Go Fish
Unlike a human heart, a zebrafish heart heals rapidly if injured and soon returns to nearly normal shape and pumping ability. What can we learn from regenerating fish hearts? A lot, it turns out.

Flu is Coming
Infectious disease experts have had plenty to worry about in the past several decades, including AIDS, SARS, Ebola, and Zika. But one disease scares them above all others: influenza.
Crash Into Me  30
Driver behavior, from speeding to distraction, causes most auto accidents. What can be done to reduce the risk? An Emory/Grady effort aims to find out.
Taming the “Hunger Nerve” 36
Interventional radiologist David Prologo believes freezing the nerve that sends hunger signals to the brain may help people lose weight.

Reducing Harm from Alarms 39
The cacophony of an ICU’s monitors isn’t good for anyone, from patients to staff. So this critical care team did something about it.

The Well 5

and more

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Eric Dunlap saw his beloved grandmother succumb to breast cancer and his mother survive it. But he never thought he was at risk.

Policy Wise 44
Antibiotic resistance may be the greatest medical challenge of our time, says David Weiss, of the Emory Antibiotic Resistance Center.

“Patients can wind up taking enormous amounts of medication and that can be a pretty dark road to follow.”
Emory senior Afam Maduka was part of a team that joined Emory ethnobotanist Cassandra Quave to collect plants at the Joseph W. Jones Ecological Research Center at Ichuaway. The plants will be tested for medicinal purposes. “It’s like being a kid again,” Maduka says. “You never know what you’re going to discover.”

Don’t miss the full story at emry.link/planhunters
What drives us? The desire to move forward.

Emory University investigators received $734 million ($686 million of this total was awarded to Woodruff Health Sciences Center researchers) in external research funding last year, an increase of 17 percent from the previous year.

This funding doesn’t sit dormant. It serves as a catalyst, producing lifesaving treatments and innovations and transforming the way we prevent, detect, and treat disease. The recently inaugurated “synergy awards” support cross-disciplinary projects among faculty at our schools of medicine, nursing, and public health, Yerkes National Primate Research Center, Emory College of Arts and Sciences, and more. Projects include developing biomarkers for neurodegenerative disorders (medicine/public health), improving imaging for stroke patients (medicine/Yerkes), and exploring how shiftwork impacts the microbiome (nursing/medicine).

This issue of Emory Health Digest highlights research as well, from Emory doctors at Grady investigating ways to make driving safer, to immunologists working on a universal flu vaccine, to a radiologist aiming to combat obesity by freezing the “hunger nerve.”

Some call it a research pipeline. I like to think of it as a research river, ever flowing, with untapped power and unlimited potential.

Be well,
Jon Lewin
evphafeedback@emory.edu
It’s important to build healthy habits and stick to them. Adhering to self-care routines can reduce stress, anxiety, and depression. Often, if you add or resume one healthy habit, it will trigger others. To that end, let’s look at sleep.

**Routines you can set a clock by**
External cues in the environment signal to your body that it is time to wake up or time to sleep. Are you a lark (an early riser) or an owl (a night person)? Consider this when building your sleep routine. A habit of going to sleep at the same time every night increases the chances you’ll be able to roll out of bed when the alarm goes off. Consistent sleep patterns influence daily secretion of cortisol and melatonin, which promote healthy levels of energy, alertness, and appetite. It’s best to have set sleeping and waking times even on the weekend, plus or minus an hour. If you need to, work your sleep time back in 15-minute intervals. Eight hours isn’t a magic number—go with what works for you.

**Creating a sleep sanctuary**
Make your bedroom a personal sanctuary. Aim for the right temperature, a comfortable mattress, pillows stuffed just right, a heavy blanket, and low or no light. An eye mask, ear plugs, and white noise machine may help.

**Winding down time**
Create a buffer zone between waking and sleeping. Take 45 minutes to an hour to give your mind and body permission to slow down. If you can’t turn your mind off, get your thoughts out by writing them down, telling them to someone, or recording them onto your phone. Use external cues like putting on pajamas, brushing teeth, listening to music, doing relaxation exercises, or reading. Once you’re in bed, take slow, diaphragmatic breaths for a few minutes; imagine the sights, sounds, and smells of a peaceful place all around you. The more you wind down in the same way, tucked in at the same time, the easier it will be for your body to fall asleep when you turn off the lights and close your eyes. EHD
Order in the OR: Gender matters

Researchers led by Emory primatologist Frans de Waal found that medical teams working in operating rooms (ORs) follow patterns of cooperation and conflict similar to those of non-human primates.

In the study, researchers observed and recorded all social interactions in three ORs during 200 surgical procedures.

Previous studies of behavior in health care teams have mostly relied on questionnaires rather than records of actual behavior.

Researchers found that:

- conflicts were directed mostly down the hierarchy between members several ranks apart
- cooperation and conflict in the OR varied by gender, with less cooperation when the OR team included more male members
- less conflict and more cooperation existed if the attending surgeon's gender (male or female) differed from that of the majority of the team.

“We used the techniques and concepts of evolutionary biology to understand how humans interact in the operating room,” says de Waal, director of the Living Links Center at Emory’s Yerkes National Primate Research Center. “Our findings show that the OR is a microcosm of typical primate social tendencies.”

Indeed, primates in general jostle for position more within their own gender group.

“Based on what we know about other species as well as human anthropology, rivalries and conflict are more typical within than between genders,” says Laura Jones, a postdoctoral research fellow with Living Links. “This is why higher-ups in the social hierarchy, such as the alpha individual, need to assert their status, especially vis-a-vis their own gender. This dynamic may explain our results.”

Researchers mainly looked at cooperation versus conflict. Cooperation was defined as affiliative behavior and team building, including chit-chat, exchanging pleasantries, two-way joking, and teaching. Conflict was defined as team-disintegrating behaviors, including yelling, being curt or disrespectful, and one-way joking.

The study was conducted between 2014 and 2016 at three large, urban teaching hospitals and included the participation of 400 different clinicians, including attending surgeons, surgical fellows or residents, anesthesia providers, circulating nurses, and surgical scrub personnel.
Political Clout

While Emory nursing instructor Jasmine Clark has been politically active for years, she is now an elected official, representing District 108 of the Georgia House of Representatives.

Clark has a PhD in microbiology from Emory and serves as an instructor at the Nell Hodgson Woodruff School of Nursing.

“I’m a foundation builder,” she says.

She served as director of the 2017 March for Science in Atlanta and continues to work with groups like the Georgia Alliance for Social Justice.

“I want to be a voice for the totality of Georgia,” she says. “I want to inject facts into our decision making.”

Clark teaches anatomy and physiology I and II and microbiology.

She joins two Emory colleagues in the Georgia legislature: State Representative Kim Schofield, who has represented District 60 since 2017 and is a lupus researcher with Emory rheumatologist Sam Lim; and State Senator Chuck Hufstetler, who has represented District 52 since 2012 and is an anesthetist at Redmond Regional Hospital in Rome, an adjunct professor at Emory School of Medicine, and an alumnus of the medical science in anesthesiology program at Emory’s School of Medicine. EHD

The Hazards of Hot Soup

Nearly one of every five burns that send children to emergency rooms are from instant soups and noodles. These microwavable, prepackaged products, say researchers, injure more than 9,500 kids between the ages of 4 and 12 each year.

“Scald burns are a major cause of preventable injury among children, and our research found that instant soup spills are responsible for a large number of these painful burns,” says Courtney Allen, a pediatric emergency fellow at Emory who led the research with colleagues. “It’s important for us and for parents to remember that these are just thin containers with boiling water in them.” The researchers examined National Electronic Injury Surveillance System data from 2006 to 2016 to identify pediatric patients whose scald burns were caused by either microwavable instant soup, instant noodles, cups of soup, or water for making instant soup. The peak age for instant soup spill injuries was 7, and the most commonly burned area of the body was the child’s torso (40 percent of the injuries.)

“Caregivers need to closely supervise younger children who might otherwise get hurt if cooking for themselves,” Allen says, adding that manufacturers could also make the containers more stable.
Spin Cycle

Hospitals produce a lot of dirty laundry—sheets, towels, gowns, and other linens that must be cleaned and replaced daily.

Emory Healthcare’s Laundry and Linen Services works around the clock to handle more than 600,000 pounds of laundry every month. Its team serves a dozen locations throughout the Emory Healthcare system.

Each day, soiled linens are collected and taken to Emory’s distribution center in Clarkston, where they are loaded onto large trucks and driven to Crothall Healthcare in Rome, Georgia, for washing, sanitizing, drying, and folding. The laundry is then returned to Clarkston for sorting and loading for delivery back to Emory. To minimize traffic delays and elevator use, most drivers arrive at around midnight, bringing fresh linens to stock the hospitals and clinics in preparation for a new day.

The service, which costs more than $5.5 million a year, is a crucial one.

“This is basically a 24/7 operation,” says director Jerry Lewis. “If you have delays on the distribution of carts, then patient care could be affected, so staying on a tight and consistent schedule is really important.”

Sindy Charles, assistant director, says turnover among their 29-member team is low. “Our staff members take a lot of pride in their jobs, with many of them staying with us until they reach retirement,” she says.

—Janet Christenbury
FOR MANY PATIENTS IT’S THEIR FIRST FLIGHT. IT’S ALSO THE MOST IMPORTANT.

