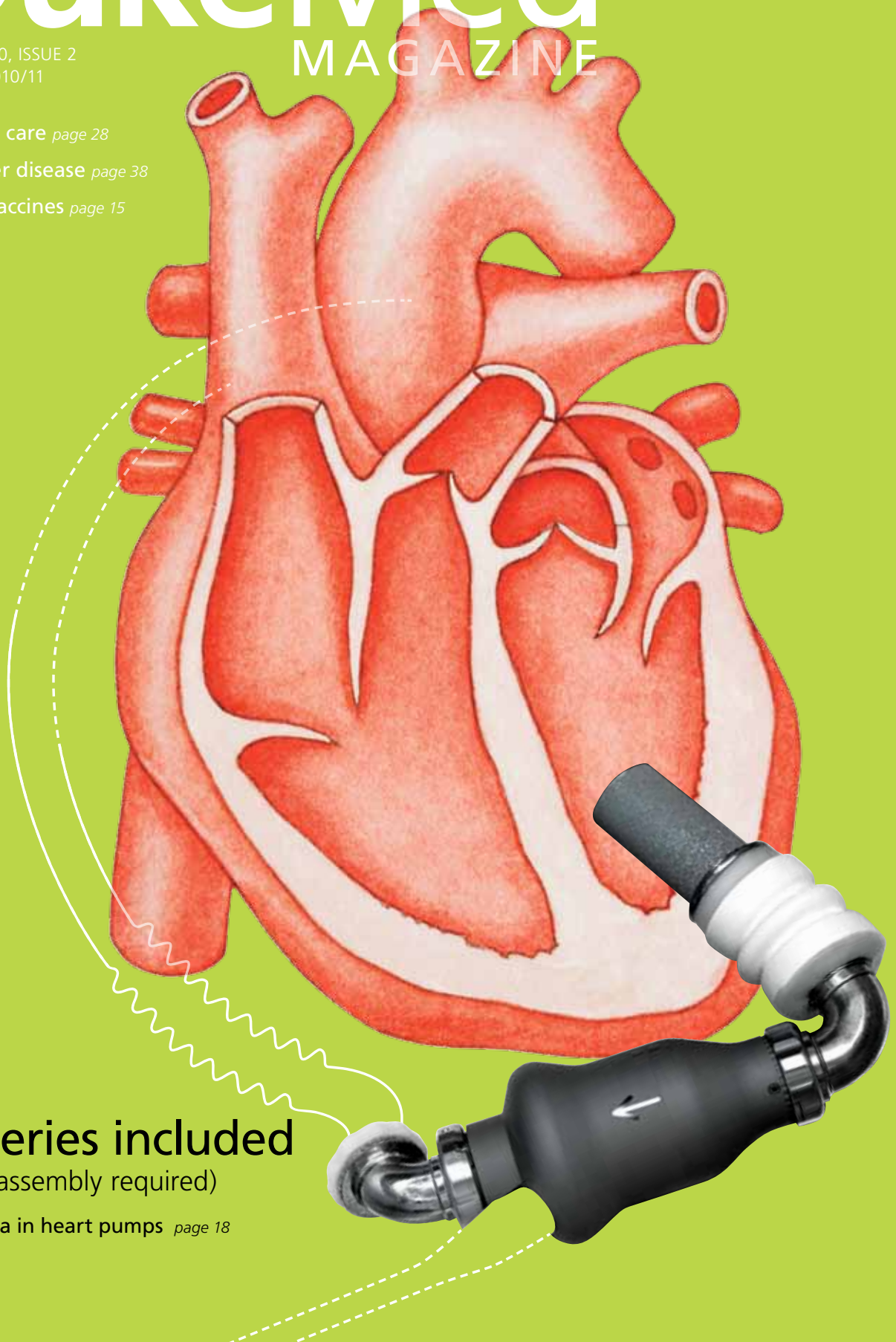
DukeMed MAGAZINE

VOLUME 10, ISSUE 2
WINTER 2010/11

Palliative care *page 28*

Fatty liver disease *page 38*

Cancer vaccines *page 15*



Batteries included

(Some assembly required)

A new era in heart pumps *page 18*

A new day for cancer patients, at Duke and beyond

November 4, 2010, marked two historic milestones for cancer care and research at Duke Medicine.

First, at an afternoon gathering of cancer survivors, faculty, staff, and friends, we celebrated the "topping out" of the new Duke Cancer Center building, which will open to patients in 2012. The sight of a giant crane lifting the final beam seven stories in the air to complete the steel framework of the new facility was truly awe-inspiring. Even more inspiring, to me, was the fact that more than 1,000 members of the Duke cancer community had made a point of signing their names to the beam before it was placed. Those signatures are a tangible reminder that it is people who are at the heart of this new building—the many patients we serve, and the deeply committed team of people who are dedicated to making Duke a place of healing and hope for decades to come.

People are also at the heart of another milestone we celebrated on November 4: the official launch of the Duke Cancer Institute (DCI). In the planning stages for more than a year, the DCI is a bold new approach to cancer research, clinical care, and education designed to deliver scientific breakthroughs from the laboratory to cancer patients even faster.

The need to accelerate progress against cancer is clear. It has been almost 40 years since the National Cancer Act declared our nation's war against this devastating disease. While medicine has made great strides over those decades, there are still too many people whose cancer cannot be effectively treated, or who do not even have access to the best treatments. At the same time, the burden of cancer continues to grow: in North Carolina, the rate of new cancer cases is expected to climb by 16.5 percent from 2009 to 2014, while the United Nations projects a doubling of cancer deaths worldwide by 2030.

These great needs have driven us to ask what we as an institution could do to maximize our impact on cancer. Cancer care and research have been a deep strength and ongoing commitment at Duke—we were named one of the original eight comprehensive cancer centers by the National Cancer Institute in 1972, and today we rank among the very best cancer hospitals nationwide—but we believe that we can and should do more.

Toward that end, we convened a blue-ribbon panel of the best and brightest minds in cancer nationwide to envision the optimal environment for advancing cancer care, training, and research. We also analyzed the best practices of other leading cancer centers, and conducted many meetings with Duke faculty and staff to seek ideas and input. From this intense study and discussion came the plan to revolutionize the way we marshal Duke's efforts in the war on cancer: the Duke Cancer Institute.

The institute is the first of its kind at Duke, a single organizational structure that breaks down traditional departmental boundaries to unite and align all those dedicated to cancer care, research, and treatment toward a shared goal: accelerating the translation of scientific breakthroughs to improve patients' experience and outcomes. The DCI will organize more than 300 cancer physicians and scientists and 500 clinical staff from across Duke into teams focused on addressing the unique challenges of specific cancer types, such as breast, lung, and prostate cancers.

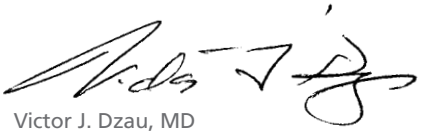
The DCI represents our highest commitment to transforming cancer care and research. Altogether, we will invest nearly $400 million in this initiative, including funding to construct our new cancer building, enhance and expand our clinical services, invest in state-of-the-art technologies, and recruit even more world-class physicians and scientists. A nationwide search for the executive director is now under way, with Pharmacology and Cancer Biology chair Anthony Means, PhD, and Radiation Oncology chair Christopher Willett, MD, serving as interim co-directors.

Through these significant investments, and through the passion and dedication of our entire cancer team, we intend to realize our vision of improving care and finding cures for patients in our community and around the world. We are excited about this new day in cancer care and research, and look forward to sharing our progress with you in the months and years ahead.

The 267,000-square-foot Duke Cancer Center building is scheduled to open in 2012. Read more on page 3.

Victor J. Dzau at the Duke Cancer Institute launch, November 4, 2010

Watch a video about the Duke Cancer Institute at cancer.duke.edu.



Victor J. Dzau, MD

Chancellor for Health Affairs, Duke University
President and CEO, Duke University Health System
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Expansion updates

Topping out the new Duke Cancer Center

THE FINAL STEEL BEAM that will frame the Duke Cancer Center facility was lifted into place at a topping-out celebration on November 4, marking an important milestone in the construction of the seven-story, 267,000-square-foot facility. More than 1,000 Duke Medicine physicians, staff, patients, and friends signed the beam before and during the ceremony, which also served to launch the new Duke Cancer Institute (see chancellor's message, inside front cover). Designed to centralize Duke cancer services, accommodate growing demand for care, and enhance the patient and family experience, the Cancer Center facility is scheduled to open in 2012.

For more information see page 42 and visit dukemedicine.org/construction.

Duke Raleigh grows its cancer services

THIS SUMMER DUKE RALEIGH CANCER CENTER opened a new oncology clinic that has significantly expanded its services—particularly chemotherapy infusion. The new infusion area offers patients a more comfortable environment, with windows that overlook the Duke Raleigh Gardens, and the improvements will also support anticipated future growth at Duke Raleigh Cancer Center. Currently, the hematology–oncology clinic sees an average of 50 patients a day, and it has experienced substantial growth in infusions as a result of expansion in the gynecologic oncology program. In July, longtime Duke professor of medicine (medical oncology) Joseph Moore, MD, was named medical director of the Duke Raleigh Cancer Center; he will oversee the center's continued expansion in breast, colorectal, thoracic, and head and neck cancer services.

A new building for medical education

2010 MARKED THE 80TH YEAR of Duke medical student education—and the start of its first new facility since classes began in the Davison Building in 1930. In October, the School of Medicine hosted a ceremonial groundbreaking for its new, $53-million Learning Center. The six-story, 84,000-square-foot building will house teaching and simulation laboratories, an auditorium, state-of-the-art classrooms designed to accommodate team-based learning activities, and a student life center. The new Learning Center will be built between Research Drive—home to many of Duke's biomedical research labs—and the hospital's new Duke Medicine Pavilion, which is currently under construction. The center is scheduled for completion in late 2012.

*See photos from the groundbreaking event on page 43 and visit **medalum.duke.edu** to learn more.*

A pill for every ill

Managing the pitfalls of polypharmacy

IN JUNE 2009, TONIA BASS lost two things: her job and her health insurance. She had a variety of health issues and a collection of prescriptions to go with them—between 12 and 15 at any given time, including vitamin supplements. Bass is part of a growing patient population: those who take medications to manage two or more chronic conditions. Many of these patients have more than one prescriber, as well, which can create risk for drug-related problems caused by polypharmacy—medications prescribed with no indication, adverse drug interactions, duplicate drug therapy, and non-adherence to treatment regimens.

Bass was able to participate in Project Access of Durham County, a program that connects uninsured patients receiving care at Lincoln Community Health Center (LCHC) to a local network of Duke specialists and others who donate specialty care. In August 2008, the LCHC Pharmacy was accepted by a federal agency into a project focusing on medication reconciliation for patients in Project Access—with the end goal of helping caregivers better understand patients' medication needs, avert potential drug interactions, and make sure patients can obtain the drugs they've been prescribed and follow through on taking them.

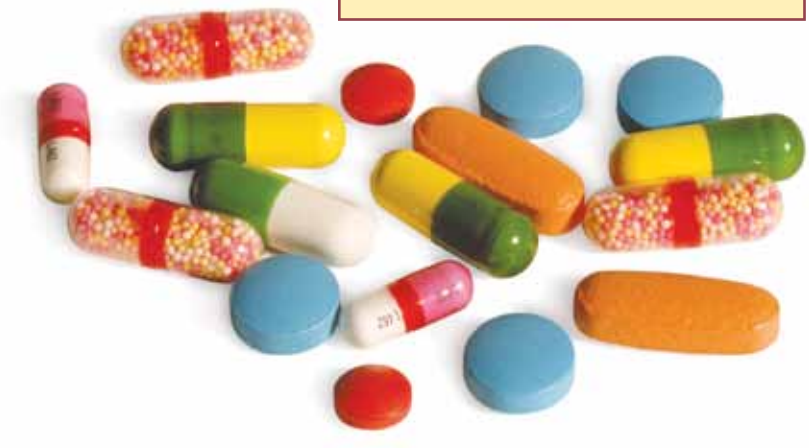
Through this project, Project Access went from having a current, comprehensive medication list for only about 20 percent of its patients to 100 percent. "The key to our success was having a single point of accountability for all the services we were providing to Project Access patients," says Duke's Lynn Robbins, PharmD, project leader. "We designated a pharmacy care coordinator who makes absolutely sure that every service is provided for our patients."

Duke University Hospital achieves the same single-source accountability by using electronic prescribing as its single central repository for drug ordering, says Philip Rodgers, PharmD, director of pharmacy education at Duke Area Health Education Center. The health system also deploys Duke pharmacists into Duke clinic settings, such as primary care clinics, where the risk for errors and adverse effects related to polypharmacy can be high. "We provide doctors and nurses with medication review and assist them in problem-solving," he says, adding that there are also pharmacists based in Duke's anticoagulation, lipid, and certain oncology clinics. "We are exploring opportunities to possibly deploy pharmacists to other clinics, such as transplant and other oncology areas."

3 ways clinicians can help

Although patients are responsible for keeping providers informed about the medications they are taking, Philip Rodgers, PharmD, says there are three steps clinicians can take to help create an accurate medication list:

- **Acknowledge** the medication information you have at hand is probably not completely accurate.
- **Conduct** a thorough medication reconciliation review with the patient to prevent duplicate therapy or adverse drug interactions.
- **Call** the patient's pharmacy to get a list of medications other providers have prescribed and what medications the patient has been picking up.



Safer scripts for kids

FEWER THAN 10 PERCENT of licensed therapeutics have been adequately studied in children, a statistic that Daniel Benjamin Jr., MD, PhD, calls "staggering."

As a result, "Much of pediatric drug use is based on an educated guess by a pediatrician using studies conducted in adults, who often absorb drugs differently or experience different side effects than children," says Benjamin, a professor of pediatrics at Duke and associate director of the Duke Clinical Research Institute (DCRI).

As leader of the newly created Pediatric Trials Network (PTN), he intends to change that. The PTN was launched by the National Institutes of Health (NIH) this fall to reduce the risks and dangers to children who are prescribed medications that lack definitive data about pediatric dosing, efficacy, and safety.

The seven-year, $95-million initiative will conduct 16 pediatric clinical trials spanning a variety of therapeutic areas, including cardiovascular diseases, cancer, infectious diseases, gastroenterology, respiratory diseases, neonatology, and medical devices. It will be led through a collaboration between the National Institute of Child Health and Human Development, the Best Pharmaceuticals for Children Act Program, and the DCRI.

DUKE-NUS GRADUATE MEDICAL SCHOOL

Pictured at the Duke-NUS phase II agreement signing ceremony, held November 30 in Singapore, are (seated from left to right) signatories Michael Merson, vice chancellor for Duke-NUS affairs and director of the Duke Global Health Institute; Victor Dzau, chancellor for health affairs, Duke University; and Tan Eng Chye, provost, National University of Singapore; and (standing from left to right) witnesses Tan Ser Kiat, group CEO, SingHealth; Tony Chew, chairman, Duke-NUS Governing Board; Khaw Boon Wan, minister for health; Ng Eng Hen, minister for education and second minister for defense; Ranga Krishnan, dean, Duke-NUS; and Tan Chorh Chuan, president, National University of Singapore.

Duke-NUS partnership extended, new PhD program added

FIVE YEARS AFTER Duke University and the National University of Singapore (NUS) established a joint graduate medical school in Singapore, the venture is thriving. The project's successes to date led to the signing of a phase II agreement in November to expand the growth and development of the Duke-NUS Graduate Medical School Singapore (Duke-NUS).

The phase II agreement will strengthen Duke's contribution as a research and educational partner to the school and help to continue to position Singapore as a global hub of biomedical expertise. The extended agreement will also serve to further align the school's research, education, and patient care programs with SingHealth, Singapore's largest group of health care institutions.

The Duke-NUS project has flourished in its first five years of rapid growth, with partners citing a commitment to its fundamental vision and its unique approach to medical instruction. Modeled upon Duke's innovative medical curriculum, which includes a year dedicated to independent study and research, the school has also pioneered novel team-based learning strategies that are now being incorporated in many of the courses at Duke University School of Medicine—one example of the partnership's bidirectional benefits, leaders say.

As one of the few medical schools in the region based on the American model of graduate medical education instead of traditional undergraduate model, Duke-NUS emphasizes translational and clinical research, with five signature research programs in cancer and stem cell biology, neuroscience and behavioral disorders, emerging infectious diseases, cardiovascular and metabolic disorders, and health services and systems research.

Recently, the school began a PhD program to prepare students who wish to pursue careers in biomedical research. The Integrated Biology and Medicine program, which focuses on translational research and grooming students to become research team leaders, enrolled its first 12 students in August.

Overall, Duke-NUS has more than doubled its enrollment since the inaugural class of 26 students arrived in 2007, drawing top students and distinguished faculty from around the globe. The school will graduate its first class of medical doctors with a joint MD degree from Duke University and NUS in 2011.

Learn more at ***duke-nus.edu.sg****.*

Welcome to the intellectual hotel

A new center brings far-flung scientists together to move their research forward.

NICO KATSANIS, PhD, says the new model of doing science should be to abandon the model. "A lot of the problems we are now facing are experimentally intractable through a single approach," he says. At the same time, research is becoming so specialized that the journals of one researcher's discipline read almost like gibberish to a researcher in another field.

What's needed now, Katsanis believes, is the dissolution of the classical boundaries between departments—and a means to help them learn from each other. The Center for Human Disease Modeling, which he launched in December 2009, is the result of this vision: what Katsanis calls "an intellectual hotel" where investigators from diverse scientific and medical disciplines can meet and collaborate, to challenge and perpetuate each other's science.

The center offers Duke researchers a place to bring their new, perhaps unusual ideas and find peers who can analyze them, critique them, and figure ways in which their own research might catalyze discovery in the work of others. Pivoting around the central idea of using broad basic science to assist the management of patients, the center is investing heavily in the development of tools that can be used to solve problems of clinical significance. For example, the center has worked with a number of investigators to help develop functional assays using small animal models such as worms or zebrafish (see sidebar) to understand how genetic variation can contribute to human disease. "The idea is to provide a little bit of activation energy," says Katsanis, "and support for the early stages of synthetic work—specifically for projects that may otherwise not be funded by traditional routes, because they are either too high-risk or too premature."

The only requirement for researchers to participate in the center is that their work must have, even if only very loosely, some link to human health. Katsanis is excited about the opportunities he sees for seemingly unaffiliated science to connect in this way—to get clinicians and researchers talking, when otherwise they might not.

For example, Katsanis is currently collaborating with Ronald Goldberg, MD, chief of neonatology, and colleagues on a new hybrid taskforce in which pediatrics research scientists and clinicians can get together and look at particularly vexing cases. "Duke University Hospital is a major referral hospital, which means that we see patients with challenging diagnoses and murky outcomes," he says. "In some instances we can make the joint decision to bring these cases into the lab and see what we can develop from it. My thought is that these efforts will not only inform the care of the patient, but also sprout out to experimental avenues that we have never even thought about.

"When I was conducting research into Bardet-Biedl syndrome [or BBS, a complex genetic disease that affects many parts of the body], I felt the need to be a nephrologist, ophthalmologist, psychiatrist, pulmonary biologist, the list goes on. I couldn't possibly do all those things and do them well," Katsanis adds. "That is the point where I started to branch out and seek out colleagues to help me. Many people have helped me during the course of my career, and now it's time for me to use that model and pay it forward."

"Clinicians and researchers have been trained and wired in a particular fashion; therefore each only sees one side of the cube. We have our own biases about what the cube looks like, but it's only when you view it from the other's perspective that you can get a clear understanding."

—NICO KATSANIS, PhD, ON ADVANCING SCIENCE AND CLINICAL CARE THROUGH COLLABORATION

The benefits of rare findings

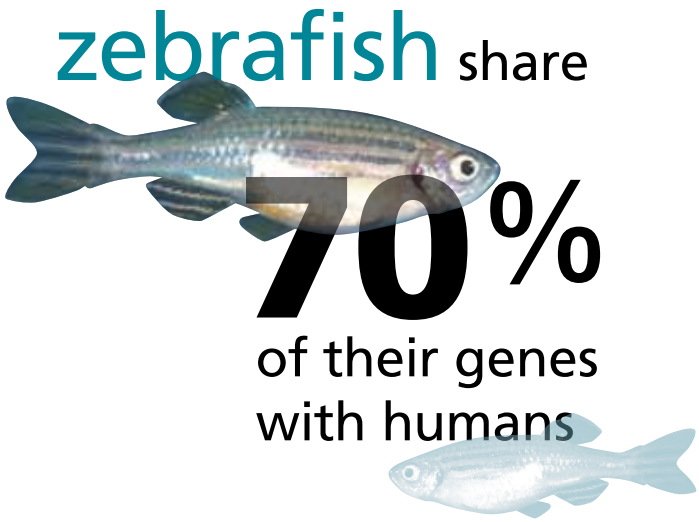
Nico Katsanis is drawn to challenges. In graduate school he mapped and cloned candidate genes for Down syndrome, but ultimately found the work too mainstream for his taste. When his postdoctoral advisor offered him the option of tackling a virtually unknown and hard-to-crack disease—Bardet-Biedl syndrome (BBS)—Katsanis jumped at the chance. It took what he describes as an "atrocious" two-and-a-half years before they uncovered the first gene for the disease.

"Every hypothesis I had about the syndrome was wrong, but the truth was more exciting," says Katsanis. "It has taught me to try as hard as I can not to pigeonhole myself and to just let the science take me where it takes me. I have to tell you, it has been a hell of a ride."

Katsanis took an unusual tactic: he analyzed every single disease variant reported in BBS patients—about 150 in all—and examined their function in zebrafish. The results have been surprising. In 20 percent of BBS patients, it takes a combination of three mutations to manifest the disease.

"We have a far more precise—not fully accurate—but far more precise notion of the disease architecture from doing this experiment," says Katsanis. "And I am willing to bet—in fact, I am betting my entire career—that this is going to be an approach that will be useful for many other problems of clinical relevance."

Katsanis intends for the Center for Human Disease Modeling to help scientists learn to use the vast and expanding universe of data from genetic research to have more direct clinical impact on illnesses, from BBS to cancer. "I think genetics has enormous potential to empower physicians by helping them to understand what is going on in one single patient at a time and to be able to manage therapeutics appropriately," he says. "We have made a lot of progress in understanding fundamental mechanisms of human genetic disease, but when it comes to prognosis, we tend to revert to population-based statistics. We have to do better."



A think tank, with zebrafish

Investigators at the Center for Human Disease Modeling are developing functional assays using zebrafish, a close relative of the minnow, whose transparent bodies make it easy to observe all stages of development. Since zebrafish share 70 percent of their genes with humans, they can also be "humanized," meaning that the fish version of a gene or set of genes can be replaced by their human equivalents. Some of the zebrafish-assisted research through the center includes:

- **Investigation of the genetics of muscular dystrophy.** In collaboration with the center, medical geneticist Michael Hauser, PhD, utilized zebrafish to functionally assay mutations found in limb girdle muscular dystrophy (LGMD), a group of disorders that affect voluntary muscles around the hips and shoulders. Instead of waiting months or years for a transgenic mouse to show symptoms of muscular dystrophy, Hauser is now able to see muscle degeneration in three days with zebrafish injected with mutant human transcript.
- **Creation of a zebrafish model of angiogenesis** (the growth of new blood vessels). Chris Kontos, MD, director of Duke's Medical Scientist Training Program, and Katsanis created a zebrafish model to obtain important in vivo, biologically relevant observations about angiogenesis within only a few months, something that would likely have taken years to do in a mouse model.
- **Katsanis's own continuing work on Bardet-Biedl syndrome,** which is now using zebrafish models to explore possible therapeutic options for this rare disease. The group has developed a lead compound that can ameliorate BBS in that model and has the possibility of jump-starting preclinical trials.

A glimpse inside

Duke's cherished History of Medicine Collections

IN 1956, MARY D. B. T. SEMANS presented to Duke's medical center library a remarkable collection of medical texts and manuscripts, which had belonged to her late husband, Duke surgeon Josiah Trent, MD. These volumes, the Josiah Trent Collection, became the foundation of what is now one of the country's most extraordinary university-owned medical history collections.

Over the next 54 years, the collection came to include items as eclectic and illuminating as a lavishly illustrated ophthalmology textbook from 1583, an ivory bas-relief memento mori skeleton, and trepans.

For 18 years, the treasures were curated by Suzanne Porter, who recently retired. Rachel Ingold now serves as curator.

Read more and find out how to tour the collection at www.mclibrary.duke.edu/hom.

De humani corporis fabrica libri septem
(Concerning the fabric of the human body)
The publishing in 1543 of this text by Andreas Vesalius is said to be a milestone in medical history. It revolutionized the science of anatomy, correcting many errors in traditional anatomical teachings. The text is part of the original Trent Collection.

Anatomical manikins
These tiny ivory dolls with removable chest plates may have been used to teach anatomy to midwives or barber surgeons, scholars say. Duke's collection includes 18 of the figures, including those depicting females in advanced stages of pregnancy. They were produced in Germany, Italy, or France in the 17th and 18th centuries.

Practical instructions in the care and treatment of the wounded
Hans von Gersdorff worked as a military surgeon for 40 years and his 200 recorded amputations may represent the largest number performed by any surgeon of his time. He also devised many surgical instruments, some of which are illustrated in this surgical field manual, published in 1517.

Surgical saw
This elaborately decorated amputation saw from the 16th or 17th century is over two feet long and weighs over three pounds.

The doctor's lady
As little as a hundred years ago, a woman in China might have used this doll for the sake of modesty during a doctor's visit. To avoid embarrassment, and to adhere to a strict separation of the sexes, a woman might have marked on the ivory figurine where it hurt, and passed it through a curtain to the physician.

Hiroshima scroll
This paper scroll depicting the atomic bomb exploding on Hiroshima in 1945 is part of a diary kept by a Japanese physician who treated victims of the blast. The drawing shows the god of wind releasing a blast of air as Hiroshima burns below.

