-based Duke Raleigh and Durham Regional hospitals, Duke HomeCare & Hospice, ambulatory surgery centers, and more than 150 outpatient clinics.

Clinical care at Duke is also distinguished by a collaborative approach that combines the perspectives of physicians from many specialties with the broad experience of specialized nurses, physician assistants, and other health professionals to offer comprehensive, patient-centered care.

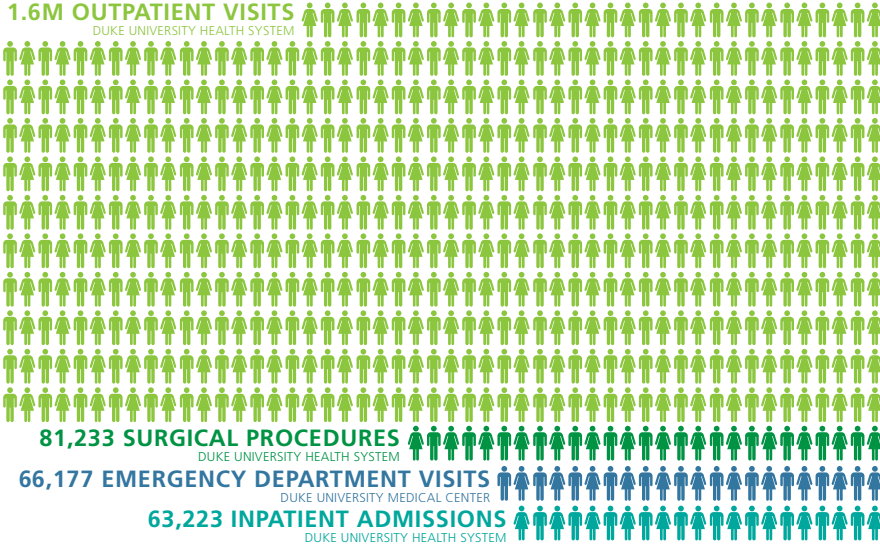
*Learn more about Duke Medicine clinical services at [dukemedicine.org](http://dukemedicine.org).*



# Facts and Figures

fiscal year 2009

## PATIENT CARE



## RESEARCH

> **\$600 MILLION**  
in sponsored research

**NIH FUNDING JUMPS** Fiscal year 2009: The Duke University School of Nursing's ranking in National Institutes of Health funding moves to 19th from 30th in the previous year. Meanwhile, Duke University School of Medicine was awarded over \$358 million in NIH funding in federal fiscal year 2007—ranking number 4 among American medical schools (most recent data available).

Source: brimr.org

Clinical trials currently ongoing at Duke

**4,200**

**1.8 MILLION**  
total patient encounters  
DUKE UNIVERSITY HEALTH SYSTEM

**5,295,665 LAB PROCEDURES**  
DUKE UNIVERSITY MEDICAL CENTER

3,000 PATIENTS =

## EDUCATION

**5,166**  
applications received for the School of Medicine's class entering September 2009  
100 slots were available

About 15 percent of Duke students are enrolled in the Medical Scientist Training Program, which leads to both an MD and a PhD in one of the basic sciences

**15%**

## RANKINGS

- #6** Duke's rank among American medical schools
- #2** Duke's physician assistant program ranking
- #15** Duke's rank among nursing schools
- #13** Duke's doctor of physical therapy ranking