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Medication Psychosis
Too many prescriptions can harm patients, especially the elderly

Mrs. Smith is diabetic and recently had a stroke. She also has issues with depression and needs psychiatric help. “She’s going to be on insulin and probably another glucose-control drug, at least one drug to control her heart rate, at least one drug to thin her blood, and maybe baby aspirin, too,” says Timothy Moore, chief of inpatient psychiatry at Emory University Hospital at Wesley Woods. “She’s already on five medications before she ever sees a psychiatrist, which makes things pretty complicated.”

While no two patients are the same, Moore’s example is typical of an elderly patient at risk for medication-induced psychosis. “We’re in an era of polypharmacy,” Moore says. “There’s a pill for every symptom. Patients can wind up taking enormous amounts of medication and that can be a pretty dark road to follow. It’s a very expensive way to treat people as well.”

“You need to apply some precision in what you’re doing so you’re not just ‘carpet bombing’ patients with pills.”
—Dr. Timothy Moore
These drugs—along with alcohol, over-the-counter medications, and dietary and herbal supplements—can interact in unexpected ways and in some instances produce severe psychological problems, including hallucinations, aggressive behavior, delusions, memory loss, and catatonia. “The most common medication-induced psychosis we see is caused by amphetamines, followed by steroids, which are well-known for producing psychotic symptoms,” he says. “These patients are in pretty rough shape. They usually look profoundly confused. They don’t know where they are, and sometimes they hear voices.”

Elderly patients are particularly vulnerable to medication-induced psychosis for several reasons. These include:

- Older people don’t tolerate a large number of pills as well as younger people.
- Nevertheless, they usually take more prescribed medications because they get sick more frequently and may have chronic illnesses that require daily medications.
- They tend to see a number of specialists, each of whom writes prescriptions addressing their area of expertise.

Health care providers in the same system can prevent some adverse drug interactions by communicating through “medication reconciliations” at hospitals. Such reconciliations involve making a list of all medications a patient is taking—including drug name, dosage, frequency, and route—and comparing it with the physician’s admission, transfer, and discharge orders. Sometimes, however, medications are left off the list or not all negative drug interactions are known.

Wesley Woods, an adult and geriatric psychiatric facility on the Emory campus, provides inpatient and outpatient services through an interdisciplinary team of physicians, nurses, social workers, and counselors. Among the conditions they address is medication-induced psychosis.

Moore’s objective is to treat patients’ psychological problems with a minimum number of antipsychotic drugs and with consideration of other medications they may be taking. It’s a complicated dynamic that takes into account any underlying pre-existing mental illness, and if prescribed medication is being taken properly and in the correct dosage. Also, some drugs lose their effectiveness over time as the patient gets older.

“Very few psychological conditions call for more than three medications,” says Moore. Depending on the person’s situation, he may start them on a few different antipsychotic drugs and then adjust them one by one over three to six months until he finds the long-term treatment that provides the greatest benefit and the least side effects.

Patients are assessed during this time through one of two intensive outpatient programs. In one, the patient sees a psychiatrist and therapist for four to six hours a day, three days a week.

Another program, intended primarily for the elderly, meets for about four hours, five mornings a week.

Wesley Woods provides inpatient services in situations where major changes are necessary. “Generally, people don’t like being in a hospital, so we try to minimize the amount of time they’re here—the hospital stays average between seven and 11 days,” Moore says.

Inpatient care gives doctors space to make changes and start to simplify treatment. “You can very quickly stop medications entirely as you look for the minimum effective treatment that you need,” Moore says. “You don’t have to worry about bad outcomes because patients are under close supervision in a safe, secure, controlled environment. You don’t have to worry about grandpa being off his medication and going out for a drive or giving the neighbor a piece of his mind. The worst that can happen is the nurses call you at night and say grandpa is getting out of hand.”

People have high expectations for medications, says Moore, but there is not a pill for everything. “For example, we have effective treatments for depression, but there’s not a lot we can do about dementia,” he says. “Even if you can’t completely eliminate every symptom, you hope to keep the patient’s overall mental health from getting worse by cautiously prescribing the minimum of necessary medications.”—Gary Goettling
Heart Disease Disparity

Heart disease remains a frequent killer. Of every four deaths in the United States, one is from heart disease. And blacks die of heart disease at a much higher rate than whites.

Although heart disease death rates fell steeply from 1968 to 2015, decreasing by 68 percent, the benefits were experienced by whites more than blacks, resulting in increased disparities.

Rollins School of Public Health researchers Miriam Van Dyke, a doctoral student in epidemiology, and Michael Kramer, associate professor of epidemiology, worked on a team that analyzed data from the National Vital Statistics System. The team found that heart disease death rates for blacks and whites were similar at the start of the study period but began to diverge in the late 1970s, when rates for blacks plateaued while rates for whites continued to decrease. The largest increases in disparities occurred in the 1970s and 1980s.

Although not as large, disparities remain today: heart disease death rates are 21 percent higher among blacks than whites. The researchers urge the use not only of evidence-based strategies and standard treatment protocols but also culturally relevant tools to promote heart-healthy living.
Just Say No to Mosquitoes

If you are visiting a country where the climate is wet and warm, you are likely to be bitten by a mosquito. If you’re lucky, your only discomfort will be an itchy welt. And if you’re not?

Well, consider that just one species of mosquito—the Aedes—can carry chikungunya, dengue fever, lymphatic filariasis, Rift Valley fever, yellow fever, and Zika.

In all, there are about 3,500 mosquito species, many of which carry disease. Travelers should always protect themselves from these tiny vectors.

Consider malaria and yellow fever. Although both diseases were eliminated from the United States in the 20th century, they still affect millions of people worldwide. The 2018 edition of the CDC Yellow Book, which provides health information for international travel, devotes more than 50 pages to travel information about malaria and yellow fever in 247 countries, islands, and territories.

Malaria occurs in Africa, Asia, parts of the Caribbean, Eastern Europe, and the South Pacific. Yellow fever is also widespread, occurring primarily in Africa, South America, and parts of Central America. Many countries require proof of yellow fever vaccination as a condition of entry.

The risk for these diseases varies from person to person and country to country, as well as by type of activity, says Jesse Waggoner, a physician with Emory TravelWell Center.

“Your risk is much lower if you’re going to a city and staying in a hotel with air-conditioning,” says Waggoner. “If you’re going to a rural area or planning to spend a lot of time outdoors, you’ll need to be more mindful of mosquitoes.”

Prevention also varies by disease. Malaria can be thwarted by taking a pill once a day or once a week, before and after a trip. Vaccines are available for yellow fever and Japanese encephalitis, a disease endemic to Asia.

Currently, no vaccines or medicines are available for dengue fever, chikungunya, West Nile, or Zika virus. In 2016, Zika occurred at an unusually high rate in Brazil, where children born to infected mothers had a greater number of birth defects. The Zika virus infection rate has since decreased in Brazil, which scientists attribute to greater immune resistance, also known as herd immunity, in the population.

For now, the best prevention for these diseases is mosquito avoidance. And should you become ill with a high fever, headache, body aches, and nausea while traveling, don’t put off seeking medical attention. “If you have a fever that’s out of the ordinary for you, don’t wait for it to come down. That can get you into trouble,” Waggoner advises. “Get to someplace where you can be evaluated. If you’re not sure where to go, contact us at TravelWell. We can recommend good medical facilities in major cities. Depending on how you are doing, you may be able to come home.”

When planning overseas travel, allow a month or more to get vaccines or medicine. To learn more, call Emory TravelWell Center, Emory University Hospital Midtown, 404-686-5885. —Pam Auchmutey

Tips for Mosquito Avoidance

- Mosquitoes bite any time of day. Wear long sleeves and pants. When possible, stay in places with air-conditioning.
- Keep windows closed.
- Even with window screens, mosquitoes can find a way in. Sleep under a bed net treated with insecticide.
- Use an insect repellent with a 20 percent to 40 percent concentration of DEET. Apply on top of sunscreen, after waiting 15 minutes. Reapply after swimming. Combination sunscreen/repellants are less effective.
- Wear clothes treated with permethrin. You can buy pre-treated clothes, spray it on your clothes, or wash your clothes in it. A treatment lasts for six washes.
- Remove or empty standing water around dwellings.
Help for Kids with Peanut Allergies

Two in 100 children are allergic to peanuts. Some have so severe an allergy, they could become acutely ill by a kiss from someone who just ate a peanut butter sandwich or a sugar cookie made in a plant that also processes peanut products.

While deaths from peanut allergies are still rare, peanuts are thought to cause anaphylactic shock more often than any other food allergen.

A treatment is in clinical trials that may reduce children’s sensitivity to peanut allergens. The process involves gradually exposing the child to increasing amounts of peanut protein under medical supervision. (Doctors emphasize that parents should not try this at home.)

The trial was led by Brian Vickery, associate professor of pulmonology, allergy, and immunology at Emory School of Medicine and director of the Children’s Healthcare of Atlanta Food Allergy Program.

After six months of treatment, followed by six months of maintenance therapy, two-thirds of children were able to ingest the equivalent of two peanuts without developing allergic symptoms. The children must continue to eat a small amount of peanut every day to maintain their tolerance. The idea of oral immunotherapy dates back to 1908, when a British doctor first reported desensitizing a child with an egg allergy by giving him small amounts of egg to eat over time.

“You exchange that uncertain, unpredictable risk of having an accidental reaction that spirals out of control for these sort of lower level, mostly mild or moderate symptoms that are manageable for most patients,” says Vickery, of Emory + Children’s Pediatric Institute.