Geeta Swamy, MD

CLINICIAN Q&A:
Vaccines at the OB–GYN office?

IF YOU'RE AN OB–GYN, you probably don't think of yourself as being the source of booster vaccines for your patients. But maybe you should.

A new pilot study from Duke researchers shows that offering the shots to women who come in for their annual checkups can increase vaccination rates in both pregnant and non-pregnant patients. The program, funded by the U.S. Centers for Disease Control and Prevention (CDC), could serve as a guide for other OB–GYN clinics to boost vaccination rates.

DukeMed Magazine talked with Geeta Swamy, MD, director of obstetrics clinical research at Duke, about the pilot program's success in North Carolina.

Why should ob–gyns consider offering vaccines during annual visits?

We tend to think of vaccinations as happening at the offices of pediatricians, primary care physicians, and family practitioners. But many women seek medical care from their gynecologists even after they have children. According to a study published in *Obstetrics & Gynecology* (March 1995), ob–gyns provide more general medical care to adolescent and adult women than either family practice or internal medicine practitioners. So their annual gynecologist visit is a good opportunity to discuss preventive care, which includes vaccinating.

How did the program shift vaccination rates?

Initial data from one clinic show that doctors were already offering the HPV vaccine to women who weren't pregnant, but when postpartum women were offered the vaccine, the rate of vaccination jumped from 0 to 44 percent. Without this program, these women would not have been vaccinated against a potentially life-threatening disease.

What vaccines were offered, and what were their results?

The pilot program was established mainly to improve the rates of vaccinations against human papillomavirus (HPV) among non-pregnant women and tetanus, diphtheria, and pertussis (Tdap) among non-pregnant and postpartum women. The results of offering this vaccine were even more significant than expected. Nearly 600 women out of the 1,000 who were offered the Tdap vaccine for the first time received it.

Why is the Tdap vaccine important?

Reaching women who had not yet received the Tdap vaccine is important because rates of pertussis have been rising for the last five years. Pertussis isn't as serious in adolescents and adults, but it is life-threatening to infants under a year old who haven't been fully immunized. In fact, the CDC reports that mothers are the primary source of infection in 32 percent of infant pertussis cases.

When is the optimal time to give the Tdap vaccine?

Ideally, we aim to vaccinate women before they conceive, but any postpartum woman should get the vaccine if her last tetanus-diphtheria shot was more than two years ago. By vaccinating new moms, we can provide a cocooning effect that protects their infants from a deadly disease.

When picky eating persists

FOR MOST PEOPLE, holidays and special occasions are filled with plenty of opportunities to eat and be merry. But what would the holiday dinner table look like to a person who couldn't eat anything but saltines, French fries, and chicken nuggets?

There is an abundance of research on picky eating in children, but not much on adult picky eaters, who choose to eat such a limited range of foods that their diet interferes with their day-to-day life, relationships, job, or health. To shed light on the range of adult eating behaviors, problems, and impact on the adult or his family, Nancy Zucker, PhD, director of the Duke Center for Eating Disorders, and researchers at the University of Pittsburgh have launched the first national registry for picky eating in adults. The registry's survey will help researchers understand the range of eating difficulties that adults experience and the adaptive strategies they use to cope with their disorder.

Most children outgrow the finicky food stage as their food preferences mature. But adults with picky eating habits can develop emotional distress and social problems, which is why the disorder, also known as avoidant, restrictive food intake disorder, is currently under consideration as an officially recognized eating disorder, like bulimia or anorexia. The registry, known as the Food FAD Study (Finicky Eating in Adults), has already drawn 5,000 respondents.

The registry survey can be found at dukehealth.org/clinicaltrials/the_food_fad_study_finicky_eating_in_adults.

Overweight patients:

In counseling, it's the style that matters

DOCTORS ARE SPENDING A GOOD DEAL OF TIME counseling their patients about diet and weight loss, but for the most part, it isn't making any difference, according to a new study which appeared in the October *American Journal of Preventive Medicine*.

Duke researchers recorded the conversations between 40 primary care physicians and 461 of their overweight or obese patients over an 18-month period. Physicians discussed weight with patients in 69 percent of the encounters. "We found that on average, physicians spent about three-and-a-half minutes talking about diet and weight loss," says Kathryn Pollak, PhD, a member of the Cancer Prevention Program in the Duke Comprehensive Cancer Center and the lead author of the study. "That may not sound like much, but it amounts to about 15 percent of the time of the average office visit, which ran about 20 minutes. So the good news is, physicians realize how important the issue is, and they are making a point to talk about it."

Overall, the data showed no difference in weight loss between those patients who received counseling and those who did not. But when researchers divided patients according to the type of counseling they received, they found that three months after the office visit, patients whose doctors talked about diet and weight loss in a more motivational fashion—using predominantly reflective or empathic statements—were much more likely to lose weight, compared to those whose physicians used a more judgmental or confrontational style of communication. Patients whose physicians communicated well lost about 3.5 pounds three months after the visit, which is substantial given that most overweight and obese patients gain weight over time, says Pollak.

"Patients don't like to be told what to do, and they are generally not going to question or talk back to their doctor," says Pollak. "But when doctors use reflective statements or a more motivational and empathic approach, it changes the relationship; the patient becomes more of an equal, more of a partner in care.

"So, for example, instead of asking a question like 'So, you can't fit exercise into your day?' a physician might say something like 'It sounds like you're finding it hard to find time to exercise.' That kind of reflection seems to help patients open up more and give more meaningful information to doctors," she says.

Pollak says the study is the largest of its kind and the first to examine not only the frequency of diet and weight counseling in physician office visits, but also the quality of the counseling and its impact on patients. "Results of the study indicate that physicians may indeed have the power to help patients change their eating and exercise habits," says Pollak.

Tinnitus: Treat it with tunes?

YOU KNOW THAT DRONING SOUND a refrigerator makes? That, or something similar, is what the 50 million Americans with varying ranges of tinnitus must endure. According to the American Tinnitus Association, 12 million of those Americans seek medical help, and two million experience family problems, job problems, sleep problems, or even depression.

Often caused by exposure to loud noise, tinnitus is becoming increasingly prevalent, especially as veterans return from war. Users of portable music players like iPods are also at risk when listening to music too loudly, but so are those who undergo some forms of chemotherapy, head and neck trauma, or even sinus infections.

Once a medical condition is ruled out as the cause, audiologists often turn to ear level maskers that produce white noise to make the condition more manageable. But audiologist Rebecca Price, AuD, says Duke's Neuromonics Tinnitus Treatment Program offers a new approach that may help some patents with tinnitus. "While tinnitus may begin as the result of damage to the hearing mechanism," says Price, "it is our neurological response that causes an increased perception of internal sound. So a successful treatment program should address the audiologic, neurologic, and psychological aspects of tinnitus."

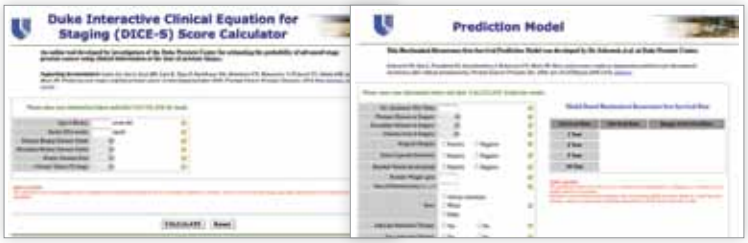
In the first phase of this six- to nine-month program, soothing music is embedded with sound that's been customized to a particular patient's hearing loss and to the sound that's bothering the patient. The patient uses an MP3 player-like device to passively listen to this music for at least two hours per day for the first two months, during which time the patient receives relief from the tinnitus.

Why music? "Utilizing a medium that is dynamic, such as music, allows for the patient to be intermittently exposed to their tinnitus, which is an important aspect during the second phase of treatment," says Price. "The therapeutic benefit of music is also key; relaxing music stimulates the limbic system in a positive manner; patients find music much more pleasant than white noise."

During the next four to six months, the music is altered and specific sound is removed from the music, allowing the patient to be periodically re-exposed to their original sound. The hope is that the patient will come to ignore the sound. "The second phase of treatment is where active rewiring of the brain takes places and the limbic system is conditioned to attach a more neutral response to the tinnitus," says Price.

At Duke, 30 patients have undergone treatment to date and for those patients with symptoms that fit strict criteria, the results have been positive. While there is no cure for tinnitus, patients who have undergone Neuromonics treatment have noted a reduction in tinnitus awareness and disturbance and an improved quality of life. "Neuromonics is not a treatment program for everybody with tinnitus," says Price, "but the results so far are promising."

To set an appointment and learn more about Neuromonics treatment for tinnitus, please call 919-684-3859.



Online calculators for prostate patients

PATIENTS WITH PROSTATE CANCER now have two new interactive Web tools known as risk calculators to help them better understand their disease:

The **Biochemical Recurrence-Free Survival Predictor** is for men who have already undergone surgical removal of the prostate gland. It uses personal information supplied by the patient to help predict recurrence-free survival rates at one-, two-, five-, and 10-year intervals.

The **Non-Organ-Constrained Prostate Cancer Predictor** was designed for men newly diagnosed with prostate cancer who are weighing various treatment options. It uses demographic and clinical data at the time of biopsy to calculate the likelihood of having an advanced-stage tumor that has extended beyond the prostate gland.

Both tools are based on research done at Duke Prostate Center and are designed to help patients with important decisions they need to make as they undergo treatment and recovery.

You can find the online calculators at dukehealth.org/prostatecalculators. To make an appointment with the Duke Prostate Center, call 919-668-8108.

PHOTO: BRYAN REGAN

Giving the gift of hope

SINCE JOANNE KURTZBERG, MD, performed the first successful transplant of stem-cell-rich umbilical cord blood from an unrelated donor in 1993, Duke has performed more than 1,000 of the procedures as a lifesaving alternative to bone marrow transplantation for children with diseases such as leukemia. Kurtzberg has continued to build on the therapy's success, most recently testing the technique in babies with cerebral palsy and other brain injuries; her research into applications of cord blood has also led to the funding of Duke's new Translational Cell Therapy Center.

But despite the field's growth, there are only seven hospitals in North Carolina—and fewer than 200 in the United States—designated as collection sites for mothers who want to donate their baby's cord blood to a public bank. "If a hospital doesn't facilitate umbilical cord blood collection, an expectant mother may never hear about the option to donate to a public bank," says Kurtzberg, who is chief of pediatric blood and bone marrow transplantation at Duke and director of the public Carolinas Cord Blood Bank.

Kurtzberg wanted to give expectant mothers an easier way to donate, so she has helped create a program at Duke that puts cord blood donation kits directly into their hands. The bright-red kit is specially designed to protect cord blood during transit and contains everything needed for the cord blood collection, plus additional vials to store some of the mother's blood so it can be tested for infectious disease.

How to get the kit

Donations of cord blood can be made from any location, so long as the blood can be shipped to Duke and arrive within 40 hours of the baby's birth.

What participating moms need to do:

- Contact the Carolinas Cord Blood Bank Public Kit Collection Program at 919-668-2071 to let them know you are interested in donating your baby's cord blood.
- Inform your physician or midwife of your intention to donate through the kit program.
- A month or two before your due date, you will receive a kit that you should take to the hospital when you are admitted for delivery.

What her physician or midwife needs to do:

- Complete an online training and certification in cord blood collection through the National Marrow Donor Program (information is provided at BeTheMatch.org).
- Collect the cord blood after the baby is born. The cord blood must be packed and shipped back to one of the three participating sites and must be received within 40 hours of the infant's delivery.

*For more information about public cord blood donation and the National Marrow Donor Program, visit **BeTheMatch.org** or call **800-MARROW-2**.*

Joanne Kurtzberg, MD

What will MRSA do next? Duke researchers developed a computer-based algorithm to predict how bacteria might mutate to evade current antibiotics—and develop drugs that stay a step ahead.

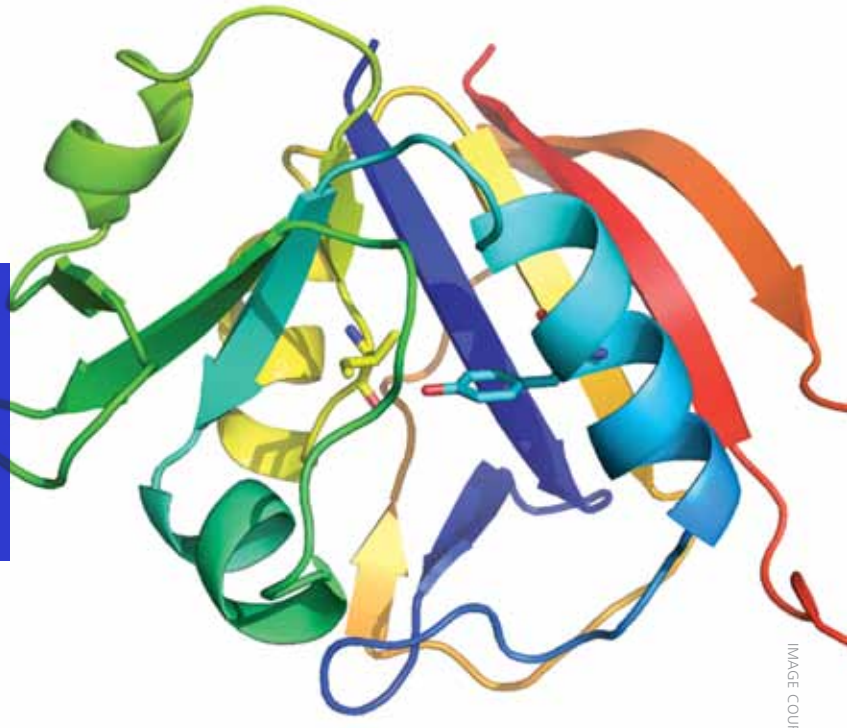


IMAGE COURTESY OF BRUCE DONALD

"This study is a step toward identifying antibiotics that can pre-emptively deal with possible resistance in nature."

—Ivelin Georgiev, PhD

Predicting MRSA's next move

COMPUTERS PREDICT snowfall accumulations during storms or where violent hurricanes will hit land. Now, Duke researchers are using computational prowess to develop smart drugs that can anticipate and defeat bacteria mutations.

Certain bacteria, such as MRSA (methicillin-resistant *Staphylococcus aureus*), are particularly dangerous because they can modify their structure quickly to sidestep any medications designed to prevent their ability to spread. But, according to Duke researchers, new predictive software that identifies and analyzes the myriad of ways bacteria can change could be a powerful weapon in fighting disease.

"It's very expensive and labor-intensive to go back to square one and redesign a drug when a bacterium gains resistance to a drug's existing structure," says Duke computer scientist and biochemist Bruce Donald, PhD. "The protein-design algorithms that predict mutations could be used in a drug-design strategy against any pathogen that mutates to gain resistance."

Duke investigators, along with collaborators from the University of Connecticut, tested the MRSA enzyme dihydrofolate reductase (DHFR), because several existing drugs already target it. It is responsible for turning folic acid into thymidine, one of the four building blocks of DNA, and is present in almost all living organisms. Researchers pushed DHFR through an algorithm to identify potential mutations that would resist drug therapies. The algorithm also has a "dead-end elimination" feature that sifts through all the outcomes that the bacterium uses to escape the drug.

Some bacteria, Donald says, outsmart antibiotics by changing the shape of their enzyme's active site. The computer program identifies all of the possible enzyme configurations a bacterium could use, much like chess moves, to evade drugs that bind to DHFR to slow or prohibit its function. "We're basically trying to do a pre-emptive strike, and this study is a step toward identifying antibiotics that can pre-emptively deal with possible resistance in nature," says Ivelin Georgiev, PhD, lead study author and one of Donald's former graduate students.

"My kids are now nine and 11," Donald says, "and when I ask about the antibiotics they took 10 years ago, I'm told these are not strong enough to treat the same illnesses." Identifying how these bacteria continue to function and multiply in the presence of drug therapies will, Donald hopes, help keep medicine a step ahead of illnesses.

Reference: Frey K, Georgiev I, Donald BR, Anderson A. Predicting resistance mutations using protein design algorithms. Proc. Natl. Acad. Sci. (PNAS) U S A. 2010;107(31):13707-12.

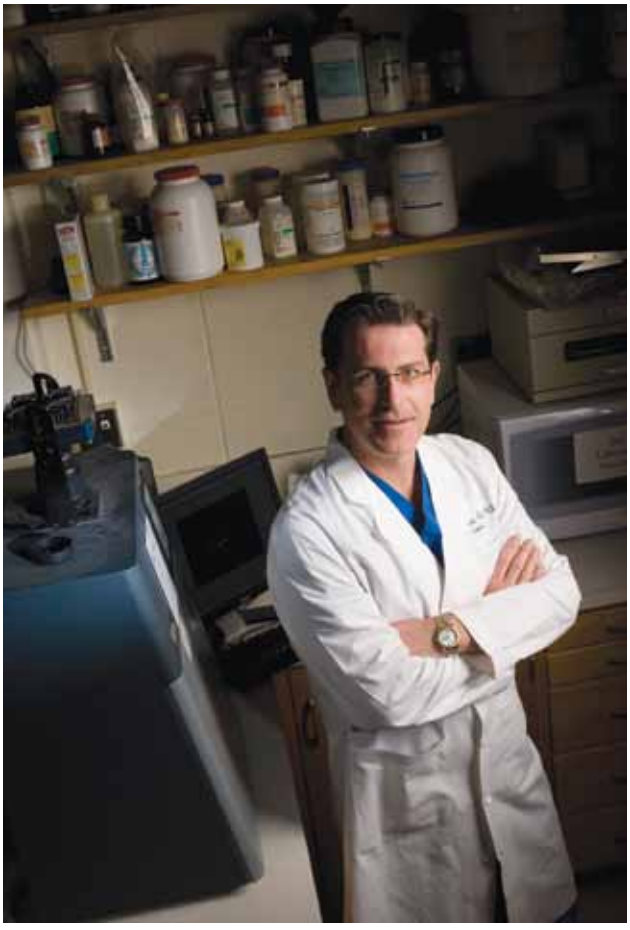
Cancer vaccines

The quest continues

IN 2005, DAVID SCHMIDT WAS DIAGNOSED with glioblastoma multiforme (GBM), one of the most aggressive of brain tumors. After surgery, radiation, and chemotherapy, his tumor had not yet recurred, but his doctors told him there was only a 3 to 5 percent chance that things would stay that way. Today, five years after his symptoms first began, Schmidt is still recurrence-free. He credits that in large part to his enrolling in a clinical trial of a vaccine developed at Duke.

"Enrolling in the trial was one of the few options available. It was either that or just kind of take my chances and hope that the cancer didn't come back," Schmidt says. "The vaccine trial was attractive because the side effects were minimal. I'm doing really well."

This vaccine "trains" immune-system cells to attack EGFRvIII, a protein that is present in 25 to 40 percent of GBMs. In the phase 2 trial in which Schmidt was involved, patients whose tumors expressed EGFRvIII and who received the vaccine showed overall improved survival times compared to historical controls—a median of 26 months, compared to 15.2 months. These patients also experienced a much longer progression-free survival period—14.2 months, compared to 6.3 months for those who did not receive the vaccine. Findings published in the October *Journal of Clinical Oncology* showed that the vaccine eliminated all of the cancer cells carrying the EGFRvIII marker in all but one of the vaccine group participants, says Duke neurosurgeon John H. Sampson, MD, PhD. The results of that trial and others led to Duke licensing the vaccine to the pharmaceutical company Pfizer.



John H. Sampson, MD, PhD

Sampson and colleagues are now honing a different type of weapon against GBM—vaccines that aid the immune system's fight against cytomegalovirus, which is normally latent in the body but that researchers at Duke and elsewhere have discovered is activated in some patients with GBM. "Because the immune system is especially developed to attack viruses, this provides an unparalleled opportunity for us to exercise immune therapy against these tumors," Sampson says. Duke is leading single-center phase 1 and phase 2 trials of glioblastoma vaccines that target cytomegalovirus.

Duke's extensive work in developing and testing cancer vaccines means that patients can participate in trials of vaccines for many types of cancers—brain, breast, colon, ovarian, and prostate. Duke was an enrolling center for the trial that led to approval of the prostate cancer vaccine Provenge, which in May 2010 became the first cancer vaccine approved by the Food and Drug Administration.

New trials available only at Duke include a study of a vaccine called dHER2 to fight breast cancer that overexpresses the HER2 protein, which is one of the more aggressive forms of the disease. The trial was developed because of findings in mice that Duke oncologist Michael Morse, MD, and colleagues published March 1, 2010, in *Clinical Cancer Research*. "We showed that if you use a cancer vaccine in conjunction with a targeted therapy [lapatinib], you get additional efficacy. The vaccine activates T cells and also multiple antibody responses against HER2 that synergize with the HER2 tyrosine kinase inhibitor lapatinib," Morse says. If that proves true in humans, the vaccine could improve upon standard treatments for this type of breast cancer, which include chemotherapy plus the monoclonal antibody trastuzumab (Herceptin). "Unlike trastuzumab, which binds to just one part of HER2, the vaccine induces polyclonal antibody responses, targeting different parts of the molecule," Morse says.

Other work from Duke has also demonstrated the additive effect from combining traditional treatments with vaccines. "We've demonstrated in animals and humans that there is a potent synergy between chemotherapy and vaccines; the chemotherapy actually dramatically enhances the effects of the vaccine," Sampson says. For now, even after surgery, radiation, chemotherapy, and immunotherapy, recurrences are still all too frequent. But Sampson, Morse, and other Duke investigators work to develop the right combination of treatments that will make survival stories such as Schmidt's more commonplace.

For enrollment information on these and other Duke cancer clinical trials, visit ***cancer.duke.edu/ctrials****.*

What we learn from bird brains

Richard Mooney records the songs of birds who are learning to sing and compares their progress to activity in the young birds' brains—research that could unlock the mechanics of human auditory learning.

THE SOUND OF SONGBIRDS in the morning can be an impromptu serenade. But listen closely, and it's clear the birds aren't improvising. They're reciting and repeating a signature tune they learned in adolescence from the dominant male in their lives.

Those melodious tweets are entrancing, but why study how birds learn their music? According to Richard Mooney, PhD, a neurobiology professor and investigator at the Duke Institute for Brain Sciences, understanding what happens inside a bird's brain when it hears and memorizes a certain song could lay a foundation to improving speech in humans with auditory disabilities.

"Birds use auditory experiences to guide behavior just like humans use hearing to guide speech development," Mooney says. "If a young bird doesn't hear a tutor song or can't hear itself sing, it doesn't develop a normal song."

According to Mooney, who has spent the last 25 years studying the brain circuitry and neural pathways that control singing, a bird has a finite amount of time to be exposed to and learn a tutor's song. The juvenile bird needs to hear a tutor song during a developmentally sensitive period, similar to a human child's need to hear language consistently in the first years of life in order to develop fluent speech. If a songbird does not hear the tutor song before two months of age, its brain becomes committed to producing a simple "isolate" song. The tutor's song lasts for a few seconds, and adolescent birds only require a few minutes of exposure to the same song to memorize it. However, to produce an accurate copy of the tutor song, they must practice the song thousands of times over a month or more.

What makes some juveniles better song learners than others? Looking inside the bird's brain can reveal the presence of dendritic spines, doorknob-shaped protrusions on a nerve cell that receive and process electrical signals from other nerve cells, at specialized junctions known as synapses. By looking into the brains of naïve juvenile songbirds, Mooney and his colleagues found that the rate at which these spines come and go (spine turnover) could predict how well a juvenile would learn from a tutor. Juveniles with the highest levels of spine turnover were the best learners, while birds with stable spines learned little or nothing from their tutors.

To visualize living neurons in juvenile birds as they learn to sing, Mooney's team first injects a brain area in the bird analogous to Broca's area in humans with a fluorescent green protein. Then, using a scanning laser microscope, they peer through a small surgically implanted window in the anesthetized bird's skull. Cells expressing the protein glow green when struck by the laser light, allowing them to be visualized under the microscope. After obtaining a baseline measure of spine turnover, the bird is exposed to the tutor song. The imaging process can be repeated over many days and weeks as the bird slowly copies the tutor song. This approach allows spine changes to be monitored as the juvenile memorizes and copies its tutor's song.

The effect of hearing and internalizing the tutor song was counterintuitive, Mooney says. "In those juveniles with high spine turnover, hearing a tutor song immediately stabilized spines, even though the copying process had hardly even begun," he says. "It appears that in receptive juveniles, hearing a tutor song rapidly stabilizes and strengthens the synaptic network. One intriguing possibility is that we are watching the formation of a memory that sets the stage for motor learning." Mooney says the findings of this work ultimately will help explain how the human brain harnesses auditory information to guide learning of complex skills, such as speech and music. It could also help to explain how, as we age, our brains become less receptive to learning new skills, including foreign languages.

Tracking the genetics of myopia

NEARSIGHTEDNESS IS NOT OFTEN thought of as a cause of blindness—but in some people it can be. The risk is highest for those with pathologic (or high-grade) myopia, in which the back of the eye continues to grow, causing vision to deteriorate into adulthood and increasing the risk of retinal detachment and other blinding eye conditions.

Right now there aren't practical treatments to prevent myopia progression. But according to Duke Eye Center researcher Terri Young, MD, the recent discovery that the gene RASGRF1 is associated with myopia (published in the August 2010 *Nature Genetics*) is a step in that direction. "If we can understand the genetics of myopia, then we can try to develop custom biological tools to manipulate eye growth," Young says.

Young led one of the two new RASGRF1 studies (she was co-author of the other), examining genetic patterns in 4,270 people to find small genetic variations associated with myopia—of which RASGRF1 was most closely aligned with myopic refractive error. Young's group validated the findings in a second population of about 8,000 people, collaborating with researchers in the Netherlands. Next, Young will learn more about the role of RASGRF1 by conducting studies in mice that have the gene knocked out (silenced). These mice show changes in the eye's lens and impaired vision.

