

TMC | PULSE

NEWS OF THE TEXAS MEDICAL CENTER — VOL. 6 / NO. 1 — FEBRUARY 2019

Saving Officer Barnes

John Barnes confronted the shooter at Santa Fe High School, p. 20

DATING APP
TAPS GENETICS
AND SOCIAL
MEDIA, p. 7

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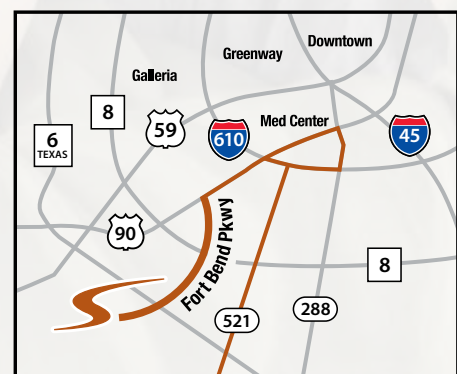
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How a Liver Transplant Put Maksim Koloskov Back in the Race

Over a decade ago, Maksim Koloskov was diagnosed with primary biliary cirrhosis (PBC), a chronic disease that causes the liver to slowly deteriorate. As his condition progressed, he went from running daily to not being able to cross the street within a matter of months.

A consultation landed him at Baylor St. Luke's Medical Center. After a meeting with the team of specialists, they determined Maksim would need a liver transplant. He was placed on the transplant waiting list in February of 2014, and after six months of waiting, he received the news he had a donor.

On July 30, 2014, Maksim underwent a successful liver transplant at Baylor St. Luke's. After spending three days in the ICU, he went home to recover.

Maksim is extremely grateful for the gift of life he received from his donor and their family as well as the care he received during his time at Baylor St. Luke's.

"Baylor St. Luke's has the best specialists in the country, and I am thankful for the entire liver team," said Maksim. "I have tremendous appreciation for everyone at the hospital that took care of me."

Since his transplant, Maksim is back to his morning runs. He competed in the 2016 Transplant Games of America and recently ran in the 2018 New York City Marathon. His goal is to help bring awareness to the importance of organ donation through his running and prove that in the marathon of life, compassion is everything.

Baylor St. Luke's Medical Center



Learn more at [InsideBSL.org](https://www.insideBSL.org).



Mark Mulligan/Houston Chronicle. Used with permission.

WILLIAM F. McKEON

*President and Chief Executive Officer
Texas Medical Center*

Every morning, I wake up very early and read the TMC Police report that covers all of the activities from the previous day and evening. It is fascinating to see, in one document, all that transpires in 24 hours across the 1,400 acres of the largest and busiest medical city in the world.

Members of the TMC Police and Security team are recruited and trained to protect and serve the 110,000 employees of the medical center and the millions of patients and their families we care for each year. They do so with great pride, recognizing that the people who come from around the world to receive

treatment at the Texas Medical Center are often facing a difficult time. A simple act of kindness means a great deal to a family receiving care.

As president and CEO of the Texas Medical Center, I am often asked: "What keeps you up at night?" My answer is always: "The safety of everyone that comes to the medical center each day." In our ever-changing social landscape, sadly, this concern is elevated.

Over the last year, we increased the presence of TMC Police considerably across the campus to maintain and enhance the safety of our employees and visitors. This spring, we will open a new TMC Police station at the center of the campus at the intersection of Holcombe and Bertner. This will enhance our visibility, capabilities and the speed at which we can respond to events that warrant police attention.

The TMC Police work very closely with the police and security departments of our member institutions, as well as the Houston Police Department, county sheriff's offices, FBI and CIA. Each of these entities plays a critical role in protecting and supporting the medical center. I will never fully rest easy, as potential threats are ever-present. I do, however, find more comfort as we enhance our collaboration and communications across this amazing medical city.

A handwritten signature in black ink that reads "William F. McKeon".



The exterior of the TMC Police station, left, is reflected in a glass barrier wall.

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President and Chief Executive Officer
William F. McKeon

Communications Director
Ryan Holeywell

Pulse Editor
Maggie Galehouse
mgalehouse@tmc.edu

Assistant Editor
Cindy George
cgeorge@tmc.edu

Staff Writers
Alexandra Becker
Britni R. McAshan
Shanley Pierce

Photojournalist
Cody Duty

NEWSROOM
713-791-8812
news@tmc.edu

ADVERTISING
Felicia Zbranek-Zeitman
713-791-8829
newsads@tmc.edu

DISTRIBUTION
Wallace Middleton
distribution@tmc.edu

READ US ONLINE
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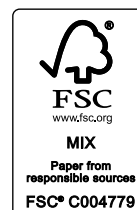


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ON THE COVER: John Barnes was on duty as a school resource officer at Santa Fe High School when a shooter opened fire.

ON THIS PAGE: Cool Acres, the family ranch of cardiovascular pioneer Denton A. Cooley, M.D., was home to the St. Luke's family picnic, p. 16.

Juul Ad Campaign Targets Adult Smokers

Medical experts remain concerned about the adolescent vaping epidemic

BY SHANLEY PIERCE

Although popular e-cigarette manufacturer Juul has launched a new ad campaign aimed at adult smokers, medical experts remain skeptical of the company's intended audience and concerned about the spike in adolescent vaping.

Earlier this year, Juul released a series of 60-second television commercials featuring testimonials from adult smokers who "made the switch" to Juul. Ads have also been released online, on the radio and in print.

"Our success ultimately depends on our ability to get our product in the hands of the adult smokers and out of the hands of youth," the company said in a press release. "When adult smokers try it, it works. And, the impact is life-changing."

E-cigarettes were initially introduced to the market to offer adult smokers a safer alternative to combustible cigarettes and to wean them off of their tobacco addiction, but adolescents jumped on the vaping bandwagon. The rise in adolescent vaping from 2017 to 2018 was the largest recorded in the past 43 years for any adolescent substance use outcome in the United States, according to the National Institutes of Health's annual Monitoring the Future survey.

Stephanie Morain, Ph.D., an assistant professor at the Center for Medical Ethics and Health Policy at Baylor College of Medicine, compared Juul's original ads with the somber, no-nonsense ads of the new campaign.

"If you look back to 2015, you see these beautiful ads with bright colors and individuals who look like they're maybe 18 to 24 at these



U.S. Surgeon General Jerome Adams, M.D., displays a Juul device during a recent visit to The University of Texas MD Anderson Cancer Center.

parties. The ads are playing up this New York City lifestyle and they're super fun," Morain said. "Now you see their Twitter campaign and it reminds me of a tombstone ad ... with very stark, black and white text. What they're saying is more politically palatable and signaling an olive branch, but it doesn't seem like they're bringing the same marketing power to those types of ads, which makes me a little skeptical about how genuine this effort is."

Juul's about-face comes on the heels of a difficult year. Throughout 2018, Juul came under intense fire from public health experts and federal regulators, who criticized the

company for deliberately targeting its products to minors by luring them with a variety of whimsical flavors, including cool mint, crème brûlée and cool cucumber.

Juul spent approximately \$10 million on television ads, which air on cable channels after 10 p.m., according to Juul spokesman Ted Kwong. The company is flush with cash after major tobacco producer Altria, which manufacturers Marlboro, acquired a 35 percent stake—worth nearly \$13 billion—in the e-cigarette startup at the end of 2018. According to Altria, the investment places Juul's market value at \$38 billion.

"There is no doubt that, if you have to choose between smoking a combustible cigarette and using an e-cigarette, using a regulated e-cigarette is actually safer. There's no doubt it has harm-reduction potential," said U.S. Surgeon General Jerome Adams, M.D., during a recent visit to The University of Texas MD Anderson Cancer Center. "I'm not against preserving e-cigarettes and vaping as an option for adults who want to quit smoking, but I absolutely want people to understand that for young people, this presents a very unique danger."

It took decades to change young Americans' minds about combustible cigarettes, Adams said, and e-cigarettes have clouded that success.

"It took us a long time to deal with advertising and marketing to help turn the tide so youth no longer thought [combustible cigarettes] were cool. We're now to a point where, if you talk to most kids, they'll tell you it's not cool to smoke," Adams said. "Unfortunately, with e-cigarettes, kids—like my own son who thought that these just contain flavored water—think they're safe and cool. They're being marketed to them through YouTube, video games, music videos that kids watch. It shows that some of these companies are, in fact, directing their marketing toward children."

“The challenge for regulation is that we're really trying to thread the needle and ensure youth aren't getting access to these products, while adult smokers who would use them to transition or ideally to quit altogether would still have access.”

—STEPHANIE MORAIN, PH.D.

Assistant professor at the Center for Medical Ethics and Health Policy at Baylor College of Medicine

Juul claimed that its flavors, social media marketing and original ads from 2015 weren't intentionally designed to attract teenagers; however, beginning in April 2018, the U.S. Food and Drug Administration (FDA) turned up the heat by placing Juul under federal investigation.

Later that month, FDA Commissioner Scott Gottlieb announced that the agency had uncovered a litany of violations in e-cigarette sales to underage teenagers and requested that Juul submit company materials, including marketing documents and research targeting different age groups. In response, Juul said it would support

raising the tobacco-buying age to 21 and invest \$30 million over the next three years to fund independent research, education and community outreach initiatives.

In November 2018, the FDA announced new steps in response to the astronomical surge of e-cigarette use among teens. Stopping short of a full ban on most flavored e-cigarette sales in retail stores and gas stations across the country—an idea many health experts and parents supported—the agency decided instead to issue new rules that limit sales to age-restricted locations and require more robust age-verification

processes for online purchases.

"I think this is overdue," Morain said. "The challenge for regulation is that we're really trying to thread the needle and ensure youth aren't getting access to these products, while adult smokers who would use them to transition or ideally to quit altogether would still have access."

At the end of 2018, Adams issued the Surgeon General's Advisory on E-Cigarette Use Among Youth, only the fourth Surgeon General's Advisory in the past 13 years.

His announcement drew data from the Monitoring the Future survey, which reported a decrease in opioid and alcohol use among

adolescents. E-cigarette use, in contrast, surged to staggering proportions. The percentage of American high school seniors who said they vaped in the past year jumped from 27.8 percent in 2017 to 37.3 percent in 2018. The percentage of high school seniors who vaped nicotine within a month before the survey nearly doubled, soaring from 11 percent in 2017 to 20.9 percent in 2018.