4Q Scrubbing Veggies

HOW SHOULD YOU WASH PRODUCE?
For delicate produce, rinse under water to preserve the integrity of the fruit or vegetable. For firmer produce, such as apples, cucumber, and melons, scrub the surface under running water with a clean brush and then do a final rinse. Commercial fruit and vegetable washes are mostly water and haven’t been shown to be more effective than water alone.

SHOULD YOU TAKE EXTRA CARE WITH SOME PRODUCE?
Rough surfaces like to capture pathogens. Use a produce brush to scrub fruits and vegetables and then clean the brush in the dishwasher. Certain foods—sprouts, herbs like parsley and cilantro, berries, and cantaloupe melons—are more at risk for becoming contaminated with pathogens like viruses, bacteria, and parasites. Scrub the outside of a cantaloupe before cutting into it with a knife. Also, produce that is eaten raw presents an increased risk—cooking produce lowers the risk.

WHAT OTHER PRECAUTIONS SHOULD YOU TAKE WHEN PREPARING FOOD?
Use common sense: Wash hands before handling produce. Don’t hold a baby while preparing food. Don’t handle meat and produce in the same spot or with the same equipment.

WHICH IS SAFER, EATING OUT OR EATING AT HOME?
Eating at home can lower your risk. When you eat in is when you have the most control. When you eat out you lose control not only of the produce being used but all the other steps of people handling and cooking for you, the water, the cleanliness. There are a lot more things that can go wrong.—Martha McKenzie
Pay it Forward
For the love of a child, four strangers were saved

Jamie McNeil's twin granddaughters, Adele and Aubrey, were born two years ago. Adele, known as “Delly,” was soon diagnosed with multicystic kidney disease.

McNeil, a nurse, began researching how she could best help Delly. She found her answer through the Emory Transplant Center and the National Kidney Registry's donor voucher program.

The voucher program creates a safety net for Delly, while also starting a chain of kidney transplants that involved eight patients—four of them recipients—across the United States. McNeil was Emory's first participant in the voucher donor program.

“My mom's selfless decision to donate her kidney to a stranger makes her a true hero,” says Meghann Adams, Aubrey and Adele's mother. "I can't wait until Delly is old enough to truly understand the sacrifice her grandma has made for her."

Voucher recipients like Adele receive a “virtual voucher” for a living donor kidney to redeem when and if they need it, and they are registered on the national registry's inactive list, often for many years. The national registry's voucher program site gave McNeil the chance to help Adele as well as a stranger waiting for a match on the paired kidney donor exchange list.

The paired-donor exchange program is available for recipients who do not have a donor match, but who have a donor willing to match with someone else so their loved one can receive a kidney.

“The day I donated my kidney was one of the most significant days of my life,” said McNeil, who had her surgery in September. “It was one of the best feelings in the world to be able to give the gift of a kidney donation to someone.”

With more than 100,000 people waiting for a kidney on the deceased-donor list, living kidney donor programs are making a huge difference. Emory's kidney transplant program has performed more than 1,300 living donor transplants to date.

"Jamie is our first patient who has come forward to be a voucher donor," says Nicole Turgeon, professor of surgery in the division of transplantation at Emory. "She immediately let us know that this was for her granddaughter, Adele, who does not need a kidney at this time but may in the future. Now Adele will have the opportunity to get a living-donor kidney later in life if she needs one, as a result of Jamie's good will.”—Janet Christenbury

To learn more about kidney transplant and Emory's Living Donor Kidney Program, visit emoryhealthcare.org/kidneytransplant or call 855-366-7989.
Regenerating Fish Hearts

After a heart attack, cardiac muscle cells die because they are deprived of blood and oxygen. In an adult human, those cells represent a dead end.

In adult fish, however, the heart can regenerate. Why can’t the human heart be more fishy?

At Emory, researcher Jinhu Wang is seeking answers that could guide the development of regenerative therapies.

“If we want to understand cardiac regeneration in mammals, we can look at it from the viewpoint of the fish,” he says.

After an injury, zebrafish heart cells “go back in time” and multiply, although their capacity to regenerate may vary with the age of the animal, Wang says.

Zebrafish hearts are simpler than mammals’ hearts: they have just two chambers, while humans have four.

Previous research by Wang and colleagues at Duke University showed that zebrafish can recover from having half of their heart muscle cut out.

Wang also developed a way to chemically cause a heart attack in fish. After an induced heart attack, the fish are sluggish and appear to gasp. A month later, they have recovered.

More recently, Wang has developed a system for culturing zebrafish hearts outside the body. He is investigating the regeneration of coronary blood vessels, and his lab is making fish with fluorescent hearts through the use of gene editing technology CRISPR/Cas9. The fluorescence allows researchers to work more efficiently, checking fish eggs for proper gene editing over just a few days.

In his earlier work on zebrafish, Wang demonstrated the importance of the epicardium, the heart’s outer layer. If the epicardium is destroyed, the ability of the cardiac muscle to regenerate is impaired. The zebrafish epicardium displays an amazing ability to regenerate, coming back after 90 percent loss in just two weeks.

Overall, zebrafish are a helpful genetic model in developmental biology, since their embryos are transparent, making it easy to spot abnormalities. Also, zebrafish are cheaper than mice, and are small and hardy.

They make up a biological system that can be easily manipulated genetically, says Wang’s colleague Ahsan Husain. Other scientists at Emory working with zebrafish include Andreas Fritz and Iain Shepherd in the Department of Biology, who are using them to study embryonic and nervous system development.—Quinn Eastman

To learn about ways to support this and other types of cardiology research, please contact Jason Zwang at (404) 727-2512 or Jason.zwang@emory.edu.
“Exercise isn’t really important for weight loss” has become a popular sentiment in the weight-loss community. “It’s all about diet,” many say. “Don’t worry about exercise so much.”

This idea crept out amid infinite theories about dieting and weight loss, and it quickly gained popularity, with one article alone citing 60 studies to support and spread this notion like wildfire.

The truth is that you absolutely can—and should—exercise your way to weight loss. So why is anyone saying otherwise?

For 10 years, I have been studying the epidemic of failed weight-loss efforts and researching the phenomenon of hundreds of millions of people embarking on weight-loss attempts, then quitting. Meanwhile, exercise remains the most common practice among nationally tracked persons who are able to maintain weight loss over time. Ninety percent of people who lose significant weight and keep it off exercise at least one hour every day, on average.

There are a few reasons exercise for weight loss gets a bad rap.

First, people are looking, in large part, for a quick fix, and the diet and weight-loss industry exploits this consumer desire for an immediate solution. Many studies have shown that exercise changes your body’s composition, improves your resting metabolism, and alters your food preferences. These plain, simple facts have stood the test of time but go largely unnoticed compared with most sensationalized diet products. Change through exercise over time is a much tougher sell than a five-day “cleanse.” Moreover, many people consider one hour a day for exercise to be unreasonable or undoable and find themselves looking elsewhere for an easier fix.

Second, doctors and nutritionists have done a poor job of explaining the link between exercise and dietary habits, perhaps because they often exist as separate camps. Exercise directly changes our dietary habits, which means we actually have an easier time making healthier choices when engaged in
exercise over time. Without exercise, abrupt changes in dietary habits, especially if they result in calorie restrictions, are very difficult for dieters to sustain. In addition, the longer we make those healthy choices, the more likely they will become habit.

For example, when a 42-year-old female who is 5-foot-4 and weighs 240 pounds decides to lose weight on her own, she is likely to struggle with abruptly switching her food choices to vegetables and broiled fish, mostly because she will feel overwhelming hunger pangs (as well as other reasons, such as fatigue, soreness, depression, and irritability). If we take that same person and increase her exercise capacity to a critical point, however, those choices become much easier to endure.

Third, there is the factor of limited capacity. Exercise originally got “demoted” following a series of studies that enrolled overweight or obese folks looking to lose weight who had limited ability to exercise. Asking someone with limited ability to use exercise to lose weight is like telling someone to empty a pool full of water with a plastic cup. It cannot be accomplished in any reasonable amount of time.

So, when you measure how much weight they can “burn off” over time, the answer is not much, because most sedentary patients can burn 500 or fewer calories a week. As a result, the shaky conclusion that exercise was less important for weight loss emerged and was quickly sensationalized.

What is missing from this logic is that people can change exercise capacity. As exercise capacity goes up for an otherwise sedentary person and approaches that of a lean person, the ability to lose weight with exercise dramatically changes.

It’s like giving the participant in our pool-emptying example a bucket, or even a hose. The ability to jog for 30 minutes uninterrupted, or ride a bicycle for 60 minutes, is what separates so many would-be dieters from their lean counterparts and accounts for most tried and failed weight-loss attempts. Moreover, once a person achieves a critical point of exercise capacity, the experience of exercise itself becomes more pleasant, even fun.

So, can you exercise your way to weight loss? Absolutely.

Of course, abrupt calorie restrictions will result in weight loss for the short run, but it is extremely difficult for folks to maintain that restriction for significant lengths of time. Most end up quitting and regaining lost weight.

Exercise, however, is a tried-and-true way to make dietary changes more tolerable.

Focusing on exercise and changing exercise capacity makes it easier to ultimately make better food choices and enjoy clean living, which means significant weight loss that can be maintained over time.