Source: U.S. News & World Report

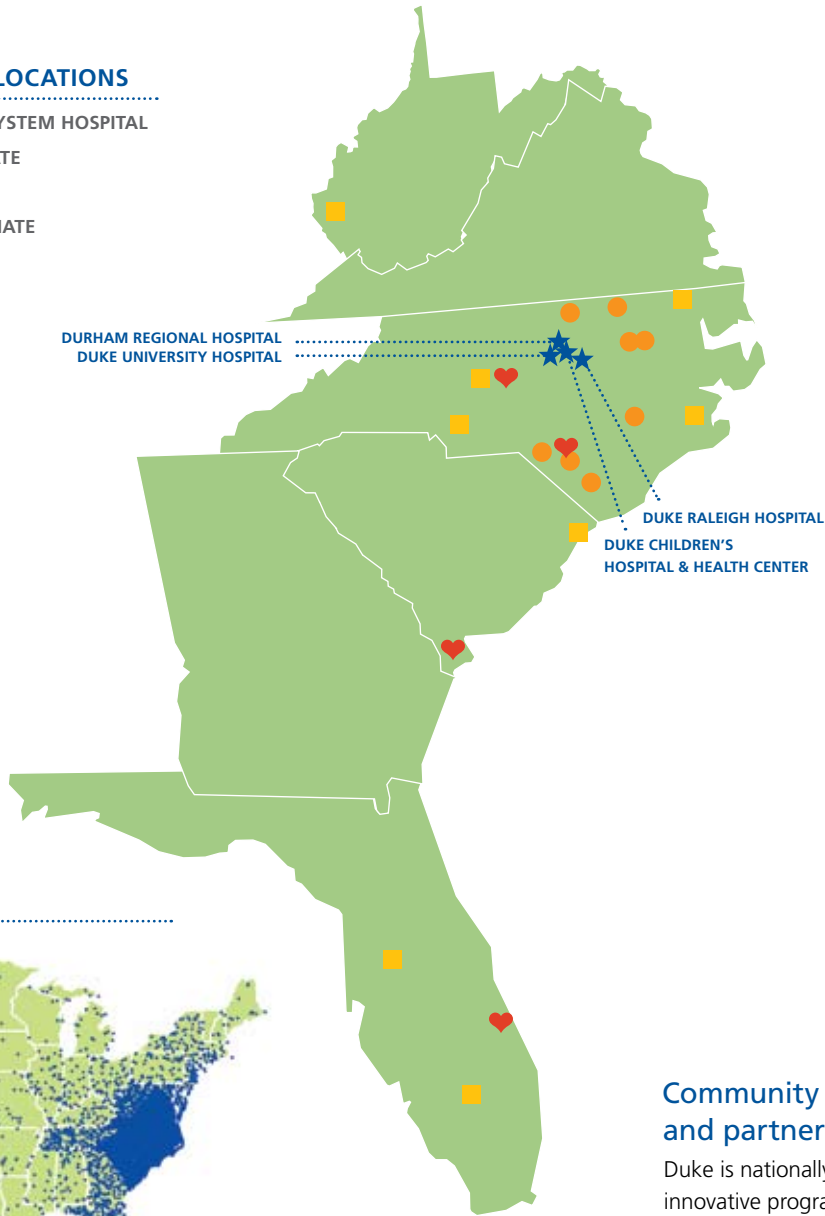
**CME**  
CME activities sponsored by the School of Medicine's Office of Continuing Medical Education in 2008 were attended by 37,621 physicians and 17,262 non-physicians

Duke launches first doctor of nursing practice program in North Carolina  
**2008**

# The Geography of Duke Medicine

## LOCAL DUKE MEDICINE LOCATIONS

- ★ DUKE UNIVERSITY HEALTH SYSTEM HOSPITAL
- ♥ DUKE HEART CENTER AFFILIATE
- DUKE CANCER AFFILIATE
- ONCOLOGY RESEARCH AFFILIATE