"The meteoric rise in the use of e-cigarettes among our young people," Adams said, "rose to the level that I felt that I had no choice but to declare it an epidemic. ■

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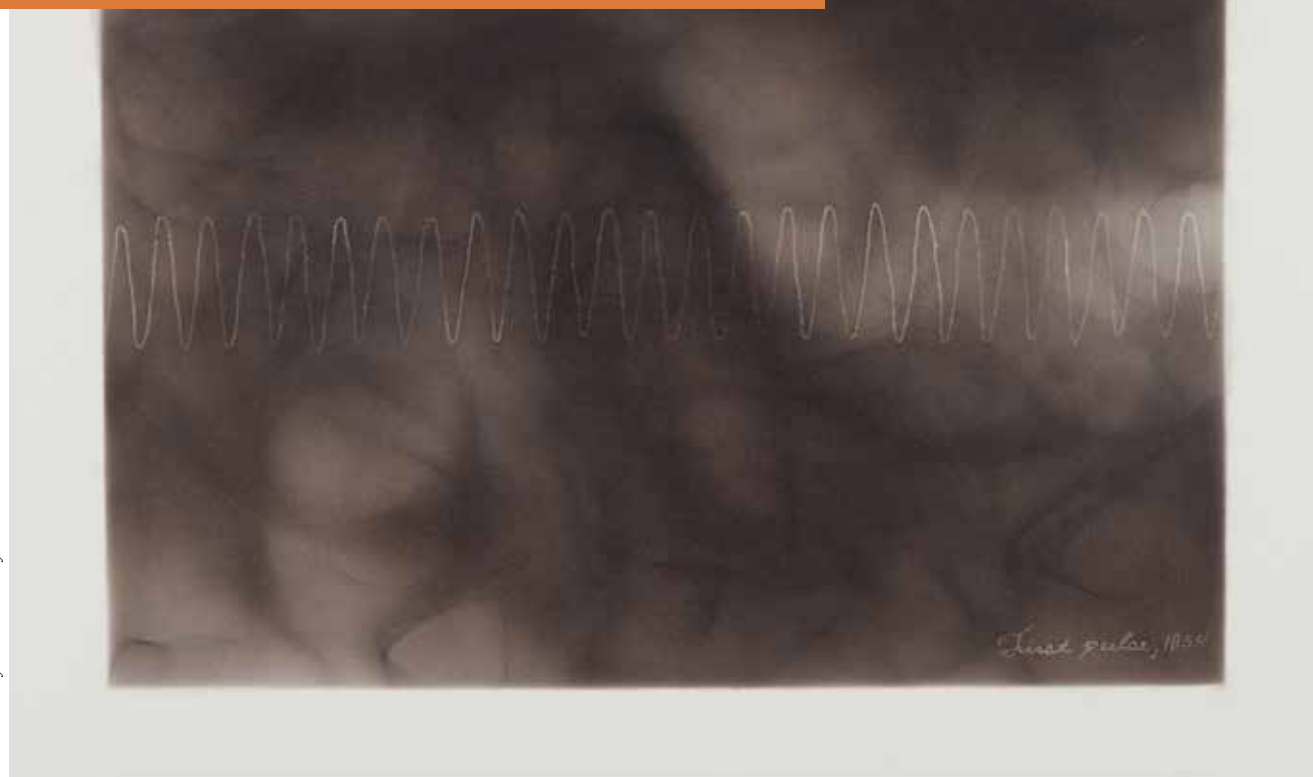


CURATED

The Intersection of ARTS and MEDICINE

By Britni R. McAshan

Credit: Courtesy of Inman Gallery



In 1977, NASA launched Voyager 1 and 2 into the far reaches of outer space. Secured on the side of each space probe was a copy of the Golden Record—an interstellar message-in-a-bottle filled with greetings in multiple languages, along with images and sounds of nature to communicate with other life forms in the galaxy.

But it was the final message in the Golden Record that transfixed young Dario Robleto, a local artist and citizen scientist. Decades later, it inspired his work, *The First Time, The Heart (A Portrait of Life 1854-1913)*, photolithographs on permanent display at Houston's Inman Gallery.

Ann Druyan, creative director of the Golden Record project, was in love with Carl Sagan, the late astronomer and author who was leading the group at NASA. Druyan's final message on the Golden Record was a one-minute recording of her brainwaves as she thought about her love for Sagan, whom she later married.

"Her heart is the only heart that has actually exited our solar system," Robleto said. "I love that both her heart and her brain are represented, because she's arguing: Is love in there and can it be deciphered at a later date?"

Robleto realized that to honor Druyan's story and fully understand the cultural, physical, historical and scientific significance of the heart, he needed to take a retrospective look at the origins of the first heartbeat recorded in history.

He found the first pulse tracing of a heartbeat, completed in the 1850s—half a century before the birth of electrocardiography. A German doctor used soot from a candle flame gathered on a piece of paper and human hair to trace the beat of his own heart.

The black and white images on display at Inman Gallery are recreations of original tracings produced between 1854 and 1913. They document the heart's reaction to everything from riding a bike to smelling lavender to feeling scared.

"There was a quest to image the invisible—the invisible being the most complicated organ in the body—and to use hair and soot to image it for the first time is so beautiful to me," Robleto said. "It is a history of materials as much as it is a history of cardiology."



To create the images, Robleto essentially designed a new form of printing. He put high-resolution scans of the images onto an uncoated machine-finished paperboard. The photolithographs were then transferred with transparent base ink onto hand-flamed and sooted paper, brushed with lithotine and fused in a mild solution of shellac and denatured alcohol.

"The heart is the only organ in our bodies that we can actually feel and, as a cultural metaphor, it will not budge," Robleto said. "Even though science moved on to the brain a long time ago, culturally, it doesn't matter. We still give our hearts to one another. The brain isn't the symbol on Valentine's Day ... it's the heart."

But as science moves forward, the cultural implications of heart transplants, regenerative medicine and technology must be considered.

Robleto has spent time with the Texas Heart Institute's Doris Taylor, Ph.D., who is working on stripping a pig heart and re-cellularizing it with human DNA. He also has consulted with William "Billy" Cohn, M.D., and the Texas Heart Institute's O.H. "Bud" Frazier, M.D., who are working with Daniel Timms, Ph.D., to develop the BiVacor, a total artificial heart with no pulse.

"Can we assume our hearts will always sound the same?" Robleto asks. "In all of human history, no one has ever proposed that you don't need a pulsatile heart to be a human, and it is a game changer. There is a cultural dynamic to the idea of letting go of our heartbeats and I think that is a fascinating question to pursue." ■

The First Time, The Heart (A Portrait of Life 1854-1913) is part of the permanent collection at Inman Gallery, 3901 Main St. Information: 713-526-7800.

Above: Dario Robleto's photolithograph of First Pulse, 1854, retraced the original image using ink, hand-flamed and sooted paper, lithotine, shellac and alcohol.

Left: Robleto holds one of his prints at Inman Gallery.

Dating App Taps Genetics and Social Media

Scientists offer a new recipe for love

BY BRITNI R. McASHAN



Brittany Barreto, Ph.D., is the CEO and co-founder of Pheramor, a dating app.

Years before she became a genetic scientist, Brittany Barreto dreamed of creating a way for people to find love through DNA.

“I just thought it would be so cool to connect people on a romantic level using their DNA,” said Barreto, co-founder and CEO of Pheramor, a dating app that aims to measure compatibility using

physical chemistry and social rapport. “It’s nothing like designer babies or anything like that. It is, essentially, how do your genes affect who you are attracted to and who you jive with the best? How is that inscribed in your genome?”

Nearly a decade and a Ph.D. from Baylor College of Medicine later, Barreto set her plan into action. While attending a workshop hosted by Enventure—a grassroots life science startup community in Houston—she met Bin Huang, Ph.D., who became the co-founder and chief technological officer of Pheramor.

“I pitched the idea at their accelerator program and Bin, who was a doctoral candidate at Rice University at the time, also pitched an idea, but then at the end, when we had to make teams, he came up to me and said, ‘Forget my idea, I want to do your idea,’” Barreto recalled. “I know the genetics behind attraction and Bin knows the techy side and he is on the back end writing the algorithm that is literally matching people.”

Pheramor brings couples together after analyzing a segment of each candidate’s human leukocyte antigen (HLA) gene complex—proteins that regulate the immune system—and social media history. It is one of a handful of companies launched over the past decade that uses genetics to determine romantic compatibility.

The HLA complex helps the immune system distinguish the body’s own proteins from proteins made by foreign invaders, such as viruses and bacteria.

“We are seeking a partner that has a different immune system

compared to our own because that means that we are not related, so we will have a decreased risk of genetic disease in our progeny and our progeny will have a more diverse set of immune system genes and therefore be immune to more pathogens,” Barreto explained.

Animals also prefer mates with complementary immune systems and communicate this information through olfactory cues. The genes associated with their immune systems are tethered to pheromones, chemicals animals produce and emit that influence all sort of behavior among others in their species—including sexual attraction.

But there is no hard science on humans releasing or picking up on pheromones, in part because animals use the vomeronasal organ (VNO)—a gathering of sensory cells in the nasal cavity above the roof of the mouth—to detect pheromones, and humans do not have a functioning VNO. ➡➡➡



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“It's nothing like designer babies or anything like that. It is, essentially, how do your genes affect who you are attracted to and who you jive with the best? How is that inscribed in your genome?”

— BRITTANY BARRETO, PH.D.
CEO and co-founder of Pheramor

That's why Pheramor takes a cheek swab from clients for DNA sequencing, rather than try to link human attraction to smell. (Confusingly, though, the company's name merges “pheromone” with “amor,” the Spanish word for love.) As the company notes on its website, pheramor.com: “Pheramor fully appreciates that the science of pheromones requires more research.”

Pheramor also recognizes that humans are highly social. To account for this in the matchmaking process, the team at Pheramor analyzes candidates' social media histories before they are matched with potential suitors.

“Humans are a more complicated animal,” Huang explains. “Fifty percent is genetics, but the other 50 percent is what do you like to do? What are your common interests? We try to extract this information from your social media data because we don't want people to answer everything themselves.”

Some research supports Pheramor's DNA matchmaking. A 2016 study published in *Scientific Reports* found that the HLA complex mediates mate behavior in humans and that subjects were generally most satisfied with their relationship if their partner exhibited a dissimilar HLA type. Researchers found that HLA dissimilarity correlates with partnership, sexuality and enhances the desire to procreate.

But among scientists, the idea of human pheromones remains a hard sell. In 2018, Richard Doty, a professor of otorhinolaryngology and director of The Smell and Taste Center at the University of

Pennsylvania, told *Wired* magazine: “The notion that there are these magical genes that are somehow associated with smells that permeate the environment and dictate our attraction to people is total nonsense. If human pheromones actually elicited the kinds of behaviors we see in other mammals, the subways of New York City would be in a constant state of mayhem with people hopping all over each other.”

Barreto and Huang launched the Pheramor app officially in September 2018.

“We have thousands of active users and have grown 50 percent month over month,” Barreto said, but declined to disclose the company's revenue.

Once users download the app, they receive a DNA kit, do a cheek swab, return the kit and wait for their sequencing to be done.

“The app is free, but we charge \$30 for the DNA testing,” Huang explained. “The processing time for the kits takes 21 business days, but the processing for us can take around one month.”

The DNA kits are processed at a lab and then returned to Pheramor. Once the data has been collected, users gain access to six profiles per day on the app. The profiles are weighted based on physical proximity of clients first, then on the gender and age each client specified. If two people like each other's profiles, they can begin messaging one another.

In the four months the Pheramor app has been live, more than 5,000 messages have been shared between users and 20 couples have deactivated their accounts because they have met a solid match, Barreto and Huang said.

Barreto even found her own romantic partner with a cheek swab.

"As the CEO of a dating app, it would be unethical for me to meet someone on the app, but occasionally I do market research on other dating apps so I have 20 of them on my phone," she said. "I opened one of the dating apps and I had a message from a lovely man, but the message was about a month old and it was actually a really sweet message, but he was a redhead. ... I've never dated a redhead. I like dark features, or so I thought."