This essay was originally published at theconversation.com and is shared through creative.commons.
Infectious disease experts have had plenty to worry about in the past several decades, including HIV/AIDS, SARS, Ebola, and Zika. But one disease scares them above all others— influenza. That’s right, the flu. Even though many people dismiss and misunderstand it, calling everything from a cold to a stomach bug “the flu,” influenza claims between 12,000 and 56,000 lives in the U.S. every year. And that’s in a normal flu season.
Every so often, a flu pandemic emerges. That’s when a new strain appears that is so different from what has circulated before that people have no immunity to it. A hundred years ago, the 1918 H1N1 pandemic swept the globe, infecting about a third of the world’s population and killing 50 million to 100 million people. Since then, there have been three more flu pandemics, in 1957, 1968, and 2009.

The next pandemic, say experts, is a question of when, not if. Are we ready? “We’ve come a long way, but we are still vulnerable,” says Ruth Berkelman, emeritus director of the Center for Public Health Preparedness and Research at the Rollins School of Public Health. “Influenza spreads quickly. It mutates quickly. And it’s persistent in the environment. It’s one of the biggest catastrophic threats we face.”

But we have vaccines to help prevent infection, antivirals to cut a bout of flu short, and antibiotics to combat the bacterial infections that often arise after the flu. We’re safer now than ever before, right?

Not really. Influenza is a wily adversary. It hides in its host for a day or so before making its presence known, so the infected person can unknowingly spread the germ to countless others just by going about daily routines of school or work, grocery shopping, or working out at the gym. The virus is contagious, spread largely by droplets produced when those infected sneeze, cough, or talk. Flu germs can leap to other people up to six feet away and linger on hard surfaces for 24 hours.

And, most worrisome, the virus constantly morphs and changes to outwit vaccines. “You can do a lot to get ready, but at the end of the day, the flu seems to find a way around everything you’ve done,” says Lynnette Brammer, who leads the CDC’s domestic influenza surveillance team.

‘a mind of its own’
Brammer has a Game of Thrones-inspired sign in her office that reads, “Flu is Coming.”

“It’s almost like influenza has a mind of
**Pregnancy and flu**

Influenza is particularly dangerous for pregnant women, causing complications like pneumonia or even death. Flu can also lead to preterm delivery and stillbirth. Doctors suggest that pregnant women get the inactivated flu shot rather than the nasal vaccine, which is made from a weakened live flu virus. “We have very good evidence that flu vaccines are safe for pregnant women,” says **Saad Omer**, professor at the Rollins School of Public Health. “The vaccines not only protect the mother, there is strong evidence to suggest they protect the babies in their first four months of life, before they are able to be vaccinated.”

For more, visit MomVax.org.

its own,” she says. “It’s wildly unpredictable.”

Consider the 2009 pandemic. Flu watchers had been convinced the next pandemic would come from an avian influenza strain out of Asia. But it actually came from a strain that circulated among swine, H1N1 (a variant of the strain responsible for the 1918 pandemic), and emerged from Mexico.

The outbreak began in April, when flu is not typically circulating in the Northern Hemisphere.

“It started in such a strange location and at such a strange time of year, taking everyone by surprise,” says **Allison Chamberlain**, acting director of the Center for Public Health Preparedness and Research and research assistant professor of epidemiology at Rollins. “It just underscores how hard it is to stay ahead of the flu.”

That fall, Emory’s Office of Critical Event Preparedness and Response (CEPAR), directed by emergency medicine physician **Alex Isaakov**, coordinated a university-wide response to the outbreak. CEPAR, in collaboration with Emory faculty and other partners, developed the Strategy for Off-Site Rapid Triage (SORT), an assessment of illness severity and risk factors that would determine the most appropriate place for people to recover. This might be home, for convalescence, or a clinic/ER, for further evaluation and care.

Emory students who had confirmed or suspected swine flu had the option of staying on campus and being housed in a voluntary “quarantine dorm.”

“The residents of Turman South receive free meals, do not attend class, and travel to the pharmacy in a van they call the Flying Pig,” wrote Emory College journalism alumnus Robbie Brown, who covered the event for *The New York Times* in September 2009. “Linens are changed daily. A staff member brings grocery bags of Tamiflu, granola, sports drinks, soup and thermometers. The goal is preventing the infected from sniffling and
The pandemic that would become the deadliest disease outbreak in history started mildly. The first wave hit in spring 1918, causing the usual chills and fevers. The second wave was different. The H1N1 strain that crashed over the world in the fall of that year was the stuff of disaster movies. Many victims were young, healthy adults, who often died within hours or days of developing horrifying symptoms—their skin turned blue, they coughed up blood, their lungs filled with fluid that caused them to suffocate. “You could be well at breakfast, sick at lunch, and dead by dinner,” said Robert Gaynes, an Emory professor and infectious disease doctor who spoke at a recent Rollins/CDC flu pandemic conference.

With no vaccines or antivirals, the disease quickly spread, helped by the movement of troops in World War I. It came to be known as the Spanish flu not because it originated in Spain but because the Spanish press covered it widely. News outlets in countries that were embroiled in the Great War downplayed the outbreak for fear it would hurt morale. “The Surgeon General said there was no cause for alarm. Media and government officials all said no big deal,” said John Barry, author of *The Great Influenza: The Story of the Deadliest Pandemic in History*, who also spoke at the Emory flu conference. But people knew they were being lied to because they saw the flu strike down co-workers, neighbors, and family. In the absence of truthful information, hysteria ensued. Communities imposed quarantines, ordered citizens to wear masks, and closed public gathering spots. Schools and businesses shut down. Towns ran out of coffins.

The Spanish flu’s lethality stemmed from an unusual feature. The 1918 H1N1 strain not only bound to the upper respiratory track, like most flus, but also penetrated deep into the lungs, damaging tissue and often resulting in a deadly viral and bacterial pneumonia.

The H1N1 strain responsible for the devastation has not gone away but, fortunately, it evolved into a much milder seasonal flu. EHD

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**PANDEMIC TIMELINE**

<table>
<thead>
<tr>
<th>Year</th>
<th>Strain</th>
<th>Mortality</th>
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</thead>
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<tr>
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<td>H1N1</td>
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</tr>
<tr>
<td>1957-1958</td>
<td>H2N2</td>
<td>1.5 - 2 million</td>
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<tr>
<td>1968-1969</td>
<td>H3N2</td>
<td>1 million</td>
</tr>
<tr>
<td>2009</td>
<td>H1N1</td>
<td>284,000*</td>
</tr>
</tbody>
</table>

*CDC estimate

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By the time the 1918 flu pandemic ended, 50 million to 100 million people had died in 15 months.
hacking their way into an epidemic.” More than 100 students passed through the dorm. A typical stay lasted three days, with students checking out after going 24 hours without a fever or medication.

**guarding against a shape shifter**
Influenza’s propensity to shape-shift makes formulating vaccines something of a guessing game.

In February, the U.S. Food and Drug Administration, with recommendations from the World Health Organization, decides which three or four strains to include in the U.S. vaccine for the next flu season, based on which ones have been circulating to that point. But in the six or more months it takes to produce and distribute a new vaccine, the virus may have morphed into a strain different enough from the original that the vaccine is ineffective.

That’s exactly what happened last year, according to Marshall Lyon, an infectious disease physician and a team member of Emory’s Serious Communicable Diseases Unit (SCDU). The federal government has called upon SCDU to care for more patients with special pathogens than any other health care institution in the United States.

Emory has leveraged this expertise to conduct research, validate clinical practice and technology, translate discoveries into training and education programs for health care providers and ultimately improve patient care outcomes and worker safety in the event of pandemic flu or other infectious disease outbreaks.

A main focus of Emory’s research is creating a more effective vaccine. Flu vaccines are only 40 percent to 60 percent effective in the best years. Compounding the problem, less than half of Americans get their annual flu shot, and vaccination rates are far less than that in developing countries.

“If I get myself vaccinated but everyone else around me skips the vaccine, I am more at risk,” says Walter Orenstein, director of the...

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**Protect Your Child**

During a bad flu season, about 20,000 children under 5 are hospitalized and about 100 die. Emory infectious disease physician **Marshall Lyon** offers these tips:

1. Vaccinate early. Flu shots are approved by age 6 months and nasal spray at 2 years.

2. Encourage everyone around your child to get the flu vaccine.

3. Discourage children from touching their eyes, nose, mouth.

4. Ask your child to cough or sneeze into a tissue or their sleeve.

5. Encourage frequent hand washing. Alcohol-based hand cleansers also are very effective at killing influenza virus.

6. Don’t allow sharing of cups or utensils.

7. Seek medical attention immediately if your child develops flu symptoms.

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*Walter Orenstein* and **Marshall Lyon** are part of the Emory Program on Vaccine Policy and Development, oversees labs that are working to identify factors that make flu strains more virulent.
Emory Program on Vaccine Policy and Development. “That’s because the general herd immunity threshold for influenza is thought to be 50 percent.” That means if at least half of the population is immune, influenza can’t get enough of a foothold to cause a pandemic. So if a vaccine is 60 percent effective, 85 percent of the population would need to get vaccinated to achieve that herd immunity threshold.

Last year’s flu season was the deadliest in 40 years, killing an estimated 80,000 Americans, including 180 children. The severity of the epidemic highlighted other shortcomings. Demand for hospital beds and services quickly outstripped supply. Atlanta’s Grady Memorial Hospital converted waiting rooms into inpatient units, rented “mobile ERs” for the parking lot, and asked staff to work overtime. “If you are depending on hospitals to have extra capacity if major disaster hits, you need to rethink your plans,” says Jeffrey Lennox, an Emory professor of medicine and chief of infectious disease at Grady.