"My goal is to find practical ways of curbing the excessive eye growth that happens in myopia, which is the most common human eye disorder and has quality-of-life impact," says Young. In some Asian countries, for instance, myopia affects 80 percent of the population. In the United States, it affects 33 percent of adults and costs an estimated $5.5 billion annually.

Bevacizumab: Safe for treating macular degeneration?

CONCERNS THAT THE DRUG BEVACIZUMAB, currently prescribed off-label to many patients with age-related macular degeneration, may increase these patients' risk for heart attack, bleeding, stroke, and death have been allayed by a new Duke study published in the October *Archives of Ophthalmology*. The study's preliminary findings showed that bevacizumab is relatively safe for these patients.

Previous studies had linked bevacizumab doses used in colorectal cancer to serious systemic cardiovascular events, and safety concerns soon arose about its off-label use in macular degeneration, says Duke researcher Lesley Curtis, PhD. But the new study data supports the drug's safety. Curtis says further analysis is needed to determine if the drugs are safe for people with macular degeneration who have also been identified as high-risk for cardiovascular events.

85%
OF PATIENTS WHO RECEIVE RADIATION TREATMENT DO SO IN A COMMUNITY PRACTICE

Online collaboration for radiation oncologists

AT LARGE MEDICAL CENTERS LIKE DUKE, radiation oncologists meet regularly with peers to discuss and review cases to determine the best course of treatment for each patient. But radiation oncologists outside major medical centers often practice without the benefit of colleagues nearby with whom they can consult.

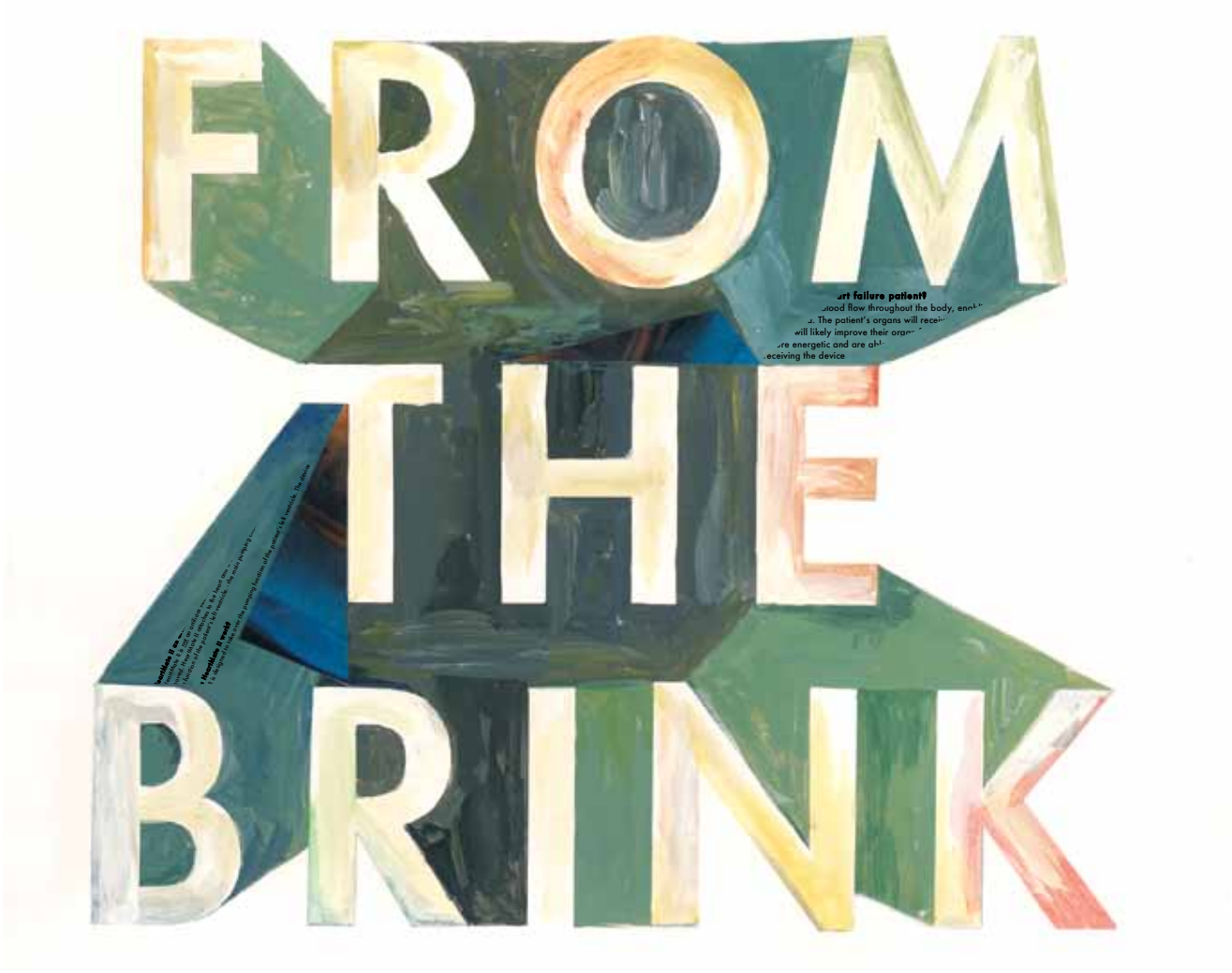
Now, a new Web-based program will enable those physicians to virtually collaborate with leading radiation oncologists throughout the country using a secure Internet connection to review patient records and images.

"This is exciting for the physicians but also for the patients," says project leader Carol Hahn, MD, noting that 85 percent of patients who receive radiation treatment do so in a community practice, not a large medical center. Also, says Hahn, whereas radiation oncologists at Duke specialize in a particular type of cancer (Hahn's expertise is with breast cancer patients), many community radiation oncologists are generalists. "It can be difficult to be a generalist in oncology," says Hahn. "There may be cases that community physicians rarely see but that physicians at Duke see regularly."

Hahn and project co-leader Patricia Hardenbergh, MD, of Shaw Regional Cancer Center in Colorado are recruiting 300 community radiation oncologists from across the country to participate in the program, which is funded by a three-year, $1.35-million grant from the American Society of Clinical Oncology Cancer Foundation's Improving Cancer Care Grants Program (funded by Susan G. Komen for the Cure). "Nothing exists like this currently," Hahn says. "This is an opportunity to allow physicians to come together to learn from one another."

*To learn more about this program, visit **chartrounds.com** or call **877-645-8760**.*

A new generation of heart pumps could be the turning point in a once-uncertain therapy for end-stage heart failure.



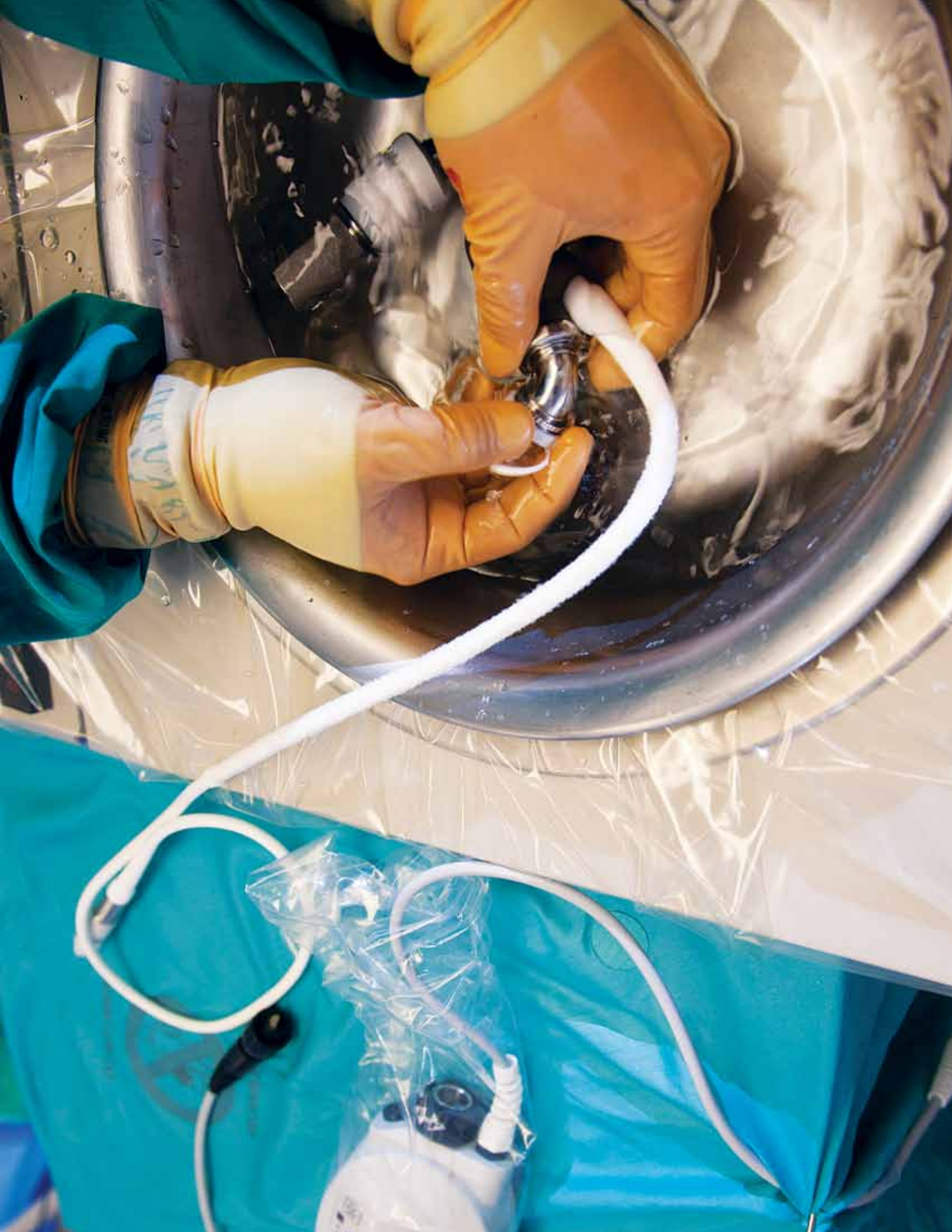
by KATHLEEN YOUNT *photography by* JARED LAZARUS

Sometimes it pays to be a zebrafish. You could stab a zebrafish in the heart, and that zebrafish would grow new heart muscle and keep on swimming.

This is not true of the human heart.

The human heart can take many an insult, that much is true. But after a heart lives long enough or suffers greatly enough, it will begin to give out. In fact, this is a guarantee for us all: if something else doesn't get us first, eventually our hearts will fail.

A HeartMate II ventricular assist device (VAD), being prepared for placement



Heart failure isn't really a disease. It's a syndrome—a collection of symptoms that comprise the bottom of the great funnel of heart diseases, disorders, and distresses. Whether you get there as a side effect of cancer treatment, a devastating heart attack, an unlucky viral infection, or decades of high blood pressure or atherosclerosis, it is the state of being in which the heart simply doesn't pump as strongly or effectively as the body needs it to. Its symptoms stem from the body's attempts to compensate for its failing pump—the kidneys sense a reduced blood volume and compensate by retaining fluid, which begins to seep out into the body's tissues and organs, causing swelling, lung congestion, and so on. Without the pump at its prime, the body starts to sputter, to stall out.

Between the body's dogged insistence on survival and the advent of medical management breakthroughs such as ACE inhibitors and beta-blockers, many people who develop heart failure today can expect to live for years, perhaps with symptoms but also still very much able to work, travel, spend time with family and friends, even exercise. But heart doctors will tell you that once the condition reaches an advanced stage, heart failure patients are difficult to treat, and their quality of life is very poor.

"Surgical treatments for heart failure deal with the sickest of the sick," says Carmelo Milano, MD, a cardiothoracic surgeon who specializes in care of heart failure patients at Duke. "When you talk about medical management of heart failure, many of those patients still have some mobility, they can still walk across the room. The patients we evaluate for advanced surgical options have symptoms of heart failure even when they're at rest." They can't sleep, eat, bathe, or even enjoy the comfort of a loved one's touch without the constant companion of half-drowned breathing, fatigue, and pain. They are moribund; they are out of options.

Unless, of course, they can be brought back from the brink. Advanced heart failure has one well-established treatment, and that is transplant. The success rate of heart transplant is booming today, boasting nearly 87 percent one-year survival nationwide (at Duke it's 88.7) and 54 percent 10-year survival (59 percent at Duke). For the transplant team, Milano says, the gig can really mess with your personal life—"It's emergency surgery, so we're often operating in the middle of the night. But the difference it makes in our patients' lives, within just a month or two of the surgery—it's incredible. That's what keeps drawing me to it."

Every transplant surgery is an opportunity to recycle tragedy into triumph—death makes possible life. But the trouble with transplant is just that: it depends on the unplannable, unexpected, and terrible loss of life. And it's not even as simple as that—to be brought back from the dead, both the donor heart and

t was like breathing life back into dying people," recalls Duke's VAD nurse coordinator, Laura Blue, NP, about the advent of ventricular assist devices. "I always loved transplant medicine, but the VADs really felt like, wow, we were stopping the train headed off the cliff. While it was not easy, they were alive, they were going to make it."

the recipient must meet very stringent criteria. There are at least 150,000 people in the United States currently on waiting lists for heart transplants, but this year there will be only about 2,200 heart transplants performed. In 2000 Duke created an extended criteria transplant program, which has given 70 hearts to patients who would otherwise not have been candidates and made use of donor hearts that would otherwise have not been transplantable. But even with the success of that program, patients and physicians are still confronted with a supply dependent on loss and woefully undermeeting demand.

"Transplant is a wonderful therapy," says Duke cardiologist Joseph Rogers, MD, who works with Milano to care for patients with advanced heart failure. "But in the world I live in, there's this huge clinical need, and there's just not enough organs to help all of our patients. So the question becomes, what do you do to help the rest of these people?"

LEARNING TO FLY

Former vice president Dick Cheney has a troubled heart, to be sure. At age 69, he's already survived five heart attacks and undergone quadruple bypass, two angioplasties, and placement of an implantable cardiac defibrillator (ICD). This summer, to treat his advancing congestive heart failure, he was implanted with one of the newest generation of VADs, or ventricular assist devices. VADs are the current answer to the question of a viable artificial heart—basically, they replace the heart's left ventricle, which is its main pumping chamber. The device attaches to the heart, and its battery-powered pump (controlled by a small, externally worn computer) pulls blood from the left ventricle and sends it through the aorta.

It's not clear whether or not Cheney ultimately will receive a transplant, but the choice to use a VAD to treat such a public figure may mark the turning point in public opinion on this type of technology. Such heart pumps were originally

RESEARCH UPDATE

Duke heart studies make headlines at the AHA

At the 2010 American Heart Association (AHA) Annual Scientific Sessions, held in November in Chicago, more than 100 Duke researchers presented results from a wide range of studies. Some highlights:

- **ASCEND-HF,** the largest acute heart failure study ever conducted, resolved safety questions about the medication nesiritide by showing no difference in mortality or renal side effects over placebo.
- **ROCKET-AF,** the largest double-blind study ever to assess a drug's effect in preventing stroke in patients with atrial fibrillation, showed that the new drug rivaroxaban is an effective alternative to warfarin.
- **RACE-ER,** a program designed to speed up heart attack care, was extended across North Carolina last year; new results show it has led to significant improvement in the quality of care—including a notable decrease in hospital death rates, from 7.5 percent in the 2006 RACE study to below 6 percent now.
- **REVEAL,** a new study, showed in preliminary results that the drug erythropoietin did not reduce the amount of heart cell damage in heart attack patients after reperfusion (when blood supply returns to the heart after a heart attack).

You can find full coverage of Duke research at the AHA meeting online, at cardiology.medicine.duke.edu/about-division/news/duke-american-heart-association-scientific-sessions.

Heart failure: What's next?

For now, replacing the heart—via transplant or mechanical pump—is the closest thing to a cure for heart failure. But what might the coming decades bring in the way of new therapies?

BETTER DRUGS Many current heart drugs, including ACE inhibitors and beta-blockers, work by altering the activity of G protein-coupled receptors (GPCRs)—receptors on the cell surface which were first discovered in the 1980s by Duke scientist Robert Lefkowitz, MD. The GPCRs in the heart that respond to the neurohormones noradrenaline and angiotensin have long been thought to have only one function—increasing the heart's activity in response to signals from the nervous system. While this is good for sprinting, it is bad for long-term heart health, especially when the heart is injured, says Duke researcher Howard Rockman, MD. "It's a bit like over-revving your engine—if you keep doing it, eventually the engine will wear out." Now, Rockman and Lefkowitz have discovered that GPCRs can also put the brakes on—by activating proteins that protect heart cells from damage and death, whether it's from adrenaline or mechanical stresses such as increased blood pressure. In the June 8 issue of *Science Signaling*, Rockman's team published the first results of the next phase of their work: to use this insight to test whether drugs that can selectively activate these protective processes will prevent the "over-revving" that occurs in the failing heart.

UNDERSTANDING THE CAUSE Matthew Wolf, MD, PhD, is using an unusual model to study the genetics that underlie heart failure: the fruit fly. Wolf and Duke engineer Joseph Izatt, PhD, have developed an imaging application that can essentially perform the fruit-fly equivalent of an echocardiogram, in order to determine whether a fly heart is normal or abnormal. By placing human genes into the fly heart and observing the results, Wolf's team can quickly and relatively cheaply prove whether certain genetic mutations contribute to human heart failure. Wolf hopes his research will help explain why the progression of heart disease and heart failure varies so much from patient to patient. "You can have two patients with extremely similar medical histories, physical symptoms, and characteristics, and you can give them the same treatments, but they may take two completely different clinical courses. So the question is, what's the difference between these two? I can't help but think there are particular genes at work, and we want to identify them."

Matthew J. Wolf, MD, PhD

STEM CELL THERAPIES Researchers are learning how to harness the power of stem cells to repair and even regenerate damaged heart tissue and blood vessels. At Duke's Mandel Center for Hypertension and Atherosclerosis, for example, scientists led by Victor J. Dzau, MD, have demonstrated that a naturally occurring protein—secreted frizzled related protein 2 (sfrp2)—protects heart muscle cells from death due to heart attack. In November the team published new findings[1] that therapeutic doses of sfrp2 after heart attack can prevent heart failure and reduce tissue scarring in rats—results that could be translated into a new therapy for study in human clinical trials.

Another Duke Heart Center researcher, Tom Povsic, MD, PhD, is studying the potential of various progenitor or stem cells to promote the growth of new blood vessels in patients with heart failure, unstable angina, and other cardiovascular diseases. One recent study, MARVEL, showed that heart failure patients who were injected with muscle progenitor cells could walk 91 meters farther in a six-minute interval than the control group. Povsic calls the results exciting, but cautions that the relationship between symptom control and actually healing the heart is unclear. "We think most of the therapies out there now work in ways such as helping the heart grow new blood vessels, but they don't make new heart tissue. We're still in phase 1 of cell therapy. The possibility of true regeneration is exciting—we're talking about a completely different outlook for medicine—but it's going to take a lot of work." Povsic hopes to have new protocols targeting patients with heart failure and advanced coronary disease active in early to mid-2011.

BIOMARKER-BASED MANAGEMENT Unlike medical management of diabetes or even high cholesterol, heart failure patients typically get a one-size-fits-all regimen of drugs. "These patients may be on seven or eight drugs, but we aren't sure which drugs are most important for which patients," says Duke cardiologist Michael Felker, MD. To provide better guidance, Felker's team is studying natriuretic peptide markers—BNP is the most common one—which are hormones the heart releases to regulate itself. "If the heart is really in trouble, it secretes more BNP; if heart function improves, it secretes less. And it's something we can measure in the blood," Felker says. "We're trying to learn to adjust the dosages of heart failure medicines based on these signals that the heart gives us—tweaking medications until the BNP level drops to what we think is a safe level." Small studies have shown promising results, and in 2011 Duke intends to launch an international clinical trial to test the biomarker-guided therapy.

[1] Nov. 15, 2010, *Proceedings of the National Academy of Sciences* Early Edition online

Cardiologist Joseph Rogers, MD (center right) and cardiothoracic surgeon Carmelo Milano, MD (right) say that heart transplant is still the gold-standard treatment for advanced heart failure, but VAD placement is an increasingly appealing option for many patients who can't wait—or don't qualify—for transplant.

approved by the FDA only for use as a medical stopgap, to keep a patient alive while he or she awaited a heart transplant. But recent studies at Duke and other institutions are showing that more and more patients are living with a VAD indefinitely—and they are living well.

In his sixteenth-century *Codex on the Flight of Birds*, da Vinci declared that "a bird is an instrument working according to a mathematical law, which instrument it is within the capacity of man to reproduce with all its movements." Milano uses that quote to remind himself of the possibilities that are in our grasp, such as a man-made replacement for a broken heart. But Milano will be the first to say it—a plane is not a bird. And when it comes to building a device that can replicate the human heart's 100,000 daily pulses that circulate six liters of blood through thousands of kilometers of blood vessels, man's now-conquered quest to fly seems rather like child's play.

It's hard—maybe harder for the doctors than the patients—to shake the memories of earlier "mechanical heart" devices. The well-publicized deaths of some patients in the late 1980s who were implanted with the Jarvik 7—an artificial heart that was powered by refrigerator-sized air compressors—led that device to be dubbed in an often-cited *New York Times* op-ed as the "Dracula of medical technology." Those patients suffered postsurgical infections, sepsis, delirium, and organ failure.

But by 1994 a new model of heart device—the VAD—was progressing through clinical trials. Instead of completely replacing the heart, these ventricular assists bolster the heart's function by taking on the lion's share of the pumping process. These first models were in fact pulsatile—they mimicked the pulsing action of the heart. The devices were exciting, but "everybody thought we wouldn't be able to get these people out of the hospital," says Laura Blue, NP, nurse coordinator for the Duke VAD program. "We had to push really hard and be very cautious. It took years to develop safe ways to discharge patients." Through the late 1990s, Duke took part in several national trials to test the devices.

In November 2001, results of REMATCH, a national trial to compare VADs to medical management in patients who weren't transplant candidates, were published in the *New England Journal of Medicine*. Positive outcomes in VAD patients helped garner the approval of the FDA first for use in patients who needed to buy more time while they

landmark Duke-led study to test the new generation of VADs—non-pulsatile, continuous flow pumps—showed that 68 percent of patients had a one-year survival, compared to 55 percent with older pulsatile pumps. Moreover, quality-of-life scores in those patients improved more than any intervention that's been tested in non-transplant advanced heart failure patients.

waited on a transplant list, and then as the destination therapy itself. In July 2003 Duke performed North Carolina's first destination therapy VAD implant. "We were the first hospital in our region who ever sent a VAD patient out in the community," says Blue. "It was entirely new type of life support; so at first, for every patient we implanted, I went to their local EMS station and met with the chief and the training officer, so that they'd know what to do if the patient needed emergency care."

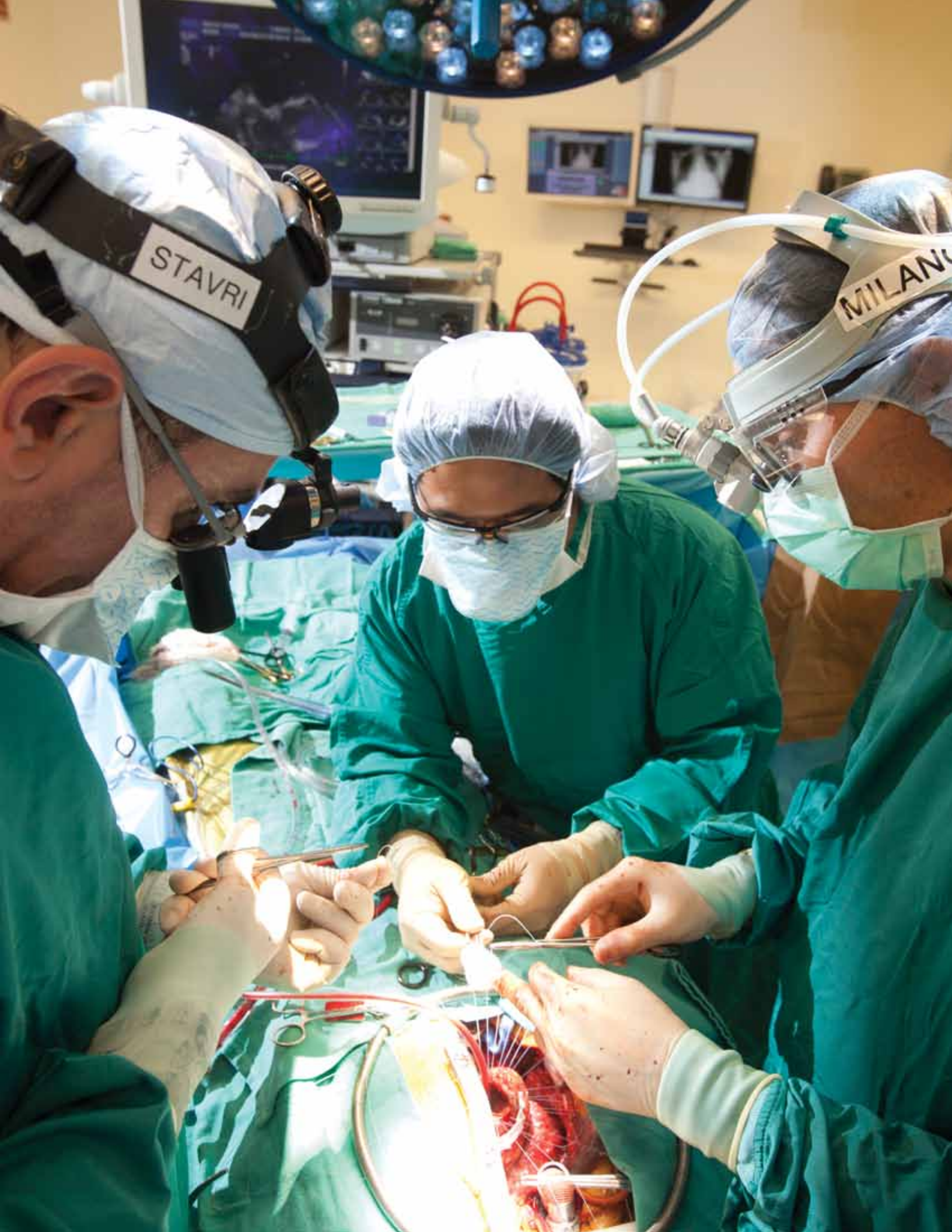
According to just about everyone who worked on them, the VADs were "like breathing life back into dying people," says Blue. "I always loved transplant medicine, but the VADs really felt like, wow, we were stopping the train headed off the cliff. While it was not easy, they were alive, they were going to make it."