The two ended up going on a date and hitting it off, at which point, Barreto asked the redhead if she could swab his cheek to see if they were a match.

It turns out they were in the top 10 percentile of compatibility.

"This is why we are changing dating by using data," Barreto said. "I never thought I wanted a redhead because I thought I didn't like them, but I do. I had all of these social constructs in my mind of what I thought I should be looking for in a person,



Barreto and Bin Huang, Ph.D., co-founder and chief technological officer of Pheramor, share a laugh.

but it's in your DNA. I thought I needed someone with an MBA who owned their own company, as well, and James is an elementary music school teacher and we jive so well."

Barreto and Huang are working on another website for existing couples to test their compatibility

through DNA. They hope to launch it this summer.

And to those think Barreto's work sounds superficial, she has this to say: "Instead of working on something for a patient who is already in the hospital and super sick, let's make people's lives better from

the get-go by decreasing the number of bad first dates they have to go on so they can find companionship and be happy. ... We are humanizing dating using data. We are making people give humans a second chance." ■

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Cardiothoracic surgeon. Serial entrepreneur. Inventor. All of these titles apply to **TODD ROSENGART, M.D.** In 1997, he was part of the team that performed the world's first viral-based cardiac gene transfer procedure. Later, Rosengart co-founded Vitals.com, a website that allows patients to find and rate doctors, and then XyloCor Therapeutics, a startup that aims to use cardiac gene therapy to treat patients with end-stage coronary artery disease. A professor and chair of the Michael E. DeBakey Department of Surgery at Baylor College of Medicine and a professor of heart and vascular disease at the Texas Heart Institute, Rosengart also holds 12 United States patents.

Q | What motivates you to create?

A | I'm definitely a 'let's fix it' type of person and I want to make a difference. The work that I do on behalf of the department or the college—from fixing someone's heart or helping other surgeons—is very important.

Q | Why do you think you became a medical problem solver?

A | My dad passed away doing exercises when I was 16—from a heart attack. I came home from high school one day and there were ambulances in front of my house on Long Island. This is 1976. Bypass surgery is still relatively new. Even though my dad was a recently educated physician, an obstetrician, the news had not gotten to him—or at least in a way he understood—that he probably could have had surgery and be alive today. Somehow, that was a disconnect. Subliminally, that concept of making sure people are well-informed has been very important to me.

Q | Is this why you chose to become a heart specialist?

A | Subconsciously, because he died of heart disease, I thought I was going to be a cardiologist. I'm a big believer in serendipity. My mentor at Northwestern was the chief of cardiology—Michael Lesch, M.D., who co-discovered Lesch-Nyhan syndrome [juvenile gout]—and he said: 'You're going to be a great cardiologist. I want you to spend the summer at NYU.' It was all a mistake because I did this as a second-year student and, typically, you don't do a clerkship until you're a third-year student. It took about a month before they figured out that I didn't belong there, at which point I'd really become a member of the team. By the end of the summer, I said: 'I love these surgeons. They're so cool. They do great things.' I went back to Northwestern and told Dr. Lesch I was going to be a heart surgeon rather than a cardiologist. I ended up going to NYU and starting my career there.

Q | How did your interest in fixing things lead to entrepreneurship?

A | Operating is phenomenal, but being able to do something that helps many, many people with the same effort is really cool, too. When I was at Northwestern, one day I got a phone call—this is before Facebook and before cell phones—from an uncle who needed a cardiologist. I gave my uncle a name and I thought: 'This is so crazy. If my uncle had not called me, he would not have had access to good information about a good doctor. Why is this?' I helped start this company called Vitals.com. We created this website that had information on physicians all over the country to better communicate with people. It's very frustrating when people are forced to make decisions without information that should be readily available to them. So many bad things happen because we don't communicate well. It's been a very significant element of what I've tried to do, though I'm not really involved in Vitals anymore. ➡

“ I think we are at an inflection point on how we take care of each other and how we take care of our patients. Between artificial intelligence and genetic engineering, I think we are going to live decades longer. I think we are going to live healthier. I think we’re going to look back on how we take care of patients in 10 years and say: ‘What were we thinking?’ ”

Q | How did you decide to focus your website on the patient perspective?

A | When we were doing Vitals, my partner—who is a business guy—said we were going to get the patient perspective. I said: ‘The patients don’t understand; we need the doctors’ perspective.’ I allowed my partner to convince me I was wrong and it turns out the patient perspective, in many ways, was more valuable than the doctors’ perspective and that’s the way we ended up doing it. At its peak, Vitals.com was getting about 15 million visitors a month. The value was the patient perspective. We were early to the online reviews.

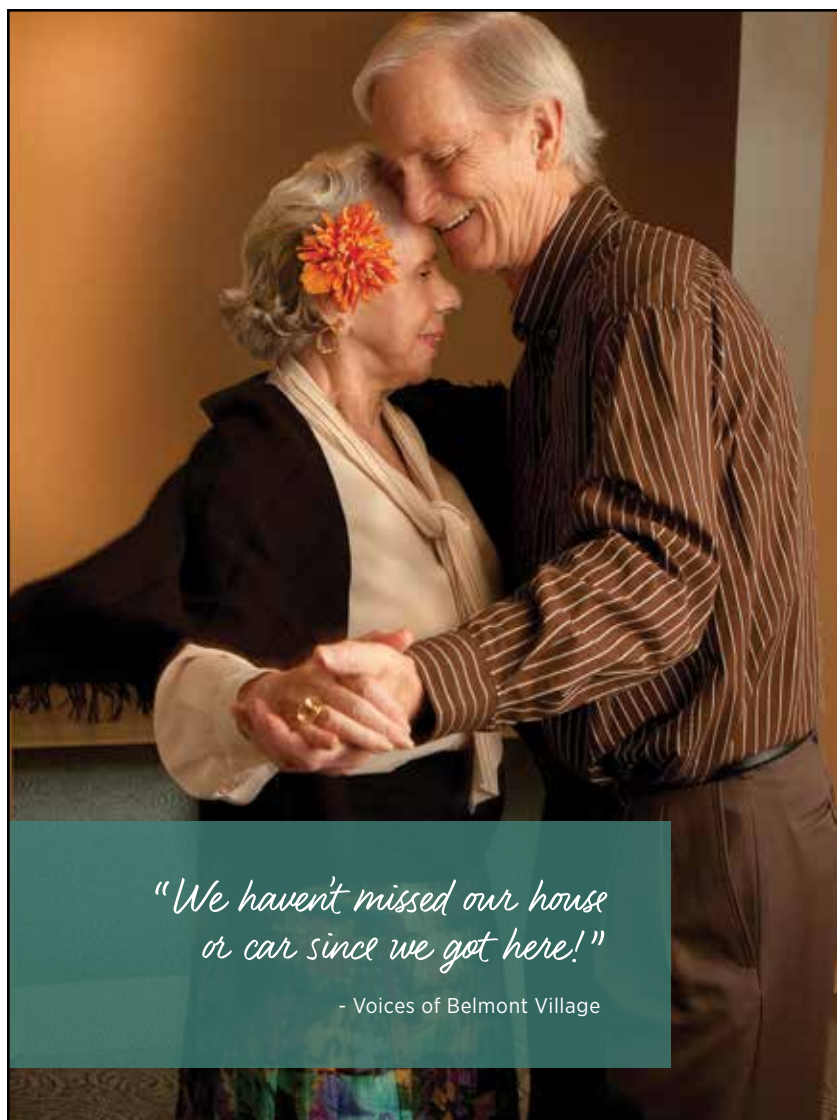
Q | Can you describe your work with gene therapy and heart disease?

A | I was a junior faculty member at Cornell [New York-Presbyterian Hospital and Weill Cornell Medical Center] and we were doing this work with gene therapy and having the heart grow its own bypasses. We had no business thinking about injecting a virus into the human heart or doing cardiac gene therapy. No one had ever done it before. But we said: ‘Why not?’ We were the first ones ever to treat someone with gene therapy for heart disease. I was 38 at the time. It’s something I talk to my residents and students and junior faculty about. Believe in what you’re doing; have

a little bit of temerity to go beyond where you should be and persevere to do it. If you feel like you’re doing the right thing and you’ve done your homework, don’t be shy about persevering on it. We are now ready to start a new trial here in the Texas Medical Center—same work, taking it to the next level 20 years later.

Q | What’s the advantage to the body growing its own bypasses?

A | For some patients who have advanced disease, typically because they are diabetics, there is nothing we can offer them [to restore blood flow to the heart]. They are literally incapacitated with angina or chest pain. And when we do bypass or angioplasty, often we can’t revascularize or get good blood flow to the whole heart. We know statistically that patients who don’t get adequate blood flow to the entire heart won’t do as well. This gene therapy can be used as an adjunct to standard therapies like bypass or angioplasties. About two years ago, I was at a Texas Heart Institute transplant review board and these patients had such incapacitating angina that they were candidates for heart transplants. They were going to take this poor person’s heart out with perfectly good function. This is an alternative.



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Q | What's the latest on XyloCor?

A | In a couple of months, we will be treating patients with end-stage coronary disease.

Q | Is the clinical trial for patients to grow their own bypasses ready to go?

A | Yes. We are finalizing approvals. We have FDA approval. We have independent review board approval. We are hoping to do our first patient here at Baylor St. Luke's before the summer.

Q | You lead hundreds of people at Baylor. How do you approach running one of the nation's largest surgery departments?

A | We have 150 faculty, 130 trainees and staff. What I love about being the chairman of the department with so many wonderful people is that everyone becomes a force multiplier. To help everyone become successful really brings me joy. I give out the book *Team of Teams* by General Stanley McChrystal all the time. I love what he said: He is an enabler. He is there to make it possible for everyone else to do what is within their ability as a servant-leader. It's the first book I underlined in 30 years. He talks about empowering people, disseminating information, giving everyone a voice and giving people the ability to get done what they want to get done. What I love about the TMC—and it's the first thing I talk about when we are trying to recruit someone—is that everyone supports each other here. If Jim Allison wins the Nobel Prize at MD Anderson, I am proud of that. That's rare. You don't see that in New York and Chicago. It's a zero-sum game in many places, unfortunately.

Q | Was there any moment that crystallized your view of Houston?

A | I had not experienced anything like Hurricane Harvey. I did not fully appreciate what happens. When I heard over that weekend that the department and everyone else had already established 'go' teams, I said: 'What?' People took it upon themselves to say: 'I am here for the duration.' They did it without being asked and they did it without being expected to be thanked or recognized, which is amazing to me. In the next thought, I said: 'Well, of course. That's what this place is all about.' That's what you have to love about Houston and the Texas Medical Center. We've recruited 120 faculty and that sense of collaboration and collegiality comes through.

Q | November marked six years since you arrived in Houston. You're an empty nester. What do you do for fun or outside of your various professional pursuits?

A | My son, Eric, is 25. He is in New York—in real estate. Michael is 27 and he's a clerk for a federal district court judge in Tampa, Florida. It's a

tremendously rich time with my wife, Debbie. We golf together. We have two dogs that we love and that we walk. Truly, my comfort zone is work, but we travel and see friends and family.

Q | You turned 59 in January and have a trim physique. What is your personal health regimen?

