

EMORY | health

PATIENT CARE, RESEARCH, AND EDUCATION FROM
THE **WOODRUFF HEALTH SCIENCES CENTER**



The **BIG SLEEP**
Delving into questions of
what really happens when we sleep.

FROM THE EXECUTIVE VP



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Executive VP for Health Affairs
S. WRIGHT CAUGHMAN, MD

Editor
RHONDA MULLEN

Art Director
PETA WESTMAAS

Director of Photography
JACK KEARSE

Graphic Designer
LINDA DOBSON

Production Manager
CAROL PINTO

Web Specialist
WENDY DARLING

Advertising Manager
DAVID MCCLURKIN

Executive Director, Health Sciences Publications
KARON SCHINDLER

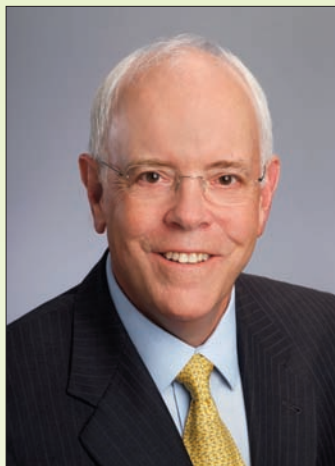
Associate Vice President, Health Sciences Communications
JEFFREY MOLTER



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New buildings don't just spring up. They're built by people who have the wisdom to envision their potential and the commitment to fulfill it.

More than half of the research space will be dedicated to pediatric research through the Emory-Children's Pediatric Research Center, a close partnership with our colleagues at Children's Healthcare of Atlanta. Very deliberately, the design of the new building connects by bridge to the Emory-Children's Center. This physical and symbolic bridging of our two organizations' programs will lead to continued medical advances to benefit children in Georgia and around the world.

Of course, new buildings don't just spring up. They're built by people who have the wisdom to envision their potential and the commitment to fulfill it. In the case of our new building, these people are the members of our enthusiastic and engaged philanthropic community. In addition to the Woodruff, Whitehead, and Rollins Foundations—which are major forces behind not only this building but also so much of the good work that's done here at Emory and throughout Atlanta—we're also grateful to the countless others whose vision for advancing research in Georgia has made our new facility possible.

In this issue, you'll find many examples of Emory research that is already saving and improving lives, from a deeper understanding of the effect of sleep on health to new developments in gene therapy for Parkinson's disease, from a clinical trial with four other medical centers for a targeted drug treatment for fragile X syndrome to a recruitment effort to include more African Americans in clinical research for Crohn's disease. We look forward to the scientific discoveries that will take place in the newest Emory place devoted to advancing health in our communities.

S. Wright Caughman

Please share your feedback at evphafeedback@emory.edu.

A place for scientific discovery

ON JUNE 15, EMORY'S WOODRUFF HEALTH SCIENCES CENTER (WHSC) BROKE GROUND ON A NEW HEALTH SCIENCES RESEARCH BUILDING. More than just a symbol of our growth, the new building will be a bricks and mortar manifestation of some of WHSC's most distinguishing qualities—a commitment to advancing scientific discoveries that save and improve lives, a collegial and collaborative environment that fosters strong partnerships, and the extraordinary gift of an engaged community that supports and promotes our mission.

The new building, to be located on Haygood Drive, will encompass 200,000 square feet with laboratory space for 65 researchers and office space to support clinical trials and other research efforts. It will house researchers from the Winship Cancer Institute, along with Emory's growing drug discovery group, including Dr. Ray Schinazi's team, known worldwide for developing the drugs used by 94% of all Americans being treated for HIV/AIDS.

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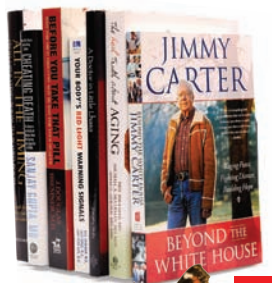
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What do you think? *Emory Health* welcomes your comments—pro or con—about topics and issues covered in this magazine. Please send comments, letters to the editor, address changes, and other correspondence to *Emory Health*, 1440 Clifton Road, 150M, Atlanta, GA 30322; email rhonda.mullen@emory.edu; or call 404-727-8166.



The big sleep

By ROBIN TRICOLES • Illustrations by JOEL NAKAMURA

Emory sleep experts are exploring questions and finding answers to **what really happens when we sleep.**

Search for alarm clocks on the Internet, and the results will yield a startling array of choices: clocks that ring, chime, and hum. Clocks that glow, shout (a tiny drill sergeant), and fly. Yes, fly. That is, you must get out of bed to squelch its incessant sound. You must cease to sleep.

But what does it mean to sleep? How do we define it? And what happens to our brains when we do so? Apparently, a lot. But we know only a fraction of what this is.

On the surface, it looks as if there's nothing to it, but actually sleeping is an exquisitely complex process. In humans, sleep involves a series of precise physiologic and chemical transitions that transport us from wakefulness to sleep and back again.

"We spend a third of our lives sleeping, and I don't think anybody knows why," says Emory neurologist and scientist David Rye. "Sure, there are the pat answers: neurochemical regeneration and such, but at the end of the day, I don't think we really know why we sleep even though every organism does it. I mean even worms have rest cycles."

So do flies. "We're doing some things here on campus with *Drosophila*," says Rye. "You can't record sleep in flies per se, but you can observe their rest cycles. We know that if we don't let the fly rest, we're going to see an increase in rebound rest, rest that makes up for a deficit." Just like in sleep-deprived humans.



What the stages tell us

Researchers study relatively simple organisms, such as worms and flies, to understand the molecular machinations behind sleep—or the lack of sleep, especially in humans.

“It’s hard to keep humans awake for more than 72 hours,” says Emory pulmonologist Nancy Collop, who directs the Emory Sleep Center. “Even at 48 hours with no sleep, people tend to have microsleeps, very brief bursts of sleep that intrude on wakefulness.” When experts measure brainwaves during microsleeps, the waves look more like sleep than they do like wakefulness. Even when the eyes are open during microsleep, the person is blind because the visual parts of the brain close down.

“Your brain is not one big blob,” Collop says. “In fact, several distinct parts of the brain interact to get us into the sleep state. There are all sorts of interesting things about the transition from wake to sleep.”

One of those interesting things involves the sleep cycle itself, which includes four stages: stages one through three, plus rapid eye movement (REM) sleep. However, the stages do not take place necessarily in that order. Instead, sleep begins in stage one and progresses orderly through the next stages until REM sleep is over, when it returns to stage two. Neurotransmitters, such as serotonin, norepinephrine, and adenosine, govern largely whether we’re awake or asleep.

During stage one, muscle activity slows, and we drift in and out of sleep and can be awakened easily. During stage two, eye movement stops and brain

waves slow with intermittent bursts of fast waves, known as sleep spindles. By stage three, very slow brain waves, or delta waves begin, punctuated by small, fast waves and eventually leading to a predominance of delta waves. REM sleep includes eye movement, increased respiration rate, and brain activity, including dreaming.

Although scientists don’t know exactly why, these stages are critical to a good night’s sleep. Evidence of their importance rests in the difference between the sleep state and the comatose state. Although a coma may resemble sleep to observers, the brain waves tell a different story.

The EEG of a person in a coma typically shows the slowest of the slow brain waves—the deltas, according to Emory neurologist Lynn Marie Trotti. While some slow waves appear during sleep, particularly in stage three, “during comas, it’s all slow wave all the time,” says Trotti. “Presumably it’s not restorative in the same way as sleep.”

What’s more, the same factors that drive sleep aren’t driving comas. With sleep, the drivers are circadian rhythm and sleep pressure; that is, the longer one is awake, the more one needs to sleep. But a coma is unattached to those drivers—with one exception. If someone is in a persistent vegetative state, they sometimes show hints of day-night cycling, Trotti says.

A walk on the wild side

Because the brain has so many parts involved in sleep, things can sometimes go awry. One such malfunction involves a dissociation among the parts of

the brain that coordinate sleep: that is, some parts are acting as if the body is awake while others act as if it's asleep. The result: parasomnias, such as sleepwalking and sleepwalking.

"Sometimes there are abnormal parts of the sleep-wake transition where people do wake-like activities when they're asleep," says Collop. "It happens because key parts of the brain are not inactive as they should be in normal sleep. So you can have some motor activity. You can walk. You can talk. You can supposedly drive a car."

Although parasomnias are not yet well understood, they are well documented. "For example, the body should move very little when higher cortical levels are dampening themselves down," says Trotti. "But with parasomnias, you're able to walk when you still don't have conscious awareness of what's around you."