REFINING THE FLOW

Though Duke patients overall had outcomes that exceeded even the REMATCH standards, as a widespread practice VADs were still problematic. The pulsatile models were "bulky, noisy devices that had lots of moving parts that would break frequently," says Rogers. It was to be counted on that, within a year or 18 months, something in the pumps would break, requiring another operation to replace the pump. A Duke study published in November 2008 in *JAMA* showed that, among Medicare patients who received these pumps between 2001 and 2006, the one-year mortality was still high—45 percent—as was cost.

"We learned several things from that study," says its lead author, cardiologist Adrian Hernandez, MD, who like Rogers cares for VAD and transplant patients at Duke. He says the data showed that, like other highly complex technical treatments, one of the most important factors in determining outcome was the experience of the team who performed the procedure. Hospitals with smaller procedure volume trended toward poorer outcomes than hospitals with more frequent procedures. And when you're dealing with an $80,000-per-person technology, as Hernandez says, "we really want—and really need—to be responsible citizens with this."

By 2008, though, design of the pumps had taken a new leap: A new generation of continuous-flow pumps, such as the HeartMate II, had abandoned the notion of pumping like a heart in favor of a tube-shaped axial flow pump, which boasted only one moving part and was one-seventh the size of its pulsatile predecessor. Rogers and Milano helped lead the study to test this new model, and the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The oddities of life with no pulse

The advent of the current generation of VADs—pulseless, continuous-flow pumps such as the HeartMate II—also brought to the forefront a host of other "fascinating questions," says Rogers, the answers to which could help improve future iterations of the pump. Foremost was the question of how much a body relies on pulse pressure—because there is no pulsatile flow of blood, most patients with a newer VAD have a blood pressure of about 90/80. "It raises the question—how will other organ systems respond? So we ran a study to see if the kidneys or other organs of the body needed higher blood pressure to keep operating normally," Rogers says, "and we found no adverse effects in kidney or liver function."

One minor adverse effect of these pumps was nuisance bleeding—such as nose and minor GI bleeds. Duke researchers found that this bleeding was the result of acquired von Willebrand disease, a blood-clotting disorder, which appears to develop in all patients with HeartMate II (though only some of them experience bleeding as a result). "We believe that as the blood moves through the rotor, the propeller is shearing the long protein in the blood that allows platelets to clot together—shortening the molecule so it's not as effective at clotting and adhering inside the blood vessel." The finding should help physicians refine the medical management of these patients, who typically are prescribed warfarin and aspirin—perhaps unnecessarily.

results—presented and published in the *NEJM* in November 2009—showed that after one year, 68 percent of patients on the continuous flow VAD survived, compared to 55 percent in the pulsatile flow group. Following the second year, 58 percent survived (compared to 24 percent with the older device). "And there was a 38 percent reduction in patients who needed to be re-hospitalized in the continuous-flow group," says Hernandez, noting that heart failure is the number-one contributor to the country's rates of hospital readmissions. These reduced re-hospitalizations were attributed to significantly fewer major adverse events, including infection, difficulty breathing, kidney failure, and cardiac arrhythmias.

Outside the hospital, the HeartMate II patients were thriving. Heart researchers will often reference the "meters walked in six minutes" as a metric of the effectiveness of a new intervention in heart failure. Rogers explains that this measure is particularly important, because it represents the difference between a person who can go to the grocery store, go to church, go to his family reunion, and the person who cannot. "Our patients don't exercise on treadmills every day," says Rogers. "But we want them to be comfortable doing what they like to do—going out to eat, shopping, golfing." According to the Duke research, compared to people living with heart failure, the improvement in these kinds of quality-of-life scores go up dramatically within three months of implanting a HeartMate II pump, and they stay high for at least two years (the longest period of time studied so far). "The improvement in this measurement went up more than any other therapy we've tested in non-transplant advanced heart failure patients," says Rogers.

Duke cardiologist Michael Felker, MD, who is also on the transplant/VAD team, adds that there are few things in medicine that you can call a magic bullet, but this kind of change in patient quality of life qualifies. "You can almost think of the VAD like you think of the iPhone," he says. "Every generation gets a little better."

MAKING THE CHOICE

On paper, the benefits of being on a pump seem myriad—until you remember that the patient has a driveline coming out of her abdomen. The pump sits in the chest, and a small tube connects it to the computer, which is worn holster-style around the patient's hips. "It's not forgettable therapy—you have batteries, you have a computer, and you have to wrap your head around the notion that you will run on batteries from now on," says Blue. "I've had patients say, 'Thank you for telling me about this, but it's not for me.' And that is the right choice for some people—I will be the first one to tell anybody that living with a VAD is not going to be easy."

here aren't many chances in medicine to do this," says cardiologist Joseph Rogers, MD, "where you can take a technology that has such profound effects on patients and how they feel, and actually help it advance."

Blue says that, when the VAD team talks with a heart failure patient about the possibility of placing a VAD, they must take the whole patient into perspective. "We put these pumps into people who have family to help care for them and a place to go when they leave the hospital. We don't recommend to anyone that they plan to live alone, at least not at first. We use a caregiver contract, we train them," she says. "And in some ways it's harder in younger people, for dual-career households, because early after surgery we ask someone to be with the patient all the time." New batteries that weigh less and hold a longer charge have helped ease some of the logistical burdens, and patients leave the hospital with extra batteries and an extra controller. But still, says Blue, it's an adjustment. "I've run out to the front of Duke Hospital and stood in the middle of Erwin Road, because a patient who came in for her first clinic visit after surgery left her batteries hanging on the back of her wheelchair in the parking garage. Her alarm started going off halfway back to Rocky Mount… so there she was, barreling down Fulton Street, and they whipped around the hospital driveway and I was jumping into the car to change out the batteries."

To some VAD patients, Blue says, the grass looks greener on the transplant side of the fence. "Other than when they take their handful of pills every day, transplant patients can almost pretend that they have a normal life—they don't necessarily have to be confronted with their illness every day. And transplant is still the gold standard—so when we can transplant a patient, we do. But transplant patients who have problems, who are sick or have rejection episodes, they can struggle just as much. And they don't get to give their transplants back. So it's a decision that we make very carefully. When the VAD patients get past the recovery from their surgery, and they are up and walking, and having a normal life….They can't believe it, how much better they feel."

COULD VAD OUTDO TRANSPLANT?

The successful outcomes of the new VADs are raising a lot of questions—and a lot of expectations. A Duke study found that outcomes in VAD patients and Duke's extended-criteria transplant patients are the same after two years, and physicians like Rogers and Milano are exploring the idea of placing the devices in patients who are less advanced in the disease process. This idea is encouraged by outcomes from the HeartWare device, an even smaller, newer VAD design. Investigators at the November 2010 American Heart Association meeting in Chicago reported one-year survival that was greater than 90 percent for patients who received a HeartWare VAD.

"We're also collaborating with industry partners to evaluate new, experimental devices," says Rogers. "We're looking at partial-support devices—some of those are the size of a AA battery, and they sit in a pacemaker-like pocket in the chest." Such devices may supply two or three liters of blood, which is less than the six or seven liters that current pumps flow. But they could be put in with less morbidity, less invasive procedures, and allow these patients to feel better and to function better. Rogers says that the possibilities give a new optimism to the care of these patients who were once at death's door. "There aren't many chances in medicine to do this," says Rogers, "where you can take a technology that has such profound effects on patients and how they feel, and actually help it advance."

"There's clearly a point when heart failure progresses, when the physician has done the best that can be done with medications, when the VAD option should be considered," says Blue. "It isn't for everybody, but for those who say 'Look, I've got grandchildren to raise,' Or 'I just retired, I was looking forward to a great life—I want more years'—the VAD can give it to them.

"I've got an 83-year-old patient who was 80 when we did his surgery, and he's still going. And the only thing that limits his golf game is his wife."

Learn more about Duke's VAD program at dukehealth.org.


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NAVY

by JUNE C. SPENCE *photography by* JARED LAZARUS

CARE BEYOND CURE

The rise of palliative medicine

My husband's maternal grandparents died in close succession, and the common belief among family members is that Louie had not cared to linger on after Fanny was gone. Both were in their 70s, and while perhaps not in perfect health, both led active lives, their home ablaze with grandchildren, up to the end. Fanny's only obvious concession to mortality her final day was to forego a luncheon she'd been planning to attend. A few months later, Louie was found in his bed, fully dressed, a broom propped nearby, suggesting he had been sweeping the floor, gotten fatigued, and lain down.

Contrasted with the multiple hospitalizations and at-times agonizing decline of my own grandparents, the swift and gentle nature of Fanny's and Louie's deaths seems not only enviable but remarkably rare. Barring sudden death by violence or accident, most of us face lengthy, medicalized journeys toward the end of life. Constantly advancing technologies offer hope against disease and debility, though often at the cost of clarity on when and how to throttle back when there's always one more round of chemo, one more clinical trial, and an array of machines and medicines to sustain basic functions.

"Hope is not a plan, but hope is our plan," observes surgeon Atul Gawande in his unvarnished assessment of end-of-life care recently published in *The New Yorker*. If saving lives is the primary function of health care providers, then what is their role when cure is no longer the goal—or at least not the only goal?

"Just to keep treating is no longer an acceptable default," says Tony Galanos, MD, medical director of the palliative care service at Duke University Hospital. "We can keep practically anyone alive. The real question is, what kind of life do you want to live?"

Palliative medicine represents a different model of care, focusing not on cure at any cost but on relief and prevention of suffering. Here the priority is supporting the best possible quality of life for the patient and family, regardless of prognosis. Ideally, the principles of palliative care can be applied as far upstream as diagnosis, in tandem with cure-directed treatment, although it's still associated in most people's minds with end-of-life care.

For that reason, it may at first glance seem almost incongruous that palliative medicine is being advanced at an academic medical center like Duke, where people tend to come seeking miracles. "People think that palliative medicine means you're giving up, or that it's basically hand-holding and low-tech," says Galanos. "But it is aggressive medicine. I consider it acute care—figuring out what bothers the patient the most, whether it is nausea, pain, confusion, or delirium, and treating that thing aggressively. We should never say, 'There is nothing more we can do for you'; that comes from a curative-only point of view and abandons the patient. There is always something to do in the service of making someone feel better."

The concept of palliative care has been gaining momentum throughout the Duke system in recent years via a robust research program, education of medical and nursing students as well as house staff, and increased inpatient services. Duke University Hospital president Kevin Sowers, RN, MSN, says it's vital to providing the full spectrum of care: "While we offer hope and even cure in many types of diseases, we also need to better understand the art and science of caring for people at all stages of life, including the end of life. Along disease trajectories, we need to be prepared for everything from delivering the most aggressive treatments to concentrating on managing pain at the end of life."

There is an economic incentive for hospitals to support palliative care—research shows significant reductions in pharmacy, laboratory, and intensive care costs—though there's understandable reluctance to tout such benefits. After all, accusations of "death panels" effectively shut out government funding for palliative care as national debates about health care reform took shape last year.

James Tulsky, MD, director of the Duke Center for Palliative Care, which encompasses teaching and research as well as clinical care (such as Galanos's consult team), says that the medical community needs to push back against the death panel smears. While palliative care may save money, money is not the motivation of the care provider. "We don't walk into the room thinking we're going to save the hospital money," he says. "If we do

Duke hospice patient Connie Kerr with her husband, Charlie, and grandchildren.

PALLIATIVE CARE FOR CHILDREN

Changing the treatment focus from cure to comfort can be especially challenging when the patient is a child. Sharron Docherty, RN, PhD, a pediatric nurse practitioner at Duke Children's Health Center, observed that making that transition is one of the most difficult decisions providers face. In her research on acute pediatric care, she's determined that to be a major barrier to introducing palliative care.

"It's not natural for a child to die," she says. "We try to do everything to save the life of a child. Aggressive treatment is what you want. But that positive has a terrible downside; by the time we've recognized that the children are dying, we've waited too long to address and relieve their suffering."

To help better integrate palliative medicine into the pediatric acute care setting, Duke pediatric oncologist Ray Barfield, MD, and his consult team refer to their efforts as a quality-of-life program. "Families tend to associate terms like palliative care and hospice with dying and reject them, saying they're not ready for that," he explains, "so another name helps with acceptance. It doesn't draw a line in the sand between one method of care and another."

> "We want to integrate palliative care into the whole trajectory of the child's illness, addressing pain and symptoms, and helping with goal-setting and decision-making from the beginning. Most kids in end-of-life care are fighting all the way to the end, and we're not asking them to relinquish treatment." —RAY BARFIELD, MD

The name change is very much in keeping with his mission. "We want to integrate palliative care into the whole trajectory of the child's illness, addressing pain and symptoms, and helping with goal-setting and decision-making from the beginning. Most kids in end-of-life care are fighting all the way to the end, and we're not asking them to relinquish treatment." So in pediatric oncology, for example, integrating palliative care might mean choosing a form of chemotherapy that causes the least side effects.

In pediatrics, parents are usually making the treatment decisions, further underscoring the need for good communication and strong partnerships with family. "It was always thought that the best family-centered care is to let parents decide," says Docherty. "But one of the things we're finding is they don't always want to make all those decisions—at least not alone. That can be too heavy a burden."

Health care providers can relieve some of that burden without imposing too much personal opinion or flat-out telling parents what to do. For instance, Barfield recently shared some research findings with a mother who was struggling over whether to be candid with her terminally ill 12-year-old. The study surveyed 449 parents of children who had died; none of those who had discussed death with their children regretted it, while nearly a third who did not do so harbored regrets, particularly if they had sensed their child was aware of his or her impending death. That information, combined with her intimate knowledge of her own child, helped the mother make her decision to confide in her daughter.

Because the pediatric population is so diverse, ranging from infants to young adults, sensitive care means being attuned to the issues facing different age groups. Terminally ill teenagers, for example, may encounter more emotional complexity than younger children who may not fully grasp what is happening. "They've got the cognitive ability of an adult," notes Barfield, "but while someone older can reflect on their life experiences, teenagers may be left to dwell on all they're not going to be able to accomplish: finishing high school, having a boyfriend or girlfriend. There's a greater sense of their unexplored potential."

That's not to say that younger children shouldn't play a role in decision-making. Barfield and Docherty are developing a method based on a project he started while working at St. Jude to help children express what kind of care they would prefer without having to burden or frighten them with thoughts of their own mortality. A current iteration of the method they're testing uses the visual of a target as a simple starting point for identifying and prioritizing what's important to the child. Things of greatest value can be positioned in or near the target's center, while less important things can be pushed to the periphery.

"A direct approach usually doesn't work for children," notes Barfield, whose method is geared especially to children ages seven to twelve. "They may 'get it' at this stage about what's going on, but lack the resources to articulate what they want. Asking them straight on, you'll get shyness. But indirectly, through play and enjoyable interaction, we can elicit their view of the world and find out how these last days and weeks would look if they could design them. Then we can put those things on the table as part of the decision-making process."

Palliative care strategies for the pediatric population can be just as appropriate for adults, Barfield notes. "When sick or dying, our cognitive abilities are blunted, we're afraid; most of us become very childlike. In fact, the overall principles of palliative care are just fundamentally good principles for the practice of medicine. If we were practicing ideally, maybe we wouldn't need palliative care."

our job right, we do save money, but the overwhelming majority of the time, what we hear from patients is how we made things better."

In fact, new research recently appearing in the *New England Journal of Medicine* suggests palliative care may actually prolong life—and a higher quality of life at that. Patients with terminal lung cancer who received palliative care upon diagnosis reported greater mobility and less pain and depression than their counterparts who did not. And, somewhat ironically, they lived close to three months longer.

Connie and Charlie Kerr

BRINGING UP THE SUBJECT—SOONER

Research suggests that doctors tend to be overly optimistic in their prognoses, offering inaccurate longer survival prospects. Pile on the difficulty of initiating conversations that acknowledge the possibility of death, and the result is that too many care providers delay addressing changing care goals and pursuing palliative measures until very late in the game, if at all. The average length of patient involvement in a hospice program, for example, is a mere two to three weeks, though studies suggest that a minimum of three to six months is needed to truly benefit.

Palliative care does not necessarily mean hospice, though hospice is a subset of palliative care. "Palliative care describes the broad field of care for patients with serious illness," Tulsky clarifies, "while hospice is a system of care appropriate for patients with life-limiting terminal illness, defined by Medicare as lasting six months or less."

That explicit acknowledgment of death, abetted by misperceptions surrounding what hospice care entails, can be off-putting to patients and physicians alike, says Toni Cutson, MD, physician leader of the palliative care consult team at the Durham Veterans Affairs Medical Center and medical director of Duke HomeCare & Hospice.

"A patient I talked to recently said, 'Oh no!' fearing we'd automatically take away all her medications and put her on morphine. Even doctors think that hospice means that no IV fluids or antibiotics are administered, but we're often caring for patients with complex problems, and offering comfort may mean giving IV fluids, transfusions, or antibiotics in situations where we think it's going to help."

In fact, as Duke hospice patient Connie Kerr can attest, effective symptom management can mean significant gains in mobility and function, even as a patient's disease continues to progress. A year ago, Kerr was feeling overwhelmed by her advancing chronic obstructive pulmonary disease (COPD). "I was so tired, and it was so much trouble keeping up. Breathing was getting harder and harder," she says—so much so that it came almost as a relief when her physician, Duke geriatrician Heidi White, MD, broached hospice care.

"Physically, mentally, she'd had enough," agrees Charlie, her husband of 51 years.

Today the mood is upbeat in the Kerr household. Connie, though reliant on a wheelchair from a recent fall and tethered to her oxygen pump, is lively, with a radiant smile. "Everybody in the family has the feeling that I've lived much longer from having gotten involved in hospice," says Connie. "Maybe it's from relaxing the stress or just knowing the nurse will be here once a week."

"She's like family," Charlie says of Donna Ratliff-Walker, the primary nurse from Duke HomeCare & Hospice who oversees Connie's care through weekly visits. "We generally laugh most of the time she's here."

Certain changes in Connie's medications, made in accordance with the shift in her care priorities toward symptom management, have brought immense relief. Prednisone, for example, was something her pulmonary team had been reluctant to prescribe. "They didn't want me to get on it because they said I'd have to stay on it," recalls Connie. "But the minute I got a little bit of prednisone, I had a lot more energy and appetite for interesting food—and these things help tremendously!"

Also helpful has been Connie's "moondrops"—the couple's playful name for the morphine that eases the tightness in her chest so that breathing need not feel like such an epic struggle all the time. With Connie in less distress from her symptoms, the Kerrs are able to focus on enjoying their time together. "There are so many positive things about it," says Charlie. "We've always been close. There are so many things we're both interested in. You read and share with me—and I'm a pretty good masseur."

"We would like to go on with our life as much as possible the way we have," says Connie. "I want to still be able to laugh, and to see and talk to people."

"Everybody in the family has the feeling that I've lived much longer from having gotten involved in hospice. Maybe it's from relaxing the stress or just knowing the nurse will be here once a week." —CONNIE KERR

Connie Kerr, who has advancing COPD, gets weekly visits from her home-health nurse, Donna Ratliff-Walker.

"We would like to go on with our life as much as possible the way we have. I want to still be able to laugh, and to see and talk to people."

Although Connie is restricted to a wheelchair due to a recent fall, the couple have taken it in stride. Prednisone and morphine—two drugs Connie probably would not have been prescribed outside of hospice care—have helped relieve her symptoms, giving her more energy.

NOTES

for a tough conversation

Mastering Communication with Seriously Ill Patients: Balancing Honesty with Empathy and Hope, a textbook co-authored by Duke's James Tulsky, MD, presents the VALUE acronym as a helpful guide to communicating with patients and families. VALUE stands for Valuing and appreciating what is said, Acknowledging emotions, Listening and Understanding the patient as a person, and Eliciting questions.

The book also includes a chapter on "transition conversations" with patients, discussions that address shifting the focus from extending life to providing comfort. The goal here, Tulsky says, is to "create a conversation that will provide medical expertise, support, and understanding so that in that moment, the patient can think clearly about the changes they are facing."

The roadmap is as follows:

1. Prepare yourself.
2. Ensure the patient or family understands the medical situation.
3. Assess the patient's readiness to talk about what's next.
4. Use big-picture questions to elicit patient values and goals.
   - *What is most important to you now?*
   - *What are you hoping for?*
   - *What do you enjoy doing now?*
5. Outline worries that are barriers to decision-making.
   - *What are your biggest concerns right now?*
   - *What is the hardest part for you? And your family?*
6. Offer to make a recommendation.
7. Propose a new treatment plan that meets the patient's goals.

Her recent fall, which might easily have proved calamitous for an 83-year-old woman with advanced lung disease, seems more like a temporary setback. "I should be working more on using the walker instead of the chair," she confesses. "I broke my right wrist when I broke my hip. I've never used my left hand; I sort of had to start from scratch."

"You've taken all these things in stride just remarkably," Charlie says to his wife with admiration. "My heavens, here you are eating with your left hand. You could say the hell with it, but you don't."

AGENDA: NO AGENDA

An important function of palliative medicine is helping people define their goals—for their care, and for the days they have left. "People are struggling with figuring out the right goals and putting them into action," says Tulsky, "particularly when making the shift from treatment directed toward cure to treatment for comfort."

Duke's palliative care team, which does around 500 consultations a year and reaches into every unit of the hospital, provides expert navigation through these difficult but very necessary communications.

"We like to say that our 'procedure' is the family conference," says Tulsky. "We walk into a room with no agenda; we assess without an agenda. We're curious: we want to learn who they are, their goals, their values—then with those things in mind, help them determine whether it's appropriate to make a shift in the course of treatment."

"We're not there to convince people they should or shouldn't be DNR," says Galanos. "We are there to help them feel better in whatever ways they need. Our consults are labor- and time-intensive to ensure their preferences are honored."

Nurse practitioner and palliative care coordinator Jennifer Gentry is often the first person on the team to meet the patient. "The majority of our consults are because of communication issues," she observes. "The patient may be very ill, things are not going well, and there's a disconnect between what the care team thinks and what the patient and family think."

Talking to patients and families takes sensitivity and skill. "The biggest mistake is to talk too much," says Gentry. "Start with open-ended questions: 'How are things going?' 'What do you understand about the illness and treatment?' Then be quiet and listen."

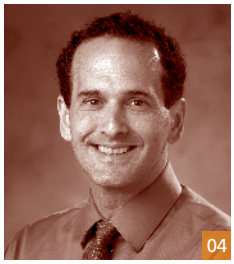
Conflict among family members is also common, especially when there's disagreement about what should be done for a patient who may not be able to clearly communicate his or her wishes.

"We're assessing family dynamics the minute we walk in the door," says Gentry. "Are people sitting together, supporting each other? You can identify very quickly who the decision-makers are, and what the cohesiveness of the family is. When people are quiet, we make an effort to bring them into the conversation. We try to get comments from everyone. Even when there's no consensus, the one thing we can all agree on is that we all care about the patient. That's a place to start."

Part of providing good end-of-life care to patients and families is "helping people resolve unfinished business," says Cutson. Delaying a turn to palliative measures or hospice care until the very end does the patient a disservice. "In the final days and hours of life, time is focused on effectively managing symptoms, and there may not be enough time to know all the members on your care team and establish trust. Once you have that and still have some energy, you can focus on those things that are so important."

Patients may have specific goals to meet. For example, "We worked with a gentleman who wanted to make it to his 60th anniversary, so his short-term care was directed toward that," Cutson says. "Afterward, he wanted a different approach."

In the case of a young mother who knew she wouldn't live to see her children grow up, hospice workers helped her make a treasure box full of meaningful souvenirs and letters for the children to open on birthdays and other special events in their lives.



01 Anthony Galanos, MD
02 James Tulsky, MD
03 Jennifer Gentry, RN
04 Raymond Barfield, MD
05 Camille Lambe, RN, PhD
06 Toni Cutson, MD
07 Sharron Docherty, RN, PhD
08 Richard Payne, MD
09 Susan Bruce, RN

"Someone has to be very brave to do this," notes Cutson. Such bravery may not even be conceivable to a patient who is overcome by pain and nausea and can't get past those immediate needs, or whose care team has not yet invited her to consider what she would want in the event that treatment doesn't work.

"A person dies once, so we have one chance to get it right," says Camille Lambe, a nurse practitioner who teaches palliative care in the Duke University School of Nursing. "When it goes well, families are so appreciative. I get notes saying you were there, you talked with me until I had no more questions. When it doesn't go well, families are devastated. They carry it for years. They remember the abrupt doctor that stood at the door and said, 'You have terminal cancer.' It colors the way they come to every other experience. We have to come prepared and get it right."

FILLING THE VOID

Offering comfort beyond the physical, addressing pain that is emotional, spiritual, or even existential—such tasks reflect a broader view of patient care than our current medical model necessarily supports. But health care providers must deal in these larger issues to truly serve their patients, says Richard Payne, MD, Esther Colliflower Director of the Duke Institute on Care at the End of Life, which resides in the Duke Divinity School but maintains a strong partnership with the medical school.

"Once one gets beyond the challenges of symptom management, most of what concerns patients and families are issues around preparation and closure: How do I talk to my family, my spouse? What's my legacy? If I'm a person of faith, what does this mean in terms of my relationship to God? They're all very important questions, and they're not peripheral to medical care, because if these matters are left unresolved, they are a tremendous source of suffering."