A | I was never a big believer in training until I started doing it. Now I realize: How could you not? I do an hour in the gym two or three times a week and eat well. My dad died of a heart attack, so I am careful on that. One of my other hats is that I am president of the Society of Surgical Chairs. We have a major national initiative to ensure the well-being of physicians as we get older in terms of our cognitive function. We are actually going to try to launch a national campaign to teach physicians how to take care of our cognitive aging. The physician workforce is growing older and there is a shortage of physicians. We want to make sure we train those physicians in their cognitive health when they are 50 or 60 so that they can continue to contribute. I also play backgammon to take care of my mind.

Q | What's on the medical horizon that excites you?

A | I think we are at an inflection point on how we take care of each other and how we take care of our patients. Between artificial intelligence and genetic engineering, I think we are going to live decades longer. I think we are going to live healthier. I think we're going to look back on how we take care of patients in 10 years and say: 'What were we thinking?' It's just very primitive. I think artificial intelligence will play a major role in diagnosis and picking treatments. We now have computers that can give us an early warning of sepsis that is completely changing the mortality risk of critically ill patients. That is very simple and yet it's been a game changer. I think in the next five years we will expand that to 80 or 90 percent of diagnoses and treatment. It's both scary and wonderful, which means the role of the physician is going to change dramatically. It is impossible for physicians now to really keep up with all the guidelines in evidence-based medicine and the computers are going to do that. But, just like the pilot monitoring autopilot's takeoff and landing, we're going to be there to make sure that it all fits and that our patients, as human beings, are comforted and supported and helped in the decision-making—which a computer is never going to be able to do. ■

Todd Rosengart, M.D., was interviewed by Pulse assistant editor Cindy George. The interview has been edited for clarity and length.



“ Believe in what you're doing; have a little bit of temerity to go beyond where you should be and persevere to do it. If you feel like you're doing the right thing and you've done your homework, don't be shy about persevering on it. ”

New HQ for TMC Police

The station will be located in the heart of the campus

By RYAN HOLEYWELL



The new TMC Police station sits at the corner of Bertner Avenue and Holcombe Boulevard.

The Texas Medical Center Police will relocate to a new, centrally located headquarters this spring in order to better serve the growing TMC community.

The new facility, located at the corner of Bertner Avenue and Holcombe Boulevard, brings the TMC Police into the core of the medical center. The department was previously headquartered about a mile away at TMC's John P. McGovern campus, near the eastern edge of the medical center. The new headquarters is located in a renovated space that was previously used as a parking office.

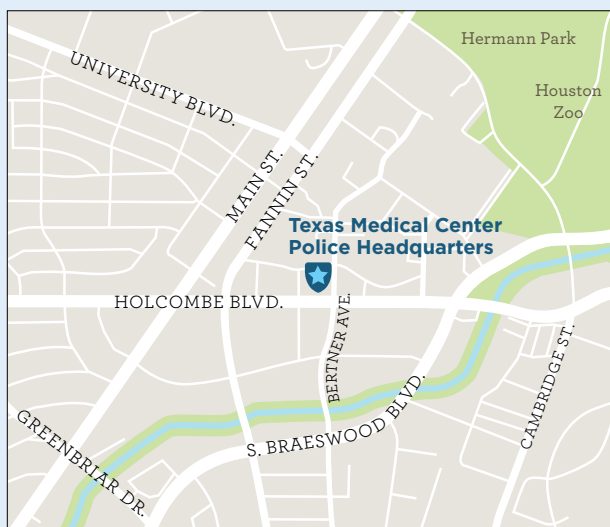
"It was important to us to have a police station located in the heart of our campus," said TMC President and CEO William "Bill" McKeon. "This facility will allow our police and security officers to continue serving the hundreds of thousands of people who visit our campus every day."

The move coincides with TMC's continued investment in strengthening the police department to provide a more secure campus. The station includes briefing and training rooms, modern dispatch equipment and space for police and security officers to write reports. Backup generators will allow the station to continue to function

during emergencies.

The project also includes improvements that make Bertner Avenue—which passes under a garage—more inviting to pedestrians. The side of the police station is outfitted with LED lights, and additional lighting is planned for the ceiling above the sidewalk. A right-hand turning lane was removed from Bertner Avenue, allowing for an expansion of the pedestrian area outside the police station.

"This is a major corridor, not just for automobile traffic, but for pedestrians and bicyclists, as well," McKeon said. "These changes will make the street safer and more comfortable for everyone who uses it." ■



The Texas Medical Center Police can be reached at 713-795-0000.

VITALS

Trending topics in health, science and medicine

By Shanley Pierce

E-CIGARETTES AND YOUTH

"The FDA is focused on regulation. The CDC is focused on surveillance. NIH and NIDA (National Institute on Drug Abuse) are focused on more research. But the reality is, we can't solve this problem, this crisis, this epidemic from Washington, D.C. We need states who control a lot of the retail environment to look at the policies, the parents and teachers who see use on a day-to-day basis to become aware of these products and to understand the steps they can take to help us turn around this epidemic."



— JEROME ADAMS, M.D.
U.S. Surgeon General

GENETICS

"Genomic technologies, like gene editing and low-cost DNA sequencing, will continue to transform the fields of human genetics and medicine. In the new year, we will see continued examples of clinical successes of gene therapy and gene editing in the treatment of somatic tissues or organs, especially in rare genetic diseases and cancer. In contrast, the scientific and ethical opposition to germline gene editing will raise society's awareness to guard against rogue experiments while also supporting continued thoughtful debate on this topic."



— BRENDAN LEE, M.D., PH.D.
Chair of Molecular and Human Genetics at Baylor College of Medicine

ASK THE EXPERTS: PREDICTIONS FOR 2019

GYNECOLOGIC ONCOLOGY

"We are at the forefront of incorporating immunotherapy into our treatment portfolio and have recently launched a broad range of cutting-edge clinical trials in many gynecological cancers. In addition, there will be an increasing focus on personalized treatments. Genetic testing for ovarian and endometrial cancer patients is key, as there are new drugs that are particularly effective in women with inherited mutations."



— KAREN LU, M.D.
Professor and Chair in the Department of Gynecologic Oncology and Reproductive Medicine at The University of Texas MD Anderson Cancer Center

HEALTH POLICY

"In health care, I expect the political debate will go in one of two directions. One direction will be around modifications, expansions and improvements in Medicare as a vehicle for ensuring access to health care and with a particular recipe for handling costs. ... The second touchstone is around the Affordable Care Act, its promise and potentially its substitution. The ACA is still functioning, but it's going to undergo some challenges."



— STEPHEN LINDER, PH.D.
Associate Director of the Texas Medical Center Health Policy Institute

POPULATION HEALTH

"This is an exciting time in terms of both unprecedented vaccine access and the introduction of new vaccines. Unfortunately, opposing these exciting trends is a growing and ominous anti-vaccine movement, now well established in North America and Europe, but working its way into ... Africa, Asia and Latin America. ... The anti-vaccine movement successfully blocked vaccination programs for measles, influenza, and other childhood vaccines, as well as the introduction of new HPV vaccines for cervical cancer, so we must continue our efforts to debunk vaccine myths in the years to come."



— PETER HOTEZ, M.D., PH.D.
Dean of the National School of Tropical Medicine at Baylor College of Medicine and Director of the Texas Children's Center for Vaccine Development

REGENERATIVE MEDICINE

"Biologics are no longer new technologies. Both cell therapies and scaffold technology are now established as effective therapeutic tools. In 2019, multiple consortia comprised of industry, not-for-profit organizations and academia are actively engaged in, and committed to, solving the greatest needs to enable manufacturing of organs and tissues—illustrating that the field has come of age and is worth the investment."



— DORIS TAYLOR, PH.D.
Director of Regenerative Medicine Research at Texas Heart Institute

TECHNOLOGY

"Operations performed in the abdomen, pelvis, chest, cardiovascular and neurological systems will continue to become more targeted with the expanded use of ever more sophisticated intraoperative image guidance and pre-procedural planning with enhanced functional and structural imaging platforms, from CT to MRI to PET. Gloved surgeons' hands will increasingly rarely feel the warmth of the patient's body as technologies and devices ... fill the interface between the surgeon and patient's body."



— BARBARA BASS, M.D.
Executive Director of the Houston Methodist Institute for Technology, Innovation & Education (MITIE)

Chilling at Cool Acres

The Brazos River retreat owned by the late Denton A. Cooley, M.D., was home to the annual St. Luke's family picnic

BY BRITNI R. McASHAN



In 1958, pioneering cardiovascular surgeon Denton A. Cooley, M.D., purchased a Brazos River retreat for his family that was not too far from their Houston home or from Cooley's patients in the burgeoning Texas Medical Center. He christened the ranch Cool Acres.

"My father worked seven days a week," said Susan Cooley, Ph.D., a nurse and former professor at The University of Texas Health Science Center at Houston, who is one of the physician's five daughters. "He worked Saturdays until 2 p.m. and then had to be back on Sunday afternoon. He would come home after Grand Rounds on Saturday, honk the horn and we would all jump in the car with my mother, the fried chicken and

as many friends as we could pile in, and go out to what we would call 'the farm.'"

Located in Orchard, Texas—about 30 miles south of Houston—the 406-acre compound spreads across nearly one mile of riverfront property. The ranch sits on a bluff 115 feet above the Brazos River and includes five homes built between 1960 and 1982. In addition to a pond named Lake Louise—after the surgeon's wife—the property holds two tennis courts, a pool, a roller skating rink and party pavilion, stables for horses and even Orchard's original post office building.

Denton A. Cooley was a busy heart surgeon who performed the first successful human heart

transplant in the United States—a bold act that famously fractured his relationship with his mentor, Michael E. DeBakey, M.D.—and became the first heart surgeon to implant a total artificial heart in a human.

He was 96 when he died in 2016. And today, Cool Acres is for sale, with an asking price of \$7.3 million.

For decades, though, Cool Acres was more than a place for the Cooley family to play and relax. The property also served as the site of the annual St. Luke's family picnic for many years. Starting in 1960, Cooley and his family welcomed staff from what was then St. Luke's Episcopal Hospital. Doctors, surgeons, nurses, residents and their



Far left: House No. 4 at Cool Acres appeared in Architectural Digest.
Top row, this page: Denton A. Cooley, M.D., left, with O.H. "Bud" Frazier, M.D., center; James "Red" Duke Jr., M.D., with his first wife, Betty.
Bottom row, this page: The original Orchard, Texas, post office sits on Cool Acres; The swimming pool on the property was built by one of Cooley's patients.



families all dropped by.

"It was always a funny cast of characters, but there would be volleyball games, softball games, barbecue and fireworks—just an afternoon of everybody relaxing, drinking beer and Cokes and just having fun," Susan Cooley said. "Dad always thought that people who worked together ought to know each other personally and play together."

Guests at the annual picnic included Texas Heart Institute surgeon O.H. "Bud" Frazier, M.D., who trained as a resident under Cooley.

Frazier's son, Todd, who directs the Center for Performing Arts Medicine at Houston Methodist Hospital, remembers the picnic well.

"I went every year when I was a kid; it was

kind of a tradition to go out there," Todd Frazier recalled. "Those are some of my earliest memories of playing baseball and skeet shooting. It was fun because the health care professionals from St. Luke's who were from all over the world and had never experienced the Texas countryside could all come together."