**working toward a universal vaccine**

The best defense against a pandemic would be a universal vaccine—a vaccine effective against all strains of the flu that would last many years, if not a lifetime. Researchers say such a vaccine is still years away, but important work is being done at Emory, which partners with the University of Georgia as one of five Centers of Excellence for Influenza Research and Surveillance (CEIRS). These centers are responsible for pandemic planning for the U.S. government.

The two main types of influenza virus that infect humans are A and B. Both are associated with seasonal epidemics, but only type A viruses have caused pandemics. Influenza A viruses are further broken down according to two surface

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Flu Shot Facts

- The flu shot cannot give you the flu.
- Flu shots are recommended for ages 6 months and older.
- The flu mist is considered safe for ages 2 years and older.
- Getting a flu shot every year protects others who can’t.
- If, even after getting the vaccine, you develop flu symptoms, go to the doctor immediately. Antivirals are most effective within 24 hours of noticing symptoms.
proteins—hemagglutinin (HA) and neuraminidase (NA). These proteins on the cell's surface are like fingerprints, unique to that virus. Small mutations in either of these proteins result in a new subtype, which is why flu vaccines have to be updated annually. A bigger mutation could result in a strain that humans haven't encountered before, so they lack any immunity to it. And that could lead to a pandemic.

The HA molecule—the most predominant—is shaped something like a tree, with a large head and a smaller stem or stalk. The head binds the virus to cells and is the part that changes from year to year. Influenza vaccines usually target the head of the HA. But Rafi Ahmed, director of the Emory Vaccine Center, is working to develop a vaccine that targets the stalk. Since the stalk does not tend to change from strain to strain, this would work for many, if not all, strains of influenza A. Ahmed and his team started down this road after the 2009 pandemic, when they made the surprising discovery that people infected with the H1N1 strain produced antibodies that attacked the stalk region, not the head. That opened the door to developing vaccines that do the same thing.

“We've been able to identify many antibodies that bind to the stem region and also to some conserved areas of the head,” says Ahmed. “We are collaborating with Mount Sinai to develop a vaccine, but we are still in the early days.”

Ahmed's lab also is looking at what could be done to make the vaccine long-lasting, be it adding another compound, altering the design, or using a different delivery method.

In another Emory lab, Ioanna Skountzou, associate professor of microbiology and immunology, is taking a novel approach to vaccine development by using a method that doesn't rely on growing the virus in eggs.

Flu 101

Two main types of influenza virus infect humans, A and B. Both are associated with seasonal epidemics, but only type A viruses have caused pandemics. Influenza A viruses are further broken down according to two surface proteins, hemagglutinin (HA) and neuraminidase (NA). There are 18 different HA subtypes and 11 NA subtypes, and they combine to cause different strains—H1N1, H3N2, etc. Small mutations in either of these proteins result in a new subtype, which is why flu vaccines have to be updated annually. A bigger mutation could result in a pandemic.
virus-like particles (VLPs). VLPs are man-made decoys of natural viruses that are not infectious, making them safer to produce and less likely to cause side effects. Skountzou’s lab has produced VLPs that express NAs on their surface and has begun testing them in mice with promising results. The next step will be to administer the vaccine(s) into the skin using microneedle patches in collaboration with Texas Tech.

monitoring birds and pigs
Experts agree that a universal vaccine is still some distance away, so Emory researchers are preparing for an influenza pandemic without one. This involves monitoring flu strains that are circulating and looking for new ones, particularly in birds and pigs, where pandemic strains tend to emerge. Emory partners with Harbin Veterinary Research Institute to monitor live bird markets and bird and swine farms in southeastern China. The work is labor-intensive, time-consuming, and expensive and involves sending people into the field to collect samples, which are brought back to the lab to analyze. “Surveillance is like an insurance policy,” says Orenstein. “It’s a hard thing to sell and it’s often the first thing cut when budgets get tight. But it’s essential to catch a pandemic strain as early as possible so a vaccine can be produced and distributed.”

Several Emory labs are trying to identify the factors that make an influenza strain more virulent—better able to jump from birds or pigs to humans and to pass easily from human to human. Researchers can then watch for these characteristics in circulating strains, getting a jump on identifying a new potential pandemic. Flu watchers are particularly concerned about a bird flu strain that has been circulating for years in China. The highly pathogenic H7N9 strain has evolved to be able to jump from birds to humans—typically on poultry farms or in live bird markets—and it kills about 40 percent of the people it infects. So far, it can’t spread from person to person, but if it were to gain that ability it would pose a serious threat.

Emory’s Hope Clinic and Emory-Children’s Center are testing H7N9 vaccines based on the strain that circulated in China last year. They already had tested an H7N9 vaccine based on the first wave of strains found, but strains from the fifth wave, which circulated last year, are not neutralized by the previous vaccines. So they are back to the drawing board to develop a vaccine that can tackle the latest strain.

The center is recruiting volunteers to test this vaccine. (Anyone who would like to participate should call 404-712-1371.) “If this vaccine proves effective against the fifth wave of H7N9, the goal would be to start stockpiling it in preparation for a possible pandemic,” says Nadine Rouphael, interim director of Emory’s Hope Clinic. The threat is ever present, say experts. “Starting in 2001, we had 9/11, then anthrax, then West Nile, then SARS,” says Julie Gerberding, former director of the CDC. “That set the stage for a period of investment in public health that was unprecedented. I feel really sad looking at what has happened since: 50,000 public health jobs lost, budgets declining. Preparedness has to be a sustainable function—it can’t be year to year, crisis to crisis.”

To support the work of the Emory Vaccine Center, contact Jonathan Russell, 404.727.6416, jonathan.russell@emory.edu, or visit vaccines.emory.edu.
Flu: A Formidable Foe

Infectious disease experts gathered at Emory for a Rollins School of Public Health/CDC conference on pandemic preparedness on the 100th anniversary of the 1918 pandemic. Here’s what they had to say.

“I’ve come to believe influenza is the most formidable and challenging virus we see in the world. There is nothing that scares me more than influenza.”

James Curran, Dean, Rollins School of Public Health

“Pandemic flu is our No. 1 health security threat. Closing borders does not work.”

Luciana Borio, director for Medical and Biodefense Preparedness Policy at the National Security Council

“There is a saying, ‘If you’ve seen one pandemic, you’ve seen one pandemic.’ I know less about influenza today than I did 10 years ago.”

Michael Osterholm, director of the Center for Infectious Disease Research and Policy at the University of Minnesota

“The status quo is not acceptable.”

Luciana Borio
“The vast majority of critical medical supplies we need are not made here. We don’t understand how dependent our health care infrastructure is on foreign activities.”

Michael Osterholm

“Federal funding for emergency preparedness is about 30 percent lower than in 2003 and funding for hospital preparedness is about 50 percent lower, which means there is less capacity in the event of pandemic.”

John Auerback, president and CEO of Trust for America’s Health

“Without a universal flu vaccine, we can only chase the virus and try to predict it.”

Florian Krammer, associate professor at the Icahn School of Medicine at Mount Sinai

“You don’t manage the truth, you tell the truth. That idea is incorporated in every preparedness plan I know of, but it still has to be executed.”

John Barry, author of The Great Influenza: The Story of the Deadliest Pandemic in History
Driver behavior—from speeding to
distraction—causes most auto accidents. What can be done to reduce the risk?

Until self-driving cars become the norm, human error will remain the primary cause of motor vehicle accidents. The most fatal mistakes when behind the wheel include driving too fast, driving under the influence, tailgating, and distracted driving. Eating in the car (read: spilled food) used to be the No. 1 cause of drivers taking their eyes off the road, but errant French fries and dripping milkshakes have been replaced by cell phone talking, texting, and tapping.
What might seem like a quick glance at a message or typing in a phone number can have dire consequences for the driver and anyone they hit.

Consider these recent accidents:

Last spring, a seven-month-old boy in southwest Atlanta ended up in intensive care with every bone in his neck broken after a driver, who was on his cell phone, collided with a car driven by the baby’s mother. Although the child survived, he has lifelong disabilities from the crash.

In May, an 18-year-old driver was charged in a crash that killed three pedestrians, including a three-month-old infant, as the group was crossing a street in Woodstock. The driver was putting away her phone when the collision happened.

Injuries from motor vehicle accidents are the No. 1 trauma seen at Atlanta’s Grady Memorial Hospital, resulting in thousands of crash victims each year.

**A PREVENTABLE EPIDEMIC**

On average, drivers report being distracted more than half the duration of a car trip—and not just by cell phones.

Distractions can be as simple as looking down to adjust a radio station or glancing at the GPS, talking to passengers, looking at something on the side of the road, or putting on makeup.

The toll of distraction is huge. Every day in the United States, nine people die and more than 1,000 are injured in crashes involving a distracted driver. The most recent count, in 2015, showed that 3,477 people died and another 391,000 were injured by drivers who were talking or texting on their cell phones. Drivers under 20 have the most distraction-related fatal crashes, according to the Centers for Disease Control and Prevention.

States like Georgia have enacted new laws to help ensure that people pay more attention to driving and less to their mobile devices. And many modern cars have features to compensate for distractions, such as voice control systems that help keep drivers’ eyes on the road.