## PATIENT ORIGIN

### INPATIENT CASES 2009



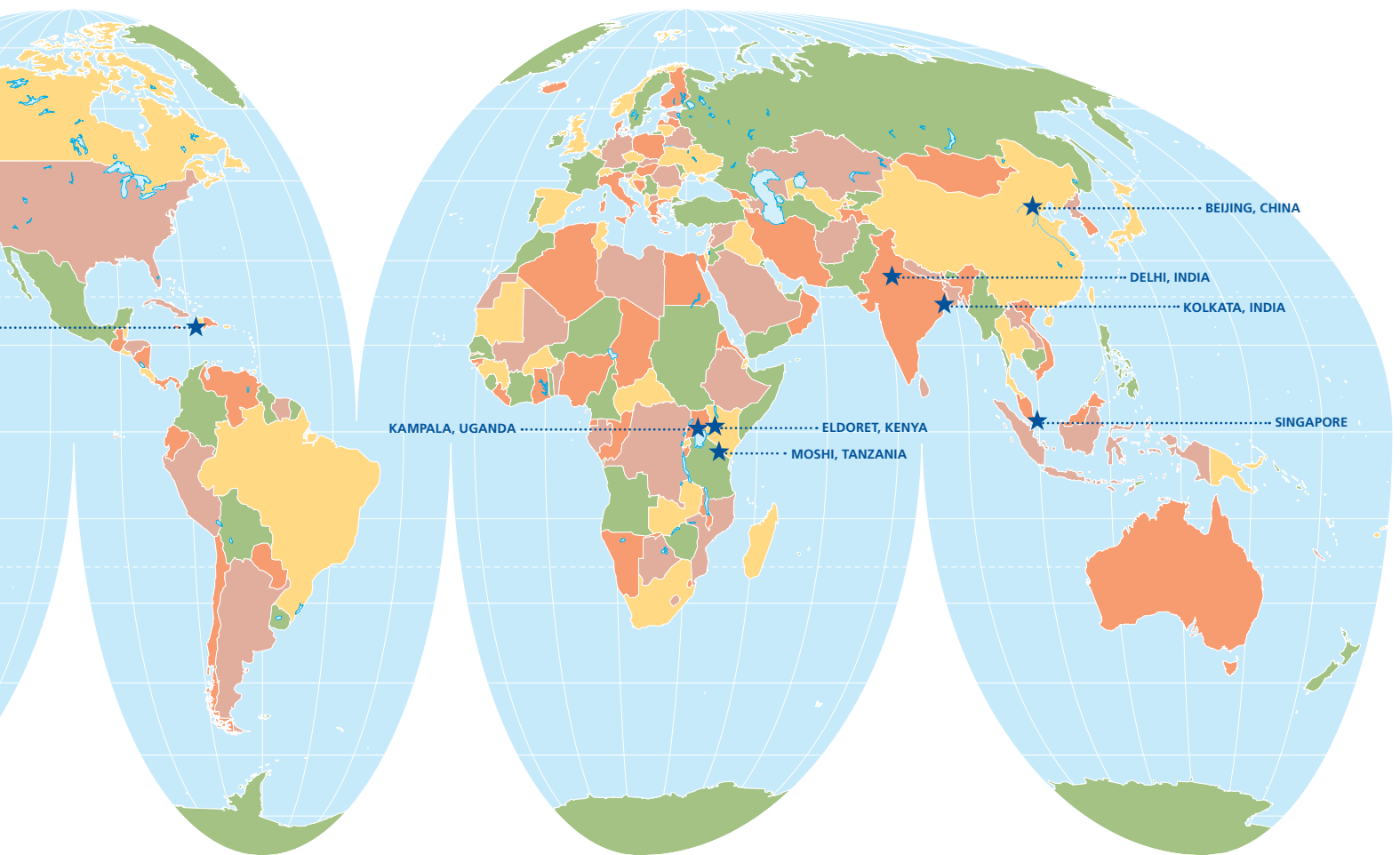
### OUTPATIENT CASES 2009



## Community benefit investments and partnerships

Duke is nationally recognized for developing innovative programs in partnership with community agencies and groups to improve the health of the local population, especially vulnerable and underserved groups. (Read about just a few of our many community outreach efforts on page 8.)

Duke Medicine also provides critical support through charity care and other contributions. Our combined community benefit investments (as defined by the IRS) and other investments in support of regional health care delivery totaled \$252 million in the fiscal year that ended June 30, 2009.