Every year at the picnic, Denton and Louise Cooley took all the children on a hayride.

"It was an older, historic fire truck and they would do a hayride at night when all of the fireflies were coming out," Frazier said. "It was just really informal and relaxing and I think he just wanted to make everyone feel welcome and show them a good time."

Susan Cooley said her parents stopped hosting the picnic when her dad reached his eighties; her mother also died in 2016, at the age of 92.

But relatives have continued to enjoy Cool Acres for everything from weddings to holiday gatherings. Between the five houses on the property—pragmatically referred to as House No. 1, House No. 2, House No. 3, House No. 4 and the pool house—there are 18 bedrooms, 10 full bathrooms and three half bathrooms. ➡

“My father worked seven days a week. He worked Saturdays until 2 p.m. and then had to be back on Sunday afternoon. He would come home after Grand Rounds on Saturday, honk the horn and we would all jump in the car with my mother, the fried chicken and as many friends as we could pile in, and go out to what we would call ‘the farm.’”

— SUSAN COOLEY, PH.D.
Daughter of Denton A. Cooley, M.D.

Each structure differs vastly in architectural style and interior aesthetics, but all were designed by Denton A. Cooley. Many of the furnishings of House No. 4 are originally from the historic Hotel Galvez in Galveston, one of the surgeon’s many business ventures. That house was also featured in *Architectural Digest*. A former patient was so inspired by the home, he painted a rendering for Cooley.

“He was a very famous Russian artist and he wanted to paint a picture of the ranch, so he came out, drew it and then took it back to Russia,” Susan Cooley said. “He shipped back this painting of Cool Acres in the snow. It doesn’t snow out here, but we still kept it.”

At the moment, each of the homes on the property is filled with letters, mementos and

photographs of Cooley family members with everyone from trauma surgeon James “Red” Duke Jr., M.D., the founder of Memorial Hermann Life Flight, to Princess Anne, the British royal and only daughter of Queen Elizabeth II.

“Going through their stuff, there are so many questions,” Susan Cooley said. “You know, why were we in Italy with Bing Crosby? Why were we visiting the Pope at his summer palace?”

Her eldest sister, Mary Cooley Craddock, explained why the family was in Italy that summer.

“A very generous patient from Florence arranged the whole thing because Dad really wanted to get the Pope’s blessing about the heart transplant,” Craddock said. “He did give Dad his blessing.”



Cooley prepares to pitch at the annual picnic’s softball game. (All picnic photos courtesy of Susan Cooley.)

More than two years after the passing of their parents, the sisters are eager for another family to make memories at Cool Acres.

“My parents were always here,” Susan Cooley said. “I don’t even know what it’s like being here without them.” ■



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Mending a hole in the heart

Before birth, babies rely on their mothers for oxygen. A mother's oxygen-rich blood travels from the right atrium to the left atrium of a baby's developing heart through a small, open flap called the foramen ovale.

All babies are born with this tiny hole in their hearts, but in most cases the hole closes within six months. For a quarter of the population, though, the hole never closes, a condition known as patent foramen ovale (PFO). This opens the door for recurring strokes.

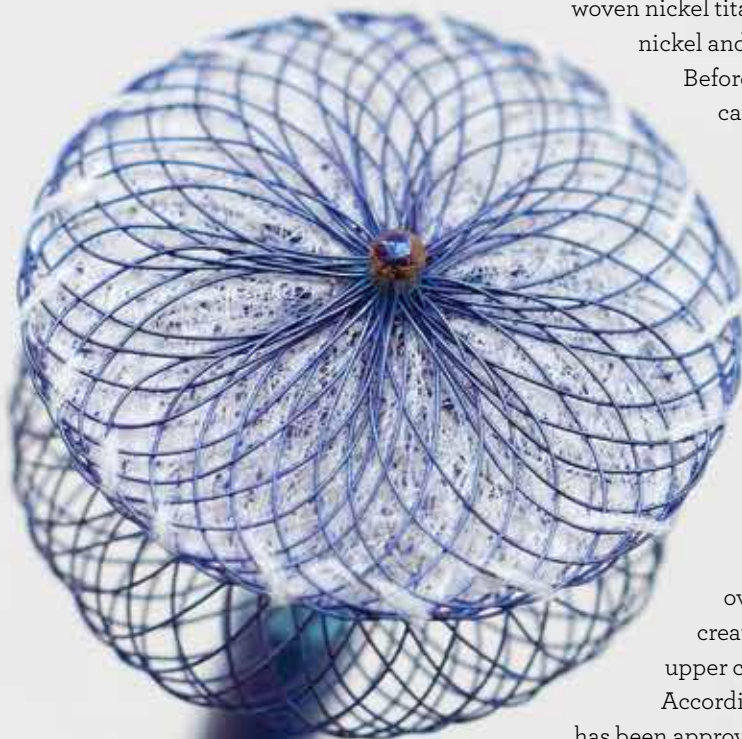
Enter Richard Smalling, M.D., director of interventional cardiology with McGovern Medical School at UTHealth and the Memorial Hermann Heart & Vascular Institute-Texas Medical Center. Smalling led an eight-year nationwide clinical trial to study the safety and efficacy of the Amplatzer PFO Occluder, a device that can patch up this congenital heart defect in less than an hour. The trial ended in late 2011 and follow-up data from nearly six years later shows the device reduces the risk of recurrent stroke by 45 to 62 percent.

"The beauty of it is: It's delivered via a catheter that we insert through a vein in the leg," Smalling explained.

The PFO Occluder is outfitted with two discs made of woven nickel titanium mesh, one the size of a nickel and the other the size of a quarter.

Before the device is inserted in the catheter, it is stretched to assume the shape of the tube. Once the catheter enters the left atrium through the hole in the heart, the smaller mesh disc expands and tugs against the wall between the heart's two upper chambers to collapse the flap. The second, larger disc springs open as the catheter is retracted in the right atrium. With the flap securely sandwiched between both discs, heart tissue heals over the device within six months, creating a new wall between the two upper chambers of the heart.

According to Smalling, the device, which has been approved by the U.S. Food and Drug Administration, provides a simple, yet elegant, solution for many patients. "With the device, we can at least eliminate one cause of recurrent stroke," he said. ■





SAVING OFFICER BARNES

John Barnes confronted the shooter at Santa Fe High School

BY ALEXANDRA BECKER

ON the morning of May 18, 2018, Officer John Barnes arrived at work hungry. It was the Friday of National Police Week, and Santa Fe High School had planned an omelet breakfast for its school resource officers—a gesture of thanks and appreciation for keeping students and faculty safe throughout the year.

Barnes can remember the omelets, that they were supposed to be served that morning. But his memory grows foggy when he tries to recall why he first stepped into the hallway, where a woman approached him to report sounds of gunfire. Just one month earlier, Santa Fe High, located about 36 miles southeast of Houston, had ordered a lockdown after rumors of an active shooter circulated; Barnes assumed that this morning's report, too, would turn out to be a misunderstanding.

But then the sting of gunpowder hit his nostrils. The smell was unmistakable.

Barnes quickly removed his pistol from his belt as

a fire alarm pierced the hallway and a rush of students poured out of the gymnasium. Gun by his side, he pushed through the crowd, craning his neck as he listened for gunshots and scanning every square inch of his sight line for someone with a weapon.

Then, he said, it all went to hell.

"People are getting shot in front of me," Barnes recalled. "And very quickly, everybody either exits out the door or goes past me."

Barnes was left standing in the hallway, blood smeared on the ground in front of him and glass shattering behind him. Another Santa Fe Independent School District (ISD) officer, Gary Forward, was close behind. *Could there be more than one shooter? One behind and one in front?* Never, not once, did Barnes think his confusion would be explained away by the wide spray of small metallic spheres from the shell of a shotgun, a weapon worshiped by hunters for its deference to destruction above precision. ➡





Credit: Steve Gonzales/Houston Chronicle via AP

Law enforcement responds to Santa Fe High School on May 18, 2018, after an active shooter was reported on campus.

Barnes barked into his radio, then focused his attention down the hallway. Slowly, carefully, and with his gun drawn, he slid his body along the left side of the wall, using it, and the corner, as a shield. He was going to sneak up on the shooter. With his pistol out front, he hugged the corner of the wall and drew himself out.

The assailant—Dimitrios Pagourtzis, at the time a 17-year-old student, is accused of the shooting rampage at the school—was standing there with his father’s shotgun, waiting. The teenager allegedly pulled the trigger as soon as he saw the officer’s right arm.

Only 60 seconds had passed since Barnes first stepped out of his office.

* *

Shotguns are not loaded with the same slick, ogival-nosed bullets found inside handguns or assault rifles. Instead, they use shells packed with tiny metallic projectiles known as shot. Once fired, the shot sprays the target, creating multiple entry points; if a shooter’s aim is off, he or she may still hit a target’s periphery.

Every shotgun shell holds a certain number of pellets. In Barnes’ case, at least three pellets tore through his right arm, shredding his brachial artery, a main thoroughfare to the heart. Barnes, a husband and father of two, would have bled to death within minutes had it not been for Officer Forward, who pulled a tourniquet from his vest and swiftly wrapped it around his friend’s arm. The team had only begun to carry the military-grade devices a month earlier,

an addition Barnes had initially dismissed as frivolous.

“It was like somebody stuck a hose in it and it was just draining out,” Barnes would later say of his wound. He can remember looking down at the large hole in his arm and feeling sick.

The two officers kept their eyes fixed on the hallway, waiting for the shooter to swing back around the corner at any second. Barnes kept telling Forward to leave; the thought of a colleague taking a bullet while tending to his arm was unbearable.

But Forward refused, and once the tourniquet was secure, he held open the door to a nearby dance classroom so that Barnes could crawl inside. Then Forward left—back to the hallway, to the corner and to the shooter. Soon, a group of officers found Barnes and helped him to his feet. He only made it about 10 yards before collapsing to the ground.

“Drag me, just drag me, just drag me,” he remembers pleading. With the threat of the shooter looming, one of the officers, unthinking, grabbed Barnes’ right arm. Pain stunned his whole body.

Ultimately, Barnes was dragged out of Santa Fe High by his duty belt, leaving a trail of blood behind him. Paramedics lifted him onto a stretcher as close friend and fellow Santa Fe ISD officer Elizabeth “Cibby” Moore rushed to his side. They could still hear the roar of gunfire inside the school.

Barnes felt faint, his head somehow both airy and weighted, like he was floating under a lead blanket. His blood was everywhere but inside his body. Amid his haze, he could make out that he was riding in an ambulance.



“People are getting shot in front of me. And very quickly, everybody either exits out the door or goes past me.”

— JOHN BARNES

Former school resource officer at Santa Fe High School

Then, he caught a glimpse of a helicopter. A veteran of the Houston Police Department, Barnes knew Life Flight was his best chance at survival. He turned to the nurse beside him and mustered the strength to speak.

“Get me on that [expletive] helicopter, or I’m going to die,” he said.