**IT’S HARD TO CHANGE PEOPLE’S HABITS, THOUGH**

Emory and Grady researchers hope that a new study of accident victims in the metro Atlanta area will result in car designs that better protect drivers, pedestrians, and motorcyclists, and reduce the severity of injuries in the event of a crash.

The Crash Injury Research and Engineering Network (CIREN) study is being conducted by Emory’s Injury Prevention Research Center, along with Grady’s emergency department and engineering experts at the University of Michigan.

CIREN is funded by a $4 million grant from the National Highway and Traffic Safety Administration. The Emory/Grady effort is one of seven CIREN centers in the U.S. and one of just two programs in the country designated as both a medical and an engineering center.

Over the next five years, information about 300 accident victims who seek care for their injuries at the Marcus Trauma Center will be entered into a federal database, as will information about the damage to their vehicles.

“Data from CIREN centers help drive rulemaking to make...
EMORY HEALTH DIGEST

Vehicles safer for passengers and support injury prevention through regulation and consumer advocacy testing,” says Jonathan Rupp, associate professor of emergency medicine and principal investigator of the new CIREN. “Grady and Emory together are an ideal location for a CIREN center, which requires a high-volume level one trauma center like Grady’s Marcus Trauma Center coupled with strong biomedical researchers.”

Traffic Accidents Top Priority

Rupp speaks from experience. The biomedical engineer was involved in CIREN at the University of Michigan for more than a decade before being recruited to Emory last year, when the Emory Injury Prevention Research Center decided that reducing injuries from traffic accidents should be its top priority. Upon arrival in Atlanta, Rupp successfully applied for a CIREN grant.

More than a dozen collaborators in emergency medicine, trauma surgery, radiology, crash investigation, and engineering are collecting and analyzing data to better understand the mechanisms of injuries from modern automobiles.

Patients with qualifying injuries—including brain bleeds, ankle fractures, broken ribs, and organ injuries—answer questions about how the injury occurred.

With police reports in hand, crash investigators scour the crash scenes. They photograph the vehicles inside and out, download the event recorder (similar to the black box in an airplane), and use a laser measurement system to calculate how the vehicle was impacted.

They look for evidence of seat belt use, like stretch marks or scuff marks, as well as signs of bodily contact and injury, such as blood stains inside the car. They also take note of where the seat is in relation to the steering wheel and how much of the vehicle’s interior compartment got pushed into the occupant compartment. “The idea is to formally define all the factors that could influence

After the Crash

Where were you seated in the car?

Were you wearing a seat belt?

Was it properly positioned?

Who else was in the car?

What were you doing (when the crash happened)?

What type of clothes were you wearing?

Were you wearing glasses?

Has the vehicle been in previous crashes?

CIREN investigators Jonathan Rupp and David Wright talk with crash investigator Ron Tomblin and project coordinator Harriet Howlett-Smith.
how an injury occurred, from the initial contact to how the force was transmitted through the body,” Rupp says.

Other variables—say, for instance, pre-existing conditions like osteoporosis or obesity—might contribute to the severity of the patient’s injuries. And medications, such as anticoagulants, taken by crash victims could affect the amount of blood or the size of bruises.

A radiologist reviews all medical records to make sure the team hasn’t missed injuries that developed over time.

Next, engineers at one of the six other CIREN centers in the U.S. analyze damage to the vehicle, the contact, how the vehicle moved, how it struck other objects, etc. Likewise, Grady-Emory CIREN team members review data from other centers.

“The engineering review brings in another set of eyes,” Rupp says. “We don’t want to quality control ourselves and it’s better to have a second opinion.”

**LESSONS FROM THE REAL WORLD**

The transportation industry doesn’t do this kind of research itself for a myriad of reasons, including cost and inability to access patient data because of privacy rules.

The automobile industry could do “tons of test dummy work and put test dummies all sensored up into a car and crash them into brick walls,” says CIREN co-principal investigator David Wright, who co-leads the Injury Prevention Research Center.

“But the variability in what happens on the real highway when a car goes down an embankment, hits a light post or a tree, and rolls over—all the different scenarios can’t be modeled. You have to put it out in the real world to see what actually happens.”

The Emory/Grady CIREN study launched in 2017 and enrolled its first patients in October of that year. Since then more than 7,200 people injured in motor vehicle crashes and taken to Grady have been screened, 92 agreed to participate, and to date, 49 have become CIREN cases. Of those, more than half were in crashes that were frontal impacts, and most of the injuries involved head, chest, or lower extremities.

Eventually, the team plans to investigate crashes involving pedestrians and motorcyclists, both vulnerable populations. “If we look at the future of mobility and safety, increased walking is going to be a big part of that,” Rupp says. “We need to design vehicles and pedestrian infrastructure to make those interactions safer.”

Visibility is a big challenge, especially at night. Some pre-crash or collision-avoidance systems now recognize pedestrians so that if a pedestrian darts out in front of the vehicle it will apply the brakes or alert the driver.

While the goal of the study is to understand how injuries occur and ultimately, to prevent as many as possible, CIREN’s impact is expected to exceed that.

“Motor vehicle crashes take up substantial bandwidth in the emergency department and the Marcus Trauma Center. Anything we can do to reduce that makes us more able to care for other people,” Rupp says.
Another outgrowth of the CIREN study is the Injury Prevention Research Center’s partnership with police and EMS all over the state, including classes on how to download event data recorders, as well as with state lawmakers to help reduce impaired driving and increase seatbelt use.

‘WE SEE JUST ABOUT EVERYTHING’

While in the past, Emory’s Injury Prevention Research Center had concentrated on violence, it refocused its efforts several years ago after analyzing statistics about the top causes of injury in the metro Atlanta area. “The data was stunning,” says Wright. Heading the list were transportation-related injuries.

Atlanta is No. 4 in the country in pedestrians struck by vehicles, and Grady has one of the busiest trauma centers in the U.S., with some 150,000 patients seeking care there each year. About 10,000 patients annually are admitted for trauma or injury-related issues.

The most common transportation-related death is from traumatic brain injury, says Wright, who also is director of emergency neurosciences at Emory. Working with residents, he typically sees 40-some patients during his eight-hour shifts at the Grady trauma unit.

“It’s unbelievable how many collisions and crashes and injuries we get,” Wright says. “We see just about everything that could happen to a human body in a motor vehicle—head, chest, abdominal, extremity injuries—and any of them can be devastating. If victims survive long enough to get into an ambulance and make it to the hospital, they are going to end up in our shop.”

A countless number of scenarios can, and do, occur.

“The beauty of this study is, it links what was damaged in the vehicle and what was damaged in the human,” Wright says. “We’re looking for red flags that cause more severe injury, and by feeding that information back to the National Highway Traffic Safety Administration, we help them with policy, and help automobile makers redesign their cars to make them safer.”

The program is ongoing, since every year brings design changes to vehicles and changes in the environment; even the human population is changing. The average car—seat belts, steering wheel, safety mechanisms, and more—is designed for a 170-pound, 5-foot-9-inch man or a
105-pound, 5-foot woman. “But if you put an obese person or an elderly frail person in a car, injury patterns are a lot different than for an average-sized human,” Wright says, “so there’s still a lot to be learned.”

**THE CASE FOR SELF-DRIVING CARS**

Autonomous vehicles hold great promise for injury prevention, but no vehicles currently sold in the U.S. are completely self-driving. Most are “situationally” autonomous, with features that have been around for a while, like adaptive cruise control and electronic stability control.

Lane departure prevention systems, lane change assist, backup cameras and warnings, and other features are becoming standard features and providing “substantial benefits” in terms of preventing crashes, according to the Insurance Institute for Highway Safety.

As more autonomous features show up on the road, the “geometries of vehicles inside and outside are going to change,” says Rupp.

GM, for example, hopes to put cars without steering wheels and pedals on the road next year. “That’s going to change the interior geometry of the car and how it’s going to perform in a crash,” he says, “and that will affect how to protect occupants.”

Someday, car manufacturers may even veer away from one-size-fits-all to more personalized vehicles. “You might even have the option of an elderly package upgrade just like you can upgrade your sound system,” Wright says. “If a car has multiple drivers, that might not make sense but, in theory, special packages for the obese or elderly could be specially tailored. This would come at a cost, but it can be done.”

In the meantime, CIREN participants will help determine how cars can be made safer in the future, reducing the chance of injury for all. **EHD**

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**Driving is ‘Serious Business’**

On a clear and bright November afternoon, Marion Farmer had just finished her coffee at a Starbucks in Buckhead and was on her way to see her husband at an assisted living facility nearby. As she drove up Peachtree Street, a large, older car hung a left out of a church parking lot. It crossed four lanes of traffic then rammed into Farmer’s beloved, robin’s-egg blue Mini Cooper in the fifth lane and spun it around.

The impact crushed the driver’s side, pinning the 77-year-old grandmother inside. “I knew I was injured; I couldn’t move,” Farmer remembers. First responders had to saw through the bent steel frame before they could extract her from the car and rush her to Grady Memorial Hospital.

A fractured clavicle and broken ribs kept her there for a week before she was transferred to a nursing care facility, where she spent two months in rehab to rebuild the strength on her left side.

While at Grady, Farmer agreed to participate in CIREN, a study that may someday result in cars that better protect drivers, pedestrians, and motorcyclists alike and reduce the severity of injuries if they are in a crash.

Farmer says her injuries have been life changing. She is still weak on her left side and her memory is not as good as before the crash. Previously “always on the go,” she now depends on friends, family, or car services to take her to run errands or to visit her husband.