In some ways, health care providers find themselves in the position of filling a cultural void. "For most of recorded human history, we took care of our loved ones who were near death not in institutions but at home," notes Payne. "It was once quite common for young people to have experienced physically the death of a parent or grandparent. Over the last 100 years, we've turned dying into a purely medical event that takes place inside hospital walls. People no longer have a sense of what it is to be near those who are dying."

Part of the institute's mission is to better equip all those who have that role: "We create training opportunities for doctors, nurses, and clergy to help them attend to all sources of suffering in the patients they encounter. Education in communication is a huge strategy."

Effective communication skills can be honed through practice, but overall Payne urges the medical community "not to be as reactive and passive as we have been. Patients and families are looking to us to advance the conversations. Too often we only ask patients what they want to do, thinking that's empowering them, but we need to be facilitators and be much more proactive in walking them through their options, making sure that they understand the risks and benefits."

Duke pediatric oncologist Ray Barfield, MD, who also serves at the institute, suggests that care providers who want to be more fully present for their patients during their most difficult moments need to broaden their perspective. "The ways families experience illness is really different from the way we focus on rounds or on our clinical practice. We're biological, talking about systems, infections, chemo—all of that's incredibly important, but families are experiencing it from the inside; it transforms every part of their lives."

Hospitals host miracles and tragedies on a daily—if not hourly—basis, and palliative care may be the one constant in the ever-shifting sands of life-threatening disease. There's continuity in providing comfort, and a deeply comforting assurance to patients, perhaps best expressed by Barfield: "My primary goal may be to cure your disease, but I can also improve the quality of your day, at whatever stage you are in. Up to the very last day, I care about the quality of your day."

Duke HomeCare & Hospice:
dhch.duhs.duke.edu

Duke Center for Palliative Care:
palliativecare.medicine.duke.edu

Fighting fatty liver disease

The rippling health implications for our increasingly obese nation go deeper than most patients think.

Anna Mae Diehl, MD

Manal F. Abdelmalek, MD

IT'S ESTIMATED THAT ALMOST 80 MILLION AMERICANS have nonalcoholic fatty liver disease (NAFLD), in which fat accumulates in the liver cells (steatosis). A small fraction of patients progress to a more serious form of the disease, called nonalcoholic steatohepatitis (NASH), in which inflammation and some cell death occurs, and a minority of patients with NASH progress to liver fibrosis (scarring) and even cirrhosis and liver cancer. NASH ranks as one of the major causes of cirrhosis in the United States, behind hepatitis C and alcoholic liver disease.

DukeMed Magazine talked with two Duke clinician-scientists who study the causes of NAFLD and each day translate what they learn to the patients they treat.

Anna Mae Diehl, MD, is chief of the Division of Gastroenterology and a researcher who conducts animal studies of NAFLD as well as human clinical studies.

Manal F. Abdelmalek, MD, is an associate professor of medicine in the Division of Gastroenterology; she's an epidemiologist and researcher who conducts clinical trials and studies NAFLD from a public health standpoint.

Which patients are at risk for NAFLD?

ABDELMALEK: Patients who have obesity, high cholesterol, insulin resistance, and hypertension should be considered at high risk. Because most patients with NAFLD do not have symptoms until the disease is more advanced, periodic evaluation of liver enzymes in patients at high risk should be considered. Elevated liver enzymes on routine blood tests can be a sign of NASH if there is no other reason for liver disease, such as viral hepatitis or excessive alcohol use. A "bright" liver on abdominal ultrasound might suggest the presence of a fatty liver.

If my patient has NAFLD that has not yet progressed to NASH, when should I consider referring him to another specialist?

ABDELMALEK: The most accurate method to differentiate simple fatty liver from NASH is liver biopsy. Therefore, if there is any suspicion of possible fatty liver disease based on the presence of multiple risk factors, features of fatty liver on an imaging study, or unexplained elevation of liver enzymes, patients may be referred to a specialist for further evaluation, counseling, and possibly staging of underlying liver disease. Although no pharmacologic therapies are approved for the treatment of NASH, antioxidants such as vitamin E, lifestyle and dietary modification, and medications such as pioglitazone or metformin—medications typically used to treat risk factors which may contribute to disease progression—may be warranted. Patients with more advanced forms of NAFLD would require further care and monitoring for potential complications of cirrhosis. At Duke, we individualize treatment depending on the risk factors that patients have which may contribute to disease and its progression. We also provide follow-up when needed, which may be necessary for patients with NASH and/or advanced fibrosis or cirrhosis from NAFLD. We will also determine those patients who have steatohepatitis [NASH] and who may be considered for treatment studies.

Are there specific dietary interventions that can help?

ABDELMALEK: In addition to treatment of risk factors such as high cholesterol and diabetes, we have learned that diet matters. We have recently reported that increased consumption of fructose is a risk factor for fatty liver, independent of obesity. In that study, patients who had fatty liver disease were more likely to consume high levels of fructose compared to patients of the same age, gender, and body mass index who didn't have fatty liver disease. In a different study, published in June 2010 in *Hepatology*, we found that among patients with fatty liver, those who consumed the most fructose were more likely to have advanced disease. In that study, we evaluated a very large cohort of patients from the NASH Clinical Research Network, and we found that the more fructose that patients with fatty liver disease consumed, the higher their risk of liver inflammation, swollen liver cells (also called ballooned cells), and even fibrosis, despite controlling for other factors that may contribute to those outcomes.

This was a very interesting discovery because up until that study, we hadn't been able to tell patients what dietary factors may contribute to NAFLD or disease progression in those with NAFLD. With more confidence, we can now inform patients with fatty liver disease to follow a diet low in refined sugars, avoid extra sugar, and to be careful about fructose, particularly in the form of high-fructose corn syrup, such as in sodas and fruit drinks. I advise them to start reading food packages and labels.

What are the best options for medical management of NASH?

DIEHL: Lifestyle modifications (diet and exercise) remain the mainstay of treatment for NAFLD. Studies are being done to identify drugs that help to reduce liver damage and prevent disease progression in NAFLD. The first multicenter, prospective controlled clinical trial comparing two treatments—vitamin E and the insulin-sensitizing medication pioglitazone—to placebo was published May 2010 in the *New England Journal of Medicine*. Duke enrolled many patients in that trial as part of an NIH-supported consortium called the NASH Clinical Research Network. In non-diabetic patients who had had a liver biopsy that showed NASH, both treatments were found to be effective: 18 months of treatment with either vitamin E or pioglitazone improved the histologic features of NASH (fatty cells in the liver and inflammation and swelling of liver cells). As a result of this recent study, therefore, we now have two potential treatments for NASH in non-diabetic patients. More studies are planned to identify agents that will help NASH patients who do not improve with pioglitazone or vitamin E treatment, and to determine the best treatments for NASH patients who also have diabetes. The latter trials will be particularly important because it appears that diabetic patients with NASH are likely to develop cirrhosis.

Why do some patients with fatty liver disease get cirrhosis while others don't?

DIEHL: From our research at Duke in animal models and in people, we find that some people tolerate fat accumulation in the liver without activating signaling pathways that lead to serious injury. Hence, they stay at early disease. Other people, for reasons that we don't understand (some may be genetic, some may be environmental) go down a path that's going to lead them to cirrhosis and liver cancer. We're trying to understand why some people go one way and some people go the other. Ultimately, as we learn more about the mechanisms that cause progression to more serious disease, we aim to not only develop therapeutics, but also blood tests to identify who's at risk of progressing to more advanced stages of NAFLD. The latter will enable us to focus our attention on those patients who are at greatest need for treatment.

We have made progress in identifying proteins and pathways that play a role when patients develop the most serious forms of NAFLD. One of those is the Hedgehog signaling pathway, which is known to provide cells with information that is used to repair tissues, and which has been implicated in some cancers. Hedgehog had never been identified before as playing a role in NAFLD, but we found that its activity correlates with NAFLD progression in animals and in people [published July 2009, *Gastroenterology*]. Now we've shown that manipulating the Hedgehog pathway in animals actually modifies disease progression in NAFLD. That's exciting because some companies have already developed Hedgehog inhibitor drugs for use in other diseases. This is a totally new treatment area for NASH that hasn't been explored before. Right now, it's still at the pre-clinical stage, however.

We have also learned more about how the Hedgehog pathway works and interacts with other molecules. For instance, we have found that the Hedgehog pathway stimulates immune cells and certain types of liver cells to produce a molecule called osteopontin. Other researchers at Duke in the Department of Surgery (Drs. Bruce Sullenger and Paul Kuo) have developed agents that block the actions of osteopontin. Using their agents in our animal models of NASH, we showed that inhibiting osteopontin blocked fibrogenesis [production of scar tissue in the liver]. Then we examined liver tissue samples that we have collected from our patients at Duke who have NAFLD. We found that osteopontin is turned on in NASH, and it's at higher levels in people who have fibrosis than in people who don't [published in the September 2010 *Hepatology*]. So, osteopontin may be a serum biomarker that helps us to recognize which NAFLD patients have more advanced liver disease. In addition, osteopontin might be another new therapeutic target in NASH. Studies are being planned to evaluate the safety and efficacy of osteopontin blockers in patients with NASH.

DUKE TISSUE REPOSITORY

Duke has created its own nonalcoholic fatty liver disease database and tissue repository with more than 1,200 patients currently enrolled. Participants donate small blood and tissue samples that Duke scientists use to develop new diagnostic tests and treatments for the disease.

TRIALS CURRENTLY RECRUITING AT DUKE

A center of excellence in NAFLD, Duke offers patients comprehensive medical evaluations and management plans, as well as access to clinical trials of new treatments. Duke is one of only eight clinical centers in the NASH Clinical Research Network, which is funded by the National Institute of Diabetes and Digestive and Kidney Diseases. Clinical studies focus on prevention and treatment of NASH.

Current trials include:

- A single-center trial to find out if the diabetes medication metformin in combination with vitamin E can improve NASH in non-diabetic patients.
- A multicenter trial evaluating the role of a highly refined fish oil for treatment of NASH in diabetic and non-diabetic patients.

Additional diagnostic and treatment studies will be open for enrollment in early 2011.

For enrollment information, visit clinicaltrials.gov.

Who shall live and who shall die?

Can we be better prepared for the next health care catastrophe?

BY PHILIP M. ROSOFF, MD

In the late summer of 2005, Dr. Anna Pou faced a horrendous and unanticipated moral and medical dilemma. An attending otolaryngologist at Memorial Medical Center in New Orleans in the immediate aftermath of Hurricane Katrina, Pou had no electricity to power the apparatus of modern medical care, with the emergency generators having failed. Caring for large numbers of patients whose very lives depended upon those machines, and with no rescue in sight, she and the few colleagues who remained behind had to decide who should live and who should die. Which of the acutely and chronically ill patients could be carried down the stairs to the helicopters and boats that might not arrive in time? Who should be permitted to suffer in unspeakable agony as the hours went by without any sign of relief? Ultimately, she decided that she would ease their suffering using the only tools she had available—morphine and midazolam. And for that, she was excoriated in the press and accused of murder by the state.

What happened after Hurricane Katrina was a national tragedy in which thousands died and many more lost their homes and livelihoods. Compounding the disaster was the poor preparation of the medical community for such an overwhelming catastrophe, with physicians like Dr. Pou being forced to make decisions for which they were prepared poorly, if at all. While it might be tempting to argue that Katrina was a once-in-a-lifetime event, and that it's improbable that doctors would have to cope with such a situation again, that seems like a meager rationalization for failing to prepare for another disaster.

Most recently, many doctors, nurses, hospital administrators, public health experts, and medical ethicists have been discussing and formulating plans for how to confront a possible influenza pandemic that could paralyze the medical system for months at a time, inundating health care facilities and providers with incredibly sick patients. While the outcome of the 2009–10 flu season was milder than many expected, there is no reason to expect that we will not face such a situation in the not-too-distant future, or that the discussions that took place were in vain. Indeed, many of the topics that were the subject of argument and deliberation taught us to scrutinize what medicine can and can't do, what we owe patients, and consequently what we should do in a crisis.

In other words, when we can't try to save everyone, how do we decide whom we should attempt to save, and what, if anything, do we owe those who "lose" the lifesaving lottery? The answers to these fundamental questions stretch our moral selves to the limit. They force us to address issues that we rarely take time to think about in this country: concerns about rationing medical care and whether there are some lives that are more important than others.

Over the past couple of years I have given a number of lectures about this topic, using pandemic influenza planning to illustrate the problems. To demonstrate the profound difficulties in making decisions such as these, I have used the following scenario and table to challenge the audience in their thinking about how they would decide who lives and who dies if forced to make a choice.

Before reading the table, imagine that you are in charge of triage at Duke Emergency Department (ED) during a flu pandemic. Many people, young and old, are presenting with incipient respiratory failure. The ED is inundated with patients. Under normal times, when intensive care unit (ICU) beds and ventilators are almost always available, there is little discriminatory thinking required: if someone can physiologically benefit from mechanical ventilation, even in the short-term, and if there is not a valid Do-Not-Attempt-Resuscitation order in place, we intubate and resuscitate. But what do you do when you have two patients in the ED at the same time whose vital signs are virtually identical, but you only have one ventilator and ICU bed available? Who gets the chance to live? Who is relegated to die?

WHO WILL LIVE AND WHO WILL DIE?

Which patient "wins" and gets the opportunity to live?

Patient #1	Patient #2
21-year-old honor student	86-year-old nursing home resident
21-year-old honor student	40-year-old mother of three children
21-year-old honor student	21-year-old honor student
21-year-old honor student	21-year-old friend of a colleague
21-year-old honor student from Durham	21-year-old honor student from Fayetteville
21-year-old honor student and illegal alien	21-year-old honor student and US citizen
21-year-old honor student	21-year-old dropout with police record
21-year-old basketball player	21-year-old with spina bifida in a wheelchair
21-year-old honor student	21-year-old with Down syndrome

If you are like most people, these questions and their possible answers make you extremely uncomfortable. Not only does the way we address them reveal possible inner prejudices and potential cracks in our carefully crafted moral personae, but also demonstrates that we don't have a clue about how we might act if we were in Dr. Pou's shoes. This thought experiment demonstrates the singular importance of open and inclusive discussion *before* such a crisis presents itself, so that the answers that are provided by the consensus plan do not compel doctors and nurses to face the choices

in the table alone and unprepared. Without proposing specific answers to these quandaries, we are not left without recourse. We can—and indeed, should—create plans that consider these horrendous scenarios and offer supportable and justifiable reasoning for choosing some people over others that are both fair and, as much as possible, evidence-based.

In point of fact, in the United States and in many other countries, a number of plans to deal with pandemic influenza have been crafted. Although most of these plans do not have specific advice on these questions, some do, for instance those of the VA system and the nascent plan created by the North Carolina Medical Society. Common features of these plans have included mechanisms to medically justify clinical decision making, using evidence-based medicine whenever possible. [See sidebar]

Both the plans and the rationale for them need to be publicly vetted and acceptable, especially those parts that may have the most controversial, perhaps even noxious, statements. Given the uproar that accompanied the recent health care reform legislation, with talk of "death panels" and the like, it is vital that the process be transparent. Furthermore, when adopted, the plans must affect everyone: it is a good practice of public justice that those who make the rules should also be bound by them. Hence, the relative of the hospital CEO does not have a greater claim on intensive care resources than someone who is possibly sicker and more likely to benefit. It may also be reasonable to advance the idea that some members of society are special, not necessarily because of who they are, but for what they do. For instance, one could make a plausible argument that first responders and others who might justifiably profess to play vital roles in a health care catastrophe, such as police and firefighters, National Guard troops, ambulance drivers, doctors and nurses, and power plant workers should have first claim on such resources as influenza vaccine (as indeed was the case last year).

Finally, the primary mission of health care is the relief of suffering. And there is no question that a disaster such as a pandemic or another Katrina or a major terrorist event would produce human suffering on a massive scale. In the event of not being able to save everyone, we should prepare to care for those who are relegated to go without lifesaving treatment. This means training a wide variety of personnel in basic palliative, end-of-life care and stockpiling the drugs and other supplies that would be required to comfort the dying and relieve their suffering.

There is no guarantee that such plans will work as intended. But it is guaranteed that without a plan, human misery and anguish will be widespread, and moral principles that we rightly hold dear would be violated. Careful discussions before the fact that include as many voices as possible will maximize the chances of how we, as a society, could successfully meet a prolonged emergency with our moral dignity both intact and strengthened.

Philip Rosoff, director of clinical ethics at Duke University Hospital, is a pediatric oncologist with a master's degree in philosophy. Duke's clinical ethics service provides education to physicians, nurses, and house staff; generates policy and policy changes regarding ethical issues; and offers mediation to patients, families, and physicians when questions arise regarding such issues as end-of-life care, patient ability to participate in decisions, and futility.

What's in pandemic flu plans?

A 2007 report from the North Carolina Institute of Medicine estimated that a severe influenza pandemic in North Carolina might result in as many as 290,000 hospital visits in eight weeks. Many resources (physicians, nurses, pain medications, ventilators) would be scarce—so scarce that it may not be possible to provide all of the essential services that an individual patient would receive under normal circumstances. Such an event would precipitate some tough decisions, so many states, including North Carolina, have begun drafting plans to guide those choices.

The North Carolina Medical Society has crafted a plan that is now under consideration in the North Carolina governor's office, says Rosoff, who helped draft the plan. The details of this and other plans are still apt to change, and at some point are likely to come up for public debate. Here are some examples of issues these plans address:

- **Many plans encourage physicians to help care for patients even if that means operating outside their areas of expertise.** Most plans include language similar to many states' "Good Samaritan" laws, which protect such practitioners from legal prosecution or lawsuits as a result of their actions, providing they are acting in good faith.
- **When lifesaving resources such as ventilators are in short supply, health care workers would need a system to guide them in allocating those resources.** That system would need to assess how likely the patient is to survive if he receives the resource. That assessment may be similar to the Sequential Organ Failure Assessment (SOFA) score, which measures the extent to which six different organ systems are functioning. It would also take into account patient age, but being older would not necessarily make the patient less likely to receive the resource.
- **Some preexisting conditions may make people ineligible for lifesaving interventions when resources are very scarce.** These conditions may include chronic renal failure, terminal cancer with less than a year of life left, severe chronic pulmonary disease, or severe chronic heart failure.
- To be cost-efficient, most hospitals stock no more than a three-day supply of medications and other items. But **caring for patients with severe illness who are determined ineligible for lifesaving care might require a larger supply of palliative care items,** such as pain medications and the equipment needed to administer them.

SAYING THANK YOU

Gifts from individuals and organizations are the largest source of non-government support for Duke Medicine's research, education, patient care, and service missions—and we are grateful to all who help us make a difference. To learn more about how you can partner with Duke Medicine, please call **919-667-2500** or visit **dukemedicine.org/giving**.

Pediatrics receives largest-ever gift from Kiser estate

The estate of Glenn A. Kiser, MD'41, HS'47, and his late wife, Muriel C. Kiser, has given the Department of Pediatrics $17.2 million for children's health research and pediatric physician education, the largest gift in the department's history.

The gift will establish the Kiser Scholars Program, providing endowment to recruit pediatric investigators, facilitate the transition to research independence by junior faculty, and retain faculty involved in research and education initiatives. It will also fund the Kiser-Arena Endowed Professorship in Pediatrics and two Glenn A. Kiser and Muriel C. Kiser Endowed Professorships for leaders in education and research. Some of the gift will also be used as a source of matching funds to encourage future giving to Duke Children's.

"Our dedicated faculty and young scientists are making great progress in diverse areas—from cardiology and cancer to childhood allergies and inherited genetic disorders," says Joseph St. Geme III, MD, chair of Duke Pediatrics. "I am excited about opportunities we will now have to fund more cutting-edge research and educational initiatives, recruit pediatric investigators, and provide more training programs for future specialists in a wide range of complex pediatric health problems."

Kiser, who died in 2009, was a 1941 graduate of the Duke University School of Medicine and completed residency training in pediatrics at Duke in 1947. An early investor in Food Lion Inc., he and his wife, Muriel, a former elementary school teacher, were leading North Carolina philanthropists who supported health care and education in Salisbury, Rowan County, and at Duke Children's. In 1994 they gave $1 million toward the McGovern-Davison Children's Health Center building, which celebrated its 10th anniversary in October.

Donors step up for new Duke Cancer Center building

As Duke Medicine prepared to celebrate the topping-out ceremony for the new Duke Cancer Center facility in November, two donors came forward with generous gifts for the building, which is scheduled to open in 2012.

Donna A. Bernstein of Roslyn Heights, New York, and her son, Sam Bernstein, have pledged $3 million in honor of Donna's father and Sam's grandfather, Harold Bernstein, who was a patient at Duke. The rooftop garden, where patients may elect to receive chemotherapy, will be named to honor Harold. The Bernstein family, which also includes Gene Bernstein, Jay Bernstein, Linda Bernstein Rubin, and Matthew Bernstein, have also been generous supporters of chronic lymphocytic leukemia research at Duke under the direction of Jon Gockerman, MD.

A second gift from Tom and Janet Kean of Norwood, North Carolina, honors the late Nicholas G. Georgiade, DDS, MD'50, HS'50-'54, a distinguished surgeon and chief of the Division of Plastic, Maxillofacial, and Reconstructive Surgery at Duke from 1975 to 1985. The Keans committed $500,000 in thanks for the care their daughter, Terry, received as Georgiade's patient many years ago. The fourth-floor patient waiting room in the new building will be named for Georgiade. The Keans also established the Janet Hartquist Kean Endowment for cancer research at Duke in 2000.

01 50th Anniversary, Class of 1960

02 2010 Medical Alumni Association Awardees: from left, front row, Walter L. Miller, MD'70, Distinguished Alumnus; Michael D. Schneider, MD, HS'76-'78, Distinguished Alumnus; Gregg and Jeff Foxworthy, Honorary Alumni; John R. Perfect, MD, HS'77-'80, Distinguished Faculty; Thomas P. Graham, MD'63, HS'67-'69, Distinguished Alumnus; Joseph A. Moylan, MD, Humanitarian; Gordon K. Klintworth, MD, PhD, HS'62-'65, Distinguished Faculty

03 Davison Building tour: Robert Green, T'56, MD'60; Nancy Preston; Edwin Preston, T'57, MD'60, HS'60-'62; Cheryl Howell; T. Rudoph "Rudy" Howell, MD'58; Colleen Grochowski, assistant dean for curriculum development

04 Welcome reception: D. Parker Moore Jr., MD'52, HS'52-'53; Robert E. Chambers, MD'52, HS'54-'56; Clarke G. Reed, MD'52, HS'52, '54-'56; Gerard Marder, MD'52, HS'54-'56; Noble J. "Nobby" David, T'48, MD'52, HS'56-'60

Medical Alumni Weekend 2010

More than 500 alumni, friends, faculty, and students took part in Medical Alumni Weekend events in October.

The weekend kicked off with the Davison Club Celebration for annual donors of $1,000 or more to the Duke Medical Annual Fund, which was held at the Cotton Room in downtown Durham and featured talks by Dean Nancy C. Andrews, MD, PhD, and Davison Club president Richard Sarner, T'79, MD'83.

Other highlights of the weekend included the Learning Center groundbreaking ceremony, a tailgate networking event before the Miami vs. Duke football game; class dinners; and special events for the Half-Century Society and 50th Reunion Class of 1960. Three new Duke department chairs were introduced and shared their early visions for research, care, and education during the Class of 1985 Medical Symposium: Mary E. Klotman, T'76, MD'80, HS'80-'85, Medicine; Geoffrey Rubin, MD, Radiology; and Sarah H. Lisanby, T'87, MD'91, HS'91-'95, Psychiatry and Behavioral Sciences.

Experience with rare eye disease leads Fosters to create lectureship

As a part of their 20-year mission to increase education and awareness of a rare eye disease, C. Stephen Foster, T'65, MD'69, and his wife, Frances, have committed $100,000 to Duke to create a Department of Ophthalmology lectureship. The annual Stephen and Frances Foster Lectureship will feature speakers with an interest in ocular immunology and the rare disease uveitis.

The Fosters' dedication to ocular immunology stems largely from personal experience. During childhood Frances suffered from uveitis, a type of inflammation inside the eye, and lost vision in one eye as a result of improper treatment. Her other eye, though functioning, is still fairly damaged from uveitis, cataracts, and glaucoma.

"Uveitis is an orphan disease that is relatively neglected, yet it's a significant cause of blindness around the world," Stephen says.

According to Stephen, out of the 130 ophthalmology departments across the country, only 21 have an ocular immunologist on faculty.

Though he completed ophthalmology training at Washington University in St. Louis, Stephen says over the years he and Frances, a nurse practitioner, developed a strong affinity toward Duke's Department of Ophthalmology.

"I had been observing from afar a real transformation in the Department of Ophthalmology at Duke," he says. "It has steadily risen in the eyes of the rest of the world."

The Fosters are cofounders of the Ocular Immunology and Uveitis Foundation. Stephen also founded the Massachusetts Eye Research and Surgery Institution, where he currently serves as CEO. He is a clinical professor of ophthalmology at Harvard University.

05 Placing the beam. A tree or branch is traditionally affixed to a building's top beam as a symbol of luck and success.

06 Joseph Moore, MD, HS'75-'77, Duke professor of medicine in hematology-oncology, and melanoma survivor Harry Rhoads, a Duke patient and CEO of the Washington Speakers Bureau in Washington, DC

07 Victor J. Dzau, MD, greets guests

Cancer Center topping-out

Placing the final beam of the steel skeleton of the new Duke Cancer Center building marked "a bold move…for cancer patients throughout North Carolina, the region, and nationally," said Victor J. Dzau, MD, chancellor for health affairs, during a special topping-out ceremony in November. The event was attended by patients, donors, physician faculty, employees, and community members, many of whom had signed their names or signed in honor of loved ones on the special white beam. Read more on the inside front cover.