* * *

Word of a school shooting in Santa Fe first made its way to the trauma center at The University of Texas Medical Branch at Galveston (UTMB Health) when an alert was pulsed out over Emergency Medical Services (EMS) dispatch radio. Abby Anderson, a registered nurse working that morning, said that after one of her coworkers got a call from a student running away from the high school on foot, she and the trauma team began to prepare for victims. *This is real*, Anderson remembered thinking. *This is happening*.

Meanwhile, up in the air with helicopter blades whirring above him, an unconscious Barnes had flatlined—his heart stopped beating. The nurses on Memorial Hermann Life

Flight pumped two units of blood into his body and he was intubated and fitted with a LUCAS device, a mechanical chest compression system that pulsed his heart with systematic accuracy, automating its beat.

By 8:31 a.m., less than an hour after he had been shot, Barnes was lying in exam room 102 at UTMB. He woke briefly for about 30 seconds, and although he couldn’t open his eyes or even wiggle a finger, he could hear the trauma team calling out orders. He was lulled back into unconsciousness with the assurance that people were trying to save his life.

* * * *

Trauma teams are charged with preserving life and keeping death at bay. Like school resource officers, police and EMS personnel, they are a first line of defense in a medical crisis.

A typical UTMB trauma team is made up of a physician faculty member, three residents and emergency room nurses. The team worked on Barnes for 50 minutes in the emergency room; they inserted a catheter, took an X-ray at the bedside to peer inside his ruptured arm, and packed the wound with QuickClot combat gauze—a fabric impregnated with a clay derivative that clots blood. A nurse initiated a massive transfusion protocol and, shortly thereafter, coolers of blood and plasma and platelets arrived from the local blood bank. They filled Barnes with five units of packed red blood cells, desperately hoping to replenish all that he had lost. ➡

Barnes visits exam room 102 at The University of Texas Medical Branch at Galveston, where he was first treated by the trauma team after arriving in the emergency room.



William “Bill” Mileski, M.D., chief of trauma services at UTMB, helped the team stabilize Barnes so that he could be transferred to the operating room for surgery. Described by colleagues as a bear without claws, Mileski can come off as gruff, but if you are in near-irreversible shock from hemorrhaging, you want him in the room.

When a body loses as much blood as Barnes’ did, it pools whatever reserves it has left and drives that blood to the core—one last-ditch effort to survive. But if organs like the kidneys and liver are deprived of blood for too long, their cells begin to die. When the condition hits a critical point, it is called irreversible shock. The patient will enter kidney failure, liver failure, respiratory failure, or all of the above, and it is almost always fatal.

The trauma team at UTMB worked to get Barnes’ blood pressure up to a point where blood and oxygen could still reach his brain—if only barely. At 9:21 a.m., they packed up the coolers of blood, steadied the gurney and rushed him to the OR.

Cibby Moore raced down Interstate 45 toward UTMB in her police cruiser, lights and sirens screaming. Beside her was Barnes’ wife, Ashley, at the time a vice principal at Wollam Elementary School, located just three miles east of Santa Fe High.

Ashley knew her husband had been shot, but nothing else. Finally, Moore turned to her. “Do you want me to tell you what happened?”

Ashley nodded and braced herself. Moore told her that her husband had been shot in the arm. A wave of relief



William “Bill” Mileski, M.D., is chief of trauma services at UTMB.

swept over Ashley.

“As soon as I heard that I was like, ‘OK, we got this. We’re in the arm. It’s not in the chest. He’s alive,’” she later recalled.

When the two finally reached UTMB’s waiting room, Ashley took note of the swarm of police officers. *How nice*, she thought. But when she was escorted from the main area to an isolated room nearby, she grew nervous. *Why do I have to be in the ‘Your-husband’s-dead room?’*

Barnes signs a poster at UTMB during a visit in August 2018.



Ashley took deep breaths. She reminded herself that it was just a gunshot wound to the arm, oblivious to the severity of his injury. Moore remained by her side, her uniform splattered with blood. When Ashley finally noticed, she knew, without question, that the blood belonged to her husband.

Family and friends circled through their small room. Police officers came to pay their respects, even Houston Police Department Chief Art Acevedo. Finally, hours after Ashley had arrived, Mileski appeared.

“He is very sick,” the surgeon told her. “He is very sick.”

* * * * *

In the operating room at UTMB that morning, anesthesia was started at 9:23 a.m. The surgeons’ task: determine exactly what damage had been done to Barnes’ body and what needed to be repaired. Everything was recorded in what would ultimately become nearly 900 pages of medical records. A “problem list” outlines the severity of Barnes’ condition:

Gunshot wound
Traumatic hemorrhagic shock
AKI (acute kidney injury)
ATN (acute tubular necrosis—kidney disorder from damage to the tubule cells)
Shock liver
Laceration of right brachial artery
Olecranon fracture

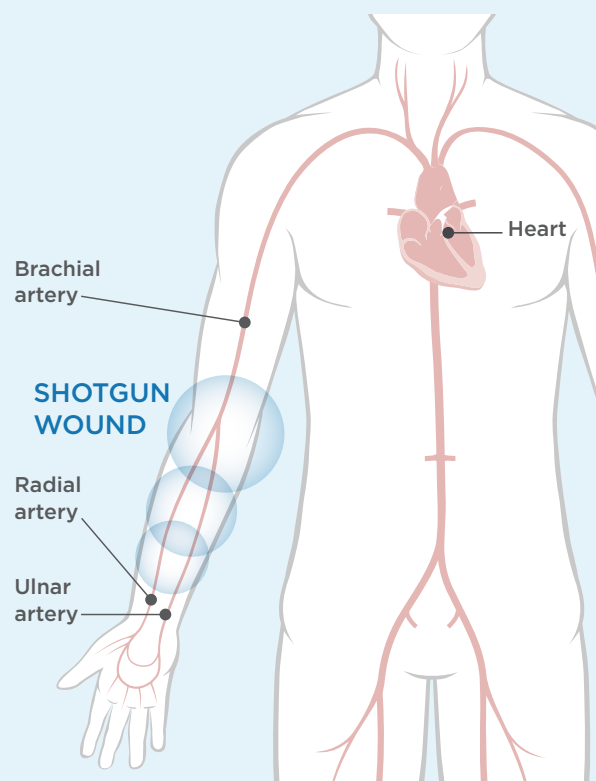
Pellets from the shotgun had shattered Barnes’ right elbow, including the tip, known as the olecranon. The blast transected the brachial artery just where it splits into the radial and ulnar arteries and tore a hole along the front of his forearm. It was no wonder he couldn’t keep blood inside his body.

By 10:20 a.m., the team began to reconstruct the arteries, harvesting fragments of Barnes’ saphenous vein (which runs the length of the leg) and right forearm cephalic veins (large veins often used for drawing blood) for the repair. Three-and-a-half hours later, with a strong pulse in place, the team set to work stabilizing Barnes’ elbow joint using pins and an external fixator. Finally, they closed the large opening in his forearm with the help of wound-VAC, a vacuum-assisted technique that decreases air pressure in and around the wound to promote healing. Last, they grafted skin from his leg to cover the large, delicate area.

The surgeries, finally over just after 4 p.m., required expertise verging on perfection, but Mileski would look back on those first seven and a half hours and say that it was nothing heroic.

“We’re pretty well conditioned to respond to the needs of patients and prioritize what we have to do to get them well,” he said. “You don’t really think that much, as silly as that sounds. It’s like a football player playing football—you react to the circumstance, you don’t sit there and run through a lot of thought, at least not if you’ve been doing it for 30 or 40 years.”

AREA OF IMPACT



Shotgun pellets shattered John Barnes’ right elbow, cutting across the brachial artery where it splits into the radial and ulnar arteries of the forearm. Because the brachial artery is a main thoroughfare to the heart, Barnes lost blood rapidly and flatlined on Memorial Hermann Life Flight en route to UTMB. The severe blood loss left him in a state of hemorrhagic shock, indicating a lack of oxygen at the cellular level; his kidneys, lungs and liver were threatened. Surgeons at UTMB reconstructed the arteries in his arm using veins from his leg and forearm. Then, they stabilized his elbow joint and closed the large opening in his forearm, grafting skin from his leg to cover the area.

* * * * *

Dimitrios Pagourtzis is accused of killing 10 people in Santa Fe, Texas, and wounding 13, including Barnes.

More than half a century ago, on Aug. 1, 1966, another Texas city ushered in the first mass school shooting in modern America, when a 25-year-old engineering student at The University of Texas at Austin climbed the campus clock tower with an armful of guns and ammunition and shot and killed 15 people.

Since then, the names of the schools around the country where students and faculty have been gunned down are forever fixed in public memory. Columbine. Virginia Tech. Sandy Hook. Marjory Stoneman Douglas. Santa Fe. There are many, many others. ➡

“It’s difficult to describe the ravages of severe hemorrhage. He had lost as much blood as a person can lose and still survive. Honestly, I was surprised he did survive. I didn’t think his kidneys were going to come back, or his lungs, for as sick as he was. But he got lucky.”

— WILLIAM “BILL” MILES, M.D.
Chief of trauma services at UTMB

Increasingly, districts are hiring school resource officers to protect students from dangerous situations, including mass shootings. They are usually armed. School resource officers are commissioned, sworn law enforcement officers—not security guards—trained to move directly to any threat, as quickly as possible, and then to neutralize the threat to prevent loss of life or injury, according to The National Association of School Resource Officers.

An estimated 20 percent of all U.S. K-12 schools, public and private, are served by school resource officers.

John Barnes had been a school resource officer for just four months when he rushed toward the sound of gunfire at Santa Fe High. Barnes spent nearly 25 years as a police officer with the Houston Police Department, 10 of those patrolling some of Houston’s toughest neighborhoods and another 13 doing detective work, making a name for himself investigating sex crimes. In January 2018, hoping to slow down a bit and prepare for retirement, Barnes began working at Santa Fe ISD.

Despite more than two decades in law enforcement, May 18, 2018 was the first time Barnes had ever been shot.

* * * * *

When Ashley was finally able to see her husband in the intensive care unit (ICU), his skin was void of color, ashen, “almost all the way through,” she recalled. His body was freezing to the touch.

Barnes came close to losing all the blood in his body, Mileski said.

“It’s difficult to describe the ravages of severe hemorrhage,” the trauma surgeon later explained. “He had lost as much blood as a person can lose and still survive. Honestly, I was surprised he did survive. I didn’t think his kidneys were going to come back, or his lungs, for as sick as he was. But he got lucky.”

Barnes cannot recall anything from his first week in the hospital. In all, he spent nearly three weeks in the ICU, undergoing dialysis to support his kidney function. On June 6, he was discharged and sent to TIRR Memorial Hermann in Houston for inpatient rehabilitation. Then, on Wednesday, June 20, he was finally well enough to go home. Nine days later, he celebrated his 50th birthday.

In August, Barnes made a special trip back to UTMB. He and his wife, with coffees in hand, spent a morning in the ER and at Sealy Hospital, meeting the people who saved his life.

Nurse Abby Anderson, one of the first to treat Barnes on that May morning, spoke up.

“We never get to see this side. We send people that were in your condition to the OR, or up to the ICU, and then we’re done,” Anderson told Barnes. “We may find out from the trauma team later how they’re doing or, you know, what happened, but that’s it. That’s as far as we get. You know, I’ve been doing this for five years, and there’s always patients that stick with you, and you stuck with me for some reason.”