She no longer feels strong enough to drive, much less run the-mile-and-a-half loop from her condo to St. Philips Cathedral like she did before the accident. But she’s held on to her driver’s license, waiting for the day she can buy a “big, old car” to do nearby errands on her own.

A former faculty administrator at a federal research university, Farmer didn’t hesitate when asked to join the CIREN study and hopes that it will help others.

“Driving in Atlanta is serious business,” she says. “Motor vehicle accidents are just pure scary. I think that being aware of what’s going on and trying to prevent accidents should be foremost in our minds.” **EHD**
Jessica Knight had tried every diet out there, from low-carb to South Beach to a mail-order boxed meal plan. Ideally, she wanted to lose 50 pounds and lower her BMI, which at more than 30 was in the obese range. But she was losing hope.
Knight tried to stick to each new diet, but all the effort just didn’t seem worth it. “The weight loss never lasted,” says the 36-year-old accountant, who lives in Melbourne, Florida, with her husband and two daughters, ages 6 and 9. “It didn’t help that I had a job where I worked 60-plus-hour weeks and sat at a desk all day.”

Then her sister, a nurse at Emory Johns Creek Hospital, told her about a feasibility study being conducted out of the hospital that involved an image-guided procedure for weight loss.

Interventional radiologist J. David Prologo, associate professor in the Department of Radiology and Imaging Sciences in Emory’s School of Medicine, was enlisting 20 men and women who were mildly to moderately obese for the study, and spots were filling quickly.

The procedure takes about 30 minutes. After the patient is sedated, the radiologist inserts a needle filled with freezing gas into the vagus nerve, using CT guidance. The vagus nerve, the longest and most complex of the 12 cranial nerves, runs from the brain to the abdomen and is a main part of the parasympathetic nervous system, which oversees crucial bodily functions, including digestion.

In effect, the vagus nerve connects the brain and the gastrointestinal (GI) tract.

New attention is being paid to the nerve by researchers for treating disorders from inflammatory bowel disease to depression.

Prologo believes that freezing the vagus nerve could be therapeutic as a weight-loss tool. “An ablation zone is created which stops or shuts down the signals in the nerve indicating hunger to the brain,” he says.

Knight says she is “deathly afraid of needles,” but was determined to regain her health—which meant losing weight. She remembers being given an IV and wheeled back to a room. Then the twilight sedation kicked in. “I could sense things, but it was like a dream state,” she says. “My sister took me home afterward, and when I checked the site where the needle went in, I couldn’t even see anything, it was just a little tender between my shoulder blades. The spot was covered by a BAND-AID.”

Prologo, who is board certified in interventional radiology and obesity management, had used a CT scanner to guide the needle to the vagus nerve, specifically to the area where the stomach meets the esophagus. “It takes two minutes to freeze the nerve, at minus-40 degrees Celsius,” he says. “The spot is a 1-cm-by-2-cm segment near that junction.”

The first week, says Knight, she felt the same as usual. “I thought, what if it didn’t work? What if nothing changed?”

Then she noticed she was cutting down on her food portions and becoming more active. “I still felt hunger but I didn’t get hangry,” she says. The next week, she had to remind herself to eat.

Jessica Knight says that, after the procedure, she feels “happy, healthy, and active, a good role model for my kids.”
safe," he says. “We didn't want pa-
tients doing anything other than
listening to their bodies.”

A surprising effect of the
treatment, Knight says, is that she
now craves healthy foods. “If I try
to eat a piece of cake, I feel like
crap afterward. The joy I once got
out of eating cake is gone,” she
says. “Now I crave salad, vege-
tables, and grilled meat. I mean,
it's not a magic pill, I do have to
make conscious choices to eat
healthfully. But it's much easier.
Before, it was torture.”

When people diet, says Prolo-
go, their body and brain conspire
to sabotage them: “The first 30
to 60 days of a diet, the body
resists and rebels in the name of
survival, thinking it's starving. It
slows everything down. It does
10 to 15 different things to block
weight loss. Most people cannot
overcome that and will succumb.”

There is a critical point
where the body readjusts to
a new set point and dieting
becomes easier, he says, but
90 percent of dieters never get
there because of their body’s
backlash. That point, which
he calls the “catching point,” is
where Prologo tries to get people
to by freezing the vagus nerve.
The treatment is temporary, he
says, and probably lasts eight to
days months. “It pulls the hunger
response from you just long
enough, “ he says, “that losing
weight becomes relatively easy.”

People shouldn’t be shamed
for their inability to lose weight,
he says. “There’s a real biological
backlash that happens when
people embark on mainstream
diets and calorie restriction. It’s
not about being weak.”

His own mother is a case
in point: She raised three boys,
went to night school, dealt with
financial strain, and was a care-
taker to her own sick parents.
“Yet my mom could not lose
weight,” he says. “When critics
say people who are overweight
or obese don’t have will power or
perseverance, I know that can’t
possibly be true.”

The patients in the study lost
an average of 5.6 percent of their
initial total weight, corresponding
to about a 23 percent reduction
in excess body mass index (BMI),
says Prologo. No adverse events
occurred over the six month fol-
low-up, and no procedure-related
complications were noted.

As for Knight, by the end of
December—eight months after
the procedure—she had lost 30
pounds. “There are drops and
plateaus. I've gone one to two
weeks without losing anything,”
she says. “But I feel like my body
and my appetite have been reset.”

An athlete in high school and col-
lege, Knight still works out four
to six days a week to videos in the
morning—cardio and weights.
“I'd say my zest for exercise has
returned,” she says.

Knight recently visited
Australia, where she snorkled the
Great Barrier Reef and took part
in a three-mile cliff hike. “There
has been more than a change in
my weight; there's been a change
in my whole attitude and my
outlook on weight loss,” she says.
“I don’t ever weigh myself any-
more. I’m more addicted to the
way I feel.”

Prologo is planning a new
study, a clinical trial to prove the
procedure’s effectiveness. “We are
not trying to prove that freez-
ing the vagus nerve necessarily
equals weight loss,” he says, “but
that it makes dieting easier.”

He is working with Emory
physician Sharon Bergquist
to determine how a weight
loss plan will work for patients
with BMIs of 25 to 35, with and
without “vagotomies.” Their goal
is to determine how the vagus
nerve-freezing procedure can
best be used to “stop the train”
and reverse weight gain, along
with its host of associated diseas-
es like diabetes and heart disease.

“Since the discovery of the
appetite hormone, leptin, in the
1990s, there has been an expo-
nential increase in research in
obesity,” Bergquist says. “We now
understand that obesity is a dis-
 ease where hormones get dysreg-
ulated and the body fights back
against weight loss. We’re dealing
with something far greater than
willpower.”
Reducing Harm from Alarms

by Pam Auchmutey • Illustration by Damien Scogin

Here’s how one ICU dealt with the cacophony of monitor alarms.

A stay in the Intensive Care Unit (ICU) is no picnic when you’re recovering from major surgery, severe trauma, or serious illness. Patients endure their share of discomfort—IVs, needle sticks, staples or sutures, bandages, chest tubes, cannulas, catheters, bright lights, and noise.
3 things to know about alarm fatigue:

*A majority of clinical alarms are false.

*Two main reasons for false alarms are parameters that are too narrow and settings not adjusted to individual patients.

*Too many alarms can cause disruption in patient care, desensitization, anxiety, sleep deprivation, depressed immune system, and missed critical events.

Among the sounds that surround patients: the incessant beeping of the ICU monitor that tracks their vital signs. When the monitor emits an alarm, it’s meant to alert their nurse when vital signs such as blood pressure, heart rate, blood oxygen level, and respiration fall below safe levels.

Today’s sophisticated ICU monitors can produce hundreds of different alarm sounds. Even a slight change in a vital sign can cause a monitor to alert. But are more alarms necessarily better?

Definitely not, say Emory University Hospital nurses familiar with medical alarm fatigue. Alarm fatigue affects hospital staffs nationwide and occurs when workers become desensitized to the excessive number of alarms emitted by medical devices. While most alarms are not urgent, missing an alarm that is urgent potentially could harm a patient. And the stress of all those alarms can create burnout among health care workers.

The Joint Commission, the agency that accredits U.S. hospitals, made reducing alarm fatigue a national safety goal in 2014. But years before that, two nurses in the medical ICU at Emory Hospital already had recognized it as a priority: With 14 beds on two floors, the unit averaged 1,400 alarms per bed per day. How could the unit reduce this overwhelming number?

Ray Snider, medical ICU director, and Pam Cosper, the hospital’s critical care services director, came up with a plan. They collected data in real time from the monitor vendor. Once a month, a unit nurse counted the number of alarms and how nurses responded to them. The majority of alarms, they found, were false. The average number per bed per day in Emory Hospital’s medical ICU dropped from 1,400 to 300, primarily from the elimination of false alarms.

Targeting false alarms

Three common alarms caused the most false alerts. These occurred when an EKG electrode came loose, a pulse oximetry sensor (which measures pulse
rate and blood oxygen levels) slipped off a patient’s finger, or a patient’s pulse ox changed slightly yet was still within a safe range.

Unit nurses reduced alarm sounds based on two goals set by Snider and Cosper. First, nurses programmed ICU monitors to make only “actionable alarms”—those that require a nurse to check on their patient at the bedside. Second, instead of a one-size-fits-all approach, nurses began using “individualized monitoring” for patients.

