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NEWS OF THE TEXAS MEDICAL CENTER — VOL. 4 / NO. 3 — APRIL 2017

Health Care Behind Bars, p. 20

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Table of Contents

APRIL 2017

ON THE COVER: Offenders walking in the main hall of the Estelle Unit in Huntsville, Texas.

The Future of Health Care

The American Health Care Act failed. So what sort of plan do Americans need?

By Arthur Garson Jr., M.D., M.P.H.

House Speaker Paul Ryan of Wisconsin at a news conference following a Republican party conference at the Capitol on March 15, 2017. Credit: AP Photo/Andrew Harnik

Any national health care overhaul must embrace the basic needs of the individuals it aims to serve and acknowledge the particular challenges for the professionals and institutions providing the care.

Under President Trump, health care in America was poised for change. But the bill to repeal Obamacare—the American Health Care Act (AHCA), sometimes called Trumpcare—never even made it to a vote. House Republicans pulled the bill in late March because they knew it wouldn't pass. So, for now, Obamacare stays.

As we pause in this race to reinvent the way Americans receive care, let's take a moment to outline the baseline tenets of any sustainable health plan that intends to serve the common good.

People deserve access to affordable, adequate health care. When we talk about "access" to health care, we mean that a patient should be able to see the right medical practitioner, at the right time and in the right place. That place may be via email or video; it is certainly not an emergency room, unless the patient is experiencing a true health emergency.

"Affordable" refers to the total out-of-pocket cost for which a patient is responsible—the premium plus the deductible. Ideally, these costs should be no more than five to 10 percent of a patient's income: for lower incomes, it should be five percent. For example, if a patient earns $20,000 a year, then, he or she should expect $1,000 in out-of-pocket expenses. This is not the case with Obamacare, which costs $6,449 for someone who makes $20,000. That's too much.

"Adequate" speaks to a basic level of care that everyone needs. This is tough to define, but going forward, legislators who want to rework Obamacare will have to get specific.

Providers should receive pay based on the quality of care. Physicians, nurses and other medical workers should be paid a base salary for their level of expertise, along with a bonus that corresponds to the quality of care they deliver.

The fee-for-service model—in which doctors bill based on the procedures used to treat a patient—should be a thing of the past, as it encourages unnecessary tests and procedures. Currently, providers spend just 55 percent of their time caring directly for patients, while the rest of the time is consumed by administrative tasks. We need well-functioning electronic health records that streamline care instead of adding time and hassles. Finally, health systems should receive payment in a way that encourages innovation and rewards value.

The American health care system should improve cost and quality, and increase life expectancy in patients. Cost and quality must be considered together. We don't want to reduce cost only to have quality suffer. According to Donald Berwick, past administrator of the Centers for Medicare and Medicaid Services, we waste one-third of our health care dollars—about $1 trillion per year—on overtreatment, failures of care coordination, failures in execution of care processes, administrative complexities, pricing failures, fraud and abuse. If we could just save 15 percent of this waste, we could pay for the uninsured. Here are three ideas: pay physicians a salary, instead of allowing them to bill per procedure, potentially saving more than $180 billion per year, according to Berwick; fund a streamlined electronic health records system, which could generate $81 billion in eventual yearly savings, according to Rand, a global nonprofit think tank; and attack chronic disease, which would help reduce emergency room visits, readmissions and unnecessary admissions to facilities.

With the AHCA off the table, at least for the present, Americans are left with Obamacare. Now what?

Obamacare expanded Medicaid to the poor between ages 19 and 64. Many legislators did not realize that about two-thirds of the people who are uninsured actually work, but could not afford the premiums and the deductibles, now totaling about $6,500 for a single person.

Medicaid expansion and the premium subsidies totaled about $190 billion per year—and with current prices, amazingly, that wasn't enough.

Really, the only way to deal with this problem is to make health care and health insurance less expensive. We could start by paying doctors salaries and giving bonuses for quality of care, eliminating the perverse practice of paying doctors for every procedure they perform. The Mayo Clinic, the Cleveland Clinic, Kaiser Permanente and other great health systems pay their physicians salaries. All should. This could save from $190 billion to $300 billion per year.

The next big health care overhaul—or the insurance industry itself—should create catastrophic plans that can be bought by anyone. The design of the plans is not trivial: The plans would cover accidents, of course, but when would they start covering heart failure? The challenge is that these plans would need to be affordable, which means a low premium plus a low deductible. The mistake of Obamacare is that less expensive plans typically have higher deductibles.

The only way insurers can stay afloat is if healthy people buy their plans. We know from our Texas Medical Center-Nielsen survey that 96 percent of people across five states said they would buy insurance if it was affordable.

Let's not just stare at the future, let's do something. Let's put bipartisan groups together to consider these and other ways to reduce cost. The health of the nation depends on it. ■

Arthur "Tim" Garson Jr., M.D., M.P.H., is director of the Texas Medical Center's Health Policy Institute. Parts of this essay have been published previously in The Hill.

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CELEBRATING 70 YEARS

Above: Astronaut Ellen Ochoa simulates a parachute drop into water during emergency bailout training in Johnson Space Center's Neutral Buoyancy Laboratory. Credit: NASA

Right: The STS-56 Misson Patch for Ochoa's first mission aboard the Space Shuttle Discovery in 1993. Credit: NASA

Veteran NASA astronaut ELLEN OCHOA, PH.D., has logged nearly 1,000 hours in space on four separate flights. She is the first Hispanic woman to travel to space and, in 2013, she became the first Hispanic and second female director of Johnson Space Center. Earlier this year, NASA announced that Ochoa will be inducted into the U.S. Astronaut Hall of Fame.

Q | ***You have quite the illustrious career. What would you say is your proudest accomplishment?***

A | I feel lucky to have been part, overall, of human space exploration. To have been able to participate in the shuttle program and then also the International Space Station program.

With my four flights, two of them were really focused on scientific research—particularly the problem of ozone depletion and the ozone hole. Then the second two were part of the assembly of the International Space Station. When I see the space station now going strong—we've had people living on board continuously for over 16 years now—to have been part of that is the reward.

Q | ***As a kid, what did you think you were going to be when you grew up?***

A | I didn't have a really good idea. There were a couple years I remembered thinking I might be a lawyer. I wasn't one of those kids that figured it out early and said, 'This is absolutely what I want to do.'

The Apollo program was going on while I was in elementary and middle school. I was 11 when they landed on the moon. The whole country was watching that, but I can't say at that point I decided I wanted to be an astronaut. There were no woman astronauts. Nobody ever would ask a girl, 'Is that something you want to grow up to do?' It was beyond what you would even think about at that point.

It was really later when it was something that I started to think seriously about.

Q | ***Did you face any particular challenges as a woman and a Latina studying STEM in the 1980s and 1990s?***

A | I really didn't see other people like me as I was going through school for physics and electrical engineering, and then earlier on in my career. That can make you feel like you stand out in a way that you'd prefer not to, at that point.

There were only a very few instances when I felt like somebody was trying to discourage me.

When I got to NASA, which was in 1988, my first job was at Ames Research Center before I came here to Johnson. First of all, I saw a lot more women. I saw a lot more minorities. At that time, NASA was maybe more welcoming and more focused on a diverse workforce than I had seen prior to that. I've seen that only increase during my years at NASA.

Q | ***At what age or point in your life did becoming an engineer and an astronaut turn into a real goal?***

A | It was really in graduate school. The first year I was at Stanford was when the space shuttle flew for the first time. Here was this new spacecraft that was quite different than anything that had ever been flown in space. It had larger numbers in the crew and a wider variety of things that the crew was doing. In particular, it was going to support all different kinds of science. That to me was really intriguing because I was really headed toward being a research engineer at that point. The ability to do research but to do it in a completely unique environment was what made it become top of mind.

Q | ***You started your formal NASA training in 1990. Three years later, you went to space. What was that training process like?***

A | The first year of training you come in as a class. There were 23 astronauts that were selected the year I was selected. A lot of it is originally classroom training; you have lots of workbooks to read. Then you start doing single system training. You're in a simulator but you're only worried about one system at a time. You're learning how it operates—what switches you use and what to do when things go wrong.

Then you graduate to a full-up trainer where all the systems are simulated with all of their interactions.

Your second year of training you get more specific. For example, I started to do robotics training. I did a little bit of spacewalk training, but not very much because by the time I was really going to get into it, I got assigned to a flight and I wasn't going to be doing a spacewalk on that flight.

After two years is when I was assigned to my first crew. I spent a year really training with that crew and for that mission.

Q | ***What was the most difficult part about being in space?***

A | I think it's that you're responsible for a lot of different things as a crew member. You have different responsibilities in different phases of flight. You're trying to remember lots of things at one time. It's like cramming for a final or for a whole set of finals.

> "I feel lucky to have been part, overall, of human space exploration. To have been able to participate in the shuttle program and then also the International Space Station program."

Q | ***One of the most intriguing aspects of being an astronaut is returning from space. What was that adjustment like for you?***

A | When you first land you feel very heavy, but that goes away pretty quickly. There are also neurovestibular changes. You can find it hard to walk straight. You can feel like you're dizzy. If you lean down or lean one direction it feels like you're being shoved in that direction and can spin a little bit. I would say those are the things you most notice when you land.

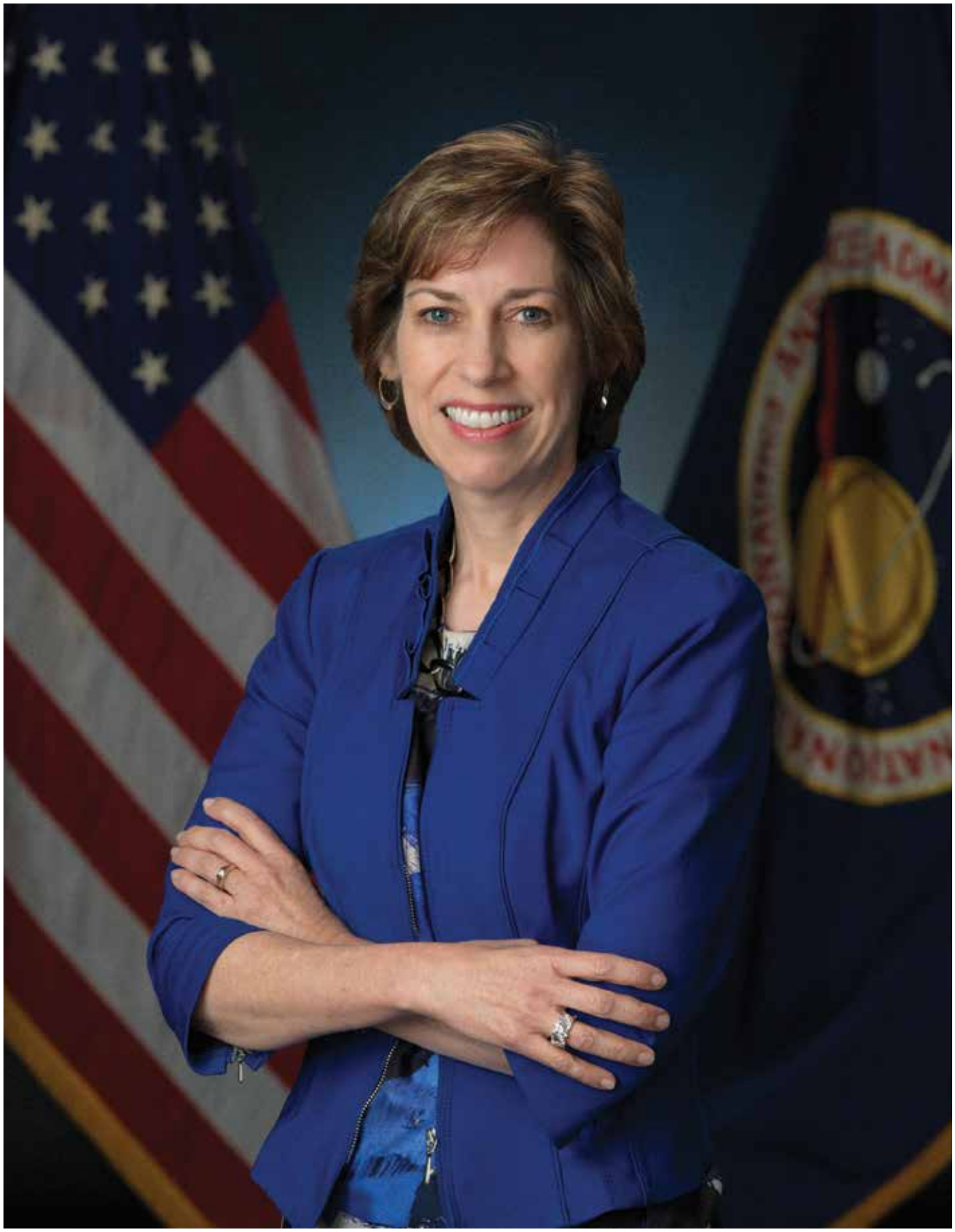
Q | ***Having that weightlessness and floating in the air has got to be priceless.***

A | It is. It's quite unlike anything else that you do. It's fun.

Q | ***Can you describe what it was like?***

A | You have to work out different ways of doing things. If you're going to be working on a particular piece of equipment or something, you have to be very methodical because you can't ever put anything down unless it has Velcro on it. You have to make sure you're really thinking step by step and being very deliberate so that things don't float away or you don't have some unintended consequence.

Of course, some things are easier. If you're trying to move what would be a very heavy piece of equipment on Earth you can do that much easier in space. You can move your body upside down or sideways if that helps give you better leverage as you're trying to do a task. If you want to move across the cabin you can push off with one fingertip and that gets your going. If you push any harder than that you're going way too fast. You have to get used to all of that when you first get to space.



Credit: NASA

Q | ***Under your leadership, NASA has launched several research initiatives to detect and monitor diseases at very early stages, many in partnership with TMC member institutions.***

A | Here at Johnson Space Center, we really value our collaborations with different institutions at the Texas Medical Center. I think we are very lucky to be located in Houston, where we have the largest medical center in the world. We have world-renowned experts in areas that are important to us, including radiation and, now, much more personalized medicine, which is becoming important to us, as well.

Q | ***For both male and female astronauts, it must be difficult to be away from families. You were a new mom before your third flight. That must have added a whole new dimension to your mission.***

A | On my third flight, I had a 1-year-old. By my fourth flight, I had had my second child. My youngest turned two while I was in orbit, and the other one was three-and-a-half. For my third flight, I made a tape of myself talking to my 1-year-old and reading a book that he liked so that my husband could play it while I was gone. I thought, 'Shoot, he's only one. He's going to forget about me.' The mission itself wasn't that long, but when you added in the week of quarantine ahead of time and the fact that you might delay before you launch, I figured I might be away three weeks, which is a long time for a 1-year-old.

(continued)

Ochoa floats through the tunnel that connected the STS-96 crew to the International Space Station (ISS) for several days in late May and early June 1999. The crew members eventually transferred several thousand pounds of supplies from Discovery to the ISS. Some of the gear can be seen behind her. Credit: NASA

Then on the fourth flight, I got a chance during the flight to actually talk to my kids, to do a video conference and talk to them once or twice on the phone. The 2-year-old didn't really talk much at that point.

My older one was almost 4. When I talked to him on the phone, I said, 'What did you think of the launch?'

He goes, 'Mommy, I got to ride in a plane.'

He flew on a NASA plane with my husband and with the other family members to Florida. Although he had been on a plane before, that was probably the first time he was really old enough to remember it.

I go, 'That's really exciting.' Then I said, 'What did you think of the launch?'

He goes, 'Mommy, it was a blue and white plane.' He was completely focused on the plane ride to and from the Cape.

Q| *Now that they're grown, what do your sons think about their mom being an astronaut?*

A| They're 18 and 16. I think at various points while they were growing up, they thought it was cool. Now they're over that, really. Plus, you have to realize that here in the Clear Lake area where we live, it's not actually unique to have a parent who's an astronaut.