As it turns out, the more common types of dissociations that lead to parasomnia occur during non-REM sleep, the deeper, slow-wave phase of the sleep cycle. More common in children, non-REM parasomnias often are related to neurodevelopment. While clinically we think of them as disorders, they are so common that some researchers believe they may just be a manifestation of normal brain development. Very young children may experience sleep terrors, whereas older children may experience sleepwalking. However, most children outgrow these parasomnias.

The rarer forms—and the potentially dangerous kinds of parasomnias—occur during REM sleep. These forms are strikingly different and manifest differently from more common parasomnias. In non-REM parasomnia, a person essentially gets stuck in a transition between deep sleep and being awake. It can be brought about by one of two scenarios, says Trotti. In the first, a person has a condition such as sleep apnea that causes frequent waking. Because the person is waking so often, she is more likely to get stuck in this transitional state. In the second case, the person has an abnormally deep sleep that is harder to wake from, so, again, she is more likely to get stuck. Sleep deprivation is one cause of abnormally deep sleep.

"It's thought that when you finally do sleep, it's so deep that it triggers parasomnias," she says.

In REM parasomnia, the brain has bypassed muscle atonia—in essence paralyzed muscles—allowing people to act out their dreams and creating a potentially dicey situation. "The normal sleep state is not to move a muscle during REM sleep," says Trotti. "If someone experiencing REM can still move freely and act out the dream, it's very dangerous."

In rare cases, people may be causing problems right in their own bedrooms. "For reasons we don't understand, with REM behavior disorder, the dreams are usually violent," says Trotti. "And what's more, they are defensive violence. For example, you may dream that someone is attacking you, and you respond to it. That's when people strangle their spouse, break things, and punch and kick."

People with this disorder often don't think of it as an illness. "You have to ask patients," Trotti says. "They won't necessarily volunteer that they gave their spouse a black eye last night. People with REM behavior disorder are sometimes assumed to have some deep, underlying psychiatric illness or some repressed motivation for the violence. But they don't."

Instead, parasomnias such as sleepwalking and REM sleep disorder tend to



Emory Sleep Center Director Nancy Collop, shown here with sleep aids for sleep apnea, studies the disorder in hospital patients.



Emory neurologist Lynn Marie Trotti holds a jack box, where researchers plug in the electrodes used in a sleep study. Trotti explores parasomnias, such as sleepwalking and sleepwalking, to understand how the parts of the brain interact during sleep.



Emory pulmonologist David Schulman studies the causes and effects of sleeplessness, which he equates to drunkenness.



Emory neurologist David Rye, an expert on restless legs syndrome, is testing a treatment for hypersomnias (see sidebar opposite).

run in families. So does restless legs syndrome (RLS). RLS is a common neurologic disorder, characterized by a compelling urge to move the legs, most often accompanied by an unpleasant sensation, which is difficult for patients to describe. It occurs most often before or during sleep. Rye, who with an international team of researchers was the first to identify a gene associated with the disorder, knows firsthand about RLS. He has it, and so does his wife.

“Restless legs is a symptomatic trait,” says Rye. “It’s genetic. Nature loads the gun. Then something happens that triggers it. It could be neuropathy. It could be spinal cord injury. It could be liver or renal failure. The gene is very common. So people are walking around, ready to have restless legs.”

In fact, 10% of the U.S. population and about 1% of school-aged children have RLS. A major cause of insomnia and sleep disruption, it has been linked to hypertension. “When you kick, your blood pressure goes up by about 30 mm,” says Rye.

One can be kicking and not know it, which occurs more often in middle-aged men than in middle-aged women, says Rye. Women are more often aware of the sensation, although men kick more.

Measuring up

Interestingly, gender differences in sleep aren’t limited to middle-aged men and women with RLS—babies also display such differences. To appreciate that notion, stop for a moment and consider what any parent can tell you: babies grow when they sleep.

Emory’s Michelle Lampl, a biological anthropologist, recently finished the first study of its kind that measures the link between daily growth and

sleep in infants. Her study showed that sleep and growth are inextricably linked. “Science is finally confirming what grandma knew all along: infants wake up taller right after they sleep,” says Lampl.

“Specifically, growth spurts are tied to an increase in total daily hours of sleep as well as an increase in the number of daily naps,” she says. “Longer naps predict an increase in weight and body fat composition tied to an increase in length. But exactly how this happens is not known.”

As far as gender differences go when it comes to sleep, Lampl’s study

found that growth spurts in babies are associated with increased lengths of naps in boys and an increased number of naps in girls.

The hours

Unlike babies, many adults are uninclined or unable to nap and get too little sleep.

That’s not good because sleeplessness, says Emory pulmonologist David Schulman, is akin to drunkenness. “If you’re an alcoholic, you may think you’re fine to drive, but you’re not. And the same is true for those who are chronically fatigued. People who are chronically fatigued suffer from the misconception that they are performing optimally, but they are not.”

Many studies of medical residents have likened driving home post-call to driving drunk. In fact, one study of residents in a simulated driving task showed that residents driving post-call performed worse than drunk people who were not post-call.

How sleepy we are at any one moment depends on many things: when we woke up, how many carbohydrates we just ate, what medications we take, how much sleep we got the night before. But more and more researchers are starting to look at how sleepy we are as a genetic trait.

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In studies on twins, in which researchers ask how much of variance in sleep is explained by genetics as opposed to sleep apnea, medication, RLS, or some other condition, 50% to 80% of the variance is explained by genetic relationships. Genetics explain approximately half of cases of insomnia as well. “The biggest factor by far is what genes you were born with,” Rye says.

However, both genetic and environmental causes may contribute to narcolepsy. Narcolepsy causes profound daytime sleepiness, even marked muscle weakness, sometimes in the middle of routine activities such as talking or eating.

Some people affected by narcolepsy have too little hypocretin, a neurochemical closely linked to wakefulness. But what causes low levels of hypocretin isn’t well understood. Researchers believe that several factors—including heredity, infections, brain injuries, and autoimmune disorders—may cause deficiencies in this chemical.

Recently, Rye saw an 8-year-old boy in his clinic who had strep. Two weeks later, the child had developed narcolepsy. “When kids get sick with strep, that might be one thing that triggers narcolepsy,” Rye says. “He’ll have it the rest of his life.”

Some would argue, Rye included, that sleep is a vital sign, a barometer of our health, especially when it comes to how much we get versus how much we need. “If you look at how much we sleep, there’s a distribution,” says Rye. “If you take people at both extremes, they have higher morbidity (like inflammation and insulin resistance) and even higher mortality. So if you don’t sleep enough, that’s not good. And if you sleep too much, that’s not good either. The good stuff is right at seven, seven and a half hours. That seems to be the happy place.”

Rye and his fellow sleep researchers at Emory believe that understanding sleep is going to give us huge insights into how insulin control and breathing are regulated, how the heart functions, and how so many of our systems work. “There’s a genuine need to understand sleep,” he says. 

WAKING FROM THE DEEP SLEEP

David Rye and colleagues on the Emory sleep team are hunting for biomarkers of hypersomnias, narcolepsy, and excessive daytime sleepiness in a new place—specifically the cerebrospinal fluid (CSF) and plasma.

The researchers analyzed biomarkers in the CSF and plasma of 31 people suffering from hypersomnia—research which Rye recently presented at the 2011 international SLEEP conference. In fact, it was one patient’s case that prompted the team to reanalyze other samples of CSF in their files.

That woman, “Anna,” was a 32-year-old attorney who first came to Emory in 2005 because of an overwhelming need for sleep—reaching at times 57 hours at a stretch. Initially, the researchers were unsure of the cause, but after extensive analysis of her CSF, they identified activity that enhanced the brain’s most abundant “shut down” chemical—namely gamma-aminobutyric acid (GABA).

Emory’s sleep team next surmised that flumazenil, a drug targeted at reversing anesthesia and sedative overdoses by way of GABA, might work as a possible treatment for Anna. Over two days, they gave higher doses of flumazenil intravenously while continuously monitoring her vital signs, electroencephalogram, and performance metrics. When the dosage reached 2mgs., Anna exclaimed, “I feel alive!”

She has continued to enjoy sustained improvement for three years.



WEB CONNECTION For more info, call 404-778-7777, or visit emory-healthcare.org/sleep. Videos about Emory sleep research are at bit.ly/sleephealthvideos and bit.ly/historyofsleepmed. A podcast on how sleep loss affects long-term health is at bit.ly/davidschulman.



ADAPTATION

Emory researchers are gathering evidence to help us mitigate environmental impacts on health.

The roads serving the two areas—like the regions themselves—couldn't be more different.