Children's Health Center turns 10

Friends, faculty, staff, and patients of Duke Children's celebrated the 10th anniversary of the McGovern-Davison Children's Health Center building in October. Former Duke Men's Basketball star Jay Bilas, T'86, L'92, a color commentator and studio analyst with ESPN, served as emcee for the event. Joseph W. St. Geme III, MD, chair of the Department of Pediatrics, and Victor J. Dzau, MD, chancellor for health affairs, joined Bilas on stage during the program, which included a performance by the Duke Children's choir, including several patients. Remarks during the event looked toward the future for Duke Children's, including hopes for a new freestanding children's hospital.

08 Cooper Thomas, a patient who was born prematurely at Duke, with his parents, Michael and Britt Thomas of Raleigh, and Joseph St. Geme III, MD.

09 The event was held in the McGovern-Davison Children's Health Center lobby.

10 Victor J. Dzau, MD, with Laura Margaret Burbach, who received a lung and bone marrow transplant at Duke Children's from the same donor—the first procedure of its kind

School of Medicine breaks ground

On October 15, more than 300 Duke officials, faculty, alumni, and students celebrated a ceremonial ground breaking for a new Learning Center for the Duke University School of Medicine. Located at the heart of Duke's medical campus, the six-story, 84,000-square-foot facility is designed to serve medical, nursing, and other health professions students with state-of-the-art educational technology and team-based learning.

Thanks to an initial $35-million gift from The Duke Endowment, construction will begin early in 2011, with completion targeted for late 2012. A campaign is under way with a goal of raising a total of $15 million toward the overall $50 million philanthropic goal for the facility. To learn more and see event videos, please visit medalum.duke.edu.

11 David L. Feldman, T'80, MD'84, HS'89-'92, past president, Duke Medical Alumni Council; Edward G. Buckley, E'72, MD'77, HS'77-'81, vice dean for medical education; E. Philip Lehman, MD'10, past president, Davison Council; Victor J. Dzau, MD, chancellor for health affairs; Nancy C. Andrews, MD, PhD, dean, School of Medicine; K.D. Weeks Jr., MD'74, trustee, The Duke Endowment; Richard H. Brodhead, PhD, president, Duke University; Brian D. Schwab, MSIII, president, Davison Council; and Dale R. Shaw, T'69, MD'73, HS'73-'77, president, Medical Alumni Council

12 Nancy C. Andrews, MD, PhD, dean, School of Medicine, presented a gift of appreciation to Edward G. Buckley, E'72, MD'77, HS'77-'81, vice dean for medical education, for his leadership in planning the Learning Center.

13 Major Groove, a medical student *a capella* group, wrote original lyrics and performed a special arrangement of the big band tune "This Could Be the Start of Something Big." From left, first row, Matthew Robinson, MSI; Karen Scherr, MSI; Matthew MacCarthy, MSIII; Jennifer Vogel, MSII; Jennifer Shaffer, MSIII; Kaitlin Rawluk, MSIII; Nina Beri, MSIII; Cecilia Ong, MSII; Stacey Schriber, MSI; Katie Yang, MSII; Amy Ehman, MSI; back row, David Arriola, MSI; Ilya Shadrin (partial), MSII; Andrew Ishizuka (partial), MSI; David Rawson (hidden), MSII; Brandon Jackson Baird, MSII; Kunal Mitra, MSIV; Nelson Diamond, MSI; Sky Vanderburg (partial), MSI; Steven Orr, MSII

*Major Groove's performance video can be viewed at **medalum.duke.edu**.*

Special thanks to the Tisch family

The family of the late Preston Robert Tisch, benefactors of Duke's Preston Robert Tisch Brain Tumor Center (PRTBTC), was honored in September in New York at an event celebrating the fifth anniversary of the naming of the Tisch Center. From left, Victor J. Dzau, MD, chancellor for health affairs; Laurie Tisch; Jonathan Tisch; Joan Tisch; Henry Friedman, MD, HS'81-'83, deputy director, PRTBTC; Lizzie Tisch, Allan Friedman, MD, HS'74-'80, deputy director, PRTBTC.

Krangel named chair of immunology

Michael S. Krangel, PhD, Mary Bernheim Professor of Immunology, began his appointment as chair of the Duke Department of Immunology in September. He transitioned into the role after serving as interim chair since January 2009.

"Mike is an integral member of the faculty who has been leading the Department of Immunology for nearly two years as interim chair," says Nancy Andrews, MD, PhD, dean of the School of Medicine. "He is also a highly regarded researcher whose work on the regulation of T cell receptor genes has received international recognition."

"I am honored to take on this position, and enthusiastic about the opportunities that lie ahead," says Krangel. "My goals are to expand and diversify the research areas we cover, and to provide even more opportunities to do basic science work in immunology."

Jaquiss named chief of congenital heart surgery

Robert D.B. "Jake" Jaquiss, MD, began his appointment as chief of congenital heart surgery at Duke Children's Hospital in September. Prior to his new role, Jaquiss served as professor at the University of Arkansas for Medical Sciences and chief of pediatric cardiothoracic surgery at Arkansas Children's Hospital. He brings his expertise in neonatal cardiac surgery, pediatric cardiac surgery including transplants, and the surgical care of adults with congenital heart disease.

"Dr. Jaquiss is widely regarded as one of the country's premier pediatric heart surgeons, and we are very pleased that he will be joining the faculty of the Duke Children's Hospital," says William J. Fulkerson Jr., MD, executive vice president of Duke University Health System. "Adding Dr. Jaquiss to a team that is already widely recognized for excellence in pediatric heart care is consistent with our commitment to provide the people of North Carolina, and the region, with the very best in heart services."

Jaquiss was offered the position after an extensive national search. His recruitment comes amid efforts to expand the Duke Children's Heart Program, including the recent and planned hiring of additional cardiologists, nurses, and physician extenders. It also follows last year's opening of the state-of-the-art Cardiac Pediatric Intensive Care Unit.

"I'm absolutely delighted to join an institution of Duke's caliber, one that has historically been recognized for excellent clinical care and innovative research," Jaquiss says. "I look forward to working with the senior leadership, faculty, and staff to further develop an already superb program that offers a uniquely comprehensive depth of services to care for the children of North Carolina, as well as those throughout the Southeast and across the nation."

Lisanby named chair of psychiatry and behavioral sciences

Sarah Hollingsworth "Holly" Lisanby, MD, an internationally recognized leader in the field of brain stimulation, began her appointment as chair of the Duke Department of Psychiatry and Behavioral Sciences in October. Lisanby joins Duke after roles as the chief of the Division of Brain Stimulation & Therapeutic Modulation at Columbia University and the New York State Psychiatric Institute, and professor of clinical psychiatry at Columbia.

Lisanby has received professional accolades for her leading role in pioneering a novel depression treatment called magnetic seizure therapy, which her team took through the steps from bench to bedside, and is now at the stage of multicenter international collaborative trials.

"Holly is an ideal chair for the Department of Psychiatry," says Nancy Andrews, MD, PhD, dean of the School of Medicine. "She has had a stellar career at Columbia, and she appreciates Duke's culture from her many years here as a student and resident. She is deeply committed to all of the school's missions, and will bring exciting new leadership in clinical care, research, and education."

"I am extremely excited by the opportunity to lead such a successful and vibrant psychiatry and behavioral sciences department that is renowned for its outstanding research, clinical, and educational programs," says Lisanby. "Having personally experienced Duke's strong tradition of excellence in research, education, and patient care during my 12 years of training here, I am motivated by the prospect of preserving and building upon these strengths as the field of psychiatry enters an era of unprecedented growth and scientific advancement."

Brennan named chair of biochemistry

Richard Brennan, PhD, former director of the Center for Biomolecular Structure and Function at the University of Texas M.D. Anderson Cancer Center, was appointed chair of the Duke Department of Biochemistry, effective January 1, 2011. Brennan is an accomplished structural biologist whose personal research focuses on the mechanisms of multidrug resistance and tolerance. His lab has identified the crystal structures of a number of genetic transcription regulators and biologically germane protein-ligand complexes.

"The search committee was impressed by Dick's deep commitment to scientific excellence and his passion for mentoring young investigators," says Nancy Andrews, MD, PhD, dean of the School of Medicine. "I believe he has important and exciting ideas for building on the strengths of the department and enhancing its excellence in structural biology, while also expanding into single-molecule science, cryo-electron microscopy, and other developing areas."

Brennan's wife, Maria Schumacher, PhD, who is herself a noted biochemistry researcher, will also join the department; her particular expertise is in protein-nucleic acid interaction, gene regulation, and DNA segregation/partitioning.

A. Wesley Burks, MD, Kiser-Arena Professor of Pediatrics and chief of pediatric allergy and immunology, received the 2010 Bret Ratner Pediatric Allergy and Immunology Research Award from the American Academy of Pediatrics in October. This award was established to recognize an outstanding pediatrician who has made important contributions in basic and clinical research in the field of allergy and immunology.

Bryan Clary, MD, associate professor of surgery, has been elected to the American Surgical Association.

Victor J. Dzau, MD, chancellor for health affairs at Duke University and president and CEO of Duke University Health System, received the American Heart Association's prestigious Research Achievement Award at the 2010 AHA Scientific Sessions in November. The award recognized Dzau's career-long contributions in revealing disease processes that affect the heart and blood vessels. Since 1953, the annual award has been conferred to distinguished cardiovascular researchers; another Duke scientist, Robert J. Lefkowitz, MD, received the award in 2009.

In November Dzau was also honored by the Old North State Medical Society, North Carolina's oldest medical society for black physicians, as a recipient of the 2010 Kuumba Award. Dzau was honored for his leadership and strength of commitment to health care equity and community health initiatives.

In addition, Dzau received honors from two universities in 2010. From his alma mater, McGill University, he received the McGill Medicine Alumni Global Award for Lifetime Achievement in recognition for enhancing the reputation of the university through a lifetime contribution of exceptional leadership. In November, he received an honorary doctor of medicine degree from King's College London. The honorary degrees are conferred by the college on "persons of conspicuous merit as demonstrated by their outstanding distinction."

Stephen Freedland, MD, associate professor of surgery, was appointed as the new editor of *Prostate Cancer and Prostatic Diseases.*

Danny O. Jacobs, MD, David C. Sabiston Jr. Professor of Surgery and chair of surgery, was selected to become president-elect of the Society of Black Academic Surgeons commencing April 2011.

Samuel Katz, MD, Wilburt C. Davison Professor of Pediatrics and chair emeritus of pediatrics, was named the 2010 Maurice Hilleman/Merck Award laureate. Katz was honored for his work with Nobel laureate John F. Enders, MD, in developing the measles vaccine, which was licensed in 1963 and has saved the lives of millions of children around the world.

Priya Kishnani, MD, professor of pediatrics and chief of pediatric medical genetics, received the 2010 Christian Pueschel Memorial Research Award from the National Down Syndrome Congress. Kishnani was recognized for her contributions in advancing the understanding of Down syndrome and in developing new approaches to its treatment.

In October, the Duke Medical Alumni Association honored physicians who have made significant contributions to Duke and to the field of medicine. Duke faculty honorees were:

Distinguished Faculty Award
Gordon Klintworth, MD, PhD, Joseph A.C. Wadsworth Research Professor of Ophthalmology

John Perfect, MD, professor of medicine and interim chief of infectious diseases

Humanitarian Award
Joseph Moylan, MD, former director of the Duke Surgical ICU

For more information and a full list of 2010 awardees, visit medalum.duke.edu.

HONORS & AWARDS

Seok-Yong Lee, PhD, assistant professor of biochemistry, received the Edward Mallinckrodt Jr. Foundation Award in September, with $60,000 in funding for the first of three years. Lee also received the Esther and Joseph Klingenstein Fund Award in April with **Cagla Eroglu, PhD,** assistant professor of cell biology, and **Rebecca Yang, PhD,** assistant professor of neurobiology. In May, Lee won the McKnight Scholar Award with a grant of $225,000 over three years.

H. Kim Lyerly, MD, George Barth Geller Professor and director of the Duke Comprehensive Cancer Center, was appointed to two councils at the National Institutes of Health (NIH): the Council of Councils, which advises the NIH director on matters related to the policies and activities of the Division of Program Coordination, Planning, and Strategic Initiatives, and the Office of AIDS Research Advisory Council, which provides input on the planning, coordination, and evaluation of research and other activities in respect to AIDS research conducted or supported by the NIH.

Miguel Nicolelis, MD, PhD, Anne W. Deane Professor of Neuroscience and co-director of the Duke Center for Neuroengineering, was one of 17 recipients of the 2010 National Institutes of Health (NIH) Director's Pioneer Award. The award will provide funding to continue Nicolelis's groundbreaking work into the development of brain–machine interface technology. The NIH selects recipients through special application and evaluation processes; distinguished outside experts identify the most highly competitive applicants. Nicolelis was awarded $2.5 million spanning five years to conduct his research.

Nicolelis was also one of 20 recipients of the 2010 NIH Director's Transformative Research Projects (T-R01) Award, making him one of the first people to receive both the Pioneer Award and the T-R01 in the same year. He will use the T-R01 to continue his groundbreaking work developing a novel approach to relieve the symptoms of Parkinson's disease. In addition to the two NIH awards, Nicolelis was recently elected to the prestigious French Academy of Sciences and the Brazilian Academy of Sciences.

Aurora Pryor, MD, associate professor of surgery and chief of general surgery at Durham Regional Hospital, was appointed as a consultant to the American Board of Surgery.

William Michael Scott, MSN, FNP-BC, clinical associate in the School of Nursing, received the State Award for Excellence during the 25th national conference of the American Academy of Nurse Practitioners. The awards recognize nurse practitioners for demonstrating excellence in practice, research, NP education, or community affairs.

Cynthia E.K. Shortell, MD, professor of surgery, was selected to serve on the Society for Vascular Surgery Education Council.

Joseph W. St. Geme III, MD, James B. Duke Professor of Pediatrics and chair of pediatrics, was one of 65 new members elected to the Institute of Medicine (IOM) at their 40th meeting, held in October. New IOM members are elected by current active members through a highly selective process that recognizes individuals who have made major contributions to the advancement of the medical sciences, health care, and public health. St. Geme is a nationally recognized expert for his research on the genetic and molecular basis of virulence by *Haemophilus influenzae*.

Julie Thacker, MD, assistant professor of surgery, was named a fellow of the American Society of Colon and Rectal Surgeons.

Deirdre Thornlow, PhD, RN, assistant professor in the School of Nursing, was one of eight recipients nationwide to receive the $120,000 Claire M. Fagin Fellowship. The fellowship supports research aimed at improving health outcomes for targeted groups of elderly patients; Thornlow is investigating postoperative respiratory failure in elderly patients.

James Urbaniak, MD, Virginia Flowers Baker Professor of Orthopaedic Surgery, was honored with the American Orthopaedic Association's 2010 AOA Distinguished Contributions to Orthopaedics Award.

Charles Vacchiano, PhD, CRNA, clinical professor in the School of Nursing, was elected to the board of directors of the American Association of Nurse Anesthetists' National Board on Certification and Recertification of Nurse Anesthetists (NBCRNA) in August. The NBCRNA seeks to offer certification and recertification programs that are tailored to specific professional standards of nurse anesthesia practice and to promote patient safety.

Ruby Wilson, EdD, RN, dean emerita of the School of Nursing, was inducted into the North Carolina Nurses Association (NCNA) Hall of Fame in October at the 2010 NCNA Convention. The NCNA Hall of Fame was established in 2006 and is intended to be the pinnacle of recognition for a registered nurse with an extensive history of nursing leadership and achievements in North Carolina.

DUKE MEDICINE HONORS

Sports Medicine achieves FIFA status

Duke Sports Medicine has been named an accredited FIFA Medical Centre of Excellence, meaning it provides a level of care found at only 12 similar programs around the world, including only one other program in the United States (in Santa Monica, California).

"The level of play and ambition seen on the fields today can sometimes result in injuries that require qualified experts who are well-versed in the latest sophisticated techniques, and conduct leading-edge research on injury mechanisms and prevention," says Claude T. Moorman III, MD, Duke Sports Medicine director.

FIFA created its worldwide network of Medical Centres of Excellence in 2005 to ensure that players know where to obtain expert care. The FIFA Medical Committee and FIFA Medical Assessment and Research Centre (F-MARC) carefully scrutinize programs that apply for the designation, taking into consideration their measured excellence in clinical care, research, innovation, involvement in local and national teams, and their emphasis on injury prevention and education.

*Read the 2010 Duke Transplant Services report at **dukemedicine.org/transplantreport**.*

Organ transplant programs honored

Three Duke Transplant Services programs have been recognized by the Health Resources and Services Administration (HRSA) Transplant Center Growth and Management Collaborative for 2010. The Lung Transplant Program was awarded the Silver Medal—and is the nation's only lung transplant program to earn gold or silver—while both the Heart and Liver Transplant Programs earned Bronze Medals. The awards are based on post-transplant survival at one year, deceased-donor transplant rates, and wait-list mortality.

In addition, Duke University Hospital was awarded a 2010 HRSA Silver Medal of Honor for Organ Donation based on its organ-conversion and donation-after-cardiac-death (DCD) rates.

Duke Raleigh's Total Joint Program takes the gold

Duke Raleigh Hospital's Total Joint Replacement Program earned the Gold Seal of Approval for health care quality from The Joint Commission in September. Duke Raleigh is the first hospital in the Triangle to receive this distinction, with only five other programs in the state having applied for and received certification. The certification is based on compliance with national standards; effective use of established clinical practice guidelines; and an organized approach to performance measurement and improvement activities. "Duke Raleigh Hospital voluntarily pursued this comprehensive, independent evaluation to enhance the safety and quality of care we provide," says hospital president Doug Vinsel. "We are honored to demonstrate our standard of excellence and the caliber of teamwork and collaboration across the entire hospital that enable us to provide the very best care to our patients."

Duke Heart Center nationally recognized for quality

The Duke Heart Center has recently received several national honors. Both Duke University Hospital and Durham Regional Hospital earned the American College of Cardiology Foundation's 2010 ACTION Registry–Get With the Guidelines Gold Performance Achievement Award, while Duke University Hospital achieved the Gold Level for success in implementing the American Heart Association's Get With the Guidelines quality initiative for heart failure care. Duke University Hospital also ranked number one in the nation for five of the six acute MI process measures when compared to a national group of academic medical centers, according to the University HealthSystem Consortium's September 2010 quality measures report.

*Read more about recent Duke Heart Center achievements at **dukemedicine.org/heartreport**.*

DUKE WELCOMES NEW PHYSICIANS

ANESTHESIOLOGY

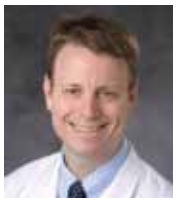
Thomas E. Buchheit, MD
Particular Clinical Interests and Skills: Regional anesthesia, pain medicine, use of ultrasound techniques to improve peripheral nerve injury diagnosis and treatment
MD Degree: Emory University School of Medicine (Georgia), 1994
Residency: Anesthesiology, University of California, San Francisco, 1998
Fellowship: Pain Management, Wake Forest University (North Carolina), 1999

Jose Mauricio Del Rio, MD
Particular Clinical Interests and Skills: Cardiothoracic anesthesia and critical care medicine
MD Degree: National University of Colombia School of Medicine, 1994
Residency: Anesthesiology, University of Pittsburgh Medical Center (Pennsylvania), 2008
Fellowship: Critical Care Medicine/Anesthesiology, Massachusetts General Hospital/Harvard Medical School, 2009; Cardiothoracic Anesthesiology, Cleveland Clinic (Ohio), 2010

Amy K. Manchester, MD
Particular Clinical Interests and Skills: Anesthesia for general, vascular, and high-risk transplantation, including liver transplant
MD Degree: University of Texas School of Medicine at San Antonio, 2006
Residency: Transitional Internship, Duke University Medical Center, 2006-2007; Anesthesiology, Duke University Medical Center, 2007-2010

Andre S. Motie, MD
Particular Clinical Interests and Skills: Transesophageal echocardiogram, cardiothoracic anesthesiology
MD Degree: University of Miami Leonard M. Miller School of Medicine (Florida), 2005
Residency: Anesthesiology, New York University, 2006-2009
Fellowship: Cardiothoracic Anesthesiology, New York University, 2009-2010

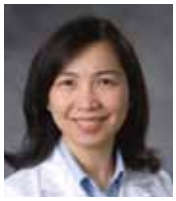
John Nardiello, MD
Particular Clinical Interests and Skills: General anesthesia practice and critical care medicine
MD Degree: School of Medicine at Stony Brook University Medical Center (New York), 2006
Residency: Internal Medicine, Winthrop University Hospital (New York), 2006-2007; Anesthesiology, Duke University Medical Center, 2007-2010



Andrew Peery, MD
Particular Clinical Interests and Skills: General anesthesia, pediatric anesthesia, neuroanesthesia, anesthesia for liver transplantation
MD Degree: Duke University School of Medicine, 2004
Residency: Anesthesiology, Duke University Medical Center, 2009
Fellowship: Pediatric Anesthesiology, Duke University Medical Center, 2010
Other Degree: MPH, University of North Carolina at Chapel Hill, 2003

Daniel S. Thomas, MD
Particular Clinical Interests and Skills: Regional and general anesthesiology, acute and chronic pain management
MD Degree: Medical College of Georgia School of Medicine, 2005
Residency: Internal Medicine, Medical College of Georgia, 2005-2006; Anesthesiology, Duke University Medical Center, 2006-2009
Fellowship: Pain Management, Duke University Medical Center, 2009-2010

DERMATOLOGY



Adela Rambi G. Cardones, MD
Particular Clinical Interests and Skills: Immune-mediated dermatologic diseases; autoimmune and autoinflammatory diseases; dermatologic diseases in patients with rheumatologic, hematologic, and oncologic disorders; cutaneous drug reactions, especially biologics and chemotherapeutic agents
MD Degree: University of the Philippines College of Medicine, 1995
Residency: Dermatology, University of the Philippines, Philippine General Hospital, 1996-1998; Dermatology, Chief Resident, University of the Philippines, Philippine General Hospital, January 1998; Medicine, Good Samaritan Hospital (Maryland), 2005-2006; Dermatology, Duke University Medical Center, 2006-2009; Dermatology, Chief Resident, Duke University Medical Center, 2008-2009
Fellowship: Research, Dermatology Branch, National Institutes of Health, National Cancer Institute (Maryland), 2001-2005

Erin B. Lesesky, MD
Particular Clinical Interests and Skills: General adult medical and surgical dermatology, diagnosis and treatment of skin cancer, eczema, acne, and psoriasis
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 2004
Residency: Internal Medicine, New York University, 2004-2005; Dermatology, University of California, San Diego, 2005-2008

Diana B. McShane, MD
Particular Clinical Interests and Skills: Pediatric dermatology
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 2003
Residency: Pediatrics, Children's Hospital of Pittsburgh (Pennsylvania), 2003-2006; Pediatrics, Chief Resident, Children's Hospital of Pittsburgh (Pennsylvania), 2006-2007; Dermatology, Duke University Medical Center, 2007-2010

DUKE PRIMARY CARE

Gina M. Carlotti, MD
Duke Urgent Care
Particular Clinical Interests and Skills: Family medicine
MD Degree: Jefferson Medical College of Thomas Jefferson University (Pennsylvania), 2006
Residency: Family Medicine, UNC Hospitals, 2007-2010

David J. Halpern, MD
Durham Medical Center
Particular Clinical Interests and Skills: General internal medicine, geriatric medicine, preventive medicine
MD Degree: Weill Cornell Medical College (New York), 2004
Residency: Internal Medicine, Hospital of the University of Pennsylvania, 2004-2007
Fellowship: Geriatric Medicine, UNC Hospitals, 2007-2009; Preventive Medicine, UNC Hospitals, 2008-2010
Other Degree: MPH, University of North Carolina at Chapel Hill, 2010

Andrea T. Kiss, MD
Durham Medical Center
Particular Clinical Interests and Skills: General internal medicine
MD Degree: MD, Semmelweis University Medical School (Hungary), 1991
Residency: Internal Medicine, University of Oklahoma Health Science Center, 1997

Tiffany N. Lowe-Payne, DO
Duke Primary Care Brier Creek
Particular Clinical Interests and Skills: Complete care for the entire family, with special interest in pediatric and adolescent medicine and preventive health care
DO Degree: University of Medicine and Dentistry of New Jersey–School of Osteopathic Medicine, 2000
Residency: Family Practice, University of Medicine and Dentistry of New Jersey–School of Medicine, Our Lady of Lourdes Hospital, 2003

Tracy E. Meyers, MD
Family Medical Associates of Durham
Particular Clinical Interests and Skills: Women's health, adolescent medicine and pediatrics, geriatrics
MD Degree: New York University School of Medicine, 1986
Residency: Family Medicine, Overlook Hospital/Columbia University (New Jersey), 1989

Anuradha Sabapathi, MD
North Hills Internal Medicine
Particular Clinical Interests and Skills: Outpatient continuity care to all ages (including children), women's health, care of diabetes, hypertension, preventive care, patient education
MD Degree: Jawaharlal Institute of Postgraduate Medical Education and Research (India), 1988
Residency: Family Medicine, University of Louisville Health Science Center (Kentucky), 2008

Brian A. Shaner, MD
Family Medical Associates of Durham
Particular Clinical Interests and Skills: Full-scope family medicine with a strong interest in the management of mental health issues and outpatient dermatology procedures
MD Degree: Uniformed Services University of the Health Sciences F. Edward Hebert School of Medicine (Maryland), 2000
Residency: Family Medicine, Saint Louis University Belleville Family Practice (Illinois), 2000-2003

Anita Shivadas, MD
Sutton Station Internal Medicine
Particular Clinical Interests and Skills: General internal medicine, women's health, preventive medicine
MD Degree: Kilpauk Medical College (India), 1996
Residency: Kilpauk Medical College Hospital (India), 1997-1998; OB–GYN, Walsgrave Teaching Hospitals, (UK), 1999; OB–GYN, Basildon General Hospital (UK), 1999-2000; OB–GYN, Cambridge University Hospitals (UK), 2000-2001; Internal Medicine, Cleveland Clinic (Ohio), 2003-2006