When they were in elementary school, for example, it wasn't uncommon for them to have some other kid in their class whose mother or father was an astronaut. In fact, my younger son was friends with a girl who was his age and both her parents were astronauts. It wasn't quite the unique experience it might be somewhere else.

Q| *What was the weirdest thing that ever happened to you in space?*

A| After I got back to Earth on my first flight, I can remember going to bed the first night and waking up in the middle of the night. I felt like my body was floating off the bed. I could not feel the bed. I was just lying there with my eyes closed. If you'd asked me if I was floating I would have said, 'Absolutely, I'm floating.' I physically had to move my arms and legs to feel the bed to say, 'I'm not floating.' Then the second night I woke up in the middle of the night and it felt like half my body was off the bed and the other half was on the bed. That was very, very weird.

I actually had the opposite when I was in space. I woke up in the middle of the night and I could have sworn I was lying against a bed. I remember waking up thinking, 'Wait, I thought I was in space. Why does it feel like I'm on a bed?' Your brain is trying to figure out these new environments. When it doesn't have something that it can correlate with, it makes up these things. It was really interesting.

Ellen Ochoa, Ph.D., was interviewed by* Pulse *reporter Shanley Chien. This interview has been edited for clarity and length.

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Hidden Treatment

An implantable device could help patients at risk of HIV exposure get reliable, preventative medication

By Christine Hall

Alessandro Grattoni, Ph.D., holds a silicon nanochannel wafer containing 700 membranes. Each membrane is cut out and placed into a tiny implant.

> "We've gotten to the point with the research where we have tested the implant to deliver the drug at the preventative level with no adverse effects."
>
> — ALESSANDRO GRATTONI, PH.D.
> *Nanomedicine department chair at Houston Methodist Research Institute*

Remembering to take medication at the same time every day is what makes medication work.

But life often gets in the way. You sleep an extra hour. You're supposed to take your meds after a meal but you eat late, which throws off your schedule. Or, you run out of your medication and can't get a refill.

Alessandro Grattoni, Ph.D., nanomedicine department chair at Houston Methodist Research Institute, understands the plight of patients who need to take medication consistently to control their diseases. That's why he has worked on implantable nanochannel membranes for a decade.

Grattoni joined Houston Methodist in 2010. He was introduced to Roberto Arduino, M.D., professor of infectious disease at McGovern Medical School at The University of Texas Health Science Center at Houston (UTHealth), who is actively involved with HIV research and prevention. In 2014, the World Health Organization estimated nearly 37 million people were living with HIV/AIDS. Grattoni and Arduino started discussing possible applications of the implantable, nanofluidic drug delivery system for use in preventing HIV.

Grattoni began testing a refillable implant that would be placed under the skin—typically on the inside of the upper arm—to release medications to people at risk of HIV exposure.

Many high-risk patients already take Truvada, a combination therapy of tenofovir disoproxil fumarate and emtricitabine, to help prevent HIV-1 infection, Grattoni said. Truvada is estimated to be up to 95 percent effective in preventing HIV when taken consistently, according to a study by the Centers for Disease Control and Prevention. But the same study found the drug was only 44 percent effective among test subjects because people kept forgetting to take it, Grattoni said.

"For patients, it is easy to forget, but in the context of HIV, forgetting is really dangerous," he said. "The implantable device stays under your skin, so it would not give you the

Grattoni shows the tiny HIV drug delivery implant. The device, placed under the skin, can release HIV preventative medicine for up to six months.

chance to miss the medication."

Grattoni's implantable device works by delivering medication through silicon membranes microfabricated with the same leading-edge technologies used to produce computer chips. The nanochannels that regulate the drug release from the implant are very small—20,000 times smaller than a human hair.

Because patients taking this type of medication typically must return to the doctor every six months for a checkup, Grattoni is working on an implant that can be refilled transcutaneously in the doctor's office every six months or even once a year. Right now, the device can deliver HIV pre-exposure prophylaxis, or PrEP, medication for up to 70 days.

Grattoni was recently awarded a $4 million grant from the National Institute of Allergy and Infectious Diseases to increase the drug delivery time frame for HIV PrEP. If successful, the research will move to the next phase, patient clinical trials.

One of the biggest challenges is assuring drug stability throughout that six-month to one-year window, particularly since the drugs will be kept at body temperature and be surrounded by biological fluids. Pharmaceutical company Gilead is supporting the study and partnering to address drug formulation needs, Grattoni said. Already, the device can remain in the body for a few years, he added, though he would like it to last as long as five or six years before it needs to be replaced.

> "The implantable device stays under your skin, so it would not give you the chance to miss the medication."

Houston Methodist is leading the study, but researchers from four other Texas Medical Center institutions are involved: Ming Hu, Ph.D., professor of pharmaceutics at the University of Houston, is helping with the pharmacokinetic analysis; Jagannadha Sastry, Ph.D., Kathryn Shelton, DVM, Ph.D., and Pramod Nehete, Ph.D., with The University of Texas MD Anderson Cancer Center are helping with animal studies; Arduino, from UTHealth, is providing the clinical perspective; and Jason Kimata, Ph.D., associate professor at Baylor College of Medicine, is lending virology expertise.

The project has garnered attention outside of the TMC. Grattoni received the 2016 AIDS Foundation Houston Shelby Hodge Vision Award.

And, as director of the Center of Space Nanomedicine at Houston Methodist, Grattoni expects the device to be tested aboard the International Space Station over the next five years.

"We've gotten to the point with the research where we have tested the implant to deliver the drug at the preventative level with no adverse effects," Grattoni said. "We are now working to test our approach on a larger number of subjects and move toward commercial development."

Ready to Reset

Electroconvulsive therapy can help patients with depression

By Britni N. Riley

Sitting in bed in a recovery room at Ben Taub Hospital, Natalia Rodriguez waits for her 35th maintenance treatment of electroconvulsive therapy.

"I've always had my depression, but I didn't recognize it until way later, because I didn't want to," Rodriguez said. "I didn't want to appear weak in front of my kids. I had to be strong so I just worked, worked, worked. And then it hit me."

In 2011, Rodriguez was diagnosed with severe depression. She began taking antidepressants.

"At first, I was at another facility and they gave me all kinds of medicine, and it was so bad, it gave me hallucinations for a month," Rodriguez said. "After that, I ended up at another facility—an inpatient clinic—because I was having such bad crying spells."

After she was discharged from the hospital, her depression continued and the medication did not help.

"I think the depression was brought on by everything that I have been through," she said. "I was molested when I was young. ... I have been in and out of prison, had low self-esteem."

Although she worked full time in the billing department of an orthopedic clinic, Rodriguez struggled to support her three children. She was sent to prison in 2005 on a drug-related conviction and served for almost five years.

In prison, Rodriguez said she was a leader in a block with 180 women. "I ran the county, I ran it," she said. "They saw me as a person in charge."

After she was released from prison, depression consumed her. Weeks went by when she didn't leave her room. When she tried to commit suicide, her care team finally realized she required immediate attention. In 2013, Rodriguez began receiving electroconvulsive therapy (ECT).

> "I'm normal now. I walk my dogs every morning. I get up and make breakfast, see my grandkids—I'm just active all day."
>
> — NATALIA RODRIGUEZ
> *Ben Taub Hospital patient*

"They ended up sending me to another facility and that's where I was introduced to ECT, but there they treated you like it was a revolving door," she said. "So I didn't know what was happening; they just told me that I needed to do it."

ECT, sometimes called shock therapy, is used mainly when antidepressant medication fails to treat severe depression. The procedure pushes small electric currents through the brain to trigger a brief seizure, which changes the brain's chemistry and, in many cases, reverses the symptoms of some types of mental illness.

Bilateral treatments

In 2014, Rodriguez found her way to Strawberry Health Center in Pasadena, Texas—an outpatient clinic that is part of Harris Health System. She began working with Robin Livingston, M.D., medical director of ECT services at Ben Taub Hospital.

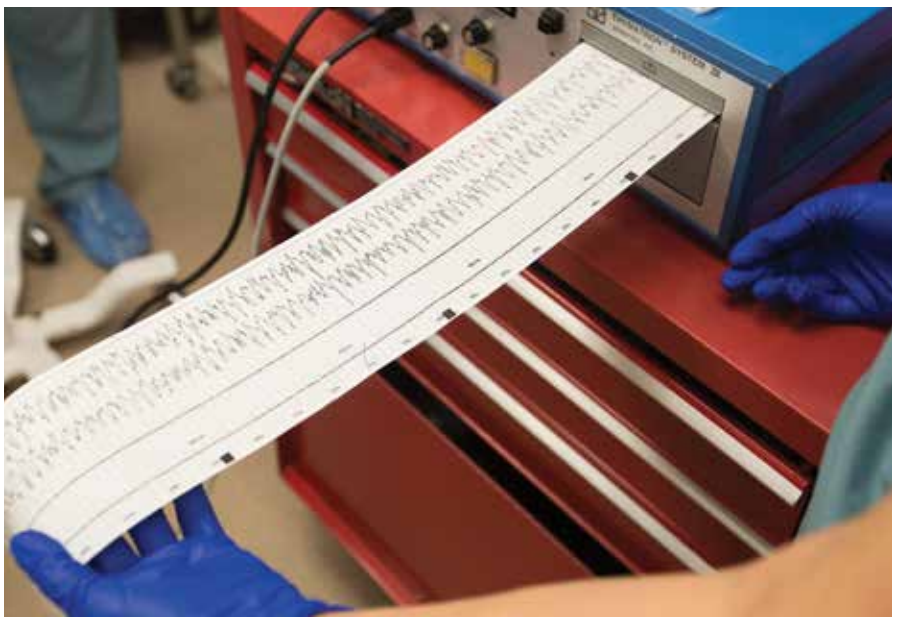
"When I met Natalia, she was severely depressed and had attempted suicide," Livingston said. "Because of that, we decided to give her bilateral treatment, which is electrodes on both sides of the head."

When a patient receives unilateral treatment, the seizure occurs only on the left side of the brain, causing fewer cognitive side effects. When a patient receives bilateral treatment, the seizure occurs on both sides of the brain. Bilateral treatment is not proven to work better, but it is proven to work faster.

Asim A. Shah, M.D., chief of psychiatry at Harris Health System and Ben Taub Hospital, brought Livingston to Ben Taub to restart Harris Health System's ECT program. "ECT is truly the best treatment when it comes to treating depression," Shah said. "There is no treatment that works as quickly as ECT. Antidepressants have an efficacy of 40 to 45 percent. ECT has an efficacy of 70 percent. Why should we not use a treatment that works for 70 percent of people?"

Once a seizure has been stimulated, it will last anywhere from 25 seconds to two minutes. The seizure changes the neurochemicals in the patient's brain, which works in various ways. ECT has been proven to increase serotonin, increase norepinephrine, decrease dopamine, work as a brain cell stabilizer and reduce stress.

A nurse places electrodes on Natalia Rodriguez's forehead, prepping her for bilateral ECT treatment.



The Thymatron System IV records the brain's reaction to ECT treatment.

"It's not one single thing ECT does that is helping psychiatric patients," Livingston said. "It is a combination of all of these things, and that is why it is our gold standard for neurostimulation treatments."

The ECT program at Ben Taub performs dozens of treatments every week—on Mondays, Wednesdays and Fridays. Prior to a treatment, patients are given a muscle relaxant and general anesthesia. Once the patient arrives in the operating room, the care team ensures the patient is comfortable and sedated before initiating the shock. The shock results in two seizures—one in the brain and one in the body. The seizure produced in the body is only visible in the patient's left foot, where it is monitored by the doctor. The procedure itself does not take that long, but due to the use of general anesthesia, patients require time before and after to recover.

"I'm normal now"

While ECT is an effective treatment for patients suffering from treatment-resistant depression, it does not work for everyone and it cannot be administered to patients without their informed consent.

In Texas, a patient must give their own consent for each ECT treatment they receive. Family members, guardians and doctors cannot give consent for the patient.

"Texas has some of the strictest laws regarding ECT in the nation," Livingston said. "ECT has had proven success in patients suffering from severe depression, and I believe it could help many patients with bipolar disorder and schizophrenia. This can be a barrier if a person is not capable of giving their consent."

Livingston is well aware of the negative stigma attached to ECT, mostly because of its depiction in films like *One Flew Over the Cuckoo's Nest*.

"For a long time, ECT was seen as a very cruel treatment," Livingston said. "When it came out in the 1930s and '40s, there was no anesthesia, so people's bones would break from the jolt. But that is not the case now. It is very safe and effective."

Today, because of the success of her ECT treatments, Rodriguez said she is enjoying life for the first time.

"I'm normal now," she said. "I walk my dogs every morning. I get up and make breakfast, see my grandkids—I'm just active all day. I make friendship bracelets for my nieces, teach my grandson how to do art. Last fall, I took my first flight to Chicago for a family reunion and I was a little scared, but I made it and it was okay."

Rodriguez receives maintenance ECT treatments once every six weeks. She also sees her therapist once a month, in addition to taking antidepressants.

"I recommend ECT to people that are in really bad shape, because it really helps," Rodriguez said. "I tell them it's a choice they have to make themselves, and they really need to see a therapist and a psychologist to really decide what they need to do. But I recommend it to anyone that is really trying to feel better. ... It's a life-changing experience."

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>
> — ROBIN LIVINGSTON, M.D.
>
> *Medical director of electroconvulsive therapy services at Ben Taub Hospital*

Medicine After the Holocaust

Ethicists cite a slippery slope between eugenics and genetics

By Britni N. Riley

Since 2011, Sheldon Rubenfeld, M.D., a clinical professor of medicine at Baylor College of Medicine, has been leading groups of doctors, professors and researchers through Europe to follow the progression of medicine during the Holocaust.

In May, he will take a group to Nuremberg to honor the 70th anniversary of the Nuremberg Code, a landmark document that outlined the rules and medical ethics surrounding research experiments on humans.

Rubenfeld, executive director of the Center for Medicine after the Holocaust, says that the eugenics policies enacted by the Nazis are not only applicable to modern medicine, but were influenced by eugenics policies in the United States in the early 20th century.

"If you trace the history of medicine's involvement in the health care policy of the Third Reich, which they called 'applied biology'—applying eugenics to eliminate people they considered inferior from first reproducing, secondly marrying and finally from living—you can begin to understand the need for medicine during the Holocaust to be taught in medical ethics courses today," Rubenfeld said.

By the early 1900s, Americans had become captivated by eugenics, a philosophy that stemmed from Charles Darwin's theory of natural selection. Eugenics is defined as the science of improving a human population by controlled breeding, in order to increase the occurrence of desirable inheritable characteristics.

"We didn't understand genetics at the time, but we were using theories of inheritance to rid the population or prevent certain members of the population from procreating through forced sterilization," explained Amy McGuire, J.D., Ph.D., director of the Center for Medical Ethics and Health Policy at Baylor College of Medicine.

> "Most of the time, the Holocaust is viewed as a war against the Jews, but it was really a war against the genetically inferior."
>
> — SHELDON RUBENFELD, M.D.
>
> *Clinical professor of medicine at Baylor College of Medicine and executive director of the Center for Medicine after the Holocaust*

In 1896, Connecticut was the first state to prohibit people who were "epileptic, imbecile or feeble-minded" from marrying. Other states soon followed suit. Over the next 30 years, additional laws passed mandating sterilization for people held in mental institutions, individuals with low IQs and violent criminals. From 1907 to 1963, more than 60,000 individuals were forcibly sterilized in the United States.

"Hitler realized this philosophy was very powerful and he decided to take advantage of it because it was a medical philosophy that had already been in place throughout the western world for the past 30 years," Rubenfeld said. "Implementing eugenic policies ... eliminated the high cost of caring for the genetically ill and kept the Aryan race pure."

Before the Jewish population of Europe was forced into concentration camps, the goal of the Nazi regime was to purify the German race. By 1935, Germany had adopted the Nuremberg Laws, which excluded German Jews from citizenship and forbade them from marrying or having sexual relations with persons of "German or related blood."