One is a network of multi-lane interstate highways that surround and bisect a metropolitan area of more than 5 million people in North America. The other is an asphalt highway intersected by dirt roads that, when the weather permits, provides the only non-river link between 125 villages in a remote area of South America.

Yet the congested highways of metro Atlanta, where local commuters and interstate haulers compete for space, and the first paved road along coastal Ecuador, where freshly cut timber moves from forest to market, share an important trait: besides providing the economic foundation for both regions, these man-made advancements alter the ecosystems and public health in ways that science is only now coming to understand.

Both regions, it turns out, also provide fertile ground for researchers at Emory's Rollins School of Public Health (RSPH). They illustrate the scope of a department that has moved aggressively

into what is best described as public health ecology—the study of how human behavior impacts the planet as well as human health. Understanding this relationship could go a long way toward informing policy decisions about the price of development as well as safeguarding personal and public health in the future.

The practical impact of these studies could lead to early detection of man-made toxins in the body that are linked to Parkinson's disease and new forms of sanitation that use less water in undeveloped regions of the world.

Air and water

Building on work that goes back to the mid-1990s, researchers at the RSPH and Georgia Tech recently won a five-year, \$8 million grant from the Environmental Protection Agency to establish one of four national Clean Air Research Centers. They will be looking at the impact of poor air quality on health, ranging from effects such as low birth weight in babies to cardiovascular disease in adults.

“We have an incredible infrastructure in place at Emory to accomplish this,” says Paige Tolbert, chair of the environmental health department, referring to the treasure trove of epidemiologic data that has accumulated on Atlanta air quality and health over the course of more than a decade. “Now we will be able to study what might be the worst aspects of the pollutant mix we face, and we may be able to suggest what control measures will have the greatest health benefit.”

Earlier research on Atlanta traffic drew from measurements of ground-level ozone (found in smog) and particulate pollution (found in haze, smoke, and dust) as well as patient reports from emergency rooms in the metro area. That work established a link between Atlanta’s air quality and increased risk of attacks for people suffering from asthma, especially children. In the new center, one project will assess whether Atlanta’s commuters may be putting their health in jeopardy in small, subtle ways while making their daily 25- to 30-minute trip to work every morning and retracing their routes home. Other center work will examine whether exposure to air pollution in utero and in early childhood is related to subsequent illness in children

as well as an investigation of how the findings in Atlanta apply to other cities.

“This new work will take us to a new level,” Tolbert says. “We’ll look at the interactions between air pollutants as well as the cumulative, combined impact of these chemicals on certain diseases and conditions that we already know are related to pollution.”

Preparing for a hotter planet

While Tolbert is bringing the air quality in Atlanta down to street-level science, another faculty member in environmental health is examining the broad impact of climate change on health.

Jeremy Hess, an emergency medicine physician at Emory University and Grady Memorial hospitals, routinely pores over color-coded maps of the globe, looking at climate patterns that impact heat waves, floods, hurricanes, and other extreme conditions. He studies the corresponding demands these weather events place on public health and safety systems.

For example, Hess has studied periodic heat waves that have





The bigger picture

When Karen Levy was a PhD candidate at the University of California-Berkeley, she was part of a team that focused international attention on the impact of water-borne disease resulting from a new roadway in northwest Ecuador. Now at Emory, she and her collaborators have established that the highway and unpaved roads that connect to it have so

altered the region that people there face increased risk of enteric diseases—including diarrhea, a major cause of death in Ecuador.

Her most recent project involves the spread of antibiotic resistance as major timber-cutting companies buy large chunks of privately held land and inhabitants move from harvesting small stands of trees to raising chickens.

Levy believes there must be a balancing act between economic development and how that

development alters the climate and public health.

"It is plausible that roads and infrastructure are the key to success and that Ecuador and other countries need these investments to develop," Levy says. "But there are few studies that assess the health impacts of these projects, especially regarding the transmission of infectious diseases. We have to look at the bigger picture."

hit major American cities over half a century, from 1956 to 2005. During an average summer, some 400 Americans succumb to heat—accounting for a greater number of climate-related deaths each year than any other form of extreme weather. Yet little public attention is focused on the health impact of heat compared with hurricanes, tornadoes, floods, and other extreme weather.

Moreover, when Hess and collaborators at Georgia Tech and CDC probed deeper into the U.S. fatalities, they found that extreme heat events over time were much more likely to happen in urban areas characterized by sprawling residential and commercial development than in more compact, high-density cities.

In sprawling metro areas, Hess found nearly 15 more days of

extreme heat during the period studied compared with 5.6 days for more compact cities. ("Extreme heat" is a measurement based on apparent temperature and humidity relative to ambient air temperature and water vapor pressure.)

Given that climate experts believe the number of days for extreme heat will increase significantly in the decades to come, Hess says that urban planners should consider strategies that preserve regional green space, planting more trees along roadways, and using more reflective surfaces on roads, buildings, and rooftops. They also could plan to rely more on mass transportation, walking, and bicycling.

"We'll have to look at our whole approach to public health as we adapt to climate change," Hess says.

Is commuting harmful to your health?

Growing up in Chicago, Jeff Solodky has seen his share of gridlock. But it is nothing compared with the traffic he has encountered since enrolling as an undergraduate at Emory. “Here, rush hour seems to last most of the day,” Solodky says. “I didn’t believe it until I saw it.”

Solodky is one of 100 participants to take part in a study by Emory and Georgia Tech researchers that measures how commuting in Atlanta impacts the health of the commuters themselves. Using sophisticated air analyzers and other instrumentation developed at Tech, the Atlanta commuting study measures what pollutants drivers are exposed to inside the car.

Participants go through a two-hour commute in the morning and again in the evening on two different days, driving along “scripted” routes provided by the researchers. Most of the time, they drive on Atlanta’s busy interstates, although they also traverse some surface streets.

Each participant also undergoes a battery of tests—including blood gas and other cardiovascular measurements—the day before their commute and again after finishing their afternoon drive.

The information gathered on how specific pollutants affect the drivers—and under what circumstances—can help inform discussions about traffic patterns, highway expansion, land use, and health, says Jeremy Sarnat, an

environmental health expert and the study’s lead investigator.

“Even the smallest changes in oxidative stress among the participants tell us something,” Sarnat says. “We may be able to help individuals who are at greater risk so that they can make informed decisions about when, for instance, to start their commutes or which routes to take.”

Such information would be helpful to Solodky, a third-year business student who has had asthma since age 3. (Half of those enrolled in the study have asthma.)

“I didn’t notice any health changes when I was on the road,” he says after his commute. “But then, living on campus, I don’t have to go through that every day.”

Shahed Iqbal, an epidemiologist in the asthma branch of the CDC who is also a study participant, more closely resembles the average Atlanta commuter. He drives about 30 minutes each way every day from his home in Norcross to his office in Chamblee. While his participation in the study is unconnected to his work at the CDC, he was intrigued by what the Emory researchers are doing.

“When you are stuck between those diesel trucks on I-285, you have some idea of what you are being exposed to,” he says. “This study is pretty comprehensive. They are looking at a whole range of exposures to see what might be impacting our health. That’s an important step forward.”








Becoming a Real Nurse

By SYLVIA WROBEL • Photography by JACK KEARSE



Early every Tuesday for 15 weeks, Whitney Winston and Kaitlin Ahienius head to unit 10-E in Emory University Hospital (EUH). On each of those Tuesdays, the Emory nursing students work alongside 30-year seasoned nurse Corinne Slack throughout a 12-hour shift. They say the long shift—typical for nurses—marked their first acclimation to real-world nursing.

They are there in the morning when the night nurse gives Slack an update at patients' bedsides. They squeeze in with their instructor in the small medication room, reviewing each patient's updated laboratory results and medication orders. Although Winston and Ahienius lack the privilege to access the locked medicine cabinets, Slack hands them the drugs, which they check against orders on a computer, then watch their teacher double-check their work. Pushing a cart loaded with medicines and the ubiquitous computer, they next follow Slack to the first patient's room, where her name as nurse and theirs as students are printed on a white board at the foot of the bed so that the patient and family members can identify them.

A complex health care system awaits nursing students the day they graduate, and veteran nurses are helping them get ready to handle the real world.

Kelly Brewer (shown here with Emory student nurses Whitney Winston and Kaitlin Ahienius) coordinates teaching in the Dedicated Education Unit.



Traditionally, groups of nursing students have trailed a nursing professor through different clinical units to get their first interactions with patients, to draw blood or give injections on a person rather than a mannequin, to see how quickly emergencies occur and staff nurses respond. But what Winston and Ahienius are experiencing is total immersion in a dedicated education unit (DEU), where they begin to understand the pace, choreography, and culture of a unit in a complex, tertiary care hospital.