Choose then customize
“As we’ve upgraded our ICU monitors in the past two years, we’ve put a lot of effort into choosing the right alarms for our patients,” says Snider. “We customize them for every new patient. We start out with the same default settings and work from there.”

Doctors and nurses also determined which alarms were not needed and turned them off. The alarm for premature ventricular contractions (PVCs) is a prime example. Healthy people have a PVC—an irregular heartbeat—from time to time. Sick people have more of them. Unless they have several in a row, PVCs don’t pose a health problem.

“Every time an ICU patient had one PVC, we got an alarm,” says Snider. “We turned that functionality off. That one intervention reduced the number of alarms significantly.”

To further prevent false alarms, nurses change EKG electrodes and pulse ox sensors daily so that they function properly. They keep track of their patients with the help of large TV screens placed throughout a newer 17-bed medical ICU, located in the Emory University Hospital Tower. The screens show each patient’s vital signs and emit an audible alert, supplementing what clinicians see and hear on computer monitors at the nurse’s station.

As ICU monitoring technology continues to evolve, patient care will become even more complex. But nothing can surpass the skills of a good nurse.

“The ICU monitors are just one piece of what nurses do,” Cosper notes. “Patients are surrounded by all types of equipment that alarm, from ventilators to IV monitors. One thing that nurses can’t lose sight of is having eyes on what’s happening with their patients at the bedside.”

What’s it like to work in an ICU with less beeping, buzzing, and dingling?
“The best testament I can give is when nurses who typically don’t work in our unit come in and comment on how much quieter it is,” says Snider. “We’ve worked on reducing alarm sounds for so long that our staff are accustomed to the fact that it’s quieter. They don’t remember what it was like when we had 1,400 alarms per bed per day. Ultimately, that’s better for our patients.”

Ray Snider (back row, left), Pam Cosper (back row, second from left) developed ways to reduce alarms and make the ICU a quieter, more peaceful environment for staff and patients.
My grandmother died of breast cancer. My mom is a survivor. But I never thought I would get it. I’m a man.—Eric Dunlap

It was 2000 and I was 34, the dad of two young sons, Jordan and Christopher, with my beautiful, smart wife, Felecia. I had always wanted to be a husband and a dad. I loved having breakfast with my sons every morning, coaching the soccer team, and just being there for my family.

After seeing an old photo on the beach from my honeymoon, I’d decided I was going to get back into shape. I went down into our basement to work out. I completed about 100 push-ups when I suddenly felt an intense, excruciating pain in my chest. I couldn’t get up off the ground. I called to my wife who came down and helped me up. I clutched my chest and felt a lump just above my right nipple. That was where the pain was radiating from.

When I went to the doctor the next morning, he asked me how long the lump had been there. I said I had just noticed it last evening. He told me it was a hard mass, and wrote a referral to see a surgical oncologist immediately. Immediately. That’s when I became concerned.

The next day, I had a needle aspiration. Three days later the doctor confirmed that I had breast cancer. I was young, didn’t smoke or drink, and was in decent shape—I’d never even had a cavity. And I was a man. How was this possible? “Are you sure you don’t have the wrong file?” I asked.

He told me it was very rare in men, but it happened. Because I had exercised so vigorously, my chest muscle pressed against the tumor, and the tumor pressed against a nerve. The pain alerted me to the problem. Most people never feel breast cancer; there is no pain.

My mother had been diagnosed with breast cancer four years previous, and her surgical oncologist, Toncred Styblo at Emory’s Winship Cancer Institute, and I had developed a rapport. I trusted her and chose her to be my doctor. I was diagnosed with stage two breast cancer, since the testing showed that the cancer was in my lymph nodes.

I had a radical mastectomy and simultaneous reconstruction. They removed all the breast tissue on my right side and then extracted muscle from my back and put it in my chest so it would be symmetrical.

During my recovery, my youngest son, Christopher, would ask me to pick him up. After surgery, I could not. I would lie down on the floor and let him climb up on me for a hug.

Next, I endured six months of chemotherapy. It was difficult to find men diagnosed with breast cancer. The actor Richard Roundtree, who played Shaft in the 1970s, was one. He had been hesitant to talk about it for a number of years, afraid that it would hurt his chance to get roles. Does breast cancer take your tough-guy edge away? In reality, it makes you tougher.
My grandmother, my nana, died from breast cancer when she was 55, in 1974; it had metastasized rapidly. She was the best grandmother in the world. She could cook anything and made you feel important and loved. She had a radical mastectomy, and her chemotherapy was horrible. She was in hospice and receiving morphine for the pain. I was 7 years old and, holding her hand, I told her, “One day, I’m going to do something about cancer.” She opened her eyes and looked at me and said, “I know you will.”

When my mom was diagnosed, I had a flashback of what nana went through. My mother was 55 as well. She beat breast cancer twice: once before I was diagnosed, and then 10 years later in the other breast. She taught me how to fight it.

As guys, we’re preconditioned to dismiss things. And many physicians don’t think of breast cancer right away with men because the percentages are low.

I think about my sons, who are now young men. I want them to always get checked out.

Now Chris is 19, and Jordan is 22. Not only did I see my sons graduate from high school, they both graduated with honors, and Jordan just graduated from Georgia State. I didn’t know if I was going to be here to see those milestones. My mom’s birthday was on Thanksgiving last year; she is 76 and remains active.

I give lectures to universities, the media, physicians, churches, and patients. For the past 18 years, I’ve worked with the American Cancer Society’s speakers’ bureau to increase awareness and raise funds. I guess I’m keeping that promise to my grandmother.

Private philanthropy enables our physicians and scientists to search for cures and care for patients. To support Winship Cancer Institute at Emory visit winshipcancer.emory.edu/support-winship/give or call 404.778.5175.
Imagine a World Where a Simple Cut Could be Deadly

A soldier is wounded by a roadside bomb. His serious injuries are survivable, but the wound is infected with antibiotic-resistant bacteria and the soldier dies from the infection.

A severely premature infant is growing and gaining strength, but she gets a drug-resistant lung infection that spreads to her blood and she dies.

A teenager gets a cut on a hike. The cut becomes infected, and this otherwise healthy adolescent succumbs to what should be a treatable infection.

Antibiotic resistance may be the greatest medical challenge of our time. It threatens major advances of modern medicine, including organ transplants, cancer chemotherapy, and routine surgical procedures that would not be possible without these life-saving drugs. We are all at risk.

The Centers for Disease Control and Prevention (CDC) estimates that at least 2 million illnesses per year in the United States are caused by antibiotic-resistant bacteria.

That translates to 8 million extra days of hospitalization, 23,000 deaths, and more than $20 billion in additional health care costs. Worldwide, an estimated 700,000 deaths per year are caused by antibiotic-resistant bacteria.

Researchers discovered that some highly antibiotic-resistant Klebsiella have acquired genes that make them 10,000 times more virulent than previous strains. These genes, also, are in a mobile form that can be shared easily between bacteria and spread rapidly. Such strains led to a recent outbreak in a Chinese hospital that killed all five infected patients.

The bacteria are not slowing down, and they certainly aren’t waiting for us to catch up. We must act now if we are to keep pace with this threat to the nation’s public health, economy, and security. With the largest economy in the world, we can clearly afford to do more. Just as we have led technological advances for decades, so should we lead the fight against antibiotic-resistant bacteria.

How do we do this? Scientists have warned us for years that we must develop new antibiotics. But we can’t fight an always-evolving enemy without fully understanding where it is and what makes it tick. We must invest heavily in research just to catch up—to discover the new and ever-changing ways in which bacteria resist antibiotics and become more virulent. We must be able to respond in real-time to current and newly emerging threats by more widely and carefully tracking the spread of antibiotic-resistant bacteria in humans as well as in animals. And we must develop more sensitive diagnostics that rapidly detect all forms of antibiotic resistance and more effectively guide patient treatment.

Imagine a World Where a Simple Cut Could be Deadly

This essay by David Weiss, director of the Emory Antibiotic Resistance Center, originally ran in TheHill.com.
Sylvia Dodson lost her late husband James—a gentle, kind, and compassionate man—to Alzheimer’s. Determined to support research at Emory School of Medicine and to help Emory researchers learn more about the disease, Sylvia has made a bequest to fund future Alzheimer’s studies.

“My husband would be proud of what I am doing.”

Sylvia Dodson
Lilburn, Georgia

Have you planned your legacy?
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Across the State and Around the Corner

Emory Healthcare in Georgia

Emory Healthcare is the most comprehensive health system in the state, with locations all over Georgia, including 11 hospitals, 143 outpatient locations in 26 counties, and 19 regional affiliate hospitals in 17 counties. Winship Cancer Network has three locations.
1. Emory University Hospital
2. Emory Clinic (multiple buildings)
3. Winship Cancer Institute
4. Emory Rehabilitation Hospital
5. Yerkes National Primate Research Center
6. Emory School of Medicine (education and research buildings)
7. Woodruff Health Sciences Center Administration Building
8. Rollins School of Public Health
9. Nell Hodgson Woodruff School of Nursing
10. Emory University Hospital Midtown
11. Executive Park (Emory Healthcare clinics in brain health, orthopaedics, and sports medicine)
MUST SEE TV

The Emory Brain Health Center is partnering with Georgia Public Broadcasting (GPB) on a news magazine program that airs Mondays at 8 p.m. Your Fantastic Mind, hosted by Emory’s Jaye Watson (below), highlights patient stories, research, and clinical advances.