The regime only provided medical care to healthy Germans and began mass sterilizations of "feeble-minded" Germans and people with alleged genetic deformities.

"Most of the time, the Holocaust is viewed as a war against the Jews," Rubenfeld said, "but it was really a war against the genetically inferior."

During his trips to Europe, Rubenfeld and his group visit concentration camps and hospitals that were in operation during the Holocaust. This year, in addition to Nuremberg, they will stop at Auschwitz, Goethe University's Institute for the History and Ethics of Medicine, and Hadamar Euthanasia Centre.

Hadamar Euthanasia Centre "looks like any other hospital you've ever been to—St. Luke's, Methodist, all white walls," Rubenfeld said. "And then you go down to the basement. The white walls become cinder blocks and you pass a dissection room before walking into a gas chamber. The gas chambers were put into hospitals originally with the intent of providing 'mercy killings' to disabled Germans, not the Jewish population."

As the Nazi regime gained more power and control of Europe, what began as a goal to "cleanse" the German population turned into a plan to rid the world of Jewish and non-Aryan people. Concentration camps were used to not only kill Jews but also to conduct research.

"In human subjects research, the Germans did very good science," Rubenfeld explained. "Their methods and their scientific protocols were good except for one thing: when they should have been using animals, they were using humans."

By the end of the war in 1945, millions had been killed. The doctors who implemented applied biology and participated in the mass murders were brought to trial by the United States, Russia, Great Britain and France during what came to be known as the Nuremberg Trials.

"When they had war crime trials after the war, there was one war crime trial for physicians, and it mostly focused on human subjects research experiments … and they came out with what is called the Nuremberg Code," Rubenfeld said.

The Nuremberg Code, established in 1947, states "voluntary consent of the human subject is absolutely essential" to research. Although it addressed the travesties and cruelty of human subjects research, it did not address the eugenics policies enacted by Nazis to eliminate Germans deemed genetically inferior.

"Nuremberg is a very important place, because it is not only where the Nuremberg trials were held and the code was created after the war," Rubenfeld said. "But it was also a site where some of the biggest Nazi rallies were held and where the 1935 Nuremberg Laws were passed essentially prohibiting all non-Aryans from citizenship."

Along with the Nuremberg Code, bioethics courses have been integrated into medical school curricula, and researchers like Rubenfeld have dedicated their careers to examining the ethical responsibilities of physicians to their patients and society. In January, many like-minded doctors and researchers gathered at the Texas Medical Center for a "Bioethics After the Holocaust" conference—among them, Matthew Wynia, M.D., director of the Center for Bioethics and Humanities at the University of Colorado Anschutz Medical Campus.

"The minute you start making applications of something that happened then to anything that is happening now, people will say, 'That's an inappropriate comparison, you're playing the Nazi card.' The research abuse that is happening today is not going to be directly comparable to intentionally infecting two young girls with typhus and when one of them dies, dissecting both to see what the difference is," Wynia said at the conference, citing a well-known Nazi experiment. "That's not happening today, yet we have to figure out a way to learn from that history."

Rubenfeld argues that eugenics has been transformed, consciously, by scientists.

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Train tracks inside the former Polish concentration camp Auschwitz II, also known as Birkenau, lead up to the main gate. Credit: Marcus Lindstrom/iStock

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Tourists walk through the main entrance to Auschwitz concentration camp. Today, the camp functions as a museum. Credit: Martin Dimitrov/ iStock

"You hardly ever hear the term eugenics used today, but you probably know the term medical genetics," Rubenfeld said. "If you do prenatal testing and find a fetus with a gene that the parents don't want, you eliminate that fetus. That is called medical genetics … seems like a good thing, but it is also called eugenics because you decided that whatever you are eliminating is an inferior fetus and you're getting rid of it."

Rubenfeld points to other examples of eugenics in modern society, including the one-child policy in China, which skewed the birth ratio so much that, by 2005, China had 32 million more males under the age of 20 than females, according to the *British Medical Journal*.

"In China, because of the birth restrictions, their society has said that to be female is inferior," Rubenfeld said.

In addition, in vitro fertilization clinics that allow parents to select fetuses based on sex, potential talent, eye color, skin color and other genetic traits have applied genetic technology to non-life-threatening situations.

"We certainly use genetic testing as a way of controlling the population—like avoiding devastating disease that will cause tremendous suffering," McGuire said. "It is a slippery slope when we start talking about using genetic and genomic technology to do sex selection. That suggests that there is a socially undesirable trait, whether it is being male or female, that any given individual is trying to avoid—or, in the case of countries like China, that an entire population is trying to avoid."

For Rubenfeld, staying vigilant and informed about the medical lessons of the Holocaust can only improve the future. He will never forget.

"Without examining the ethics of that time period and how they were transformed into very bad policies, we go blindly along assuming we aren't capable of doing similar things," Rubenfeld said. "But we are capable of doing similar things, because we have done them." ■

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>
> — AMY McGUIRE, J.D., PH.D.
> *Director of the Center for Medical Ethics and Health Policy at Baylor College of Medicine*

Med School at 40

Shasta Theodore, Ph.D., brings decades of experience to her role as a medical student

By Alexandra Becker

Shasta Theodore is the oldest student at McGovern Medical School at UTHealth. Theodore has already completed a Ph.D. and worked on public health initiatives in Africa. So why medical school, now? The second-year medical student, now 42, spoke with *Pulse* about her nontraditional career path, fasting for answers, and how she hopes to expand access to health care for underserved populations.

Q | *You earned a bachelor's degree in sociology and history at the University of Houston and went on to complete a Ph.D. in demography at the University of Pennsylvania. What made you decide to go to medical school?*

A | The summer after my first year of graduate school is when I decided I wanted to do health care, but I was thinking nursing. I was sick of school at that point, and I didn't want to spend the summer working for my professor, so he sent me to Ghana. They had a health project there where nurses were working to figure out how to give rural residents more access to care, so I spent my time traveling with those nurses. They would go and visit families and basically take health care to the families instead of asking people to come to clinics and hospitals. That was revolutionary for me, to make health care accessible in that way. And I just decided, this is what I want to do with my life. I wanted to be relevant like that, and the people appreciated it so much. I had just never seen that kind of gratitude where they would give the nurses chickens and eggs as a way to say thank you, and these are people who are already just barely feeding their own families. The nurses would explain to me that even a small cut on the foot or on the hand, or a headache that goes without treatment, could be life-threatening issues for people in these areas. I just said, you know, I want what I do to matter that much.

When I returned to Penn, I thought I would continue my Ph.D. but also combine that with nursing, but my professor was not impressed by that plan. I think he was afraid that I would go more in the nursing direction and ultimately just drop the Ph.D., and he might have been right. He strongly encouraged me to just focus on the Ph.D., and by the time I was done with it, I was really tired of school. It had been a long journey.

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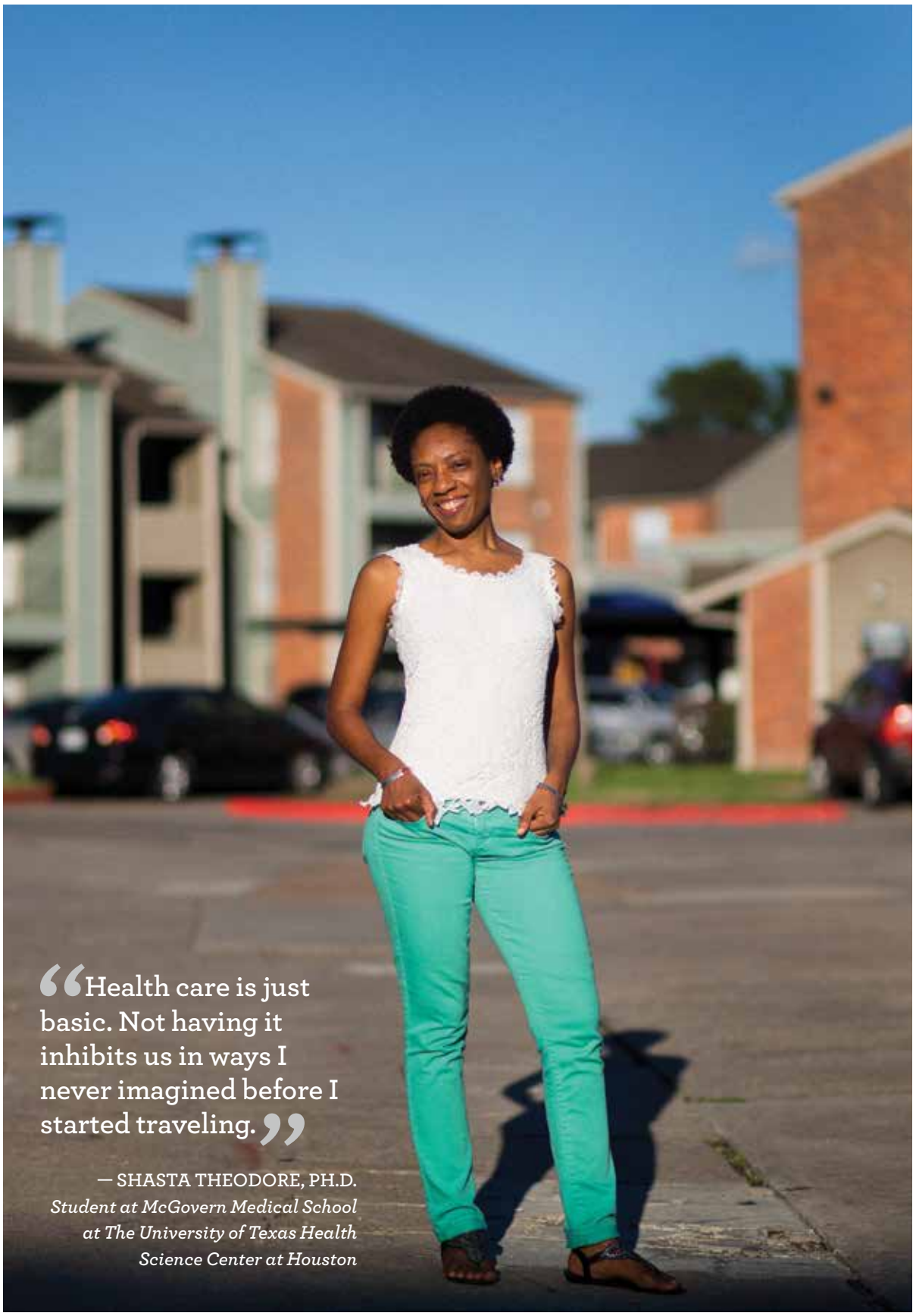
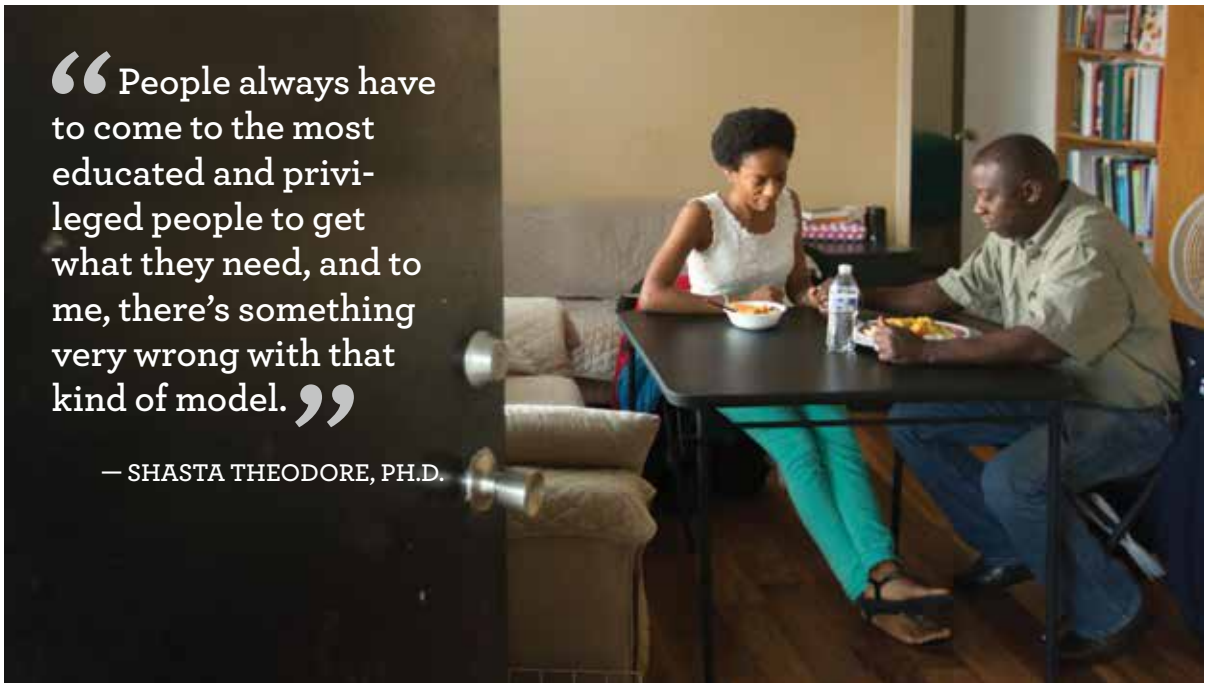


Theodore outside her apartment.



Theodore at home with her husband.

Q | *So how did you change the channel?*

A | I went to work in South Africa as the director of a health promotion project for adolescents. We were working with children to educate them about HIV and to design programs where they would gain skills to protect themselves and not just fall victim to HIV. The results of the project were not as successful as I had hoped. We tested the children a few years down the road for STDs and there was a really high percentage of them that had a STD, and I just thought, I can’t sit in an office for the rest of my life creating research projects that may or may not work. So I decided I’d leave research to those people who are really passionate about it and good at it.

Q | *Can you describe the moment when you realized that your personal passion was leading you elsewhere?*

A | I worked really, really long hours, and every day when I drove home it was always after dark. I lived in a beach community and there were hotels not far from my apartment building, and I would pass by prostitutes every day. I remember thinking that it was very clearly God saying, ‘Are you just going to keep driving by them every day?’ So, one day I just stopped, and there were two young girls, 19 and 20, and one of them spoke English, so that’s how I was able to communicate. And I just said, ‘I live right there in that building, do you want to come home and just get something hot to eat and drink and just relax a little bit? And then you can always come back out.’ I didn’t know what else to do, I just knew that God wanted me to stop. At first they said no, but it was cold outside so I gave one of them my jacket and I guess that made them feel like they could trust me, so they agreed to come with me to get something to eat. We talked and I cooked a meal that took a really long time and they got sleepy and ended up staying the night.

I never saw them on the street again, but over a year later, the one who spoke English came into my office and she had sores all over her face and she said, ‘I have AIDS.’ I had never seen AIDS like that before, and I just remember standing there like, I don’t know what to do. I’m the director of an HIV and AIDS project, and I didn’t know what to do. I didn’t know how to help her. And I thought, am I just here with a title then, doing some research that’s really just going to benefit the University of Pennsylvania in the end? Get us more grant money? I remember feeling very helpless at that moment. And she kept coming back to me. She was also pregnant; she delivered at about eight months and the baby died immediately after. So that story makes me feel most ashamed about my time there. I was there to help in terms of HIV, but the one person who really needed it the most, I couldn’t do much for her.

Q | *Your plan was to come back and become a nurse, but here you are in medical school. That must have been a difficult transition.*

A | I was in my mid-30s and I thought, if I’m going to do something, I better do it now. So, I resigned from my job and my plan was to find a job here and then go to nursing school part-time so I could pay for it. But I couldn’t get a job anywhere. I applied for job after job after job, the kind of work I had done, research jobs, all of it, and no one would call me back. I got no job interviews. I moved back in with my mom and ended up working as a substitute teacher, and I had a friend who was working on a Ph.D., so she paid me to help her, but my ego took a hard hit. I just kept praying and asking God for a job and finally I decided to fast. I believe very strongly in God and that he has a plan for everybody’s life, and I know now that I just couldn’t hear his plan because I had my own plan.