Susan Grant, chief nursing officer for Emory Healthcare, says even the best-prepared new nurses can take months to become comfortable and confident—time health care can ill afford in an era of shortages, both of staff nurses and nursing faculty to train more. That's one reason Emory Healthcare was eager to be a part of a joint plan with Emory's Nell Hodgson Woodruff School of Nursing to offer a faster-track, more immersive, staff nurse-centered clinical rotation to junior and senior nursing students.

Emory launched the first two DEUs in 2009—at EUH on 10-E, where patients are recovering from gastrointestinal surgery and at EUH Midtown on a floor for patients with a range of complex medical and postsurgical conditions. A DEU in Midtown's women's services soon followed, and others are now in the works.

Although DEU programs vary widely, they usually share a strong partnership between nursing schools and hospitals, experienced staff nurses who serve as the primary clinical instructors, and a commitment of the nurses on these units to help students learn what it means to be one of them.

Teaching students and the teachers

As coordinator of Emory's DEU program, Kelly Brewer meets with undergraduate students weekly or whenever they need answers or context. She grades their assignments and stays with the students—whom she affectionately calls “my

chicks”—during the long days they spend on the DEU clinical rotation.

Brewer also prepares and supports the staff nurses who serve as the students' primary clinical instructors. Many DEU instructors already have experience as preceptors who have taught the ropes to new nurses. But having primary responsibility for undergraduates requires a different level of responsibility: meeting educational objectives, evaluating work and providing feedback, motivating students to keep performing and progressing, encouraging them when they break down, and correcting them when necessary.

The payoff for students makes the effort worth it. Because DEU students work in pairs and do not have to wait for a professor to do a procedure among a larger group, they say they sometimes do more real nursing in one day than they did in total during three regular rotations.



Veteran nurse Corinne Slack (top left) reviews medication instructions with nursing students on 10E in Emory University Hospital—where they experience the real world of a busy, clinical unit at a tertiary care center.



As a DEU clinical instructor, Slack continually evaluates her students' strengths and weaknesses, teaching them new skills when they are ready. Today, for example, her students carefully change a surgical dressing. Good job, says the young patient, then asks Slack if she can walk down the hall later that day. Yes, is the answer, and Whitney and Kaitlin will come help you.

Of course, if patients prefer not to have students involved in their care, they can opt out. Few do. Most, like a middle-aged man with a belly swollen from his surgery, seem to enjoy participating in the program. "They were nervous at first," he jokingly says, "but I started teaching them right away." Under Slack's watchful eye, the students ask the man to rate his pain. They take his vital signs, give him a scheduled injection, and log their actions into the computer. Slack rechecks everything and nods

almost imperceptibly—both at the skill of the injection and the "confident demeanor" she considers to be a vital part of learning to be a nurse.

Students also must learn to prioritize, says Slack. When a crisis occurs on the unit—a bleed-out or a cardiopulmonary arrest—the students see prioritization in action, staying out of the way but later getting explanations from Slack, Brewer, and other nurses. They review the events of the day over a meal with Brewer in the hospital cafeteria and share entries from their clinical journals.

Between patients, Slack talks informally to her young charges in the conference room about how to deal with problems she and her colleagues have faced. She also tells her young charges that patients know their bodies best and will be their biggest allies and partners in care.

Where quality and teaching meet

As health care becomes more complex, staff nurses increasingly are called on to fill expanding

roles, master more technology and information management systems, and collaborate and coordinate care across growing teams of health professionals. That's a lot of responsibility. When Grant first proposed the DEU initiative to nursing managers and staff nurses in Emory Healthcare, she half expected a veiled protest: "Oh goody, something new again." Instead, she got enthusiasm for more teaching—as long as it didn't diminish safety and quality of care for patients.

That was three years ago. Far from diminishing patient care, these units get extra staffing to assure teaching time doesn't take away from patient time. Quality is foremost in the DEU, where students are taught that the daily quality-improvement plan is as important as the care plan.

"I know there will be new things when we start practice," says Winston, "but I don't think they will be such a shock." "And now that I've been part of this team," adds Ahienius, "I feel more confident, knowing there will always be nurses to help me like the ones on 10-E help us and each other." ■

FEATURE | FOR ETHIOPIANS, BY ETHIOPIANS

NATHAN GOLON

HEALTH ACCESS IN

By DANA GOLDMAN

Ethiopia

The goal was to improve the everyday lives of Ethiopians by giving them access to better health services. That ambitious dream not only came true but also is spreading in new directions throughout the country and beyond.

It all started in Addis Ababa, roughly 20 years ago, during a meeting between U.S. President Jimmy Carter and Ethiopian President Meles Zenawi. The two leaders and friends had just toured an agricultural demonstration project in rural Ethiopia, in which the Carter Center of Emory University was assisting. (The project later contributed to grain exports from Ethiopia for the first time in modern history.) Both men were energized by the opportunities in Ethiopia after the end of a brutal civil war. Still Zenawi knew that to stabilize his country, he needed to address a severe lack of access to health services—especially in rural areas.

At the time, Ethiopia had several government-run universities that were training physicians, but most of these professionals soon left Ethiopia for better economic opportunity. Limited infrastructure, poor access to safe water, and high fertility all contributed to an already challenging situation there.

During their discussions, Carter and Zenawi agreed that any plan to train health workers and improve health conditions should be implemented by Ethiopians for Ethiopians. Their brainstorming led to the Ethiopia Public Health Training Initiative (EPHTI), launched in 1997, which set out to build a sustainable health care workforce and strengthen capacity to better tackle health needs.

“Our ultimate goal was to improve the lives of everyday Ethiopians by giving them access to better health through better trained health workers,” says Shelly Terrazas, who served as EPHTI assistant director.

Nothing like the EPHTI had previously been attempted on a national scale in a developing country. To complicate matters, the plan called for collaboration between two Ethiopian ministries—Education and Health—one which trained health workers and the other which deployed them, but these ministries had had little communication with each other.

However, the effort had several things going for it: a strong political commitment, the Carter Center’s grassroots experience in agricultural development and Guinea worm eradication, and access to Emory faculty expertise.

Over the next 13 years, the partners—including seven government-funded Ethiopian universities—focused on creating culturally appropriate and accurate health materials as well as training teachers. Colleagues from the Carter Center and Emory (led by Emory nursing professor and then-EPHTI director Joyce Murray) frequently flew to Ethiopia to train faculty counterparts there to become more effective teachers. Throughout the year, small groups of Ethiopian faculty members from around the country met to discuss health concerns and create new learning materials, a process of collaboration and open dialogue that was new for them.



President Carter tours a farm in Ethiopia with Prime Minister Zenawi (left). Hailu Yeneneh (below), who served as the Carter Center’s resident technical adviser in Ethiopia, credits Emory faculty as critical in helping develop health training materials in the country.



Another key component of the work was providing \$1 million worth of new reference materials. Many of the materials in Ethiopia’s classrooms and university libraries were decades out of date.

“When we started, the majority of faculty members were newly graduated students themselves with no experience in the classroom, and they were using notes they took as students as lesson plans because they had nothing else to work with,” says Terrazas. “We worked to strengthen their teaching skills and help them develop a comprehensive curriculum that each of the universities in the network could use.”

Fast forward to today: more than 2,500 experts have been trained through Ethiopian universities, nearly 230 health learning modules have been developed, and more than 26,000 health care professionals have been trained to serve the rural population, the majority of the population.

The EPHTI has made good on Carter’s and Zenawi’s commitments to each other. Ethiopia is now a model for a new wave of development that focuses on empowering local communities to build long-term, sus-

tainable capacity for health services and infrastructure.

The project also has paved the way for more collaborations between Emory and Ethiopia. For instance, Emory nursing professor Lynn Sibley, who has served as an EPHTI consultant, currently is conducting a multi-year project in two rural areas of Ethiopia that helps new parents recognize signs of health problems in their newborns and connect with local health workers (*see photo top left*).

Perhaps most satisfying to the EPHTI team, however, is what’s happening outside of Ethiopia: the EPHTI model is spreading to other African countries. Elements of the program are being replicated in Liberia to train local health workers on mental health issues, and several African countries are working with the Carter Center on plans to create their own public health training initiatives. ☐

WEB CONNECTION Through support from the Ethiopian government, all EPHTI learning materials are available for free download at: cartercenter.org/health/ephti/learning_materials/index.html.