Jennifer L. Swanson, MD
Duke Urgent Care Morrisville
Particular Clinical Interests and Skills: Emergency medicine, urgent care medicine, occupational medicine
MD Degree: University of Virginia School of Medicine, 1988
Residency: Emergency Medicine, Wright State University (Ohio), 1991

Madhvi M. Thakkar, MD
North Hills Internal Medicine
Particular Clinical Interests and Skills: General internal medicine, with special interest in type 2 diabetes and preventive medicine
MD Degree: MBBS, Baroda Medical College (India), 1988
Residency: Frankford Hospital (Pennsylvania), 1989-1990 Internal Medicine, University of Illinois at Chicago, 1990-1993

Jason J. Troiano, MD
Triangle Family Medicine
Particular Clinical Interests and Skills: General primary care, minor injuries and musculoskeletal problems, integration of lifestyle and medication management of chronic disease
MD Degree: University of Virginia School of Medicine, 1999
Residency: Family Medicine, Wake Forest University Baptist Medical Center (North Carolina), 2002

Brian E. Wolf, MD
Duke Primary Care Pickett Road
Particular Clinical Interests and Skills: Primary care focusing on prevention and management of chronic disease, general internal medicine
MD Degree: Medical College of Virginia, Virginia Commonwealth University, 2001
Residency: Internal Medicine, University of Maryland Medical Center, 2001-2004

HOSPITAL MEDICINE

Bhavesh Bhatt, MD
Durham Regional Hospital Medicine Program
Particular Clinical Interests and Skills: Hospital medicine, consultative general internal medicine for hospitalized patients
MD Degree: University of Texas Medical School at Houston, 1995
Residency: Internal Medicine, University of Texas Health Science Center, 1998

Mitchell C. Black, MD
Duke University Hospital Medicine Program
Particular Clinical Interests and Skills: Hospital medicine, consultative general internal medicine for hospitalized patients
MD Degree: Brody School of Medicine at East Carolina University (North Carolina), 2007
Residency: Internal Medicine, Duke University Medical Center, 2007-2010

Alfred C. Burris, MD
Duke University Hospital Medicine Program
Particular Clinical Interests and Skills: Hospital medicine, consultative general internal medicine for hospitalized patients
MD Degree: Howard University College of Medicine (Washington, DC), 2007
Residency: Internal Medicine, Duke University Medical Center, 2007-2010

Karen M. Catignani, MD
Duke University Hospital Medicine Program
Particular Clinical Interests and Skills: Inpatient care of adult hospitalized patients
MD Degree: Northeastern Ohio Universities Colleges of Medicine and Pharmacy, 2003
Residency: Internal Medicine, University of Virginia Medical Center, 2006

Lauren Holmes Griffin, MD
Duke Raleigh Hospital Medicine Program
Particular Clinical Interests and Skills: Hospital medicine
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 2007
Residency: General Internal Medicine, University of Colorado Denver, 2007-2010

Antonio Gutierrez, MD
Duke University Hospital Medicine Program
Particular Clinical Interests and Skills: Hospital medicine, consultative general internal medicine for hospitalized patients
MD Degree: Case Western Reserve University School of Medicine (Ohio), 2007
Residency: Internal Medicine, Duke University Medical Center, 2007-2010

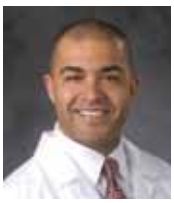
Ashley W. Lowery, MD
Durham Regional Hospital and Duke University Hospital Medicine Programs
Particular Clinical Interests and Skills: Prevention and relief of suffering, quality-of-life support for patients and their families across all disease stages or need for other therapies
MD Degree: University of Arkansas for Medical Sciences College of Medicine, 2005
Residency: Internal Medicine, University of Texas Health Science Center at San Antonio, 2005-2008
Fellowship: Hospital and Palliative Medicine, University of Texas Health Science Center at San Antonio, 2009-2010

Shannon A. Novosad, MD
Duke University Hospital Medicine Program
Particular Clinical Interests and Skills: Hospital medicine, consultative general internal medicine for hospitalized patients
MD Degree: University of Alabama at Birmingham School of Medicine, 2007
Residency: Internal Medicine, Duke University Medical Center, 2007-2010

Lance N. Okeke, MD
Durham Regional Hospital Medicine Program
Particular Clinical Interests and Skills: HIV, opportunistic infections, tropical medicine
MD Degree: Stanford University School of Medicine (California), 2007
Residency: Internal Medicine, Duke University Medical Center, 2007-2010

Lynn B. O'Neill, MD
Duke University Hospital and Durham Regional Hospital Medicine Programs
Particular Clinical Interests and Skills: Palliative medicine, geriatrics
MD Degree: Vanderbilt University School of Medicine (Tennessee), 2002
Residency: Internal Medicine, University of Alabama at Birmingham Hospitals, 2002-2005
Fellowship: Geriatrics and Palliative Care, Mount Sinai Medical Center (New York), 2005-2007

Cecily K. Peterson, MD
Duke University Hospital Medicine Program
Particular Clinical Interests and Skills: Hospital medicine for adults with acute and chronic illnesses, including primary inpatient care and consultative care
MD Degree: Dartmouth Medical School (New Hampshire), 1995
Residency: Internal Medicine, Madigan Army Medical Center (Washington), 1995-1998

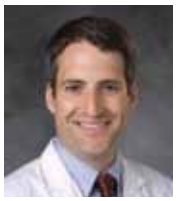


Christopher S. Roser-Jones, MD
Duke University Hospital Medicine Program
Particular Clinical Interests and Skills: Hospital medicine, consultative general internal medicine for hospitalized patients
MD Degree: University of Pennsylvania School of Medicine, 2007
Residency: Internal Medicine, Duke University Medical Center, 2007-2010

Poonam Sharma, MD
Durham Regional Hospital Medicine Program
Particular Clinical Interests and Skills: Hospital medicine
MD Degree: University of Virginia School of Medicine, 1999
Residency: Internal Medicine, Duke University Medical Center, 2010

Taylor S. Wofford, MD
Durham Regional Hospital Medicine Program
Particular Clinical Interests and Skills: Hospital medicine
MD Degree: University of Mississippi School of Medicine, 2007
Residency: Internal Medicine, UNC Hospitals, 2007-2010

MEDICINE



Brett D. Atwater, MD
Cardiology
Particular Clinical Interests and Skills: Clinical and procedural management of complex heart arrhythmias including atrial fibrillation, supraventricular tachycardia, and ventricular tachycardia
MD Degree: University of Chicago Pritzker School of Medicine (Illinois), 2002
Residency: Internal Medicine, Duke University Medical Center, 2005
Fellowship: Cardiovascular Medicine, University of Wisconsin Hospital, 2008; Clinical Cardiac Electrophysiology, Duke University Medical Center, 2010

Philip M. Blatt, MD
Hematology
Particular Clinical Interests and Skills: Thrombosis, hemostasis
MD Degree: Washington University in St. Louis School of Medicine (Missouri), 1969
Residency: Junior Assistant Residency, North Carolina Memorial Hospital, 1969-1970; Senior Assistant Residency, North Carolina Memorial Hospital, 1970-1971
Fellowship: Hematology, University of Utah Medical Center, 1972-1973; Hematology, UNC Hospitals, 1973-1974

Rebecca A. Burbridge, MD
Gastroenterology
Particular Clinical Interests and Skills: Advanced endoscopy, including endoscopic ultrasound and ERCP
MD Degree: West Virginia University School of Medicine, 2003
Residency: Internal Medicine, West Virginia University Hospitals, 2003-2006 Internal Medicine, Chief Resident, West Virginia University Hospitals, 2006-2007
Fellowship: Gastroenterology, Duke University Medical Center, 2007-2010

Jessica Y. Chia, MD
Pulmonary, Allergy, and Critical Care Medicine
Particular Clinical Interests and Skills: Management of critically ill adult patients, including ventilator and airway management, invasive and noninvasive hemodynamic monitoring, and management of multiple organ dysfunction
MD Degree: Louisiana State University School of Medicine in New Orleans, 2003
Residency: Internal Medicine, Duke University Medical Center, 2006
Fellowship: Pulmonary and Critical Care Medicine, Duke University Medical Center, 2010

Scott J. Denardo, MD
Cardiology
Particular Clinical Interests and Skills: Invasive and interventional cardiology and their applications to acute and chronic ischemic heart disease; all other domains of cardiovascular disease, especially management of non-ischemic cardiomyopathies and systemic hypertension
MD Degree: University of California, San Francisco, School of Medicine, 1985
Residency: Internal Medicine, UCLA Hospitals, 1985-1988
Fellowship: General Cardiology, UCSF Medical Center, 1988-1992; Interventional Cardiology, Scripps Clinic and Research Foundation (California),1992-1993

Phuong L. Doan, MD
Cellular Therapy
Particular Clinical Interests and Skills: Cellular therapy
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 2003
Residency: Internal Medicine, UNC Hospitals, 2006
Fellowship: Hematology, Oncology, and Cellular Therapy, Duke University Medical Center, 2010

Alice L. Gray, MD
Pulmonary, Allergy, and Critical Care Medicine
Particular Clinical Interests and Skills: Lung transplantation, management of end-stage lung disease, general pulmonary medicine, critical care medicine
MD Degree: University of Michigan Medical School, 2004
Residency: Internal Medicine, Duke University Medical Center, 2004-2007
Fellowship: Pulmonary and Critical Care Medicine, Duke University Medical Center, 2007-2010

Jodi J. Hawes, MD
Neurology
Particular Clinical Interests and Skills: General neurology, stroke and stroke rehabilitation, traumatic brain injury, neurologic complication of medical illness, neurorehabilitation
MD Degree: Albany Medical College (New York), 2005
Residency: Internal Medicine, Duke University Medical Center, 2005-2006; Neurology, Duke University Medical Center, 2006-2009
Fellowship: Neurorehabilitation, Wake Forest University Baptist Medical Center (North Carolina), 2009-2010

Janet L. Hortin, MD
General Internal Medicine/ Student Health
Particular Clinical Interests and Skills: Student health care, headaches, women's health, health issues related to graduate school/professional school stresses, assisting students in coping with chronic illness during graduate and undergraduate school, non-traditional student and international student health care issues
MD Degree: University of Michigan Medical School, 1977
Residency: Internal Medicine, University of Wisconsin Hospital, 1977-1980

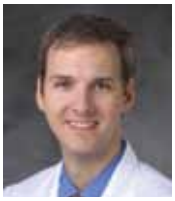
Julia C. Johnson, MD
Neurology
Particular Clinical Interests and Skills: Movement disorders, Parkinson's disease, progressive supranuclear palsy, corticobasal ganglionic degeneration, multiple system atrophy, tremor, restless legs syndrome, tics, Tourette's syndrome, myoclonus, ataxia, Huntington's disease, chorea, tardive dyskinesia, Wilson's disease, treatment with botulinum toxin and deep brain stimulation
MD Degree: University of Heidelberg Faculty of Medicine (Germany), 2005
Residency: Internal Medicine, UNC Hospitals, 2005-2006; Neurology: UNC Hospitals, 2006-2009
Fellowship: Movement Disorders, Duke University Medical Center, 2009-2010

ON THE SPOT

What are you enjoying most about your new role as director of heart services at Duke Raleigh Hospital?

From a leadership perspective, I'm enjoying the opportunity to take a growing program, such as the one at Duke Raleigh, and putting a face on it in the community, especially with the resources of the world-renowned Duke Heart Center. We have Duke cardiologists right on our hospital campus and in two additional Wake County locations: Morrisville and Knightdale. This localized proximity to Duke care is revolutionary; it simply wasn't an option for patients five years ago. From a clinician's perspective, I really enjoy interacting with my patients and listening to their concerns. They might be feeling vulnerable, or they're looking for reassurance or for a course of action. The patient-doctor relationship is very unique in terms of human interaction. Using medical science and knowledge and applying it to that relationship—that brings me great joy.

—Mark Leithe, MD



Schuyler Jones, MD
Cardiology
Particular Clinical Interests and Skills: Interventional cardiology (coronary artery revascularization and stenting), clinical and research interests in the diagnosis and treatment of patients with peripheral arterial disease, peripheral arterial diagnostic and interventional techniques
MD Degree: University of Arkansas for Medical Sciences College of Medicine, 2001
Residency: Internal Medicine, Duke University Medical Center, 2002-2004; Internal Medicine, Chief Resident, Duke University Medical Center, 2006
Fellowship: Cardiology, Duke University Medical Center, 2009; Interventional Cardiology, Duke University Medical Center, 2010

Mala Kaul, MD
Rheumatology and Immunology
Particular Clinical Interests and Skills: General rheumatology, antiphospholipid syndrome
MD Degree: University of Miami Leonard M. Miller School of Medicine (Florida), 2003
Residency: Internal Medicine, NewYork–Presbyterian Hospital/Weill Cornell Medical Center, 2003-2006
Fellowship: Rheumatology, Duke University Medical Center, 2007-2010
Other Degree: MHS, Clinical Health Sciences, Duke University, 2010

Mark E. Leithe, MD
Cardiology
Particular Clinical Interests and Skills: Complex interventional cardiology, including high-risk patients, rotational atherectomy, intravascular ultrasound, code STEMI patients, general cardiology
MD Degree: Ohio State University College of Medicine, 1983
Residency: Ohio State University Medical Center, 1986
Fellowship: Cardiology, Duke University Medical Center, 1989

Micah T. McClain, MD, PhD
Infectious Diseases
Particular Clinical Interests and Skills: HIV, respiratory viral infections, tick-borne diseases, emerging infections
MD Degree: University of Oklahoma College of Medicine, 2004
Residency: Internal Medicine, Duke University Medical Center, 2004-2006
Fellowship: Infectious Diseases, Duke University Medical Center, 2006-2010
Other Degree: PhD, Immunology, University of Oklahoma, 2002

Kate L. Mitchell, MD
Rheumatology and Immunology
Particular Clinical Interests and Skills: General rheumatology, including rheumatoid arthritis, inflammatory arthritis, Sjögren's syndrome, inflammatory myopathy, systemic lupus erythematosus, and vasculitis
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 2005
Residency: Internal Medicine, Duke University Medical Center, 2005-2008
Fellowship: Rheumatology, Duke University Medical Center, 2008-2010

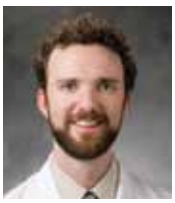
Kent R. Nilsson Jr., MD
Cardiology
Particular Clinical Interests and Skills: Inherited arrhythmias, implantable cardioverter defibrillators, cardiac resynchronization, atrial fibrillation, sudden cardiac death, clinical cardiac electrophysiology, pacemakers
MD Degree: Johns Hopkins University School of Medicine (Maryland), 2002
Residency: Internal Medicine, Johns Hopkins Hospital (Maryland), 2002-2005
Fellowship: Cardiology, Duke University Medical Center, 2005-2009; Clinical Cardiac Electrophysiology, Duke University Medical Center, 2009-2010
Other Degree: MA, Biochemistry, Cellular and Molecular Biology, Johns Hopkins University (Maryland), 2002

Melissa W. Quan, DO
Neurology
Particular Clinical Interests and Skills: General neurology, including cerebrovascular disease (stroke), headache, dementia, epilepsy, movement disorders, multiple sclerosis, neuropathies, and radiculopathies
DO Degree: Michigan State University College of Osteopathic Medicine, 2006
Residency: Neurology, Botsford Hospital (Michigan), 2010

April K.S. Salama, MD
Medical Oncology
Particular Clinical Interests and Skills: Treatment and management of patients with melanoma
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 2004
Residency: Internal Medicine, University of Chicago Medical Center (Illinois), 2004-2007
Fellowship: Hematology–Oncology, University of Chicago Medical Center (Illinois), 2007-2010

Nirmish R. Shah, MD
Hematology
Particular Clinical Interests and Skills: Hypercoagulable state/clotting and sickle cell disease, research therapies for sickle cell disease such as anticoagulation, sickle cell disease transition clinic development
MD Degree: American University of the Caribbean School of Medicine (St. Maarten), 2000
Residency: Medicine and Pediatrics, East Carolina University (North Carolina), 2004
Fellowship: Adult Hematology–Oncology, East Carolina University (North Carolina), 2004-2005; Pediatric Hematology–Oncology, Duke University Medical Center, 2007-2010

Robert M. Tighe, MD
Pulmonary, Allergy, and Critical Care Medicine
Particular Clinical Interests and Skills: Interstitial lung disease, idiopathic pulmonary fibrosis, COPD, asthma, evaluation of lung masses
MD Degree: University of Tennessee College of Medicine, 2002
Residency: Internal Medicine, Boston University Medical Center (Massachusetts), 2002-2005; Internal Medicine, Chief Resident, Boston University Medical Center (Massachusetts), 2005-2006
Fellowship: Pulmonary and Critical Care, Duke University Medical Center, 2006-2009



Sascha A. Tuchman, MD
Medical Oncology
Particular Clinical Interests and Skills: Plasma cell disorders, including multiple myeloma, monoclonal gammopathy of uncertain significance, and amyloidosis
MD Degree: Georgetown University School of Medicine (Washington, DC), 2003
Residency: Internal Medicine, Duke University Medical Center, 2006; Internal Medicine, Chief Resident, Duke University Medical Center, 2007-2008
Fellowship: Hematology–Oncology, Duke University Medical Center, 2010

ON THE SPOT

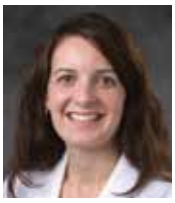
Describe the "frozen section" diagnostic process.

An intraoperative pathology consultation is sometimes referred to as a "frozen section" because the tissue in question is literally frozen then sectioned within minutes of excision. We perform the diagnosis while the patient is still under anesthesia in order to direct surgical management. For example, microscopic tumor at a margin may necessitate additional surgery, while confirmation of metastatic tumor may abort the previously planned operation. This work is challenging for pathologists, since our more routine samples (biopsies, non-frozen surgical resections) rely on paraffin processing, special stains, peer consultation, and/or molecular testing before the final diagnosis is rendered. During "frozen sections," we rely on complex pattern recognition and anatomic and pathologic knowledge to make a rapid decision. Experience and good communication skills are vital. Duke is fortunate to have a team of excellent surgical pathologists available for OR consultations 24 hours a day, 365 days a year.

—Shannon J. McCall, MD

Deepak Voora, MD
Cardiology
Particular Clinical Interests and Skills: Consultative cardiology, antiplatelet therapy, genetics, pharmacogenetics
MD Degree: Northwestern University Feinberg School of Medicine (Illinois), 2002
Residency: Internal Medicine, Barnes-Jewish Hospital (Missouri), 2002-2005
Fellowship: Cardiovascular Disease, Duke University Medical Center, 2010

OBSTETRICS AND GYNECOLOGY



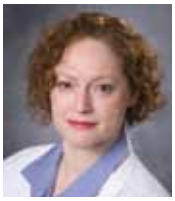
Amber M. Jarvis, MD
Durham OB–GYN
Particular Clinical Interests and Skills: General OB–GYN, family planning, gynecologic surgery (including laparoscopy and robotic surgery), menorrhagia, dysmenorrhea, uterine fibroids, office gynecology
MD Degree: University at Buffalo SUNY School of Medicine and Biomedical Sciences, 2006
Residency: OB–GYN, VCU Medical Center, 2006-2010

Nicole P. Kerner, MD
General OB–GYN
Particular Clinical Interests and Skills: General gynecologic and obstetric care, minimally invasive surgical treatment for common problems such as heavy periods and permanent sterilization, adolescent and menopausal patient counseling
MD Degree: University at Buffalo SUNY School of Medicine and Biomedical Sciences, 1998
Residency: OB–GYN, Abington Memorial Hospital (Pennsylvania), 2002

Nazema Y. Siddiqui, MD
Urogynecology
Particular Clinical Interests and Skills: Robotic sacrocolpopexy and hysterectomy, minimally invasive surgery for pelvic organ prolapse and urinary incontinence, mid-urethral slings, sacral neuromodulation, intra-vesical Botox, treatment of vesicovaginal and rectovaginal fistula, suburethral diverticulectomy
MD Degree: University of Michigan Medical School, 2001
Residency: OB–GYN, Metro Health Medical Center/ Cleveland Clinic (Ohio), 2002-2006
Fellowship: Female Pelvic Medicine and Reconstructive Surgery, Duke University Medical Center, 2007-2010
Other Degree: MHS, Clinical Research, Duke University, 2010

OPHTHALMOLOGY

Anupama B. Horne, MD
Comprehensive Ophthalmology Service
Particular Clinical Interests and Skills: Comprehensive ophthalmology, cataract surgery
MD Degree: Ohio State University College of Medicine, 2005
Residency: Internship, Riverside Methodist Hospital (Ohio), 2005-2006; Ophthalmology, Ohio State University Medical Center, 2006-2009



Frankie-Lynn Silver, MD
Comprehensive Ophthalmology Service
Particular Clinical Interests and Skills: Comprehensive ophthalmology, management of common ocular diseases and complaints, including dry eye, glaucoma, cataract, diabetes, and macular degeneration
MD Degree: Stony Brook University School of Medicine (New York), 2001
Residency: Internal Medicine, Case Western MetroHealth (Ohio), 2002; Ophthalmology, Saint Louis University Hospital (Missouri), 2005
Fellowship: K12 Research, Duke Eye Center, 2008; Comprehensive Ophthalmology, Duke Eye Center, 2009
Other Degree: MHS, Duke University, 2009

ORTHOPAEDICS

Robert K. Lark, MD
Particular Clinical Interests and Skills: All aspects of children's orthopaedics, disorders of the spine and hip, including scoliosis and hip dysplasia, pediatric fractures
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 2004
Residency: Orthopaedics, Duke University Medical Center, 2009
Fellowship: Pediatric Orthopaedics, Rady Children's Hospital (California), 2010
Other Degree: MS, Physiology, North Carolina State University, 1996

PATHOLOGY

Jennifer H. Crow, MD
Particular Clinical Interests and Skills: Anatomic and clinical pathology, hematopathology, pediatric pathology, gynecologic pathology
MD Degree: University of Medicine and Dentistry of New Jersey–New Jersey Medical School, 2005
Residency: Anatomic and Clinical Pathology, Duke University Medical Center, 2005-2009
Fellowship: Hematopathology, Duke University Medical Center, 2009-2010

Shannon J. McCall, MD
Particular Clinical Interests and Skills: Diagnostic surgical pathology of the gastrointestinal tract including hepatobiliary and pancreatic pathology, intraoperative ("frozen section") consultations for Duke surgical patients
MD Degree: Duke University School of Medicine, 2000
Residency: Anatomic and Clinical Pathology, Duke University Medical Center, 2005
Fellowship: Gastrointestinal and Hepatic Pathology, Duke University Medical Center, 2006

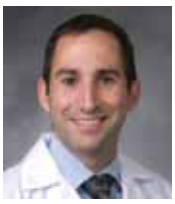
Emanuela F. Veras, MD
Particular Clinical Interests and Skills: Gynecologic, oncologic, gastrointestinal, and liver pathology
MD Degree: Federal University of Ceara (Brazil), 1999
Residency: Internal Medicine, Walter Cantideo University Hospital (Brazil), 2000-2002; Anatomic and Clinical Pathology, University of Texas Health Science Center at Houston, 2003-2007
Fellowship: Gynecologic Pathology, Johns Hopkins Hospital (Maryland), 2007-2008; Oncologic Pathology, Memorial Sloan-Kettering Cancer Center (New York), 2008-2009; Gastrointestinal and Liver Pathology, Memorial Sloan-Kettering Cancer Center (New York), 2009-2010

Kenneth E. Youens, MD
Particular Clinical Interests and Skills: Cytopathology, fine-needle aspiration biopsy, surgical pathology
MD Degree: University of Texas Southwestern Medical School, 2005

Residency: Anatomic and Clinical Pathology, Duke University Medical Center, 2009
Fellowship: Cytopathology, Duke University Medical Center, 2010

PEDIATRICS

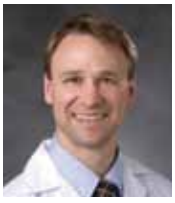
Frederique C. Bailliard, MD
Cardiology
Particular Clinical Interests and Skills: Clinical management of children with congenital heart disease, cardiac MRI in the diagnosis and management of congenital heart disease, cardiac MRI research
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 2000
Residency: Pediatrics, UNC Hospitals, 2003
Fellowship: Pediatric Cardiology, Northwestern University Medical Center (Illinois), 2007; Pediatric Cardiac MRI, Great Ormond Street Hospital, Centre for Cardiovascular MRI (UK), 2008
Other Degree: MS, Clinical Investigation, Northwestern University (Illinois), 2007



Oren J. Becher, MD
Hematology–Oncology
Particular Clinical Interests and Skills: Central nervous system tumors in children and teenagers, new treatment regimens for children and young adults with gliomas, discovery of novel, highly targeted, potent, and less-toxic molecular inhibitors to treat brain tumors, novel drug testing in genetic models of brain stem gliomas or DIPGs
MD Degree: Johns Hopkins University School of Medicine (Maryland), 2000
Residency: Pediatrics, Children's National Medical Center (Washington, DC), 2003
Fellowship: Pediatric Hematology–Oncology, Memorial Sloan-Kettering Cancer Center (New York), 2006; Pediatric Neuro-Oncology, Memorial Sloan-Kettering Cancer Center (New York), 2007

Aimee B. Chung, MD
Primary Care Pediatrics
Particular Clinical Interests and Skills: General medicine, general pediatrics, transitional care
MD Degree: Brody School of Medicine at East Carolina University (North Carolina), 2005
Residency: Internal Medicine and Pediatrics, Duke University Medical Center, 2009; Pediatrics, Chief Resident, Duke University Medical Center, 2009-2010