I fasted for 21 days, and every day I was praying for a job. No food, just liquids. That’s how desperate I was. I felt like my life was out of control. I was thinking that somewhere along the way God was going to say, ‘This job is for you,’ and around day 17, I just said, ‘God, I’m not going to ask you for anything today. You already know what I need, so I’m just going to praise you and just tell you how good you are.’ And in the midst of that, I just heard, ‘Go back to school.’

Six weeks later, I started taking the prerequisite classes for nursing. But something still didn’t feel right. I decided to go on a 40-day fast. I was desperate. But at the end of 40 days, I heard nothing. Then one morning, I was waking up, and I remember talking in my sleep, in that half-awake state, and I just said, ‘No, God. I’m not going to medical school.’ And then I woke up and I thought, ‘Well why did I say that?’ That had never been on the table. I went to class that day, and after my anatomy and physiology course I went to a tutoring session and the woman looked me in the eyes and said, ‘When you finish nursing, you need to go to medical school.’ And I thought, no, I’m too old, it’s going to cost too much, and I’m happy with nursing. But then I talked to her for a little while and she told me she felt very strongly that I was supposed to be in medical school. And that was the same day I was waking up and had that dream. So that next semester, I was at UH taking my prerequisites for medical school.

God just wanted me to get on his plan of going to medical school, because about a month into my time at UH, I went to visit the people I used to work for when I was an undergraduate there, and literally as I was walking out of the office, the dean of the Honors College came out and said, ‘Oh, I’m glad you’re here! We are in need of a sociology professor, would you be interested?’ So then I had my job. Everything fell into place.

Q | *What are your goals now? What do you hope to do once you complete medical school?*

A | The only thing I know for sure is that I want to continue to work overseas. My husband is from Haiti and when I was teaching at UH we would take undergraduates there every year to do medical work. We’d get doctors and nurses to come along with us. He grew up as an orphan and then became an assistant director of an orphanage that was run by an American nurse. She would have medical care teams visit and his job was to take those teams out to different parts of Haiti. So that’s something that I’m still very passionate about. I want to go to less developed countries and work, but specifically to take students. I really think it’s valuable for American students to see what’s happening in these other countries.

Q | *You seem to bristle against the traditional health care model in America, which requires patients to travel to a doctor or nurse’s office, or to a clinic or hospital, for treatment.*

A | People always have to come to the most educated and privileged people to get what they need, and to me, there’s something very wrong with that kind of model. We are privileged and we should be

taking everything we have, everything that we've been entrusted with, and we should be taking it out into the communities, just like those nurses in Ghana were taking it out to the rural areas, because they just don't have real access to it any other way. We need to develop some type of home health care or community health care, and I don't think it is enough to have a clinic in a community. I think we need to go to people's homes.

Q | *With so much need in the U.S., why is it important for Americans to continue their work overseas?*

A | It starts here. We need to do more of that here, a whole lot more. But it's also that sense of responsibility. That we've been entrusted with so much, and maybe we would not be so dissatisfied with our lives if we were giving more. I don't think I've ever looked at it in terms of a big, philosophical plan, but just that it's what we are supposed to do. Why else would we be given so many privileges here, when people in other countries are dying from things that we don't die from here? People are dying from TB, they're dying from a cut on the hand, and why is that? It's because we are very selfish. We have so much and we're so desperate to hold onto it, and I think that makes us very insecure and unsettled, because we're so worried about losing this very privileged position we're in. Overseas, you see how simple access to health care can liberate people—they're just people who want to live, just like us, and I guess maybe what my traveling has helped me know is that there's this shared understanding across humanity that we want to live productive lives and we want to have families, we want to have close relationships, and what can we do in order to have those things? Health care is just basic. Not having it inhibits us in ways I never imagined before I started traveling.

With that said, I'm not a believer that countries should be dependent, because I've seen it. From South Africa I was able to travel to a lot of different African countries and I got to a place where I just said, 'These countries are too dependent on the West, and that makes their lives so unstable.' Here in the U.S., we have our own ways of trying to police the world and make other countries more stable, but we're doing it on our terms, and so while that's stable for us, it's not stable for them.

I've been given so much. Even though everything that I had planned in my life has not worked out, at very critical moments people came into my life and they shared what they had with me, and every time it put me on a different trajectory that I never would have imagined. So why wouldn't I want to help do that for someone else? I just can't think of any other reason why I'm here.

Q | *You seem so driven. What keeps you motivated on the especially hard days?*

A | I was one of three kids raised by a single mom who didn't graduate from high school, and my dad didn't go beyond 8th grade. So many people could have fallen off the tracks just based on those circumstances, but we didn't. I was the first person in my family to graduate from college, and a lot of that had to do with my mom. My mom would say to me, 'What's the highest degree you can get?' And I said, 'Well, I think it's a Ph.D.,' and she said, 'OK, go and get that.' It was just so matter-of-fact for her, just so simple. She always encouraged me to keep going because, for her, there was no reason for me not to.

Q | *You are the oldest and presumably most experienced student in your medical school class. How has this shaped your time here?*

A | Most of my classmates are 20 years younger, and they are so much smarter than me. I'm not kidding you! They are sharper and faster. It's like that time when nobody was calling me for job interviews. It's been very humbling because I don't catch onto the information as quickly. I came from history and sociology where you're just reading all the time and it is mostly just theories, nothing concrete like memorizing the parts of the kidney. I think I've made this experience harder for myself because I want to read and I want to talk and discuss things, but there's no time for that. It's been a hard transition and emotionally challenging at times. But I think I bring something to the table. I'm patient and I love hearing their stories." ■

Health Care Behind Bars

Story by Alexandra Becker | Photography by Cody Duty

A nurse treats a patient in the Regional Medical Facility at the Estelle Unit in Huntsville, Texas.

A group of men gathered around a table in the geriatric wing of the Estelle Unit in Huntsville, Texas, for a game of dominoes. Behind them, a small television flickered with the day's soaps, and beyond that, a white-washed room separated by waist-high partitions exposed rows of state-issued cots strewn with magazines, Bibles, empty cups and headphones. Here on the inside, this is high-dollar real estate. It's air-conditioned and quiet, almost peaceful, absent of the endless buzz that bounces through the main hall where the general population of this maximum-security prison resides. On clear days, natural light beams through the small windows here and, if you're lucky, you might catch a glimpse of the feral kittens playing outside along the towering fences.

The inmates in the geriatric unit suffer from multiple medical diagnoses, which is how they gained access to this haven in the first place—a silver lining to their chronic obstructive pulmonary disease, high blood pressure or kidney failure. One man with advanced kidney disease had been paroled a few years prior after serving two decades. He was doing well on the outside, abstaining from alcohol and working for a group home in Fort Worth, cooking and cleaning and sometimes assisting with baths and overnight diapers. But he ended up back in the system because he couldn't get the dialysis he needed in the free world. At least in prison, he said, he had health care.

A DIY approach

The country's state prison population has grown by more than 700 percent since the 1970s, according to a report by the Vera Institute of Justice. In 1994, the Texas Correctional Managed Care program was created in response to growing concerns about overcrowding and access to health services in the state's prisons. With a mission to improve care while maintaining costs, the partnership between The University of Texas Medical Branch (UTMB), the Texas Department of Criminal Justice (TDCJ) and Texas Tech University Health Sciences Center has significantly changed how health care is delivered in Texas prisons.

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Assistant Warden Cliff Prestwood walks through a cell block in the Estelle Unit.

The pill window, where offenders are responsible for picking up their medications at a scheduled time each day.

Before, caring for Texas inmates took as much as 14 percent of the prison system's operating costs. One-on-one treatment was delivered by prison system employees and through fee-for-service arrangements with local hospitals, which generated little incentive to control spending. Staffing challenges at rural hospitals and rising rates of HIV and hepatitis C also burdened the system.

Today, through the Correctional Managed Care program, complete medical services are provided by the partnering universities, with UTMB treating close to 126,000 patients, or 80 percent of the state's offenders. The universities also manage the recruitment and hiring of all health care personnel, pharmaceutical operations, outpatient and ancillary services, and inpatient hospital encounters.

"We get the value of a health care entity providing health care services versus the correctional system, plus we have a better aligned compensation system in place because hospitals and universities are running the program," explained Owen Murray, D.O., MBA, executive director of clinical services and chief physician executive for the UTMB Correctional Managed Care program. "It's a win-win situation."

Comprehensive care

Entry to the W.J. "Jim" Estelle Unit involves passing through multiple checkpoints akin to post-9/11 airport security and prison guards unlocking cell blocks with extra-large brass keys. Offenders are dressed in head-to-toe white and instructed to walk alongside the walls between thick yellow lines painted on the polished concrete in the main hall. This is their entrée to their everything—the mail room, commissary, barbershop, law library, medical clinic, pill line, rec rooms and classrooms. It is a city unto itself, fostering self-sufficiency and accountability.

Medical care is available here 24 hours a day, seven days a week. The clinic inside the main building functions like a typical doctor's office and minor emergency room. Those with more serious health concerns are transported to the Regional Medical Facility (RMF) on campus, where patriotic murals painted by inmates cover the walls. Like the geriatric unit, offenders residing in the RMF must meet specific medical criteria. Many require an inpatient setting for ongoing nursing and IV care.

> "They're not sick enough to be in the free world, but not well enough to be anywhere else inside."
>
> — SHELLY HANSON
> *Director of nursing at the Estelle Unit*

"They're not sick enough to be in the free world, but not well enough to be anywhere else inside," explained Shelly Hanson, director of nursing.

All told, Estelle's comprehensive medical capabilities range from primary care to UV therapy for skin conditions to dental services. The regional laboratory for the prison system is also on-site, as well as an ambulance service for offenders on other campuses or emergencies at the RMF. For highly specialized care, prisoners are transported to a free world hospital or a prison hospital in Galveston managed by UTMB.

Delivering services on-site reins in millions in otherwise necessary expenditures. According to Laura King, nurse supervisor, the RMF's dialysis unit alone saves the state $6 million a month.

"We have a lot of individuals who are not going to be getting out, so we are going to be dialyzing a long time," King explained. "It's unbelievable the amount of money this facility saves the state when you look at the ancillary staff and security required to send them out to a free world hospital."

According to Murray, that $6 million in savings translates to a cost that is seven times less than other states, most of which contract with an outside company for dialysis treatment.

"It just makes sense to do it ourselves," he said.

Aging population

Only a small portion of the prison population needs dialysis—a process that takes on the natural work of kidneys and eliminates waste and water from the blood—but it is an expensive procedure most commonly required for older patients. And as the prison population continues to age, the cost of caring for older inmates will rise.

The number of state and federal prisoners age 55 or older increased 204 percent—from 43,300 to 131,500—between 1999 and 2012, while the number of inmates under 55 increased by just 9 percent over the same time period, according to a recent report from the Pew Charitable Trusts and the John D. and Catherine T. MacArthur Foundation. Pew cites a National Institute of Corrections study that pegs the annual cost of incarcerating prisoners 55 and older with chronic and terminal illnesses at, on average, two to three times that of the expense for other inmates.

(continued)

UTMB TREATS CLOSE TO 126,000 PATIENTS, OR

THROUGH THE CORRECTIONAL MANAGED CARE PROGRAM. TEXAS TECH UNIVERSITY TREATS THE REMAINING 20%.

A patient on his cot in the geriatric wing of the Estelle Unit.

In the Count Room at the Estelle Unit, rows of colored tags serve as a visual census for every offender in the facility.

Prisoners Have a Right to Medical Care

"Under the landmark 1976 Estelle v. Gamble decision, the U.S. Supreme Court affirmed that prisoners have a constitutional right to adequate medical attention and concluded that the Eighth Amendment is violated when corrections officials display 'deliberate indifference' to an inmate's medical needs. The manner in which states manage prison health care services that meet these legal requirements affects not only inmates' health, but also the public's health and safety and taxpayers' total corrections bill."

Source: State Prison Health Care Spending: An Examination, *a report from The Pew Charitable Trusts and the John D. and Catherine T. MacArthur Foundation*

It's an issue made worse by the fact that prisoners are more likely than the general population to report ever having a chronic condition or infectious disease, with 40 percent of state and federal prisoners and jail inmates reporting current chronic medical conditions, according to a National Inmate Survey published by the U.S. Department of Justice.

Many offenders in the Estelle Unit will die on the inside. More and more will require increasingly expensive medical care and infirmary placement. But where will they go, when much of Estelle's medical slots are already at max capacity? Releasing older offenders with a low likelihood of committing a crime has been proposed, but how would the justice system determine criteria, especially when life sentences are on the line? It's a problem the state legislature will have to address, and soon.

"When I started in '95, we had open infirmary beds, but now they're filled 100 percent of the time, and the number of those patients who are permanently assigned has grown each year," Murray said. "Right now, about 70 percent of our total beds are filled with offenders who will never get out of here."

WITH A CURRENT CHRONIC CONDITION TAKE PRESCRIPTION MEDICATION*

Blister packs

Each prison in the state of Texas has a Count Room, where rows of colored tags hang from tiny hooks on a wall. It's a visual census, a physical database of every offender in the facility, their tags marked with height, weight, age, medical restrictions, custody levels and whether or not they require a bottom bunk due to strength and mobility. The tags are color-coded by race—blue for black, red for Hispanic, white for white. Offenders are separated into different wings based not on race, but on age and stature; individuals in each group can be no more than

15 years, 6 inches, and 60 pounds apart. Like everything the prison system does, it's deliberate. It is not like it is in the movies.

Doling out prescription drugs to inmates is no different.

Early on, UTMB determined that the most efficient and cost-effective way to dispense drugs to inmates was through its own pharmacy, now housed in an unmarked Huntsville building that used to be part of a strip mall. It's a huge, highly organized production with custom-made conveyor belts and automated machines that fill, seal and label 30-day-supply blister packs, which is how almost every drug in the prison system is bundled. The method is proven to enhance sanitation, safety and accountability throughout the supply chain. The blister packs also allow for reclamation; facilities can return unopened pills for credits, which has saved the state an average of $8.2 million a year, according to Melanie Roberts, assistant director of operations at the pharmacy.

Orders are sent through the electronic medical record system, and the pharmacy fills approximately 20,000 prescriptions a day, serving 130 facilities throughout the state, including TDCJ and the Texas Juvenile Justice Department, as well as a handful of county jails.

"It's another example of where we're taking full responsibility," said Murray, who has been working in the prison system for nearly 30 years. "We've realized the cost of dollars we can save by doing it ourselves is much more of a value to the state than contracting it out."

And because UTMB runs the entire operation, they are eligible for 340B Drug Discount Program pricing, which requires drug manufacturers to extend the lowest possible cost to hospitals with substantial low-income patient loads.

The pharmacy offers a 24-hour next-business-day turnaround time and works in conjunction with the Correctional Managed Care program's robust telemedicine practice to ensure patients in need of pharmaceuticals—everything from amoxicillin to Zyrtec—receive them as quickly as possible.

Since most facilities in the state cannot cater to medical needs the way the Estelle Unit does, telemedicine fills the gaps, allowing inmates to be seen quickly without spending additional dollars staffing full-time providers or reimbursing mileage. The telehealth program serves 83 facilities across the state.

"As a primary care provider, I can take care of most cases through telemedicine," explained Ruth Brouwer, a physician assistant who transitioned to the UTMB telehealth team after being attacked by a cuffed inmate with a knife. She now works in an office building in Conroe and serves far more patients on a daily basis than she did in the field. "I can order labs, follow up on labs, talk directly to patients and share data through the EMR."

According to Murray, efficient delivery of primary care services is one of the most important aspects of the telehealth program, for both quality and cost.

"If we didn't have telemedicine, we may miss an opportunity for early intervention and treatment," Murray said. "Seeing Ruth provides a great opportunity for us to improve care and decrease cost."