See also Educating Health Professionals in Low-Resource Countries, by Joyce Murray, Anna Frances Wenger, Elizabeth Downes, and Shelly Terrazas, on conducting teacher workshops in Ethiopia.

PHOTOS THIS PAGE AND OPPOSITE, BOTTOM: CARTER CENTER/IA. FIORENT

Protecting Parkinson's brains

WITH THE HELP OF EXPERIMENTAL GENE THERAPY, EMORY DOCTORS ARE HOPING TO ENCOURAGE BRAIN CELLS UNDER STRESS FROM PARKINSON'S DISEASE TO DO MORE NURTURING.

The goal is to prod the brains of Parkinson's disease patients to produce more of the growth factor neurturin. Neurturin is a naturally occurring protein that has been shown to protect and improve the function of damaged brain cells in animal models of Parkinson's. Doctors think neurturin could help prevent loss of the dopamine-producing brain cells that help regulate movement and slow progression of the disease's motor symptoms, including tremor and stiffness.

The study is aimed at Parkinson's patients who continue to experience motor complications despite adequate drug therapy. Emory is one of 11 institutions nationwide participating in the research, which is partially funded by the Michael J. Fox Foundation for Parkinson's Research. The clinical trial will follow 50 patients for 15 weeks up to three years after treatment to test safety and efficacy of the treatment.

In the trial, surgeons will inject a gene that encodes neurturin (clothed in a modified virus that doesn't cause disease) directly into the substantia nigra and putamen, two key brain areas damaged in Parkinson's. Half



BRIAN STAUFFER

A new Emory study that uses an experimental gene therapy approach seeks to help Parkinson's patients who continue to experience motor complications despite adequate drug therapy.

of the participants will undergo a placebo procedure, where nothing will be injected. If the study demonstrates the therapy to be safe and beneficial, those who receive placebo operations can receive the therapy later at no cost.

"Most available therapies for Parkinson's disease treat symptoms and do not address the degeneration of the brain cells," says Emory neurosurgeon and principal investigator Nicholas Boulis. "This trial takes a new approach that emphasizes the protection of brain cells and is aimed at restoring function and ultimately delaying the progression of the disease."

Another Emory study takes a similar approach for Alzheimer's patients, but it uses a different gene (nerve growth factor) and targets a different part of the brain.

In previous clinical trials, surgeons have inserted growth factor directly into the brains of Parkinson's patients with disappointing results. However, in the aftermath of those trials, they believe that the growth factors didn't spread enough to benefit the targeted areas.

By contrast, "gene therapy would be an improvement over infusion therapy as it involves one procedure and leads to long-lasting

expression," says Emory neurologist and co-investigator Stewart Factor. —Quinn Eastman

Using breath to detect lung cancer

Seed grants—or pilot projects—offer one way for an adventurous research idea to get a start. At Emory, one such pilot project is allowing researchers to explore the use of breath for early detection of lung cancer. The project is made possible through part of a \$4.7 million gift from Sarah and James Kennedy that set aside support for seed grants, and it was one of five \$50,000 awards from the Kennedy Seed Grant program in 2010.

Collaborating with Emory breast cancer surgeon Sheryl Gabram and colleagues from Georgia Tech, Emory thoracic oncologist Suresh Ramalingam and postdoctoral fellow Geetha Vallabhaneni are collecting samples from patients with and without lung cancer. During testing, a patient breathes into a device that separates and detects volatile organic compounds. The presence of cancer cells, which often have altered metabolism, may be detectable in the pattern of organic compounds in the breath.

"Right now, we use CT scanning to decide whether a patient with suspected lung cancer should undergo a biopsy," Ramalingam says. "Having additional information to bring to that decision would be a significant improvement, and the lung is an ideal place to start." —QE



HEALTHY SUMMER READING

Recent and soon-to-be-released titles from Emory Health authors

All in the Timing

By Charles Hatcher Jr.

This biography recounts the journey of a small-town boy from rural Attapulgus, Ga., to the top ranks of the medical ladder, with an insider's stories on leading Emory's Woodruff Health Sciences Center.

Before You Take that Pill

By Douglas Bremner

The Emory psychiatrist provides an inside look at the pharmaceutical industry and offers a safety assessment of more than 300 commonly prescribed medications, vitamins, and supplements.

Beyond the White House

By Jimmy Carter

The President's years after the White House have been among the most productive of U.S. Presidents, a time in which the Nobel Laureate and Emory distinguished professor has waged peace, fought disease, and built hope through the Carter Center of Emory University.

Cheating Death

By Sanjay Gupta

The Emory neurosurgeon and CNN chief medical correspondent known as America's Doctor explores the medical miracles that are saving lives against all odds.

The Dalai Lama's Little Book of Inner Peace

By the Dalai Lama

The Emory distinguished professor packages his essential life lessons and teachings under one cover.

A Doctor in Little Lhasa

By Timothy Holtz

The Emory infectious disease professor spent a year providing medical care to Tibetan refugees in Dharamsala. His account is required reading for those searching for a connection between medical training and social justice.

Health Information for International Travel 2011

eds. Phyllis Kozarsky, Alan Magill, David Shlim, and Gary Brunette

Learn from the director of Emory's TravelWell Clinic what to expect before you go abroad and what to take before you pack.

House on Fire

By William Foege

The Emory distinguished professor and born storyteller recounts the adventures and stories of what it was like to work on the ground in some of the world's most impoverished countries to eradicate smallpox.

Leaves Falling Gently

By Susan Bauer-Wu

An Emory nursing professor ponders how to live fully with serious illness through mindfulness, compassion, and connectedness.

The Real Truth About Aging

By Neil Shulman, Michael Silverman, and Adam Golden

Learn which vitamins may make a difference in your health, safe new approaches to getting a good night's sleep, and health tips that can save you money in this guide from Emory doctor Neil Shulman and colleagues. See also his *Your Body's Red Light Warning Signals*, with co-authors Jack Birge and Joon Ahn, a new edition of an essential reference that puts an ER doctor in your home.

Fragile X revisited



Emory human genetics chair Stephen Warren has led research on fragile X syndrome since it was first identified nearly three decades ago as the most common inherited cause of intellectual disability. In 1991, he led a team that discovered the mutated gene on the X chromosome. Along with other Emory scientists, he helped develop a screening test for fragile X and has been studying it ever since.

Until recently, there has been no treatment, but in 2010, Emory joined four other medical centers in a phase 2 clinical trial that is testing a targeted drug therapy for the syndrome.

In the most recent findings from Emory, scientists collaborating with Warren show how the protein missing in fragile X syndrome acts as a molecular toggle switch in brain cells. To learn more about this research, published in the June issue of *Molecular Cell*, see bit.ly/fragileXtoggleswitch.

Cross-cultural health care reform

ON ISSUES OF HEALTH CARE DELIVERY AND REFORM, THE UNITED STATES AND CHINA HAVE MUCH IN COMMON. Both are seeking ways to expand coverage, improve benefits and delivery systems, and contain costs. Those observations played out repeatedly during a spring conference at Emory that drew leading experts from both countries.

Healthcare Reform in China and the United States was the third such conference between China and this country. Co-hosted by the Emory Global Health Institute, Zhejiang University School of Medicine, and the China Medical Board, it explored workable solutions for health care reform.

China has a goal of complete health care coverage by 2020. Although 90% of its citizens are currently covered, cost and accessibility vary considerably. Hospital stays are longer than in the United States, medical



training is less rigorous, and access to high-quality care is limited. As in the United States, public hospitals and providers in China struggle with the economic and quality issues generated by a fee-for-service reimbursement structure.

Yet health care costs in China are only 5.13% of the country's GDP, compared with 17% in the United States.

Conference presenter William Roper, dean of the University of North Carolina School of Medicine, suggested that Americans should rethink long-held assumptions that they have the best health care system in the world. Although we spend more on medical care than any other country, a substantial portion of citizens lack care, nurses are in short supply, quality and safety are not as good as they should be, and incentives for physicians are skewed toward specialization and expensive technical procedures, Roper said.

Another presenter, Kenneth Thorpe—chair of health policy and management at Emory's Rollins School of Public Health—outlined the main points of the newly passed U.S. health reform law. Many of its improvements would likely be paid through Medicare reductions and increased taxes on higher income households, said Thorpe.



Getting HIV out of jail Your local jail may be the last frontier in the fight against HIV infection. HIV infection among inmates in the United States is more than three times higher than among the general public, says Anne Spaulding, an epidemiologist at Emory's Rollins School of Public Health.