Standing in exam room 102, where crisp white sheets stretched across an empty bed, Barnes grew emotional, thanking those who surrounded him for, in his words, being so good at their jobs. He knew how much that mattered; ballistic analysis would eventually reveal that Barnes’ aggressive march toward the alleged shooter kept the teenager contained, that despite classrooms full of students

Barnes gets emotional in August 2018 while visiting with members of the team who cared for him at UTMB.



 VISIT [TMCNEWS.ORG](https://www.tmcnews.org) TO WATCH A VIDEO FEATURING JOHN BARNES.



Barnes sits in the dining room of his League City, Texas, home.

hiding all around them, Barnes was the last person shot at Santa Fe High that day.

On a Tuesday morning in early January, John Barnes sat in his home in League City hooked up to an IV drip full of antibiotics. His living room still shone with the relics of Christmas—an unlit tree in the corner, heavy with ornaments, a forgotten Elf on the Shelf, his two children's

wish lists on display. A few months prior, Barnes had awoken with a fever, and then a day later, his arm grew warm. Doctors at UTMB discovered a staph infection and operated quickly, leaving a new scar hugging the length of Barnes' shattered elbow. It would mark his eighth surgery, with more on the horizon.

Now, every day at 10 a.m., he will hook the IV to a port in his chest until his bones are finally healed enough for surgeons to remove the plate in his arm—a magnet for bacteria. Barnes believes the infection will set his rehabilitation back at least six months, a disappointment in light of how far he'd come re-establishing his range of motion. But aside from his goals of mountain biking again and living without pain, Barnes said life is finally feeling settled. He can take trips with his family. He can enjoy a bourbon and a cigar. He can make plans for the future.

"It's as normal now as it's probably ever going to be," he said. "This is my life now."

Barnes has been shown the surveillance video from the day of the shooting. He has counted the seconds on the ticker and analyzed every possible scenario, wondering if he could have saved anyone else with the information he'd had that day. He has watched the student with the shotgun wait for him as he turns the corner. It's surreal, Barnes said—even at the time, he felt like he was inside a movie: His body was responding, his brain was reacting, but he still couldn't believe it was happening.

He has declined to review all the evidence from the shooting, though. For now, Barnes is focused on healing. ■

1 in 11 Americans has diabetes.

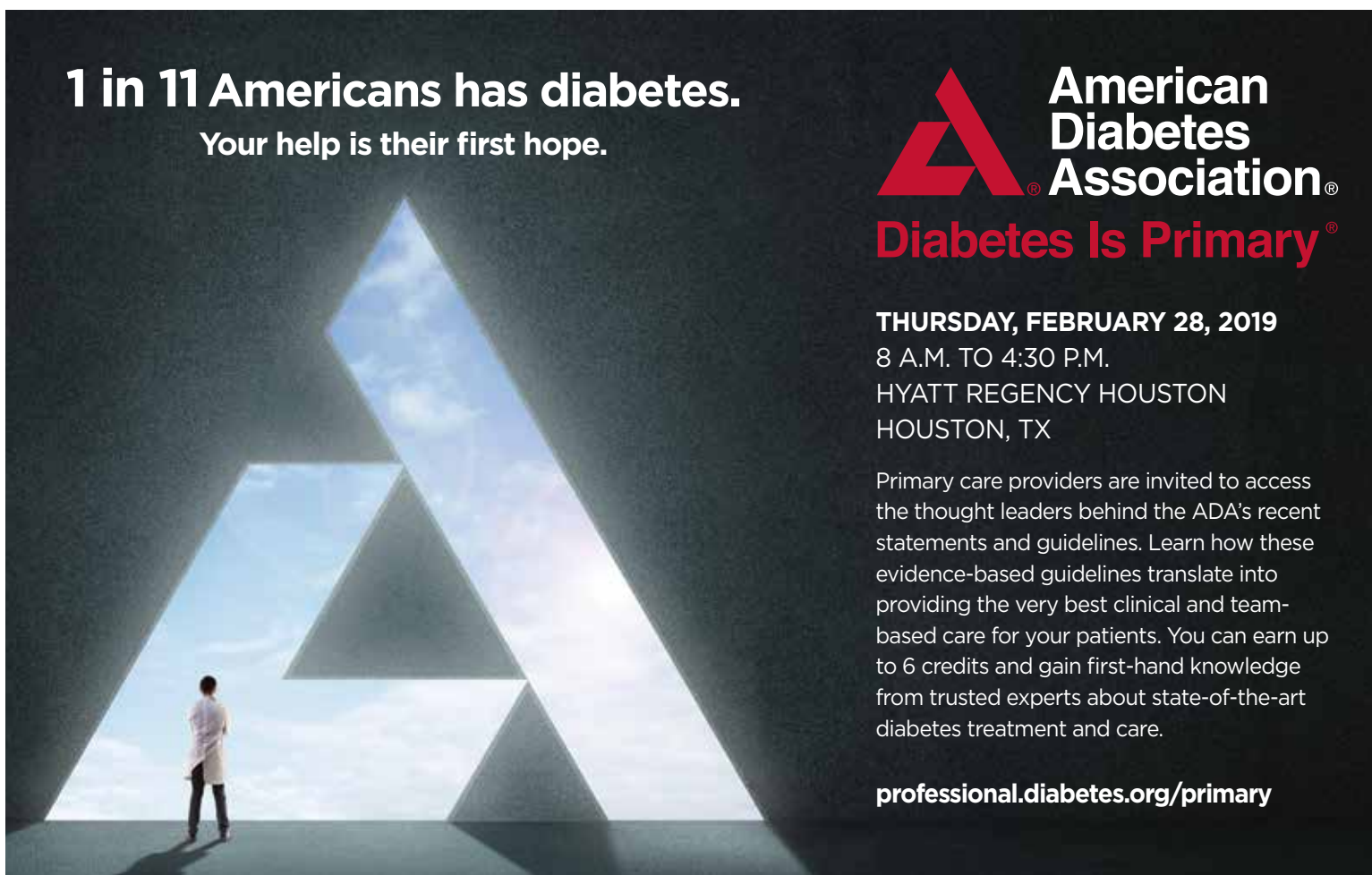
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A Bridge for Katlyen

Texas Children's Hospital is the first in the world to implant the Jarvik 2015 pediatric ventricular assist device as a bridge to transplant

BY ALEXANDRA BECKER



Above: Katlyen Hickman enjoys lunch at Texas Children's Hospital with congenital heart surgeon Iki Adachi, M.D.

Facing page: The Jarvik 2015 pediatric ventricular assist device is the size of a AA battery.

Four-year-old Katlyen Hickman has always been special. Even at birth, she defied the odds after she was diagnosed with several critical congenital heart defects, including aortic arch hypoplasia—meaning the vessel leaving the left side of her heart was too small—as well as multiple ventricular septal defects, which required her heart to pump excessively to push blood through her body. Despite numerous heart surgeries and cardiac catheterizations in her first few years of life, though, her heart was failing fast.

“It was clear she was moving in the direction of needing heart transplantation,” said Iki Adachi, M.D., a congenital heart surgeon at Texas Children's Hospital. “She was admitted to the ICU and her heart condition was just getting worse and worse.”

Adachi and his team were determined to give the spunky young patient the best chance for a long life. So, on Oct. 2, 2018, they implanted the Jarvik 2015 ventricular assist device (VAD) into her chest, confident that it would

keep her alive as she waited for a new heart.

It did—and it also put her name in the history books. Hickman was the first patient in the United States, and only the second in the world, to receive the new device.

AA battery

Ventricular assist devices can be used in pediatric patients who are in need of a heart transplant as a means of sustaining them until they are matched with a new organ—a bridge to transplant. In



“One of the most significant benefits of this ventricular device’s support is that we can make the patient stronger so that they can be a better candidate for the next operation, which is usually a heart transplant.”

— IKI ADACHI, M.D.

Congenital heart surgeon at Texas Children’s Hospital

attached to the rotor—technology that has been associated with significantly improved outcomes in adults. But designing a similar technology tiny enough to be implanted in a small child’s chest—like Hickman’s—proved nearly impossible. The team behind the Jarvik 2015, which is approximately the size of a AA battery, has been working on its design for more than a decade, watching each competitor give up and move on to a new, perhaps more attainable challenge.

After the U.S. Food and Drug Administration (FDA) rejected the device twice in 2014, Adachi came on board to test the current iteration that had undergone substantial design modifications, including the shape of the blade. That final modification would prove to be the charm.

“The main problem was that the previous iterations caused the red blood cells to break because it was spinning too fast,” explained Adachi, who continued his involvement in the project as the principal investigator of preclinical testing. “So they changed the design of the blade and they also increased the size of the pump slightly so it didn’t have to spin so quickly, which reduced damage to the red blood cells. But it had to stay small, which is the challenge in making a pump for kids versus adults. The pediatric pump has to be smaller, despite the fact that the red blood cells are nearly the same size regardless of age.”

The waiting game

As a result of extensive testing in the Texas Medical Center, the latest prototype of the Jarvik 2015 has been approved by the FDA for a clinical trial. Because it has not yet been approved for commercialization, Adachi had to obtain expanded access use from the FDA for Hickman’s procedure. He was able to do so because Hickman was too small to be a candidate for a VAD made for adults, which, while not ideal, is what Texas Children’s typically uses on patients in heart failure. All other options are external devices, which are hooked up to the heart through cannulae (tubing) and remain on the outside of the body. They carry with them increased risks of side effects, especially strokes.

“The Jarvik 2015 is an internal device, and the only other device we have for this sized population is on the outside of the body, but it’s very clear that the outcome of the outside device is much worse than an internal device,” Adachi said. “That has been clearly shown in the adult population—internal devices are better in general than the external devices. There is no question about it.”

The Jarvik 2015 turned out to be perfect for Hickman. Not only did the tiny device keep her alive as she waited for her heart transplant, but it actually improved her blood flow so much that her visceral organs recovered dramatically in the weeks leading up to her surgery. Hickman was stronger and healthier and in much better shape overall to undergo major surgery and rehabilitation.

“One of the most significant benefits of this ventricular device’s support is that we can make the patient stronger so that they can be a better candidate for the next operation, which is usually a heart transplant,” Adachi said, adding that the practice aligns with Texas Children’s Heart Center’s clinical philosophy in general. ➡

rare cases, the device helps a heart recover to the point that the patient no longer requires a transplant, and in even rarer instances, it can be used as a permanent therapy for a failing heart.

What sets the Jarvik 2015 apart is that it is the first and only implantable ventricular assist device with a continuous flow designed specifically for small children.

The continuous flow is key: Rather than pumping like the heart, it pushes blood through an impeller with the help of an agitator blade





Above: Hickman gets a ride to the playroom at Texas Children's Hospital. **Below:** Adachi in his office at Texas Children's.

“The VAD not only improves survival outcome, but also length of stay in the hospital post-transplant and how quickly a patient is able to get back on their feet and get back into the swing of things as far as their life is concerned.”

— JEFF DREYER, M.D.

Medical director of heart failure, cardiomyopathy and cardiac transplantation at Texas Children's Hospital

“Our center is known for making pediatric patients better while waiting for a transplant,” he said. “Unlike most other centers, we intentionally wait before moving forward with a transplant after we implant an internal device. We usually wait at least three months with an internal pump before activating the patient on the transplant list, and not a lot of pediatric centers are doing this—they want to get to transplant as soon as possible, which is primarily driven by the sense of urgency to avoid potential complications with VAD support.”