In addition to cost savings, general health compliance has surged, as well. Compared to national benchmarks like HEDIS—the Healthcare Effectiveness Data and Information Set, a tool used by the vast majority of health plans in the U.S. to measure performance—the Correctional Managed Care program surpasses national benchmarks in the management of diabetes, hypertension and asthma.

"We compare incredibly well, and rightly so, probably because we know where our patients are, we don't lose them to follow up, and I can tell whether they're taking their meds or not," Murray said. "So we've got some controls in place that really do help us do a better job than compared to the free world, where I'd see you in my office and I just hope that you're going to take your meds and follow your diet and come back."

ARE OVERWEIGHT, OBESE, OR MORBIDLY OBESE*

New tricks

Despite the program's victories, challenges threaten its momentum. Diseases like HIV and hepatitis C strain its resources. HIV drugs account for 40 percent of the pharmacy's total budget, with less than 2 percent of the offender population infected.

"HIV drugs are always changing, the disease is changing, and every year we get new guys coming in so we're always starting the clock again, always doing more workups, always finding more disease," Murray said.

Frustratingly, all too often he sees offenders whose disease was controlled in prison neglect treatment after being released.

(continued)

> "We've looked at every aspect of our care provision and our health system and are always looking for ways to improve things and cut costs, but eventually, you kind of run out of new tricks."
>
> — OWEN MURRAY, D.O., MBA
> *Executive director of clinical services and chief physician executive for the UTMB Correctional Managed Care program*

The Texas Correctional Managed Care program operates its own pharmacy, using a custom-made conveyor belt and automated machines to fill approximately 20,000 prescriptions a day.

"Three years later they come back and the HIV isn't controlled because they didn't take their meds," he said. "Now all of a sudden what was maybe a $500-a-month regime is now $5,000."

Although horrified, Murray gets it. "Am I really going to be worried about following up with mental health or going to the doctor for my HIV care when I don't have a home, I don't have a job, and I have no food?"

Controlling hepatitis C is even more challenging, with its prevalence considerably higher in prisons compared to the free world.

"Curative treatment runs about $80,000, but if you do the math, that becomes a significant economic challenge for the state," Murray said. "Then there's the ethical question of whether every inmate should get that kind of treatment. And then there's the public health concern that we've got all these high-risk groups, known patients, and we could actually begin to eradicate the disease if we really had an aggressive treatment program in prisons and jails. It's a clinical issue and a public health issue, but, ultimately, it's a cost issue."

While the program has restrained costs in every corner it could find, ongoing funding is essential. The RMF is in dire need of new dialysis chairs, the telehealth network could benefit from higher bandwidth and updated technology, and staff need their salaries. Even in the pharmacy, where achievements in automation and efficiency feel futuristic, the most proficient tool for the simple yet critical job of peeling labels off returned blister packs turned out to be hands.

"We try to be judicious and respectful of the fact that there's not an infinite amount of dollars out there to take care of these patients, yet we're going to do what's necessary in terms of a reasonable clinical level of care and expect a reasonable clinical outcome," Murray said. "We've looked at every aspect of our care provision and our health system and are always looking for ways to improve things and cut costs, but eventually, you kind of run out of new tricks."

An alternate ending

Thirteen miles south of the Estelle Unit is the Huntsville Unit, nicknamed "the Walls." It is the oldest prison in the state and home to the execution chamber, the busiest in the nation. Like all prisons in the area, it is built with a ruddy red brick, which stands in stark contrast to the glistening brass railings guarding the entrance. As the legend goes, these railings have been polished daily since the prison's opening in 1849.

Each day, there is a release. Men from the Estelle Unit and other regional facilities serve their time, and when they make parole they are transferred to the Walls. Across the narrow street, mothers, fathers, lovers, sons, cousins and friends sit on picnic benches under trees, waiting. If an inmate is lucky, he will be met there with a handshake or an embrace. He may feel grateful, even blessed that he didn't leave in a wooden box on its way to Boot Hill, where unclaimed prisoners lie buried. Or he might scan the crowd, hold his breath until he is absolutely sure, then walk to the Greyhound station alone. He will worry about housing and food, his past and his future. And if he is ill, he will worry about how to manage his health—today and every day—in the free world. ■

** Statistics collected from the* 2011-12 National Inmate Survey *published by the U.S. Department of Justice*

ON THE SIDE

NAME: Dianna Riall, RN

OCCUPATION: Clinical research nurse at The University of Texas MD Anderson Cancer Center

INTEREST: Art Car Parade

At the moment, clinical research nurse Dianna Riall, 45, is working on an immunotherapy trial for patients suffering from stage 4 sarcoma. She helps enroll patients, screens them for clinical trial eligibility at The University of Texas MD Anderson Cancer Center, and coordinates their care.

Patients in the clinical trial range in age from 20 to 80 and many had no other option but the traditional radiation and chemotherapy treatment. Some didn't want to put their bodies through the grueling regimen. Others wanted to try any and every treatment available.

It's a difficult experience for the patients and their families, but it can also be an emotional process for Riall and other medical staff.

"We should have outlets because we work with cancer patients and it can be very, very sad and stressful," Riall said. "We need to do as many good, fun things as we can."

Riall's outlet is volunteering with Houston's annual Art Car Parade, organized by the Orange Show Center for Visionary Art. On April 8, approximately 250 mobile masterpieces will roll through the streets of the city to celebrate the creative, eclectic and often cheeky artistic minds in the area.

Since 2007, Riall has been involved with the Art Car Parade in various ways. She has dressed up as a belly dancer—complete with a bejeweled blouse, harem pants and veil—for her friend's "Jeannie in a Bottle" car entry. She has meticulously sorted through a plethora of plastic jewelry for her 17-year-old daughter's glam rock-inspired Art Car entries from Heights High School. And she has skated in neon-colored wigs and wacky outfits alongside cars to help with crowd control.

In 2009, Riall participated as a skater in her first Art Car entry, a politically-minded artistic presentation mocking the 2008 financial crisis. She dressed as an AIG banker clown, with a full face of makeup, a fuchsia wig and dollar sign glasses.

But Riall hasn't always been a strong skater. She tumbled down a hill on Allen Parkway during her first time volunteering as a crowd control skater.

"The police were nice enough to stop, pick me up and drive me to the top of the hill," she said. "It didn't ruin my day, but it definitely scraped up my knee pads and my phone a bit."

Today, after years of practice, she's a pro.

"It's really fun to just get to cruise back and forth with all the crowd and wave," she said. "You can see all the cars up close and personal."

While she'd like to zip and weave through the parade again, she's still recovering from a foot injury she sustained at the Houston Renaissance Fair last November. She broke her foot in five different places and was placed in a boot cast for six weeks. She had the cast removed Feb. 6, but she's "still kind of on probation" with her foot.

This year, she'll ride in the parade on artist Ken Crimmins' Art Car entry, a former SWAT bus from Midlothian, Texas, that's been converted into a magical mystery tour bus and outfitted with a full-length roof deck and rear porch for Art Car shenanigans.

"I enjoy wearing wigs and the kinds of things that don't make me look so noticeable because I'm always like, 'Oh no, what would people think?'" said Riall, a natural introvert.

Riall is deeply rooted in the Art Car community. When she's not helping artists decorate or skating around during the parade to keep enthusiasts away from the cars, she and her friends meet once a week to skate around town for 15 to 20 miles, stopping here and there to have a drink. She even met her husband, Russell, a fellow Art Car enthusiast and volunteer, through this circle of friends.

"They're all very generous, giving and good, down-to-earth people," Riall said. "They just like to have fun and be creative." ■

By Shanley Chien

ART CAR PARADE

WHEN: 2 p.m., Saturday, April 8

WHERE: Downtown Houston along Smith St.

DETAILS: Cheech Marin is Grand Marshal of the 30th annual parade, powered by the Orange Show Center for Visionary Art

INFO: thehoustonartcarparade.com

Silent Professors

Individuals who willed their bodies to science live on through the medical students they teach

By Shanley Chien

One of the rooms in the gross anatomy lab at Baylor College of Medicine houses 24 steel tanks. There, 24 "silent professors" await their class.

Last August, first-year medical students stepped into this cold, sterile room for the first time, the smell of formaldehyde embalming fluid lingering in the air. Entering this space is a rite of passage for medical students. It marks the beginning of the most important part of their training and, for many, their very first encounter with death.

"Even though we hadn't filed into the room yet, I remember this sensation of thinking the room already felt very full because you could sense the aura," recalled Sarah McGriff, a first-year medical student at Baylor. "Even though I hadn't opened the tank yet, there were 24 people in this room already. There was that weight and sense of … aura. There are people in here, people who have had lives and things that happened before us that we can't possibly know of."

The bodies are donated through the school's Willed Body Program, which oversees requests from individuals who wish to contribute their bodies to science. Since its inception in the 1940s, the program has received more than 11,000 donor bequests, averaging 100 donations each year for the sole purpose of helping educate future doctors, prosthetics and orthotics clinicians, nurse anesthetists, physician assistants and other allied health professionals.

Throughout their 30-week anatomy training, medical students attend lectures, memorize key terms and spend Tuesday mornings in the lab, where they use scalpels, forceps, probes and scissors to pick apart the intricate anatomical structure of the human body. Each lab starts with a "Kretzer moment," an homage to the late Francis Kretzer, M.D., a beloved Baylor educator who instilled in his students a deep appreciation and respect for the donors.

Sarah McGriff, right, a first-year medical student at Baylor College of Medicine, lights a candle during a ceremony to honor donors to the Willed Body Program.

Dissecting bodies can be an overwhelming experience that requires a certain level of desensitization and emotional detachment. But during the Kretzer moments, one student from the lab recoups a little bit of that humanity by reading a poem to thank and commemorate the donors for their generous service.

"Our donor housed a person, housed a soul." McGriff said. "I became so attached to that."

> "When I made that first incision, I was being so careful, not wanting to cut any deeper … I didn't want to hurt her, almost. I didn't expect that to be as difficult as that was."
>
> — SARAH McGRIFF
> *First-year medical student at Baylor College of Medicine*

Meeting face-to-fascia

In the gross anatomy lab, donors are more than the students' silent professors. They are the students' first patients.

Their identities—names, ages and personal histories—are withheld from students, in order to protect their privacy. By the time the donors reach the gross anatomy lab, they have been assigned a serial number and a group of students.

McGriff's donor was an older female, most likely in her 60s or 70s, who died of breast cancer. After McGriff and her team peeled back the towels that covered the body, they discovered that the donor was heavier set and average height, with a scar running down her abdomen from a previous surgical procedure. Her wrinkled skin had turned a greyish hue, with the slightest hint of purple and green, from the chemicals in the embalming fluid, but her nails still bore a pop of pink nail polish.

The stubble on her head, shaven from the cadaver preparation process, revealed vestiges of silver hair.

While other groups named their donors—names including "Al" and "Esther Rose"—McGriff and her all-female team couldn't decide what to call their cadaver.

"We could all relate with every single part of her body and her experience. We just couldn't think of a name that would encompass the whole thing," McGriff said. "'She' and 'her' were such powerful words in and of themselves."

Once acquainted, the dissections began. Each student picked up a scalpel, placed the blade on the cadaver's skin and made the initial incisions. First, a vertical slit was made from between the shoulder blades, along the spine to the lower back, followed by a horizontal cut from one end of the shoulder to the other, to create a T-shape opening, intimately revealing the inner workings of the human body.

The technicality of the initial incisions is relatively easy, but it's the emotional attachment that makes the process extremely uncomfortable.

"When you have to face death, you think of it as something that is fragile and fleeting," McGriff said. "When I made that first incision, I was being so careful, not wanting to cut any deeper … and being so absolutely careful with everything because I didn't want to hurt her, almost. I didn't expect that to be as difficult as that was. Your cadaver is there for you to learn from, but at the same time, I was still thinking this was a real person."

Over the weeks, the students carefully peeled back the skin, sliced through layers of fascia, navigated around different muscles and meticulously extracted the vast networks of nerves and blood vessels.

McGriff and her tankmates even discovered remnants of breast cancer in their donor's chest.

The cancer "probably defined how she and her family thought about the world," McGriff said, recalling her own grandmother's battle with breast cancer. "It became something we could physically hold and touch. That, to me, was mind-boggling."

The real deal

In recent years, medical schools around the country have considered eliminating the use of cadavers, citing time-consuming labs and high costs.

New technology provides students with comprehensive and highly detailed medical atlases on tablets; 3-D software that can display every muscle, nerve and bone in the human body; and interactive virtual reality systems that provide medical training without spending hundreds of thousands of dollars on operating costs for cadaver dissections.

Furthermore, companies such as Tampa, Florida-based SynDaver Labs, can even manufacture lifelike "synthetic humans" to replace the use of cadavers in medical school training and surgical simulations. SynDaver Labs' human anatomy models are realistic—complete with bones, joints, muscles, tendons and organs—and serve as a unique educational tool.

But traditionalists disagree with this new approach. While advanced computer tools and realistic models may save students time and medical schools money, curtailing the dissection experience will undoubtedly come at the expense of the students' skill development.

"Despite the fact that there's a lot of software that you can use to practice on, the reason you want to have an experienced surgeon is because they have experience not through a simulator," said Shayan Izaddoost, M.D., Ph.D., chief of plastic surgery at Ben Taub Hospital, who matriculated at Baylor under Kretzer. "There's so much of surgery that requires you to feel the tissue, know how it gives, know where each plane is based on feel and intuition. It's very difficult to do that through a simulator."

Working with cadavers also prepares students to cope with the emotional gravity of dealing with patients.

"There are so many intangible lessons that have nothing to do with the anatomy and that come from the gross anatomy lab for the students. It would just be a mistake to take it away," said Sarah Blutt, Ph.D., Baylor associate professor of molecular virology and microbiology and former anatomy teaching assistant.

"For many of them, it's the first time they've seen a deceased individual and it's about learning to accept that, how you feel about that and how you deal with the emotions of that," she added. "For some of them, it's the first time they've seen a member of the opposite sex fully unclothed. These are important things they have to get through before they see patients for the first time."

Eternal life

By the end of Baylor's 30-week term, the first-year students had a chance to return to the gross anatomy lab to say thank you and bid farewell to their donors, placing a white rose in the tank along with the remains.

Alone in the lab, McGriff stood by her tank, preparing to say goodbye.

"It still felt like there was an aura there, but I didn't have the same sort of nervousness I had when I first came in and it felt heavy," she said. "It was more familiar to me and I was more comfortable with that weight."

McGriff had written a poem and shared it with her donor during their final moment together.

"We gave so little in comparison to our donor, but we received so much," McGriff said. "The first patient I see in clinic won't be my first patient. It'll be my second patient. Everything I have learned from my donor is something I want to honor and respect and bring that forward into my practice. The donor provided a service to us and it was a privilege to work with that donor just as it is a privilege to work with any patient and their family."

> "We gave so little in comparison to our donor, but we received so much. The first patient I see in clinic won't be my first patient. It'll be my second patient."
>
> — SARAH McGRIFF

The donors' bodies can be used for up to three years in the gross anatomy lab. After that, Baylor cremates the bodies and returns them to families upon request.

It's an emotional process, but the willed bodies are an "amazing gift" to the students and faculty, Blutt said.