Spaulding, a physician who has researched public health issues among inmates for 15 years, recently conducted a study in collaboration with the Fulton County Jail in Atlanta that found a high number of people with HIV who previously had been undiagnosed. Spaulding's team used a mouth swab to test inmates who volunteered for the HIV screening. Of the volunteers, the rate of HIV detection was about two in 100 inmates. By contrast, among the general public, the rate is approximately one in 500 people.

"Most people—including inmates—who find out they are HIV-positive take precautions to decrease the risk of transmission," says Spaulding.

Jails that test for HIV do not incur higher health care costs since most inmates, with average jail stays of two days, are already back in their communities before they start medication. In Fulton County, for example, inmates who test positive but are returning to the community are referred to various Atlanta programs for treatment.

Testing inmates often catches the infection at an early stage and leads to earlier treatment. In a study released in April by the CDC, the average CD4 count of a person in the general population first testing positive for HIV was less than 200. CD4 is a type of white blood cells targeted by HIV, and too few CD4 cells indicate a weak immune system. In another Emory study among jails nationally, the median CD4 count of inmates first diagnosed in jail was more than 400.

"People are less likely to transmit HIV if they start medications early," Spaulding says. "They have fewer hospitalizations and problems with their immune systems. This translates to less financial burden on our health care system."—Kay Torrance

Nitrite, the heart healthy choice

Hot dogs might not be the first item a health-conscious diner would choose on the menu, but they do contain a preservative, nitrite, which may have a curious benefit for the heart.

In a recent study published in *Circulation Research*, Emory cardiac surgeons John Calvert and David Lefer identified the ability to produce and store nitric oxide as an important way in which exercise protects the heart from injury.

Nitric oxide, a short-lived gas that is generated in the body, relaxes blood vessels, increases blood flow, and



activates survival pathways.

The body stores nitric

oxide by converting it into the chemical nitrite, and nitrite can be turned back into nitric oxide in situations where it's needed, such as a lack of blood flow or oxygen.

In experiments with mice, Calvert and Lefer showed that four weeks of being able to run on an exercise wheel boosted levels of both nitrite and an enzyme that produces nitric oxide. Four weeks of exercising also reduced the amount of heart muscle damaged after a coronary artery was blocked.

How long the increased levels of nitrite stayed high matched the duration of protection given by exercise. Nitrite and the nitric-oxide-producing enzyme stayed high for a week after the exercise wheel was taken away, unlike other heart enzymes stimulated by exercise, which faded more quickly.

However, before ordering that hot dog, consider that most nitrite in the diet comes from green vegetables. —QE



Antidepressants' toll on arteries

Antidepressant use has been linked to thicker arteries, possibly contributing to the risk of heart disease and stroke, according to an Emory study of U.S. veterans who are twins.

Viola Vaccarino, epidemiology chair at the Rollins School of Public Health, and Emory cardiology research fellow Amit Shah used data gathered from twins to separate the effects of antidepressants from depression itself, which can also heighten the risk of heart disease. The study included 513 middle-aged male twins who served in Vietnam.

The arteries of those taking antidepressants resembled arteries of people roughly four years older. The effect was seen both in twins who had and had not experienced a heart attack or stroke. Researchers measured the thickness of the lining of the main arteries in the neck by ultrasound.

Antidepressants' effects on arteries may be coming from changes in serotonin, a chemical in the brain targeted by antidepressants. Most serotonin in the body is actually found outside the brain, and changes in serotonin may be affecting the blood vessels as well, Shah says.

"Antidepressants have an established clinical benefit so nobody taking these medications should stop based only on these results," he says. —QE

Diversifying the Crohn's research pool

Among complex diseases, Crohn's disease is a poster child because of researchers' success in identifying genetic variations that contribute to the risk of getting it. However, one group is missing from the poster: African Americans, among whom rates of Crohn's have been increasing.

A type of inflammatory bowel disease, Crohn's can involve episodic abdominal pain, diarrhea, blood in the stool, and



weight loss. Severe cases lead to intestinal blockage, requiring surgery.

Although studies have identified dozens of genetic variations that contribute to disease risk in people of European descent, most of these are not expected to contribute to disease risk in African Americans, says Emory pediatric gastroenterologist Subra Kugathasan.

Kugathasan is leading a \$4.8 million NIH trial—the first large-scale genomic study of Crohn's disease in African Americans—which will recruit 1,500 participants nationally. Although no cure exists for Crohn's, he believes the investigation can help guide better treatments and differentiate between existing treatments.

"Future drugs for Crohn's disease will be based on genetics, and more specifically tailored to the patient," he says. —QE

“Look on me”



Juanita Clarke



Ileana Barrios

When the doctor goes in to the patient's room to deliver the diagnosis, Juanita Clarke is there. This morning at the Avon Comprehensive Breast Center at Grady Memorial Hospital, the woman they talk with is a single mother of three, and her diagnosis is early-stage breast cancer. “What is going to happen to me? What am I going to do with them?” the mom asks.

Clarke, a breast cancer survivor who was also raising a daughter on her own when she was diagnosed decades ago, has an answer. “Look on me,” she says. “You’re going to do what I did. You’re going to make it.”

Clarke volunteers as a clinic patient navigator in the Avon Foundation Community Education and Outreach Initiative (CEOI). A collaboration between the Avon Foundation, Grady Health System, and Emory’s Winship Cancer Institute and Rollins School of Public Health (RSPH), the effort supports patients in the breast cancer clinic from diagnosis through treatment. It also includes educational outreach to teach underserved, underinsured, and uninsured minority communities about breast health.

The clinic patient navigators—known as the “pink ladies” for the smocks they

wear—provide information, emotional support, and referrals for newly diagnosed women. “I encourage my patients,” says Clarke, “and let them know what to expect. They can call me after they get home if they have more questions.”

But more than answering questions, the pink ladies—all breast cancer survivors themselves—serve as proof that a cancer diagnosis need not be a death sentence, says Clarke, age 75. She was

only 42 when she was diagnosed with breast cancer and underwent 28 treatments of radiation in days before chemotherapy. “I had to live for my child and get her grown,” she says. (Today her daughter is a mother herself and works in Emory’s radiology department.)

The “pink ladies” volunteer in a community program that seeks to improve the odds for newly diagnosed women.

The program also matches individual navigators with patients to provide one-on-one follow-up throughout their care. The individual navigators encourage women to attend appointments, take their medications,

and find all the resources to give them the best chance of survival.

Ileana Barrios, who was treated for breast cancer at Grady in 2007, now serves as an individual patient navigator, working with Spanish-speaking

patients. The language barrier is just one of the problems that these women face. Many are from rural Mexico with little education and few financial resources, and half are undocumented workers, says Barrios.

A Spanish teacher at a school in Marietta,



Ga., Barrios does her comforting and follow-up by phone. When she calls, she knows what it is like to be in the women's shoes. "At that moment, you feel like, oh my God. What am I going to do? My children. My husband. I don't want to die. But I call and say it happened to me too. Let's talk."

Cecelia Muhammad is a self-described talker who also is passionate about breast health education. A community patient navigator in the Avon program and member of Toastmasters, Muhammad says she can speak on the spur of the moment to anyone about anything. The thing she most likes to talk about? Preventing breast cancer.

A retired registered nurse, Muhammad, 70, makes presentations on breast health at churches, community events, and in homes. She comes with a table covered with a pink tablecloth—"I want it to look pretty," she says—and she sets out literature on breast cancer prevention and a model that she uses to demonstrate how to correctly do a self breast exam. She asks if women have had a mammogram and the last time they have done a self exam for cancer.

"I'm concerned about the increase in the incidence of breast cancer in younger

women," Muhammad says. "The challenge with them is that they don't think anything is going to happen to them. With older women, who have been taught not to touch their bodies, the challenge is getting them to do their own exam."

When appropriate, Muhammad refers women to the Breast Test and More program—a service for underserved women that offers mammograms, pap smears, and clinical breast exams at little or no charge.

Measuring outcomes is important, says Tamara Mason, who coordinates the navigator program, and several studies indicate that the program is working.

An early assessment led by Emory surgeon Sheryl Gabram, who directs the AVON Comprehensive Breast Center, followed 487 patients who were diagnosed and treated from 2001 to 2004. That research, published by the American Cancer Society in 2008, showed a decline in stage 4 invasive breast cancers in participants in the Avon community program from 16.8% to 9.4%. Current research is under way to determine whether specific patients presented earlier as a result of specific community outreach initiatives and to measure the effects of the outreach interventions on potential stage migration.

In July 2010, *The Annals of Surgical Oncology* published a study led by Gabram's colleague, Monica Rizzo, which showed that with interventions, adherence to treatment markedly increased in a group of breast cancer patients where the no-show and non-completion of therapy rate traditionally is high. These interventions included training patient navigators and hiring a nurse practitioner in medical oncology.