## SELECTED DUKE GLOBAL HEALTH SITES

1000 km  
Scale at equator

★ **Singapore** Home to the Duke-National University of Singapore Graduate Medical School

★ **Moshi, Tanzania** Site of Kilimanjaro Christian Medical Centre, where faculty, fellows, residents, and students work alongside Tanzanian health care workers in hospitals, outpatient clinics, in other regional health care centers, and within the local community to provide services and conduct research. Here, CHAVI (the Center for HIV/AIDS Vaccine Immunology) conducts studies to learn more about the immune response to HIV infection

★ **Eldoret, Kenya** America/Sub-Saharan Africa Network for Training and Education in Medicine (ASANTE) consortium, of which Duke is a partner, led by the Hubert-Young Center for Global Health

★ **Kampala, Uganda** Duke Global Health Institute and Global Health PLUS provide equipment and supplies to New Mulago Hospital, which will soon establish a new neurosurgical training program. Robertson Foundation-supported Health Systems Strengthening grant is under way with an interdisciplinary team from Duke. Site also holds a Fogarty International Center planning grant for stroke research

★ **Léogane, Haiti** Research and services—primarily related to cervical cancer—in partnership with Family Health Ministries

★ **Beijing, China** Duke-Peking University Global Health Diploma program launched summer 2009; Center for Excellence grant in cardiovascular disease in partnership with the George Institute for International Health in Beijing

★ **India** Cardiovascular disease studies under way in **Kolkata** and **Delhi**





## Talented and passionate, meet world-class and liveable

Duke continues to recruit physicians and nurses to meet growing needs

**DUKE MEDICINE HAS LAUNCHED** an effort to attract and retain a cadre of care-givers to help meet the needs of a growing regional population and an increasing demand for services.

“Duke’s hospital expansion, our new cancer center, and other expansion plans as well as the aging of the physician population means we’ll need to recruit approximately 200 physicians over the next five years,” says Paul Newman, executive director of the Private Diagnostic Clinic (or PDC, Duke’s faculty practice).

In addition, Duke continues to seek out the most talented and passionate nurses and nurse managers. “Our campus expansion means we’ll hire around 1,000 people over the next few years, and most of those will be nurses,” says Kevin Sowers, chief executive officer of Duke University Hospital.

The new Duke Medicine Pavilion, scheduled to open in 2013, will add 160 new inpatient rooms and 16 operating suites. The new cancer center, scheduled to open in 2012, will add 267,000 square feet dedicated to cancer care. (Read more on page 10.)

Newman says that the primary goal is to seek out excellent physicians who want to be part of Duke Medicine, and that diversity is a goal. “We strive to have the diversity of age, sex, and race of our caregivers match the diversity of Durham, the Triangle, and the key communities in central North Carolina that we serve,” says Newman.

*For more information, contact Suzanne Anderson, director of medical staff recruitment, at 919-419-5003 or [suzanne.anderson@duke.edu](mailto:suzanne.anderson@duke.edu).*

*For information about nurse recruitment, please visit [dukenursing.org](http://dukenursing.org).*

### Home, world-class home

*U.S. News & World Report* ranks Durham as one of the best places to live in the country. The magazine, which describes Durham as “a world-class center of all things advanced,” selected its 10 Best Places to Live 2009 based on their strong economies, low living costs, and fun diversions.

*Forbes* magazine ranked Raleigh #1 and Durham #3 on its list of the country’s best cities for business and careers in 2009.