"I'm so appreciative that even in death, these individuals are still giving," she said. "They've left a piece of themselves with each one of the medical students, who are going to go on and heal people. In some views, that's eternal life. You're living forever through all the medical students, all the people they touch and all the people they teach." ■

Auto Play

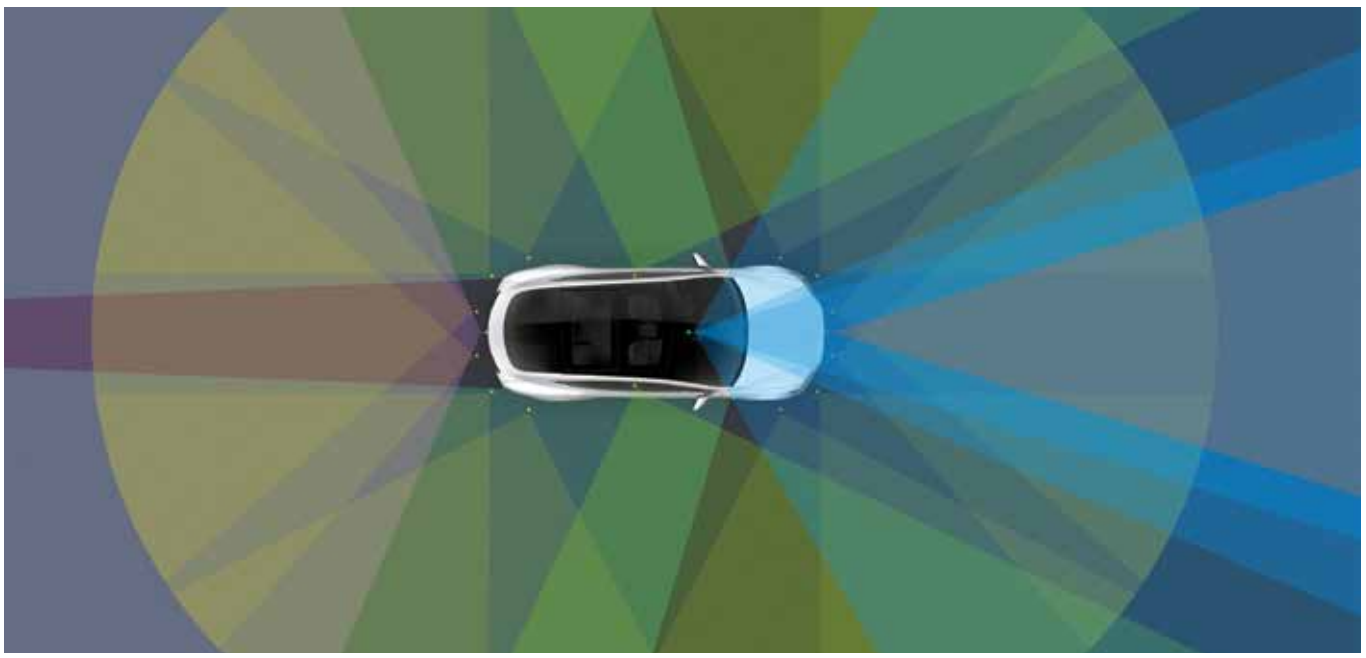
The Texas Medical Center is named an automated vehicle proving ground

By Shea Connelly

From Knight Rider's car to the Batmobile, automated vehicles have long been a fixture in popular culture. As companies like Google, Tesla and Uber experiment with automation, what was once science fiction may soon be a reality.

But before the highest levels of automation can be made available to the average consumer, the vehicles need to be tested. A recent designation by the U.S. Department of Transportation (DOT) has the potential to bring the Texas Medical Center to the forefront of testing innovative forms of transportation.

Given that Texas is the second most populous state in the country and home to five of the nation's 11 fastest-growing cities, state leaders decided it was an ideal location for experimentation. Thirty-two municipal and regional partners in Texas joined three research institutions—Texas A&M University, The University of Texas at Austin and Southwest Research Institute—to form the Texas AV (Automated Vehicle) Proving Ground Partnership. At the beginning of 2017, the partnership was selected by the DOT as one of 10 testing regions.



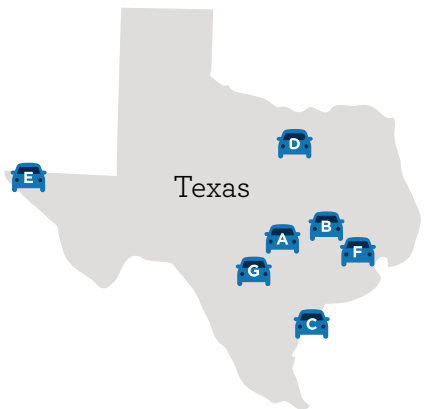
Last fall, Tesla unveiled hardware to enable fully autonomous vehicles. Features include eight cameras providing 360-degree visibility, 12 sensors to detect obstacles, and radar that can travel through inclement weather and even in front of another car ahead. Credit: Tesla

Each of the institutions is already studying various aspects of vehicle automation, which is likely part of what made the Texas AV Proving Grounds Partnership attractive to the DOT: it encompasses the full ecosystem of vehicle automation research, testing and implementation.

"We can take automated vehicle research coming out of our three research entities and migrate it to pilots and demonstrations in real-world urban test sites around Texas," said Christopher Poe, Ph.D., assistant director of connected and automated transportation strategy at the Texas A&M Transportation Institute.

Among the 32 partners is a group known as Team Houston, which consists of Houston-area institutions, including METRO Houston, Port of Houston and the Texas Medical Center (TMC).

THE TEXAS AV PROVING GROUND PARTNERSHIP



A ***Austin Area***
City of Austin, Central Texas Regional Mobility Authority, Capital METRO, Capital Area MPO.

B ***Bryan/College Station Area***
City of Bryan, City of College Station, and Brazos Valley Council of Governments.

C ***Corpus Christi Area***
City of Corpus Christi and Corpus Christi MPO.

D ***Dallas/Fort Worth/Arlington Area***
City of Arlington, City of Dallas, City of Fort Worth, City of Grand Prairie, North Central Texas Council of Governments, Tarrant County, Denton County Transit Authority, University of Texas at Arlington.

E ***El Paso Area***
City of El Paso, County of El Paso, and Camino Real Regional Mobility Authority, and El Paso MPO.

F ***Houston Area***
Houston METRO, City of Houston, Harris County, Port of Houston, Houston-Galveston Area Council, Texas Medical Center, University of Houston.

G ***San Antonio Area***
City of San Antonio, VIA Transit, Alamo Area MPO, Joint Base San Antonio.

Source: Texas AV Proving Ground Partnership

"We understand this will take significant involvement from the private sector, and we want to attract that business to Houston and to the state of Texas," said Lauren Cochran, director of innovation at METRO and one of the leaders of Team Houston. She added that the TMC was of particular interest due to "the volume of people who work there and the transit that exists in that corridor. That kind of urban environment, we think, would be good for testing low-speed automated technologies."

Some of those technologies could include automation that enables first responders to travel more easily and quickly in emergency situations, Poe noted, which would be valuable in the largest medical center in the world.

"Emergency vehicles could use the technology to broadcast that they are approaching directly to vehicle drivers, giving them earlier warnings to move out of the way. Or, with more fully automated vehicles, they could be programmed to pull to the right," Poe said. "More detailed information could be shared between vehicles to help responders navigate through traffic."

Multiple levels of automation

While the words "automated vehicle" may bring to mind the image of a car or bus hurtling down the highway without a driver, there are multiple levels of automation. The National Highway Traffic Safety Administration has outlined six levels, ranging from zero, meaning the driver is fully in control, to five, which refers to a vehicle that "can perform all driving tasks, under all conditions that a human driver could perform them."

Some vehicles on the market are semi-autonomous, possessing the technology to assist drivers with tasks such as parking or braking quickly if an obstacle appears suddenly in the road. But no automaker currently offers a consumer vehicle with level 5 autonomy. At the end of 2016, however, Tesla CEO Elon Musk announced he expects the company to be testing level 5 vehicles by the end of 2017 that can drive from "a home in L.A. to Times Square ... without the need for a single touch, including charging."

The driving force behind all levels of vehicle automation is safety. More than 30,000 people are killed in auto accidents each year in the U.S., according to the Centers for Disease Control and Prevention, and that number is rising.

"Automated vehicle technologies are designed to reduce the human error in crashes by helping to prevent accidents from vehicles running off the road, crashing into another vehicle or crashing into an obstacle," Poe said.

Aside from improving safety, the Texas AV Proving Ground Partnership also wants to enhance high-capacity transit and solve what's known as the "first and last mile" problem. This refers to the issues involved in getting commuters from their homes to transportation hubs and vice versa. As the distance to transportation hubs increases, the number of public transit users decreases.

"If we could use automation or autonomous shuttles to make those connections to transit, that would solve a challenge urbanized areas face," Cochran said. This would both reduce the number of cars on Houston's crowded roadways and make the city more accessible to people who don't own cars or can't afford them.

The first step toward bringing automated vehicles to the Texas Medical Center will be to assess how they can best contribute to efficiency, quality and safety of transportation in the area, said Abbey Roberson, TMC vice president of planning.

"What problem are we trying to solve and what opportunities do we see?" Roberson said. "From there, we'll figure out the technologies we could potentially use to solve these problems and how to best team up with the private industry piloting those technologies."

All of the 10 selected testing sites will offer guidance to the DOT on how to best test the new technology, Poe said. While the DOT did release an official policy in Sept. 2016 addressing automated vehicles, the field is changing swiftly and the department expects to make improvements and updates to the policy.

"The DOT is interested in the 10 regions giving guidance on what needs to be tested, how it should be tested, whether we need to develop consistent guidelines to cover all 50 states," Poe said. "A lot of the first year will be spent developing those documents to guide this forward."

While fully automated vehicles will not be taking over the roadways any time in the very near future, Roberson said the TMC is committed to remaining on the front lines of new technological developments.

"We have to always be thinking about how these opportunities with technology will impact us in the future," she said. "In 15 years, will we all be using driverless cars? We don't know the answer to that, but we have to be thinking about it, be progressive and make sure we consider these advancements as we make long-term decisions for our campus."

A Community Bridge

Together, Cuney Homes residents and UH students learn to be community health workers

By Christine Hall

Sylvia Guilliam furiously takes notes as photographs of babies, families and pregnant women flash in front of her. The images are part of a PowerPoint presentation by Michelle Catalano, director of library services for the health sciences at the University of Houston.

Catalano asks the group of about 10, which includes Guilliam, if the photos are accurate portrayals of health situations that could be used in marketing materials.

At first, Guilliam thinks the photo of a thin woman in exercise clothing, stretching on the ground, would be a good image to convey "exercising while pregnant." But when she sees the second photo of a woman with a defined baby bump, she changes her mind.

"You can definitely tell that second woman is pregnant," she said.

Guilliam is halfway through a 14-week Community Health Worker Training and Certification Program conducted by the University of Houston Honors College. So far, she and her neighbors at Cuney Homes, where classes are held, have learned how to spot possible allergens in a home, how to identify health care needs, what community health workers do, and where jobs for health workers are available.

Community health workers often live in the neighborhoods they serve. They help disseminate health care information, motivate patients to manage chronic health issues and connect patients to available resources.

Sylvia Guilliam, left, and Nour Haikal, lower right, practice looking for mold in the kitchen of the Cuney Homes' recreation center.

Cuney Homes, in Houston's Third Ward near Texas Southern University, is the city's oldest public housing complex. Opened by the Houston Housing Authority in 1938, the complex has undergone extensive renovation and holds more than 500 apartments for residents who, as Guilliam puts it, "have a lot of stressors in their life."

That includes her. She said at times she felt powerless when dealing with the health care system, especially during the loss of her mother at an early age due to heart problems. Guilliam also lost her husband. Four years ago, she decided to seek advice from people who could help her sort through those feelings, even studying with a Buddhist monk.

"I wanted to connect with my internal health and address the anxiety of losing my mom and husband," Guilliam said.

When she moved to Cuney Homes two years ago, she could sense that same feeling of powerlessness in her neighbors, who were fighting anxiety and financial pressures, as well. Having found her own inner peace, Guilliam wanted to share that with the people around her. She started to work with the YMCA, integrating health education with programs that teach science, technology, engineering and mathematics (STEM) to children.

A class made up of University of Houston students and residents from Cuney Homes learn about becoming community health workers.

"Bringing awareness to health in a STEM way allows the kids to get that hands-on training about their health early on," she said.

And then she joined the Community Health Worker Training and Certification Program.

This is the first year of the UH program, launched by Dan Price, Ph.D., who directs a number of interdisciplinary projects on community health and data at UH Honors College; and Erica Fletcher, Ph.D., a visiting scholar at the Honors College and program director for honors in community health. They believe the program can help change the way health care is perceived, by reducing cultural and socioeconomic obstacles and becoming a bridge between doctors and patients. UH students and residents of the community take the classes side-by-side.

"The health care system is too top-down, which is why some programs have done so poorly," Price explained. "People don't feel ownership. When you have a project-based program, like this one, there is collaborative learning from the end users, so people feel engaged and are able to find the information they need."

Training to be a community health worker takes 160 hours. There is flexibility for those who need to work other jobs, be caregivers to family, or fit the training into their UH class schedule. UH students don't receive course credit for completing the program, but they do receive community health certifications from the state.

Nour Haikal, a freshman pre-law student, says the certification will help her continue her work with Syrian refugees in Houston. A Syrian-American, Haikal acts as an advocate for the families already here, helping them navigate the complex web of Houston's health care system.

"There are a lot of mental health issues as a result of them coming from a war-torn country," Haikal said. "The things they tell you about their struggle to cross the border are heartbreaking. I want to help them figure out the resources that can help them."

Michelle Catalano, director of library services for the health sciences at the University of Houston, explains health care marketing materials.

In some cases, community health workers can pick up the slack where a clinic or school nurse leaves off. For example, a community health worker could go to the home of a child with asthma to determine if the asthma is triggered by something in the home.

Communication between the different groups involved in the program has had its challenges. Not everyone in the class has ready access to a computer or the Internet, and not everyone is digitally literate. As a result, homework assignments had to be coordinated differently so that everyone could participate, and UH students were paired with residents who needed help, Fletcher said. In addition, schedules had to be tweaked so participants had time for classes, jobs and caring for children.

"Ultimately, the groups figured out how to use their strengths to work together on projects," Fletcher said.

The classes at Cuney Homes are part of a bigger program at The University of Texas Health Science Center at Houston (UTHealth) School of Public Health's Texas Public Health Training Center. Other Texas Medical Center institutions—including Harris Health System, Houston Community College, Texas Southern University and Texas A&M University Health Science Center—have similar programs.

UTHealth started these community efforts nearly 20 years ago to help keep people out of emergency rooms and educate them about preventative care, said Rosalia Guerrero-Luera, program manager for the Community Health Worker Training Program at UTHealth School of Public Health.

"We found the best way to do that is through a peer who can build a bridge between them and the health care system," she said. "We call them 'friends with benefits' because they have empathy for the person they are working with. They've been in their shoes—they take the bus, they get the kids to school, they may not have the best type of insurance, but they help them know there is a place for them. They don't have to do this alone."

Guilliam is looking forward to getting her certification from the UH program.

"This gives us an outlet to give direction to people, so they can do things like get to the store and know which food to buy to be healthy, or deal with the stressors in their life so they can grow." ■

> "The health care system is too top-down, which is why some programs have done so poorly. People don't feel ownership. When you have a project-based program, like this one, there is collaborative learning ..."
>
> — DAN PRICE, PH.D.
> *University of Houston Honors College*

A Military Match

Fourth-year medical student Courtney Clutter will follow in her family's footsteps

By Shanley Chien

Joining the military was always in Courtney Clutter's blood. Her grandparents enlisted in the United States Air Force and her parents, Keith and Paula Clutter, served in the Air Force as a reserve colonel and lieutenant colonel, respectively.

"It's a family tradition," said Clutter, a fourth-year medical student at McGovern Medical School at The University of Texas Health Science Center at Houston (UTHealth). "Growing up with them as parents, they instilled in me a sense of patriotism and a desire to serve our country. They never pushed me to join. It was just an internal thing that I grew up with wanting to do, eventually, at some point in my life."

That point has finally come.

Each year, nearly 40,000 fourth-year medical students compete for 30,000 residency positions across the country. National Match Day, held annually on the third Friday in March, is the culmination of countless hours studying and memorizing medical terms, attending lectures, practicing in the lab and working through clinical rotations.