In addition, a qualitative study led by Emory alumna Dara Schlueter, published in the *Journal of Cancer Education*, has shown that women who work with the patient navigators feel more confident in talking to their doctors, are better informed about what questions to ask, appreciate the availability of someone to reach out to no matter the time of day or night, and feel more emotional support than the women who forego participating in the program.

And research published by the program and RSPH staff in *Health Promotion Practice* (April 2011) shows that 22 community patient navigators hosted 207 breast health events with 9,601 attendees in a 15-month period. Of those participants, 304 women indicated an interest in mammography, and 21% went on to receive mammograms at collaborating facilities. Participants who reported breast symptoms were twice as likely to get a mammogram as those who did not report symptoms.

Regardless of numbers, for Muhammad, the program is about saving lives. "My biggest joy is getting feedback from someone I've helped," she says. "They call me up and say 'thank you.' I'm getting ready to boohoo just thinking about it."

And all of the 12 women that Barrios has assisted in the past two years have survived their cancer so far. "It is great to know that our work has helped our patients," she says. "It makes me happy." —Rhonda Mullen

WEB CONNECTION To learn more about breast cancer treatments at Emory, call 404-778-7777 or visit emoryhealthcare.org/connecting/healthconnection.html.

Customized care for complex aortic aneurysms

Abdominal aortic aneurysms are common—9% of men over 65 have one. And if they rupture, they are lethal, causing a person to die of rapid blood loss within minutes. The good news is that abdominal aneurysms can be surgically repaired, if found in time. The bad news is that half of patients with these aneurysms are unable to have conventional surgery because they have other conditions that rule it out.

Enter Emory vascular surgeon Joseph Ricotta. He is one of only a handful of surgeons in the United States who are able to offer a custom-made solution to people with complex abdominal aortic aneurysms.

Ricotta fashions a stent graft (a tiny tube of fabric and metal) that is fenestrated and branched, which he customizes based on a patient's CAT and PET scans. He then inserts the graft into the aorta through arteries in the groin. Holes in the graft line up with the necessary blood vessels to preserve blood flow and shore up the artery without puncturing the aorta.

"The people who benefit from this procedure have no other options and could not survive open aortic surgery," says Ricotta, who came to Emory from the Mayo Clinic, where he had performed more than 100 of the fenestrated and branched endograft procedures.

People who are candidates for the investigational approach possess large aneurysms that are likely to rupture. They often are too

sick from heart, lung, or kidney disease to undergo conventional aortic surgery.

Short- and mid-term results of the fenestrated and branched grafts indicate that they are safe and effective in treating selected patients, with a low incidence of complications. Between 20% and 30% of patients who undergo the traditional open chest and abdominal surgical procedure die within one year, and 10% to 15% will die during or shortly after surgery. Mortality for the new procedure is much lower—at 1% to 2%. Emory is one of only a handful of institutions in the country and the only place in the Southeast that offers the procedure.

Screening remains a vital tool in saving lives lost to aortic aneurysms, and Congress recently recognized its importance by revising the SAAAVE Act (Screen Abdominal Aortic Aneurysms Very Effectively). The new legislation includes ultrasound screening for at-risk Medicare beneficiaries aged 65 to 75 years.

"Screening is crucial because abdominal aortic aneurysms are asymptomatic, silent killers," Ricotta says. "That's why early detection with ultrasound is key."

WEB CONNECTION To see a video about the customized treatment for aortic aneurysms, see bit.ly/aorticaneurysms. For more information, call Emory HealthConnection at 404-778-7777, or visit emoryhealthcare.org/connecting/healthconnection.html.

Just do it: A team of patients who underwent bariatric surgery at Emory Johns Creek Hospital recently reunited with their surgeons—Christopher Hart, far left, and Will Johnson, far right—to run the first annual 5K Scrub Run. Bariatric Coordinator Lynne Winne, kneeling center, assured the group, including one patient who had surgery just three weeks before the race, that they would finish the run ahead of others. "This is evidence that you can achieve anything you put your mind to," Winne says. "They did it, and it's awesome."



A (Proper) Jump Forward



John Xerogeanes knows all too well what can happen if an athlete takes a jump and lands wrong. Each year, the chief of Emory's Sports Medicine Center treats athletes of all ages—from the 8-year-old soccer player to the professional athlete—who've torn the knee's anterior cruciate ligament, better known as the ACL.

Medical technology has made the ACL surgery more effective. Because of recent advances by Emory doctors in collaboration with Georgia Tech engineers, sports medicine orthopedists can now translate MRIs into 3D images, making preparation for ACL surgery easier and surgeons less likely to damage the knee's growth plate. The result, says Xerogeanes, or Dr. X as his patients call him, is that "we can do an operation that's much faster and less invasive, without the use of X-ray radiation. And that's pretty cool." So cool, in fact, that kids have come from as far away as Alaska for 3D-MRI-assisted surgery.

But Xerogeanes isn't content with treating a problem that can be avoided in the first place. After all, the costs—both economic and physical—are high. "You have an ACL injury, and the financial cost is around \$20,000," he says. "You're out of play for 8 to 12 months. It takes about 18 months to reach the level of function you had prior to the injury. Then there's the emotional trauma and risk of re-injury."

Previous work on ACL injury prevention has focused on teaching individual athletes to change their body mechanics when they come down from a jump: adjusting the angle of their hips, knees, and

ankles. But, says Xerogeanes, "It takes money and people to teach people how to jump and to give them feedback. No one has the resources to do it."

Bioengineering solutions

So Xerogeanes is once again teaming up with Allen Tannenbaum and Georgia Tech engineers, to create a free, web-based system that uses computer programming to provide individual feedback about whether



Dr. X helps young athletes prevent ACL tears.

a person's jumping mechanics put him or her at risk for an ACL tear. Athletes of all ages can upload videos of themselves jumping, and the program will automatically analyze body angles and provide feedback. A split-screen will show the difference between a proper, safe jump and your own jumping—and then show you what you need to do differently. "And you practice for a while and film yourself again at any

interval you want," says Xerogeanes.

The website should be up and running by this fall. Doctors are hopeful that it will help athletes prevent injury and pave the way for more insight into the causes of ACL tears. After all, females are at least four times more likely to tear their ACLs than males, and having access to encrypted data about women's jumping styles may help provide answers as to why.

These answers are coming not a moment too soon for specialists in sports medicine. "Every girl who has ACL problems in high school ends up with significant knee issues as they age," Xerogeanes says. "I have a whole litany of female athletes who are high level whose knees are shot, and they're only 30 years old. It's a big deal."

But a web program that can help thousands of athletes at a time for free? That, he hopes, is an even bigger deal—for patients. —Dana Goldman



WEB CONNECTION *Emory sports medicine specialists are using the 3D imaging technique pioneered at Emory for better ACL surgery results. To speak with an Emory sports medicine specialist, call Emory HealthConnection at 404-778-7777, or visit emoryhealthcare.org/connecting/healthconnection.html.*

The Era of AIDS

By JAMES CURRAN

We are all part of the era of AIDS. My generation was the last to experience sex for the first time without fear of HIV. My children are part of the first generation to grow up with HIV. We now live in a different world because of a single infection that affects more than 33 million people.

Thirty years ago this summer, I led a CDC task force to study the first cases. They occurred in Los Angeles, where five healthy gay men had become ill with *Pneumocystis carinii* pneumonia (PCP). Within three weeks, we confirmed more than 25 additional cases of PCP in LA and New York City and several cases of Kaposi's sarcoma (KS), a rare form of cancer, in NYC. These cases were significant. They were clustered among previously healthy gay men, they were fatal, and their cause was unknown.

The first step in understanding this new epidemic was to develop a case definition and conduct intensive surveillance for cases of KS and opportunistic infections, which we later termed AIDS (acquired immune deficiency syndrome). Our definition was quickly adopted worldwide, allowing for precise and consistent identification of disease

patterns in the United States and other countries with sophisticated health care.

A number of discoveries soon followed. Surveillance patterns confirmed the disease among gay men, intravenous drug users, and their sexual partners. We investigated three cases of PCP among men with severe hemophilia A and no other known risk factors who had received blood products pooled from thousands of donors. The identification of people with hemophilia provided solid epidemiologic evidence that a blood-borne and sexually transmitted pathogen caused AIDS.

Completing the picture, scientists confirmed that AIDS was likely caused by an unknown agent transmitted from mother to child and through heterosexual contact. The CDC took steps to protect health care workers and blood supplies and educate the public about transmission.