The publications and organizations that have named Duke Medicine a best place to work include:

- *Carolina Parent*
- *Computer World*
- *Nursing Professionals*
- AARP
- *Modern Healthcare*
- NC Nurses Association

2010 ON-SITE COURSES	DATE	LOCATION	CREDITS
<b>ANESTHESIOLOGY</b> Ultrasound-Guided Regional Anesthesia Preceptorship	January 11–13, February 8–10, March 8–10, April 12–14, May 10–12, June 14–16, July 12–14, August 9–11, September 13–15, October 4–6, November 8–10, December 13–15	Durham, NC	20
Anesthesia Camp St. Thomas	January 27–30	St. Thomas, U.S. Virgin Islands	22
4th Annual Winter Anesthesia & Critical Care Review	February 28–March 5	Park City, UT	26
Carolina Cadaver Course	May 22–23	Durham, NC	12
<b>CARDIOLOGY</b> Preceptorship in Intraoperative Transesophageal Echocardiography	February 22–24, March 15–17, April 12–14, May 17–19, June 7–9	Durham, NC	27
Duke Cardiovascular Research Symposium	May 24	Durham, NC	8
Acute Coronary Syndromes Management: The Current State of Clinical Practice	April 29–30	Washington, DC	10
<b>ONCOLOGY</b> Spring Update on Cancer CARE	April 30–May 1	Las Vegas, NV	12
<b>RADIOLOGY</b> Musculoskeletal MRI & Neuroimaging Update 2010	January 16–19	Paradise Island, The Bahamas	18
Comprehensive Review of Musculoskeletal MRI	February 13–16 September 18–21 November 7–10	Orlando, FL Washington, DC Lahaina, HI	18 18 19
3rd International Symposium on Focal Therapy & Imaging of Prostate and Kidney Cancers	February 24–27	Washington, DC	24.75
Mammograms to MRI: Breast Imaging & Interventions 2010	June 13–16	Kiawah Island, SC	18
<b>SPORTS MEDICINE</b> Sports Medicine MSK Ultrasound, Diagnosis & Procedures Workshop	February 25–26	Durham, NC	15.5
<b>UROLOGY</b> 42nd Annual Duke Urologic Assembly	March 25–28	Orlando, FL	20

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

**LIVE WEBCASTS** Archived for on-demand viewing at [www.dcri.duke.edu](http://www.dcri.duke.edu).

	DATE	PRESENTER	<b>Accreditation with Commendation</b> In March 2009, Duke's Office of Continuing Medical Education was awarded Accreditation with Commendation for six years as a provider of continuing medical education for physicians. Six-year accreditation is the highest accreditation awarded by the Accreditation Council Continuing Medical Education, and only seven providers have received that recognition to date under the new accreditation criteria.
<b>DUKE CLINICAL MEDICINE SERIES: NEPHROLOGY</b> 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	
<b>DUKE CLINICAL MEDICINE SERIES: CARDIOLOGY</b> Management of Refractory Angina: Drugs, Devices, or Both	Noon, December 25	Magnus Ohman, MB ChB	

# DukeMedicine reVIEW

# '09



**February 2009:** Duke Raleigh Hospital joins Duke Medicine's other hospitals (Duke University Hospital and Durham Regional Hospital) as a recipient of **Magnet designation for excellence in nursing** by the American Nurses Credentialing Center. Only 5 percent of the nation's hospitals have earned this designation.



**April 2009:** Duke University Hospital receives the **Thomson Reuters 100 Top Hospitals Everest Award**, which honors an elite group of the 2008 100 Top Hospitals: National Benchmarks Award winners. Given to only 23 hospitals in the country, the Everest Award recognizes those who demonstrated the highest performance and fastest rates of long-term improvement on the National Balanced Scorecard.



**July 2009:** Duke University Hospital is one of only three hospitals honored with a 2009 **American Hospital Association-McKesson Quest for Quality Prize** award, receiving the Citation of Merit.

**July 2009:** For the 20th consecutive year, Duke University Medical Center is ranked **among the top 10 on the Honor Roll of "America's Best Hospitals"** by *U.S. News & World Report*.



This report is printed on ArborWeb Plus, 80-lb text.  
Environmental savings realized by using this paper are summarized below:

Lbs of paper used **32,400** | Trees saved **96** | Water saved in gallons **34,893** | Landfill waste reduced in lbs **5,773**  
Greenhouse gas reduced in lbs of CO2 **34,905** | Energy consumption reduced in million BTUs **66.2**