The residents who are matched will go on to become doctors, but Clutter will earn the dual title of "doctor" and "captain," serving as a military physician in the Air Force.

While more than 200 fourth-year medical students at McGovern Medical School anxiously awaited the results of their match on the morning of March 17, Clutter learned about her match to the San Antonio Military Medical Center in December 2016, when the Air Force and other military branches announced their matches.

"It was pure excitement to get my first choice and to know that the next three years of my life are set for me," Clutter said. "I think it's going to be a lot starting residency and entering that new chapter, but it's going to be just like med school in terms of a lot coming at you and just taking it in—taking it step by step."

> "With the prevalence of diabetes increasing so much, I know there's definitely a need for people working in endocrinology. I'm very excited for the opportunity to care for the people who've sacrificed a lot to defend and serve their country."
>
> — 2ND LT. COURTNEY CLUTTER
> *Fourth-year medical student at McGovern Medical School at The University of Texas Health Science Center at Houston*

Her father, who worked as an aerospace engineer, currently runs his own military consulting firm. Her mother retired from the Air Force in 2016 and is now a nursing professor at Texas Woman's University.

Clutter, 25, was born at the Elgin Air Force Base in Florida, where her parents met. She grew up watching them come home from work each day in their camouflage Airman Battle Uniforms or dress blues. Their leadership and passion inspired Clutter to join the military and explore both engineering and nursing careers. Ultimately, though, she realized she wanted to be a doctor.

Determined to pursue a career that married both her military and medical ambition, Clutter joined the Air Force's Health Professions Scholarship Program in 2012 during her senior year at The University of Texas-Austin. The program covers full tuition for prospective military physicians, dentists, nurse practitioners and other allied health professionals, alleviating the financial burden of medical school.

As part of the program, Clutter completed a mandatory five-week commissioned officer training in June 2013, prior to the start of medical school. The following year, she attended a two-week aerospace medicine program at Wright-Patterson Air Force Base, where she learned about treating pilots and aviation personnel and even flew a two-seater plane, co-piloted by a retired major general, on her birthday.

In exchange for her education, Clutter must serve a minimum of three years in active duty with the possibility of being deployed. Coming from a military family, she knows about deployments all too well.

"It's definitely a difficult situation when you have your loved one away, but you're also very proud of the work they're doing," said Clutter, whose father was deployed several times, including two tours in Iraq. "Your purpose is to serve the Air Force and your country first."

On June 5, Clutter will begin her three-year residency as a military internist at the San Antonio Military Medical Center, where she will treat active duty and retired Air Force personnel, as well as their family members. Her goal is to specialize in endocrinology to treat and prevent chronic diseases, such as diabetes and thyroid disease.

"In medicine, it's about finding your fit in what you would love waking up to do every morning," Clutter said. "With the prevalence of diabetes increasing so much, I know there's definitely a need for people working in endocrinology. I'm very excited for the opportunity to care for the people who've sacrificed a lot to defend and serve their country."

Clutter's mentor, Philip Orlander, M.D., said her kindness, focus on patient care and strong leadership skills will help her become a great doctor.

"The ability to lead is going to be an increasingly important part in what physicians do," said Orlander, director of endocrinology, diabetes and metabolism at McGovern Medical School. "Courtney has clearly demonstrated those leadership skills … and has the potential to go wherever she wants. She has the background knowledge to do it and the communication and leadership skills that are so important."

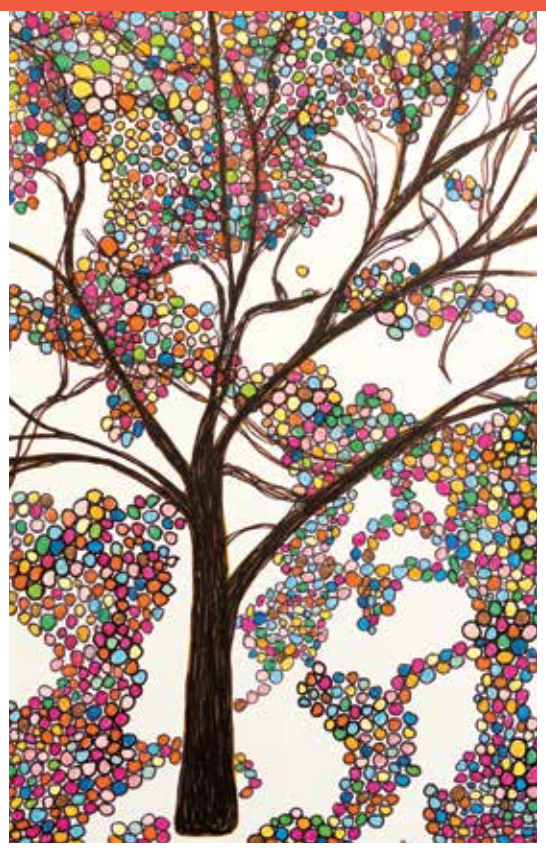
As Clutter prepares to take this next step in her career, her father plans to retire from the Air Force and join his wife in the civilian life.

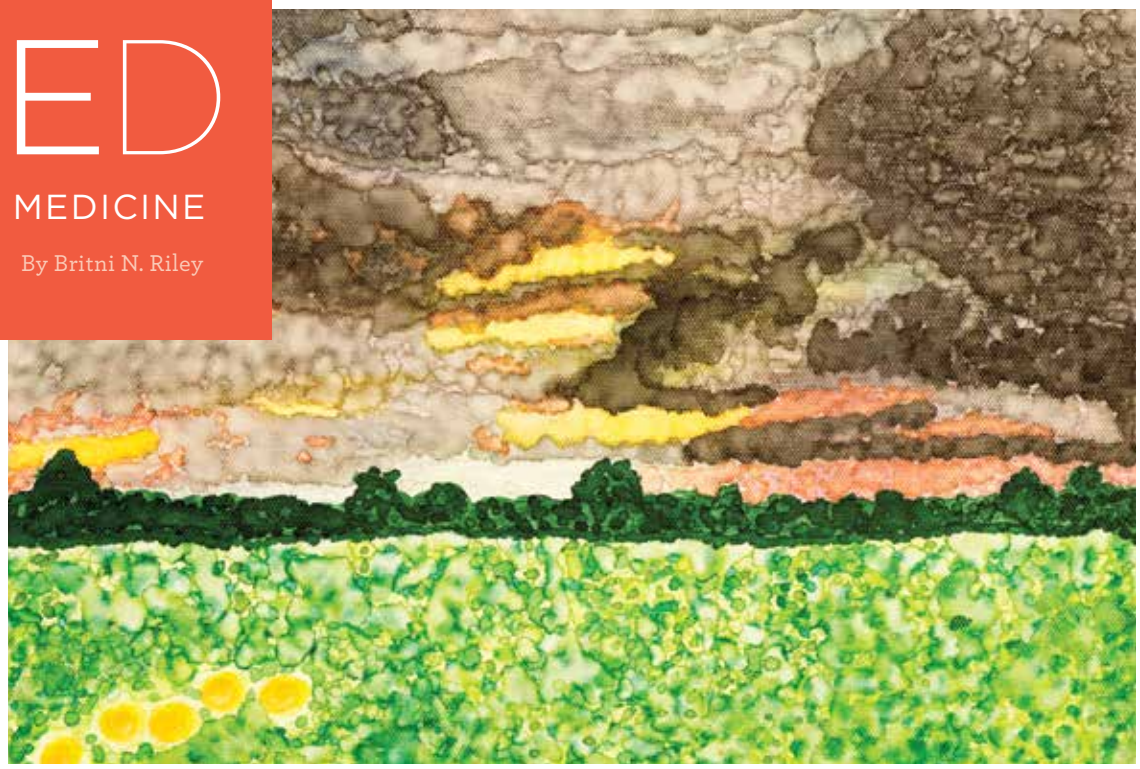
"As my parents are retiring, I'm starting my chapter in the Air Force," Clutter said. "It's a nice, bittersweet scenario." ■

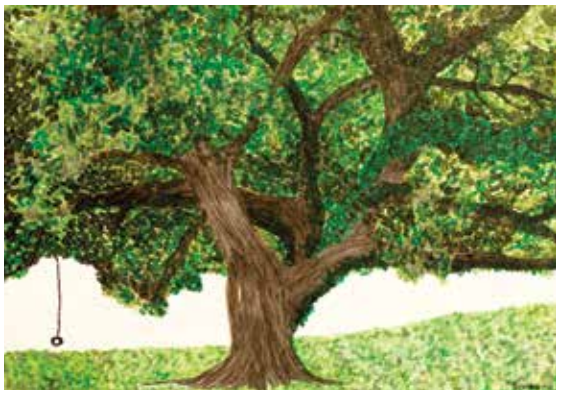
CURATED

The Intersection of ARTS and MEDICINE

By Britni N. Riley







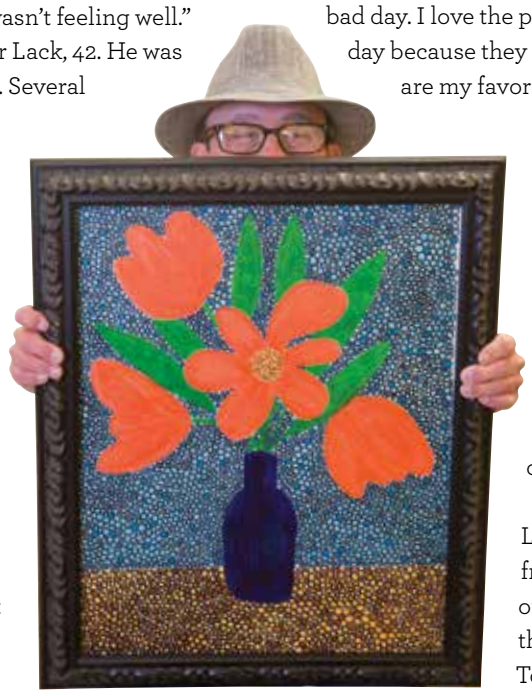
Above and center, recent works by Brandon Lack. Far right, Cynthia Peacock, M.D., of the Transition Medicine Clinic at Baylor College of Medicine, with Lack.

Brandon Lack has been creating art since he was a child. His circles, squares, colors and doodles have evolved into cherished artworks that can be found in public places and private homes in Texas.

"When he was a toddler, he would sit down and fill tablets with pictures," said Katherine Murray, Lack's mother. "It was the way he soothed himself when he wasn't feeling well."

Life hasn't been easy for Lack, 42. He was born with Down syndrome. Several years ago, he was hit by a car and broke his clavicle and ankle. He suffers from severe respiratory issues that will plague him for the rest of his life. And he has been diagnosed with cancer.

"Two and a half years ago, Brandon was diagnosed with bladder cancer," Murray said. "It was a really tough time for all of us and Brandon could feel how stressed out we all were about it. The week after the diagnosis, Brandon's artwork went to a whole new level."



Lack's work tends to reveal his moods, so his paintings can be very different depending on what he is going through.

"When he is having a bad day and not feeling well, he draws very harsh shapes," Murray said. "He has one piece that is all squares and circles inside of other circles—he made that on a really bad day. I love the pieces he makes on a good day because they are so free-flowing; those are my favorites."

Lack draws inspiration from places he has been, pictures he has seen and images that appear in his mind.

"I like squares, circles. I like colors and mixing them and it makes me happy," explained Lack, ordinarily a man of few words.

Three days a week, Lack and his mother travel from their home just south of Austin to see doctors in the Texas Medical Center. To treat his bladder cancer, which is now in maintenance, they visit doctors at Houston Methodist Hospital. For regular checkups, they see Cynthia Peacock, M.D., at the Transition Medicine Clinic at Baylor College of Medicine, which treats individuals with developmental and genetic conditions as they move into adulthood.

"Brandon has been coming to the Transition Medicine Clinic for about four-and-a-half years," Peacock said. "We just started to discover his talents through our process—trying to understand what he does socially and what he does for work. I was just enamored with his work when I first saw it. He is very artistic and he uses form in a different way; he uses circles for leaves and I think it is exceptional."

As part of the Free from Limits initiative Lack and his family established, which honors individuals and organizations that demonstrate respect for marginalized groups in meaningful and beneficial ways, Lack and his mother recognized Peacock for her ongoing commitment to her patients. For this honor, Peacock was presented with an original painting by Lack. ■

Lack's art can been found at Les Givral's Khave, 4601 Washington Ave., and by visiting his website: brandonlackstudio.com.

Connect to End Cancer

SXSW medical panels discuss everything from data networks to the patient experience

By Christine Hall

Before a packed house at South by Southwest (SXSW) in Austin last month, former Vice President Joe Biden outlined his plans for the White House Cancer Moonshot—the initiative he began while in office. In simple terms, the Cancer Moonshot aims to accelerate research efforts and break down barriers to progress in order to eliminate cancer as we know it.

"I'm driven by the desire to spare other families what our family and so many other families have gone through," said Biden, who spoke openly about his son Beau's death from brain cancer in 2015 and his family's struggle to accept the diagnosis.

Biden added that cancer was the only bipartisan topic that Congress seemed to agree on when he asked senators and representatives for funding.

Although SXSW attracts tens of thousands of people each year to experience the latest in music, film and entrepreneurship, it is also, increasingly, a place to share and debate new health care ideas.

Biden even shared one of his ideas, which was a 3-D cancer atlas—a web-based catalog of lesions, tumors and cells.

The Connect to End Cancer panel series at SXSW included discussions on cancer innovation, easing the pain of the disease and its treatments, and how to improve a cancer patient's journey.

"Cancer is difficult to diagnose and treat," said Ronald A. DePinho, M.D., outgoing president of The University of Texas MD Anderson Cancer Center, during the first panel. "MD Anderson is the largest cancer center in the U.S., and 80 percent of our patients come from outside of Houston. We see some 24 percent of patients misdiagnosed, 38 percent are misstaged."

DePinho also spoke of a knowledge gap between staging and treatment.

"It takes, on average, seven years for a practicing oncologist to adopt a new standard of care," he said. "MD Anderson publishes 10 papers per day on care methods, so it is hard to keep up with that and still provide high quality of care."

On the same panel, members discussed cancer data: how to get it, how to analyze it and what to do with it.

Most of the rich data is locked inside free text fields and electronic health records, said Eric Lefkofsky, Groupon founder and now president of Tempus Health. Tempus Health is working to extract this data and analyze it using both artificial intelligence and machine learning.

The panelists also discussed bringing data from behind the firewall so it could follow patients from the hospital to the pharmacy to doctors' appointments. Talk then turned to the cancer journey and its effect on patients' families.

"I like the idea of curing cancer, but also focusing on the journey of the family; not everyone is going to make it out alive, so we owe them fresh thinking," said panelist Mark Ganz, president and CEO of Cambia Health Solutions. "If we do it well with cancer, we will do it well with other diseases."

Another panel focused on data networks. The challenge is moving data between practitioners and facilities, said John Donovan, chief strategy officer and group president of AT&T Technology and Operations.

"There is an evolution of securing the highway, and now, we are securing the on-ramps and we need to then pay attention to what is on the highway," he said. "We need to safely trust the party on the other end, share only what is supposed to be shared and in the way it should be shared, and allow patients to receive what they need most."

The same panel also considered the ways patient care can be improved by technology, acknowledging that one of the biggest challenges is competing with Dr. Google.

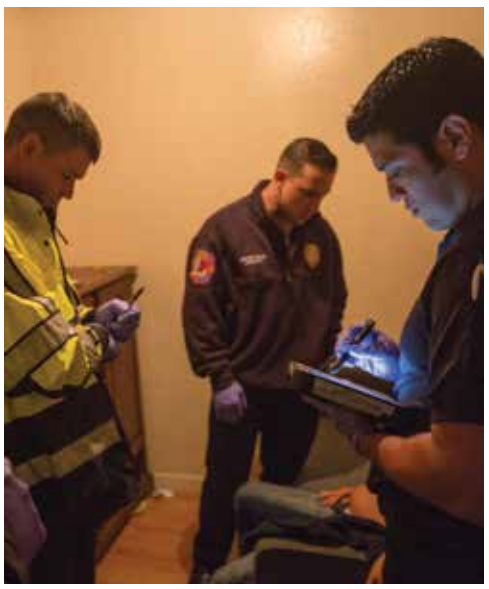
"Technology is standalone—it is interacting with the patients, but not with us," said Rebecca Kaul, chief innovation officer at MD Anderson. "The challenge is how to create an influx of data and apply advanced analytics, how to intervene when appropriate and not deal with an overflow of data."