In 1983, French investigators from the Institut Pasteur identified HIV—the human immunodeficiency virus—as the virus that caused AIDS. The diagnostic test to detect HIV in the blood became available in 1984. Three years later, the U.S. Food and Drug Administration approved the use of AZT (azidothymidine), the first antiretroviral therapy (ART) drug to treat HIV.

In the 1990s, AZT proved beneficial in reducing mother-to-child transmission during pregnancy. The greatest breakthrough was the development of the AIDS cocktail or HAART (highly active antiretroviral therapy). Because of this combination therapy, people who were very ill could regain their health and resume their lives.

ART drugs were discovered by several scientists, mostly in this country. In the early 1990s, Emory researchers Dennis Liotta, Raymond Schinazi, and Woo-Baeg Choi developed FTC (Emtriva) and 3TC (Epidur), two of the major drugs now in use. Today, a single pill called Atripla, a combination of Emtriva and two additional drugs, replaces the handful of pills that men and women with AIDS took a decade ago.





Pockets of strength

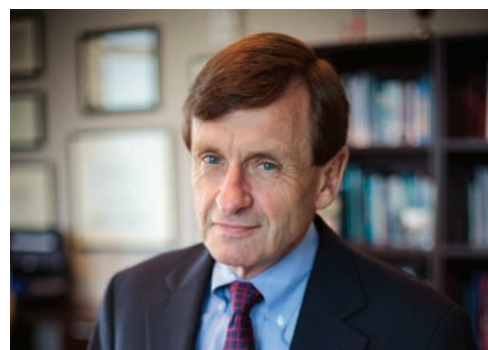
In the early days, AIDS was very common in gay communities in San Francisco, New York, and Atlanta. At Emory, physician Sumner Thompson fought to open the Ponce de Leon Clinic at Grady Memorial Hospital to serve the growing number of Georgians with HIV. Today, the 8,000 patients treated annually by Emory clinicians at the Ponce Center, Emory University Hospital Midtown, and the Atlanta Veterans Affairs Medical Center comprise one of the largest concentrations of HIV/AIDS patients in the country. Research at these clinical facilities is part of the Emory Center for AIDS Research (CFAR), formed more than a decade ago to coalesce pockets of strength in basic, translational, behavioral, and epidemiologic research.

Prevention is CFAR's central theme—health education, preventing transmission among adolescents and adults, developing and testing HIV vaccines, testing microbicides, and preventing and treating HIV and co-infections such as tuberculosis. Our work spans Atlanta, the Southeast, the United States, and Africa, Asia, and Eastern Europe. Currently, many studies are under way, including a phase 2 clinical trial for a leading

HIV vaccine candidate, which was 96% effective when tested in rhesus macaque monkeys.

In 2010, Emory's CFAR and the Global Vaccine HIV Enterprise hosted the international AIDS Vaccine Conference in Atlanta, and the mood among the 1,100 participants was upbeat. At the 2009 conference in Paris, researchers announced that a vaccine trial in Thailand yielded a 31% protection rate against HIV infection, the first positive result suggesting that research may produce a much needed and more effective vaccine. New discoveries presented in Atlanta showed that generating an immune response to neutralize different HIV strains might be feasible.

In the absence of a safe and affordable vaccine, prevention remains key. Each day, more than 7,000 people worldwide acquire HIV, totaling 2.7 million cases annually and including 56,000 cases in the United States.



James Curran served as director of the Division of HIV/AIDS at the CDC and was appointed assistant surgeon general of the United States. Dean of Emory's Rollins School of Public Health since 1995, he recently received the Ryan White Distinguished Leadership Award, recognizing significant national contributions to AIDS.

The rates of infection in sub-Saharan Africa continue to level off but remain at a very high rate. They are still rising in China and are a substantial problem in India, Eastern Europe, the Caribbean, and Latin America, where infection rates exceed available health resources.

In 2008, President Bush authorized five more years of funding for PEPFAR—the U.S.

President's Emergency Plan for AIDS Relief—to continue prevention, treatment, and health care training in more than 30 countries.

As more people receive treatment and live longer, additional funding will be needed to sustain them.

Last year, President Obama introduced the National HIV/AIDS Strategy to intensify efforts to reduce disease incidence and health disparities in this country. The plan calls for targeting specific high-risk populations, re-introducing conventional prevention methods such as condom distribution and needle-exchange programs, and greater outreach to HIV providers in rural settings.

Research shows that preventing HIV is our best line of defense. When condoms are used consistently and correctly, they can reduce transmission by nearly 100%. Men who are circumcised have a substantially reduced risk of acquiring and transmitting HIV. A female microbicide recently tested in Africa reduced HIV transmission in that study by 40%. In Rwanda and Zambia, Emory scientist Susan Allen and colleagues showed that a large portion of the total number of HIV infections in these countries are transmitted within discordant couples (one infected, one not), who most often are unaware of their HIV status. The researchers have begun counseling and testing programs that have greatly reduced this transmission.

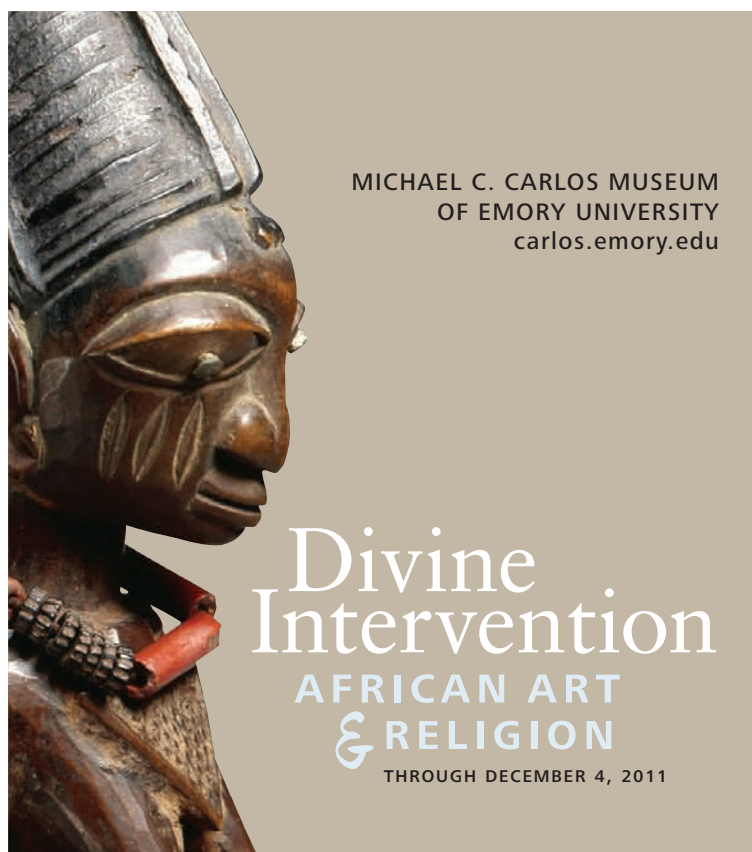
Today and 30 years from now, reducing HIV risk will pose some of the same challenges. Every year in the United States, more than 4 million people have sex for the first time. We must keep the conversation going about HIV/AIDS in homes, communities, and nations.

As one Emory public health researcher has said, "I don't know of any other disease in modern history that requires people to talk so openly about their sexuality. We've got to talk about it, no matter how difficult." ■

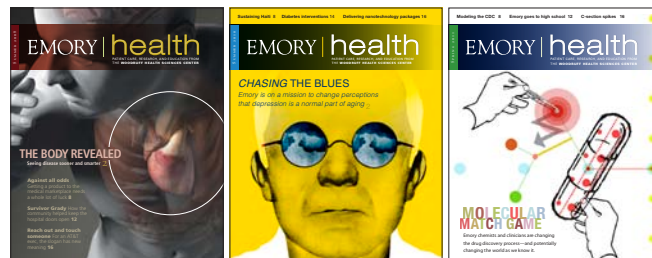
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Hammett is one of the 14 registered nurses who answer 16 phone lines at Emory Healthcare’s HealthConnection. A one-stop shop for patients and referring physicians, HealthConnection is available 7 a.m. to 7 p.m. each weekday. **What would you like to know?**

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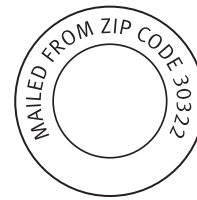
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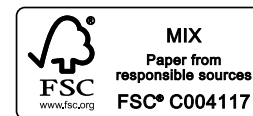
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Now Mansour is making an endless contribution to thoracic surgery at Emory: He and his wife, Cleo, have established the Kamal A. Mansour Professorship through a provision in their will.

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