Jeffrey A. Dvergsten, MD
Rheumatology
Particular Clinical Interests and Skills: Juvenile arthritis, juvenile dermatomyositis, systemic-onset juvenile idiopathic arthritis, research interests in pathogenesis of pediatric inflammatory diseases
MD Degree: University of Minnesota Medical School, 1993
Residency: Pediatrics, University of Minnesota Medical Center, 1999-2002
Fellowship: Pediatric Intensive Care, University of Minnesota Medical Center, 2002; Pediatric Rheumatology, University of Pittsburgh Medical Center (Pennsylvania), 2007-2010

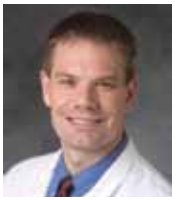


Gregory A. Fleming, MD
Cardiology
Particular Clinical Interests and Skills: Outpatient and inpatient management of pediatric patients with acquired and congenital heart disease, interventional and diagnostic cardiac catheterization of pediatric patients
MD Degree: University of South Carolina School of Medicine, 2003
Residency: General Pediatrics, Vanderbilt University Medical Center (Tennessee), 2006
Fellowship: Pediatric Cardiology, Vanderbilt University Medical Center (Tennessee), 2010; Interventional Pediatric Cardiology, Vanderbilt University Medical Center (Tennessee), 2010
Other Degree: MSCI, Vanderbilt University Medical Center (Tennessee), 2009

G. William Henry, MD
Cardiology
Particular Clinical Interests and Skills: Evaluation and treatment of infants, children, and adolescents with suspected congenital or acquired heart disease
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 1977
Residency: Pediatrics, Indiana University Medical Center, 1977-1979
Fellowship: Pediatric Cardiology, UNC Hospitals, 1979-1982

Mikelle L. Key-Solle, MD
Hospital and Emergency Medicine
Particular Clinical Interests and Skills: Comprehensive, family-centered care of hospitalized children
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 2002
Residency: General Pediatrics and Adolescent Medicine, North Carolina Children's Hospital, 2005

George Ofori-Amanfo, MD
Critical Care Medicine
Particular Clinical Interests and Skills: Postoperative management of the critically ill neonate after open-heart surgery, outcomes of neonatal cardiac surgery, cardiac critical care education and simulation
MD Degree: MB ChB, Kwame Nkrumah University of Science and Technology Medical School (Ghana), 1989
Residency: Pediatrics, Children's Hospital of New York, Columbia University College of Physicians and Surgeons, 1996
Fellowship: Pediatric Cardiology, Children's Hospital of New York, Columbia University College of Physicians and Surgeons, 1999; Pediatric Cardiology, Children's Hospital of New York, Columbia University College of Physicians and Surgeons, 2002



Kyle J. Rehder, MD
Pediatric Critical Care Medicine
Particular Clinical Interests and Skills: Care of critically ill infants and children, including the use of mechanical ventilation and extracorporeal membrane oxygenation (ECMO), patient safety, quality improvement
MD Degree: University of North Carolina at Chapel Hill School of Medicine, 2003
Residency: Pediatrics, North Carolina Children's Hospital, 2003-2006; Pediatrics, Chief Resident, North Carolina Children's Hospital, 2006-2007
Fellowship: Pediatric Critical Care Medicine, Duke University Medical Center, 2007-2010

Silvia Y. Rho, MD
Neonatology
Particular Clinical Interests and Skills: General pediatrics, including hospital medicine and newborn care
MD Degree: Duke University School of Medicine, 2007
Residency: Pediatrics, Duke University Medical Center, 2007-2010

Rachel E. Vinson, MD
Neonatology
Particular Clinical Interests and Skills: General pediatrics and newborn care
MD Degree: Virginia Commonwealth University School of Medicine, 2007
Residency: Pediatrics, Duke University Medical Center, 2007-2010

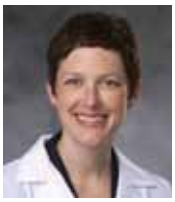
PSYCHIATRY

Sarah E. Cook, PhD
Medical Psychology
Particular Clinical Interests and Skills: Neuropsychological evaluation of adults with known or suspected central nervous system injury or illness such as memory disorders, Alzheimer's disease, geriatrics, movement disorders, stroke, epilepsy, brain injuries, toxic exposure, multiple sclerosis
PhD Degree: Clinical Psychology, University of Florida, 2008
Residency: Clinical Neuropsychology, James A. Haley Veterans Hospital (Florida), 2007-2008
Fellowship: Clinical Neuropsychology, University of Michigan, 2008-2010

Julie A. Hammer, PhD
Medical Psychology
Particular Clinical Interests and Skills: Attention deficit/hyperactivity disorder, externalizing disorders, autism spectrum disorders, learning disabilities
PhD Degree: School Psychology, University of North Carolina at Chapel Hill, 2008
Fellowship: Clinical Center for the Study of Development and Learning (CDL), University of North Carolina at Chapel Hill, 2008-2010

Nicole S.C. Heilbron, PhD
Medical Psychology
Particular Clinical Interests and Skills: Child clinical psychology, child/adolescent trauma and maltreatment, non-suicidal self-injury, suicidality, child/adolescent mood and anxiety disorders
PhD Degree: Clinical Psychology, University of North Carolina at Chapel Hill, 2007
Residency: Clinical Internship, Child Trauma Specialization, Duke University Medical Center, 2006-2007
Fellowship: Postdoctoral Research, Psychology, University of North Carolina at Chapel Hill, 2007-2010

Sarah H. Lisanby, MD
Biological Psychiatry
Particular Clinical Interests and Skills: Treatment-resistant depression and other conditions when conventional treatments fail; brain stimulation, including transcranial magnetic stimulation, electroconvulsive therapy, magnetic seizure therapy, deep brain stimulation, and vagus nerve stimulation; advanced training in the delivery of device-based therapies, including transcranial magnetic stimulation, electroconvulsive therapy, vagus nerve stimulation, deep brain stimulation, magnetic seizure therapy, and transcranial direct current stimulation
MD Degree: Duke University School of Medicine, 1991
Residency: Psychiatry and Behavioral Sciences, Duke University Medical Center, 1991-1995
Fellowship: Postdoctoral Research, Affective Disorders, Columbia University (New York), 1995-1998



Virginia C. O'Brien, MD
Outpatient Psychiatry
Particular Clinical Interests and Skills: Treatment of patients with complex combined medical and psychiatric illnesses
MD Degree: University of Mississippi School of Medicine, 2005
Residency: Internal Medicine and Psychiatry, Rush University Medical Center (Illinois), 2010

Kristen G. Shirey, MD
Outpatient Psychiatry
Particular Clinical Interests and Skills: Inpatient general internal medicine and psychiatry, consultation liaison psychiatry
MD Degree: Ohio State University College of Medicine, 2005
Residency: Internal Medicine and Psychiatry, Duke University Medical Center, 2010

RADIATION ONCOLOGY

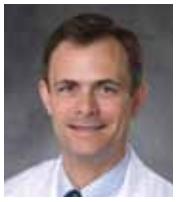
Rachel C. Blitzblau, MD
Particular Clinical Interests and Skills: Breast cancer
MD Degree: Tufts University School of Medicine (Massachusetts), 2005
Residency: Internal Medicine, Beth Israel Deaconess Hospital (Massachusetts), 2005-2006; Radiation Oncology, Yale–New Haven Hospital (Connecticut), 2006-2010

A. Paiman Ghafoori, MD
Particular Clinical Interests and Skills: Stereotactic body radiation therapy (SBRT), stereotactic radiosurgery (SRS), lung cancer and thoracic malignancies, gastrointestinal cancers, central nervous system cancers, lymphomas, head and neck cancers, breast cancer, prostate cancer
MD Degree: Harvard Medical School (Massachusetts), 2005
Residency: Medicine, Presbyterian/St. Luke's Medical Center (Colorado), 2005-2006; Radiation Oncology, Duke University Medical Center, 2006-2009; Radiation Oncology, Chief Resident, Duke University Medical Center, 2009-2010

Joseph K. Salama, MD
Particular Clinical Interests and Skills: Development and implementation of advanced radiotherapy techniques for cancer treatment
MD Degree: Baylor College of Medicine (Texas), 2001
Residency: Transition Year, University of Texas Health Science Center at Houston, 2001-2002; Radiation Oncology, University of Chicago Medical Center (Illinois), 2002-2006

RADIOLOGY

Mustafa R. Bashir, MD
Abdominal Imaging
Particular Clinical Interests and Skills: Abdominal imaging, magnetic resonance imaging, computed tomography, hepatobiliary imaging, image-guided percutaneous interventions/procedures
MD Degree: University of Iowa Roy J. and Lucille A. Carver College of Medicine, 2004
Residency: Diagnostic Radiology and Nuclear Medicine, Rush University Medical Center (Illinois), 2009
Fellowship: Abdominal Imaging and Intervention, Duke University Medical Center, 2010



Thomas W. Hash II, MD
Musculoskeletal
Particular Clinical Interests and Skills: Imaging of sports-related injury
MD Degree: Medical College of Georgia School of Medicine, 1997
Residency: Internal Medicine, Naval Medical Center Portsmouth (Virginia), 1997-1998; Diagnostic Radiology, National Capital Consortium (Maryland), 2001-2005
Fellowship: Orthopaedic MRI, Hospital for Special Surgery (New York), 2009-2010

Waleska M. Pabon-Ramos, MD
Vascular and Interventional
Particular Clinical Interests and Skills: Minimally invasive procedures including women's interventions, care of dialysis access, treatment of vascular malformations, lymphatic interventions
MD Degree: Boston University School of Medicine (Massachusetts), 2004
Residency: Diagnostic Radiology, University of Michigan Health System, 2009
Fellowship: Vascular and Interventional Radiology, Brigham and Women's Hospital (Massachusetts), 2010
Other Degree: MPH, Boston University School of Public Health (Massachusetts), 2004

Christopher J. Roth, MD
Neuroradiology
Particular Clinical Interests and Skills: MR and CT neuroimaging, CT-guided pain management, functional MR neuroimaging, quality and organizational improvement frameworks
MD Degree: University of Michigan Medical School, 2004
Residency: Diagnostic Radiology, Duke University Medical Center, 2005-2009
Fellowship: Neuroradiology, Duke University Medical Center, 2009-2010

Geoffrey D. Rubin, MD
Cardiopulmonary
Particular Clinical Interests and Skills: Cardiovascular and pulmonary imaging, 3-D visualization and analysis, computed tomography and magnetic resonance imaging
MD Degree: University of California, San Diego, School of Medicine, 1987
Residency: Transitional Internship, Mercy Hospital and Medical Center (California), 1987-1988; Radiology, Stanford University Medical Center (California), 1988-1992
Fellowship: Body Imaging, Stanford University Medical Center (California), 1992-1993

SURGERY

Matthew D. Bitner, MD
Emergency Medicine
Particular Clinical Interests and Skills: Pre-hospital/out-of-hospital medicine, emergency preparedness, medical education with a focus on curriculum development and adult-learning strategies, emergency medical response planning/event medicine
MD Degree: University of Miami Leonard M. Miller School of Medicine (Florida), 2004
Residency: Emergency Medicine, Emory University School of Medicine (Georgia), 2007
Fellowship: Pre-Hospital and Disaster Medicine, Emory University School of Medicine (Georgia), 2009
Other Degree: MEd, Medical Education, University of Cincinnati (Ohio), expected 2011

Caroline E. Eady, MD
Emergency Medicine
Particular Clinical Interests and Skills: Medical student and resident education, acute pain control, end-of-life decisions
MD Degree: University of Cincinnati College of Medicine (Ohio), 2006
Residency: Emergency Medicine, University of Cincinnati (Ohio), 2006-2010; Emergency Medicine, Chief Resident, University of Cincinnati (Ohio), 2009-2010

Linda M. Farkas, MD
General Surgery
Particular Clinical Interests and Skills: Open and laparoscopic colon and rectal surgery including sphincter-preservation procedures for benign disease, cancers, and recurrent cancers; surgical treatment of Crohn's disease, ulcerative colitis, diverticulitis, rectal prolapse, presacral tumors, benign anorectal disease, and anal cancer; surgical techniques such as ileal pouch procedures, transanal hemorrhoidal dearterialization for hemorrhoids, and transanal endoscopic microsurgery; fecal incontinence surgery; special interest in assessment, detection, and treatment of hereditary colon cancer syndromes
MD Degree: Loyola University Chicago Stritch School of Medicine (Illinois), 1989
Residency: General Surgery, University of Illinois at Chicago, Cook County Hospital, 1995
Fellowship: Colon and Rectal Surgery, Cook County Hospital, University of Illinois at Chicago, 1998

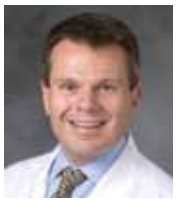
Oren N. Gottfried, MD
Neurosurgery
Particular Clinical Interests and Skills: Surgical management of all spine disease, including degenerative spinal disease of the cervical, thoracic, and lumbar spine, spinal deformities, spinal oncology including surgical treatment of primary and metastatic tumors, spinal trauma
MD Degree: University of Arizona College of Medicine, 2001
Residency: Neurological Surgery, University of Utah Hospitals & Clinics, 2001-2007
Fellowship: Spinal Deformity Orthopaedic Surgery, University of Utah Hospitals & Clinics, 2007-2008; Spinal Oncology, Johns Hopkins Hospital (Maryland), 2008-2009

Scott T. Hollenbeck, MD
Plastic, Maxillofacial, and Oral Surgery
Particular Clinical Interests and Skills: Reconstructive surgery, microsurgery, breast reconstruction, extremity reconstruction, abdominal wall reconstruction, vascular anomalies, fat grafting, cosmetic surgery, breast implant surgery, breast lift surgery, body contouring, abdominoplasty
MD Degree: Ohio State University College of Medicine, 2000
Residency: General Surgery, NewYork–Presbyterian Hospital/Weill Cornell Medical Center, 2000-2007; Plastic and Reconstructive Surgery, Duke University Medical Center, 2007-2010

M. Benjamin Hopkins, MD
General Surgery
Particular Clinical Interests and Skills: Colorectal surgery, laparoscopic colorectal surgery, surgery for inflammatory bowel disease, endorectal ultrasound, benign anorectal disease, sphincter-saving procedures, ileal pouch procedures, rectal prolapse repair, fecal incontinence, diverticulitis, presacral tumors, anal cancer
MD Degree: Wake Forest University School of Medicine (North Carolina), 2004
Residency: General Surgery, Ochsner Clinic (Louisiana), 2009
Fellowship: Colon and Rectal Surgery, Ochsner Clinic (Louisiana), 2010

Robert D.B. Jaquiss, MD
Cardiovascular and Thoracic Surgery
Particular Clinical Interests and Skills: Surgical treatment of congenital and acquired heart disease in children and surgical treatment of congenital heart disease in adults, neonatal heart surgery, mechanical circulatory support, pediatric cardiac transplantation
MD Degree: Vanderbilt University School of Medicine (Tennessee), 1986
Residency: Surgery, Washington University Medical Center (Missouri), 1986-1990; Cardiothoracic Surgery, Washington University Medical Center (Missouri), 1992-1994
Fellowship: Cardiac Surgical Research, Washington University Medical Center (Missouri), 1990-1992; Pediatric Cardiothoracic Surgery, St. Louis Children's Hospital (Missouri), 1994-1995

Carolyn E. Keeler, DO
Neurosurgery
Particular Clinical Interests and Skills: Assessment, diagnosis, and nonsurgical treatment of spine disorders, lumbar spine and peripheral joint injections, musculoskeletal medicine, medical acupuncture, performing arts and dance medicine, osteoporosis, pregnancy-related back pain, electrodiagnosis, spine wellness
DO Degree: Touro University College of Osteopathic Medicine (New York), 2004
Residency: St. Vincent's Midtown Hospital (New York), 2004-2005; Physical Medicine and Rehabilitation, NYU Medical Center Rusk Institute, 2005-2008
Fellowship: Cleveland Clinic Center for Spine Health (Ohio), 2008-2009

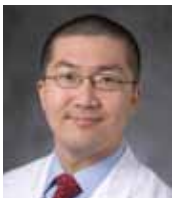


Richard A. Pierce, MD, PhD
General Surgery
Particular Clinical Interests and Skills: Laparoscopic and endoscopic surgery, diseases of the esophagus, stomach and GI tract, complex hernia repair (abdomen, groin, diaphragm), mechanisms of weight loss, GERD, gastroparesis, rectal cancer, hepatobiliary disease
MD Degree: University of Virginia School of Medicine, 2002
Residency: General Surgery, Washington University Medical Center (Missouri), 2009; Research Fellow, Minimally Invasive Surgery, Washington University Medical Center (Missouri), 2005-2007
Fellowship: Laparoscopic and Endoscopic Surgery, Legacy Health System (Oregon), 2010
Other Degree: PhD, Microbiology and Immunology, University of Virginia School of Medicine, 2001

Alan A. Simeone, MD
Cardiovascular and Thoracic Surgery
Particular Clinical Interests and Skills: Cardiac transplantation, surgical treatment of advanced heart failure, cardiothoracic critical care, emergency cardiopulmonary support, thoracic trauma, general adult cardiac surgery and lung transplantation
MD Degree: Eastern Virginia Medical School, 1993
Residency: General Surgery, Wake Forest University Baptist Medical Center (North Carolina), 1998; Thoracic Surgery, Medical University of South Carolina Medical Center, 2001
Fellowship: Surgical Critical Care and Trauma, Yale–New Haven Hospital (Connecticut), 2005; Cardiopulmonary Transplantation and Mechanical Circulatory Support, Duke University Medical Center, 2009

Deepak Vikraman-Sushama, MD
General Surgery
Particular Clinical Interests and Skills: Abdominal solid organ transplantation, including pediatric/adult liver, pancreas; kidney and small intestine transplantation; general surgery; laparoscopic and hepatobiliary surgery
MD Degree: Trivandrum Medical College (India), 1998
Residency: Basic Surgical Training, Leeds United Teaching Hospitals (UK), 1999-2002; General Surgery, Georgetown University Hospital (Washington, DC), 2002-2007
Fellowship: Transplant Surgery, Duke University Medical Center, 2007-2009

Christopher R. Watters, MD
General Surgery
Particular Clinical Interests and Skills: Broad practice of general surgery with emphasis on pancreatic and biliary disease, gastrointestinal diseases/malignancies, gastroesophageal reflux, and venous disease
MD Degree: University of Michigan Medical School, 1983
Residency: General Surgery, Duke University Medical Center, 1983-1991
Fellowship: Surgery Research, Duke University Medical Center, 1985-1987



Jin S. Yoo, MD
General Surgery
Particular Clinical Interests and Skills: Advanced laparoscopic and bariatric surgery, including surgical management of GERD, achalasia, benign/malignant gastric tumors, pancreatic and adrenal disease, splenectomy, Roux-en-Y gastric bypass, adjustable gastric banding, sleeve gastrectomy, single-incision laparoscopic procedures
MD Degree: University of Virginia School of Medicine, 2002
Residency: General Surgery, Duke University Medical Center, 2002-2004, 2006-2009
Fellowship: Minimally Invasive Surgery/Bariatric Surgery, Duke University Medical Center, 2009-2010

2011 **Duke CME Calendar**

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.

On-site courses

	DATE	LOCATION	CREDITS
ANESTHESIOLOGY			
Preceptorship in Intraoperative Transesophageal Echocardiography	January 10-12, January 31-February 2, March 7-9, April 4-6, May 9-11	Durham, NC	27
Anesthesia Camp Grand Cayman	January 26-29	Grand Cayman, Cayman Islands	20
CARDIOLOGY			
Atrial Fibrillation and Heart Failure Are Epidemic: What Does the Clinician Need to Know?	January 21-22	Cary, NC	9
4th Annual Duke/IRMC Cardiovascular Symposium: A Quality Perspective	February 19	Vero Beach, FL	4
14th Cardiothoracic Update and TEE Review Course	June 23-26	Hilton Head Island, SC	39.75
DERMATOLOGY			
Society for Investigative Dermatology 2011 Annual Meeting	May 4-7	Phoenix, AZ	20
NEUROLOGY			
9th Annual Advanced EMG & EMG-Guided Chemodenervation Workshop	March 4-6	Durham, NC	19.75
PSYCHIATRY			
Psychotic and Cognitive Disorders: Solving Clinical Challenges, Improving Patient Care	April 15-17	Chicago, IL	18
RADIOLOGY			
Abdominal Imaging & Musculoskeletal MRI Update 2011	January 15-18	Paradise Island, Bahamas	19
Musculoskeletal Magnetic Resonance Imaging	February 7-10, April 18-21	Durham, NC	28
Comprehensive Review of Musculoskeletal MRI	February 19-22	Orlando, FL	18
Advanced Imaging in the Islands	February 20-23	Grand Cayman, Cayman Islands	18
Comprehensive Review of Musculoskeletal MRI	March 20-23	Herradura, Costa Rica	18
27th Annual Duke Radiology Review Course	April 9-15	Durham, NC	57
Mammograms to MRI 2011	June 19-22	Kiawah Island, SC	17.5
Comprehensive Review of Musculoskeletal MRI	November 6-9	Maui, HI	18

Online courses

	DATE	CREDITS
Thromboprophylaxis in Atrial Fibrillation and Acute Coronary Syndromes: Can We Do Better?	Through February 1	1.25
Creating a Patient Safety Culture	Through February 2	1
Pneumococcal Disease in Adults: Rationale Behind Updated Practice Recommendations	Through February 9	1.25
PROACTIVE: Prostate Cancer Screening Guidelines 2010	Through February 11	0.75
Insertion of Central Venous Catheters	Through February 28	2
Dissecting Diabetic Dyslipidemia: Understanding Causes and Implementing Solutions	Through March 19	1.5
Update on Novel Antiplatelet and Anticoagulant Agents: A Clinical Perspective for Best Practices	Through March 25	0.75
Chemotherapeutic Options in Castration-Resistant Prostate Cancer: Optimizing Treatment Strategies	Through April 4	1.25
Current and Emerging Treatment Modalities for Patients with Glioblastoma	Through April 7	1.25
Risk Assessment and Prevention of Venous Thromboembolism: Challenges and Practical Strategies for Federal Health Care	Through April 22	1
Managing Female Patients with Early Onset of Rheumatoid Arthritis	Through May 6	1
Improving VTE Risk Assessment and Prophylaxis in Orthopaedic Surgery Patients	Through May 18	1.5
Improving VTE Risk Assessment and Prophylaxis in Hospitalized Oncology Patients	Through May 18	1.5
Improving VTE Risk Assessment and Prophylaxis in Hospitalized Medically Ill Patients	Through May 18	1.5
Clinical Syndromes of Arterial Thrombosis	Through May 27	0.75
Targeted Therapy in Castration-Resistant Prostate Cancer: Exploring New Pathways of Treatment	Through May 27	1
TeamSTEPPS e-Fundamentals	Through May 31	1.5
Management of Parkinson Disease in the Primary Care Setting	Through June 11	1
Making Evidence-Based Decisions in the Molecular Age: Improving Practice Patterns in the Diagnosis and Treatment of GIST	Through June 20	1.25
Duke Clinical Medicine Series: Endocrinology Conference	Through June 27	0.5
Duke Clinical Medicine Series: Cardiology Conference	Through June 29	0.5
TeamSTEPPS e-Essentials	Through August 10	1

DukeMedicine

"I feel like it's a miracle I got my life back!"

As Genny Mulligan and her husband neared the end of an exhilarating trip to attend her 50th high school reunion, she wondered if she was coming down with a serious case of the flu. It was difficult to breathe, and she could hardly make it up a flight of stairs.

The normally active amateur golfer soon found herself on oxygen in a local hospital, suffering from what doctors thought was severe asthma. She finally returned home nine days later, but never regained her strength. The next six months were agonizing. "I couldn't do any of the things I love to do," says Mulligan, 71, of Southport, North Carolina.

Further testing at her local pulmonologist's office revealed a serious diagnosis: pulmonary fibrosis. But even with new medication and oxygen, Mulligan felt she wasn't responding to treatment. "I told my doctor I wanted to go to Duke," she says. "The next day, they called with an appointment for me to see Dr. Peter Kussin."

A series of appointments and tests at Duke revealed that, in addition to pulmonary fibrosis and emphysema, Mulligan was suffering from aspergillosis, a fungal infection of the lungs, as well as full-blown diabetes caused by the steroid medication she had been taking. "I remember Dr. Kussin saying to his medical students, 'This woman had three life-threatening conditions—any one of them could have killed her at any moment,'"says Mulligan.

At one point she was preparing herself for the possibility of lung transplant, but after treatment and continuing pulmonary rehabilitation, she is once again challenging her golfing buddies.

"I feel that Dr. Kussin and Duke saved my life," says Mulligan.

To express their thanks, Mulligan and her husband, Ed, have made a generous planned gift through their estate to support pulmonary research at Duke.

"I know that the NIH has made serious cuts and times are hard for medical researchers," says Mulligan. "The care I received at Duke was just wonderful, and I feel like it's a miracle I got my life back!"

Duke offers a number of options for gift planning, including life income gifts and gifts through one's estate. To learn more about how you can make a planned gift that benefits you and helps fund important medical research at Duke, please visit dukemedicine.org/giving or call Joseph W. Tynan, JD, Director of Gift and Endowment Planning, Duke Medicine Development and Alumni Affairs at 919-667-2506.

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DukeMed MAGAZINE
VOLUME 10, ISSUE 2, WINTER 2010/11

"WHEN WE CAN'T TRY TO SAVE everyone, how do we decide whom we should attempt to save—and what, if anything, do we owe those who 'lose' the lifesaving lottery?"

Whether it's a devastating hurricane, an influenza pandemic, or an economic disaster, Philip Rosoff, MD, director of clinical ethics at Duke University Hospital, says that a future health-care crisis is inevitable—and the medical community must create plans that provide supportable and justifiable reasoning for choosing some patients over others in times of catastrophe—or catastrophic scarcity. Read more on page 38.