> "I'm driven by the desire to spare other families what our family and so many other families have gone through."
>
> — FORMER VICE PRESIDENT JOE BIDEN

Arriving at a Decision

The ETHAN project gives first responders a better way to handle non-emergency 911 calls

By Christine Hall



The Houston Emergency Center handles 9,000 calls per day. Middle: Fire and EMS officers from Houston Fire Department Squad 46 respond to a medical 911 call. Right: When paramedics enter a home, they assess the patient to determine if the Emergency Tele-Health and Navigation resource is applicable.

On a recent rainy morning, a man complaining of chest pains called 911, and Houston Fire Department Squad 46 was assigned the call. During the short drive to the man's home, paramedics discussed what they might encounter when they got there.

"Chest pains" can mean any number of things, from heartburn to full cardiac arrest. In this case, the 49-year-old man explained that he had started to feel a tingling sensation in his left arm after feeling poorly for the past few days.

The paramedics took his vital signs and sent him to the hospital. In fact, he went to the hospital in another squad's ambulance because the Squad 46 ambulance had to attend to another call.

The entire process, from responding to the 911 call to helping admit the man to the hospital, took more than an hour. In this instance, it *was* an emergency situation. But typically, that is not the case.

The Houston Emergency Center handles 9,000 calls per day, but only 2,500 to 3,000 are true emergencies, said Joe Laud, administration manager for the center.

Over the past decade, the city has tested different programs to help decrease the number of people being transported unnecessarily to emergency rooms. Since 2014, the ETHAN (Emergency Tele-Health and Navigation) project has proved effective, streamlining 911 calls and trimming the time it takes to get patients the care they need.

Emergency medical technicians (EMTs) can spend up to 90 minutes with one patient, said Michael Gonzalez, M.D., associate medical director of the Houston Fire Department (HFD) and director of the ETHAN project.

"Houston is the middle of a perfect storm," Gonzalez added. "When the oil industry was doing well, it attracted lots of people here, to the point where some 10,000 people were moving here per month. That growth is nearly impossible to keep pace with."

Gonzalez said a typical "low acuity" emergency call goes something like this: A woman calls 911 and tells the operator she can't breathe. When the EMTs arrive, they discover the reason she can't breathe is because she has run out of medicine for her asthma inhaler. She called 911 because she doesn't have a ride to the doctor or hospital, where she can refill her prescription.

Led by the HFD, ETHAN matches 911 callers in less severe situations with primary care resources in the community. Already, the project has reduced the time EMTs spend with certain 911 callers from 90 minutes down to about half an hour.

Here's how it works: After a fire truck or ambulance arrives on a 911 call, EMTs asses the patient. If the health situation appears serious or life-threatening, the patient is sent to the emergency room. If that level of care is not deemed necessary, a doctor trained in emergency medicine will talk to the patient via video and advise EMTs on the best course of action—though doctors do not provide a medical diagnosis.

At this point, multiple scenarios are possible. The doctor might book an online appointment at one of the 26 clinic partners across the city and call the patient a cab through a partnership with Yellow Cab; the patient might be given home care instructions and a referral for a follow-up; or the patient might be sent to the emergency room, after all.

All firefighters in the HFD are cross-trained for emergency services and use ETHAN, which operates out of the Houston Emergency Center. About 90 fire stations cover some 670 square miles of Houston. HFD ambulances made about eight runs per day in 2015, according to statistics published by the city.

ETHAN is a city collaboration funded through the Medicaid 1115 Waiver program, which promotes innovative health care delivery methods. Since the project began, HFD has had some 8,000 ETHAN encounters, Gonzalez said. Not only does ETHAN free up ambulances for other calls, but it also saves patients from the costs associated with ambulance rides and emergency room visits.

"What we care about most is providing the best possible care to our community and using our crews efficiently," Gonzalez said. "That can mean providing some education to convince people to take the ETHAN option. We aren't treating the person, but rather assessing to appropriate level of medical concern, and where they need to go." ■

[1] TEXAS CHILDREN'S HOSPITAL'S PULMONARY HYPERTENSION PROGRAM recently earned accreditation from the Pulmonary Hypertension Association. Pictured is Nidhy P. Varghese, M.D., with a patient. *(credit: Photo courtesy of Texas Children's Hospital)*

[2] Families, doctors, nurses and staff from TEXAS CHILDREN'S HOSPITAL gathered for an "unveiling" celebration of the second phase of a permanent photography exhibit called the WALL OF HOPE, situated in the halls of the hospital's NICU unit.*

[3] At the TMC LIBRARY'S Student Appreciation Day, FAITHFUL PAWS provided stress relief from studying.

[4] THE UNIVERSITY OF ST. THOMAS Mardi Gras Scholarship Gala raised more than $1.8 million for the Ivany Family Scholarship Fund. Pictured: Gala co-chairs GEORGE AND ANNETTE STRAKE; MARIANNE IVANY AND University of St. Thomas president ROBERT IVANY, PH.D.; CARDINAL DANIEL N. DiNARDO; CATHY AND JOE CLEARY; and THE VERY REVEREND GEORGE T. SMITH, CSB. *(credit: Daniel Ortiz Photography)*

[5] SPENCER BERTHELSEN, M.D., an internal medicine physician, retired as managing director of Kelsey-Seybold Clinic. *(credit: © Gittings)*

[6] HASHEM EL-SERAG, M.D., M.P.H., chair and professor of medicine at Baylor College of Medicine, was selected by the American Gastroenterological Association to serve as the next vice president.*

[7] LILLIAN KAO, M.D., M.S., professor of surgery at The University of Texas Health Science Center at Houston (UTHealth), has been appointed chief of the Division of Acute Care Surgery at McGovern Medical School at UTHealth.*

[8] ELI MIZRAHI, M.D., chair and professor of neurology and pediatrics at Baylor College of Medicine, was elected president of the American Epilepsy Society.*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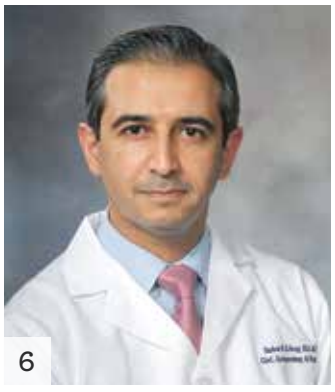
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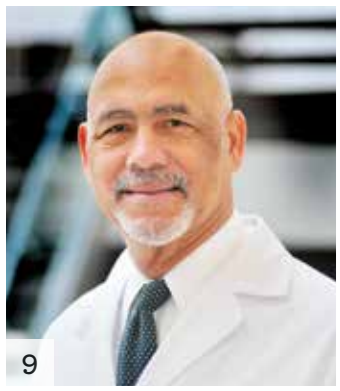
*Credit: Courtesy photo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DO YOU HAVE TMC EVENT PHOTOS YOU WOULD LIKE TO SHARE WITH PULSE? SUBMIT HIGH-RESOLUTION IMAGES TO: NEWS@TMC.EDU

[9] Houston Cares honored **JIM PHILLIPS, M.D.,** senior associate dean for diversity and community outreach at Baylor College of Medicine, as a mentoring leader.*

[10] **BARBARA J. STOLL, M.D.,** dean of McGovern Medical School at UTHealth has been awarded the 2017 Women Leaders in Medicine award by the American Medical Student Association.

[11] A firearms collection in the new **HARRIS COUNTY INSTITUTE OF FORENSIC SCIENCES** building.

[12] **ERIC THOMAS, M.D., M.P.H.,** professor of medicine at McGovern Medical School at UTHealth, has been appointed to the Board of Advisors of the National Patient Safety Foundation.*

[13] **JOSHUA UTAY, M.ED.,** assistant professor of allied health sciences and assistant director of didactic education for the Orthotics and Prosthetics Program at Baylor College of Medicine, received the 2017 Outstanding Educator Award from the American Academy of Orthotists and Prosthetists.*

[14] John Nordby, vice president of talent and innovation at the Greater Houston Partnership, tries out a virtual reality app at **SOUTH BY SOUTHWEST** in Austin, Texas.

[15] **PETER J. HOTEZ, M.D., PH.D.,** dean of the National School of Tropical Medicine and professor of pediatrics and molecular virology and microbiology at Baylor College of Medicine, with family and friends, including **REP. SHEILA JACKSON LEE** (in pink), received a Distinguished Achievement Award from B'nai B'rith International.*

[16] TMC executives **LARRY STOKES,** senior vice president of shared services, **DENISE CASTILLO-RHODES,** executive vice president and chief financial officer, **WILLIAM F. McKEON,** executive vice president, chief strategy officer, and chief operating officer, with journalist **DAN RATHER** at the Wrapped in Red Luncheon to benefit the American Red Cross.

FOR MORE EVENTS, VISIT tmc.edu/news/

April 2017

7 ***Camp Kesem Rice – Make the Magic Dinner Gala***
Friday, 6:30 – 9:30 p.m.
Rice University, Cohen House
6100 Main St.
Tickets start at $70
campkesem.org/rice
rice.mtm@campkesem.org

12 ***Houston Library Foundation's Beyond the Page Luncheon with author Rebecca Skloot***
Wednesday, 11 a.m. – 1:30 p.m.
Marriott Marquis
1777 Walker St.
Tickets start at $150
rhinojosa@houstonlibraryfoundation.org
832-393-1464

20 ***James T. Willerson, M.D., Cardiovascular Seminar: "Alternative Splicing Regulation in Heart Development and Disease," featuring Thomas A. Cooper, M.D.***
Thursday, 4 p.m.
Texas Heart Institute
6770 Bertner Ave.
vswseed@texasheart.org
832-355-9144

22 ***Donate Life Texas 2nd Chance Run: 5K and 1-Mile***
Saturday, 8 a.m.
Constellation Field
1 Stadium Dr.
Sugar Land, Texas
Registration required: $20 adults; $10 children 11 and under
2ndchancerun.org
ldavis@lifegift.org
713-523-4438

22 ***March for Science – Houston***
Saturday, 11 a.m. – 3 p.m.
Location to be announced
facebook.com/marchforsciencehou
info@scientistsmarchonhouston.org

Runners participate in the Donate Life Texas 2nd Chance Run. Credit: Ralph Lauer

22 ***San José Clinic's Art with Heart Party and Auction***
Saturday, 6 – 10 p.m.
TMCx
2450 Holcombe Blvd., Suite X
donna@sanjoseclinic.org
713-490-2620

25 ***Huffington Center on Aging Spotlight on Health: "Into Dementia: Where and How Far Are We from Effective Treatments?" lecture by John Hardy, Ph.D.***
Tuesday, 6 p.m.
The Junior League of Houston
1811 Briar Oaks Ln.
Tickets start at $75
fincher@bcm.edu
713-798-5804

28-30 ***MD Anderson Cancer Center's Together in Hope: A Conference for Brain Tumor Patients and Their Families***
Friday, 11:30 a.m. – 7 p.m.;
Saturday, 8 a.m. – 8 p.m.;
Sunday, 8 a.m. – 12:15 p.m.
DoubleTree Houston – Greenway Plaza
6 Greenway Plaza East
Registration: $75 on-site; $50 by mail
mdanderson.org/conferences
ejimenez@mdanderson.org
713-745-0432

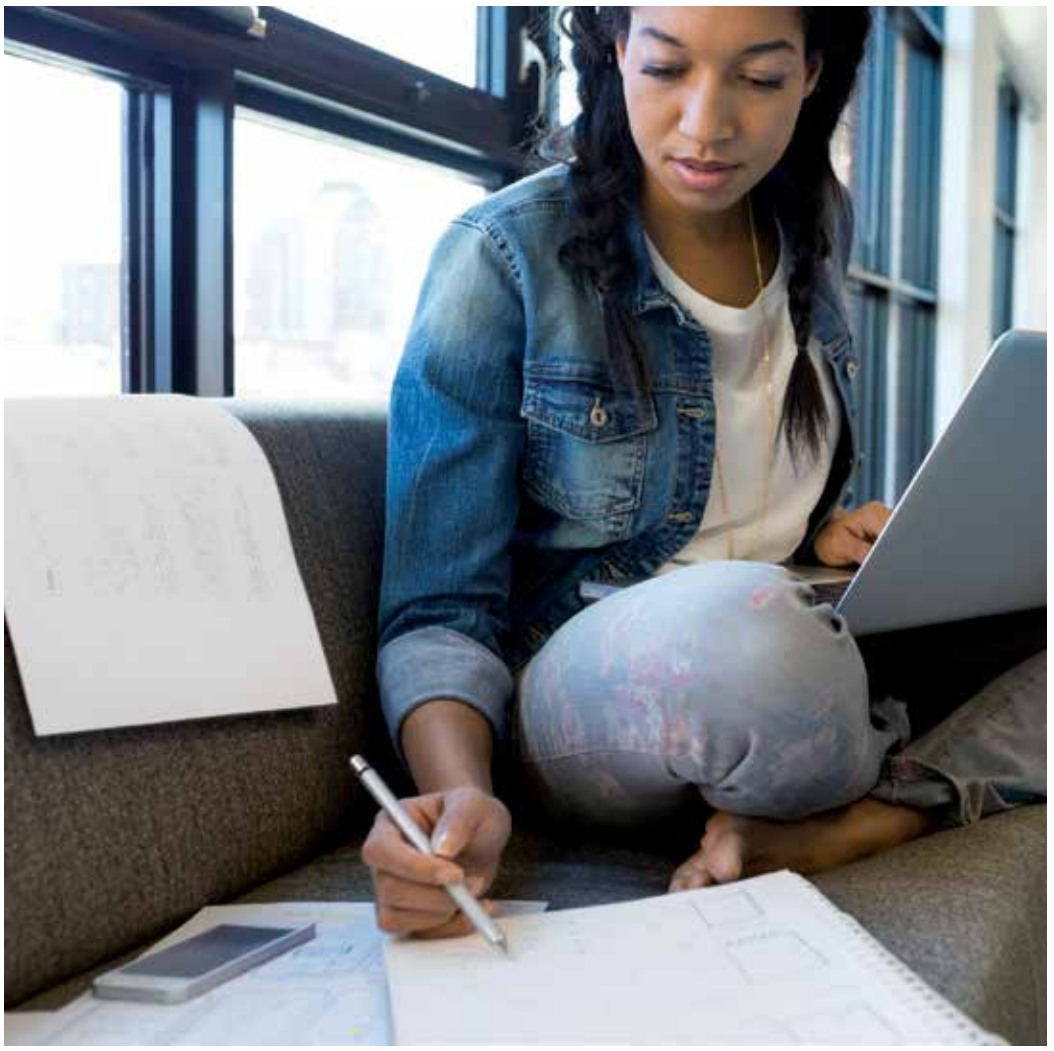
APRIL:
AUTISM AWARENESS MONTH

For nearly 25 years, April has been recognized as National Autism Awareness month. According to the Centers for Disease Control and Prevention, 3.5 million Americans have been diagnosed with this cognitive disorder.

Autism spectrum disorder is a developmental disability that affects one in every 68 children born in the United States. Because it is a spectrum, individuals with autism can display several of the behaviors associated with the disorder or only a few, depending on the severity of their diagnosis.

Throughout the month of April, the Autism Society aims to encourage awareness and education of the disorder, promote inclusion, and ensure that each person with autism is given the opportunity to achieve the highest quality of life.

CME that makes a difference. On a screen near you.



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