Texas Children's recognizes the benefit in waiting—the benefit in re-establishing healthy blood flow and all that comes with that, but also the rare benefit of rehabilitating a failing heart, Adachi explained. Such a practice is possible at Texas Children's, which has the world's largest pediatric VAD program, because the team is able to provide stable outpatient management.

“Occasionally, someone will recover while waiting, and transplantation becomes unnecessary,” Adachi said. “And recovery is very, very important, particularly in a pediatric patient, because while heart transplantation is great, it's not really a permanent solution.”

Adachi explained that it takes at least two or three months for a

failing heart on a VAD to show some signs of recovery—and that the younger the patient, the greater the chance that a heart in failure may recover on this kind of support.

“Most heart centers don't provide the pediatric patient with an opportunity to recover,” Adachi said. “If you transplant so quickly, you may miss the opportunity to see some signs of recovery, which is why we like to wait at least three months.”

Adachi noted that in Hickman's case, they chose not to wait three months since it was only the second time ever the device had been implanted in a patient—the first being in Italy not long before—and the first time the device was used as a bridge to transplant. Still, Adachi anticipates that the Jarvik 2015 will do well in the upcoming multi-institutional clinical trial—in which Texas Children's is participating—and hopes that it will soon become widely available and lead to a world-wide shift in clinical management of pediatric patients in heart failure.

Buying time

On Nov. 23, 2018, the day after Thanksgiving, Hickman received a new heart—then proceeded to amaze everyone with her swift and steady recovery.

“The VAD not only improves

survival outcome, but also length of stay in the hospital post-transplant and how quickly a patient is able to get back on their feet and get back into the swing of things as far as their life is concerned,” said Jeff Dreyer, M.D., medical director of heart failure, cardiomyopathy and cardiac transplantation at Texas Children's.

Hickman will continue to be monitored over the next several months and will need lifelong follow-up care, Dreyer said, but the frequency of her visits will eventually drop to just three a year—two in clinic and one for a routine biopsy of the heart. As Adachi noted, a heart transplant isn't permanent, and the thrice-yearly monitoring helps heart centers like Texas Children's keep an eye on their patients. According to Dreyer, the half-life of a transplanted heart is approximately 15 to 16 years, meaning that in that period of time, about half of patients will need another heart.

Texas Children's has already implanted another Jarvik 2015 in a different patient suffering from heart failure, again with expanded

use approval from the FDA. That patient, like Hickman, is recovering well.

On Dec. 24, 2018, Hickman's Christmas wish came true, and she was discharged home. As time passes, her transplanted heart will grow with her, and although it won't last forever, science and technology are evolving quickly—and who knows what therapies will exist in the future to save her life once again.

“We're buying time,” Dreyer said. “Medicine changes. I can't exactly predict where things will go, but what I do know is that the way we practice medicine today isn't the same as what we did 10 years ago or 15 years ago, and so I imagine that innovations will likely occur over the same period of time going forward that will very significantly alter the clinical course or prognosis of our patients.” ■



Harnessing Inflammation to Heal the Heart

Researchers discover a new way to control inflammation after a heart attack

BY SHANLEY PIERCE

Inflammation is the body's natural response to injury or infection. After a heart attack, the inflammatory response is an integral part of the healing process, but the body must strike a delicate balance. Here, the Goldilocks principle applies: Too much or too little inflammation could cause irreparable damage to the heart.

"There is a huge challenge to really find out how to manipulate inflammation," said Jiang Chang, M.D., Ph.D., professor at the Texas A&M Institute of Biosciences and Technology Center for Translational Cancer Research. "Both over-responsive or less responsive [inflammation] lead to terrible consequences for patient healing."

Chang and a team of scientists at the Texas A&M Institute of Biosciences and Technology recently discovered a specific protein, called RhoE, that they believe can be harnessed to regulate inflammation. Beyond RhoE's potential for

improving outcomes for heart patients, this new biomarker could lead to targeted therapies for chronic inflammation diseases, Chang said, such as asthma and arthritis.

When the immune system recognizes any sign of danger, it dispatches white blood cells to the site of the injury or infection. The white blood cells produce and secrete cytokines and antibodies that identify foreign invaders, activating the inflammatory response.

Inflammation and cell death occur after a heart attack, as the body clears out dead heart tissue. Excessive inflammation can cause the body to destroy healthy tissue, whereas an inadequate inflammatory response could prolong recovery.

In a recent study published in *Circulation*, Chang and other researchers tested the correlation between RhoE and inflammatory responses in a mouse model, using two groups of mice—one

genetically modified to deactivate the gene that produces RhoE (a group known as knockout mice) and the other designed to produce more RhoE (known as transgenic mice).

Results showed that the absence of the protein led the knockout mice to experience severe inflammatory responses after a heart attack and even poorer heart function. Conversely, the mice expressing higher levels of RhoE had a better prognosis in terms of cardiac function, recovery time and size of infarction (an obstruction of the blood supply to an organ). The researchers studied RhoE expression levels in human patients after myocardial infarction to further confirm their theory and noticed the same result: Patients with higher levels of RhoE healed better and faster.

"Turned out, this protein targets a factor called NF- κ B, which is a key transcription factor that regulates a whole set of inflammatory response genes," Chang said.

RhoE physically bonds with and inhibits NF- κ B—effectively blocking it from turning on too many inflammatory response genes.

"This is a perfect responsive strategy that makes sure inflammation is not over or under," Chang added. ■

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Help for Failing Hearts

TMC-based startups hope to change the way heart failure is treated

BY RYAN HOLEYWELL

How do we combat heart failure? Two startups based in the Texas Medical Center, CorInnova and Alleviant Medical, are working on novel solutions. Both companies are part of the TMC Venture Fund portfolio, which aims to bolster innovation across Houston's health care ecosystem. The \$25 million fund launched in 2017.

A gentle squeeze

A device in development at CorInnova aims to use "soft robotics" to prolong the lives of patients suffering from heart failure.

The new device wraps around the heart and squeezes it to increase blood flow—but importantly, never comes in contact with blood itself. Leaders at CorInnova say that lack of blood contact will make it dramatically safer for patients, reducing

complications like stroke, blood damage and kidney problems that can be associated with other heart devices.

"Not touching the blood is a big deal, as this feature offers a dramatic advantage over standard therapy," CorInnova CEO William Altman said.

The company is housed within Johnson & Johnson Innovation's JLABS @ TMC accelerator. In 2015, CorInnova received a \$6.1 million investment from the Wellcome Trust, a United Kingdom foundation that supports health research and innovation and has said the technology could be "transformative." The TMC Venture Fund announced its investment in CorInnova in 2018.

"CorInnova could revolutionize the market the way the pacemaker did," said Juliana Garaizar, director

of the TMC Venture Fund.

Heart failure occurs when the heart is no longer able to supply enough blood to meet the body's needs. There is no cure. Though the preferred method for treatment is a heart transplant, precious few hearts are available. Long-term devices, known as chronic LVADs (left ventricular assist devices), can also be used to help with blood flow, but these pumps require invasive surgery. Furthermore, fewer than 12,000 LVADs are implanted



CorInnova's device could support patients in the hospital after a short-term heart injury.

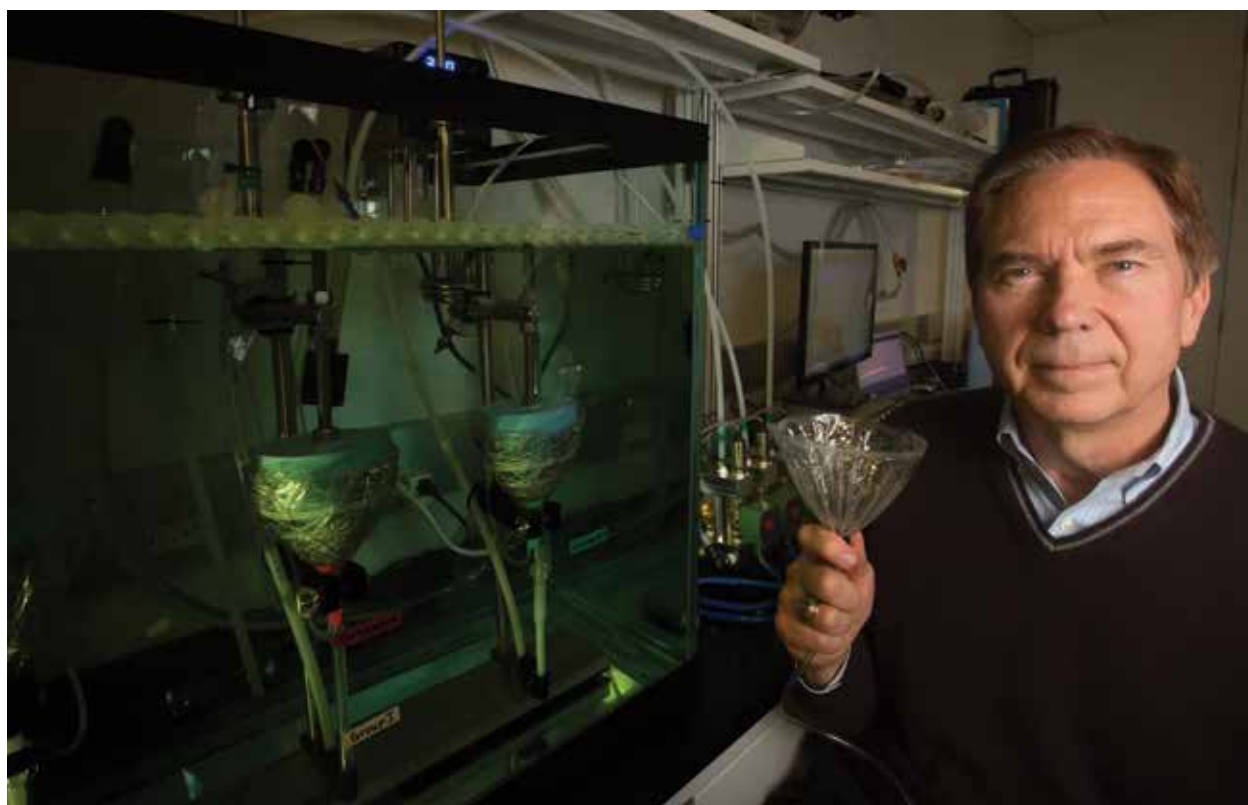
annually for long-term use, in part, due to strict eligibility requirements for the surgery—generally, those over age 65 may not be eligible. Short-term LVADs (for less than seven days' use in the hospital) also

touch the blood and many patients can't use them either.

CorInnova hopes its device can help fill the gap. "If you don't qualify for an LVAD—and 90 percent of patients don't qualify—this would be an alternative," Altman said. The device could support patients in the hospital, allowing them to recover and return home after a short-term heart injury. Or, for patients with end-stage failure, the device could extend life by six months to a year in a gentler way, without the risk of blood contact, Altman said.

The CorInnova device encases the heart, its saline-filled chambers closely hugging the organ. It inflates with air in synchrony with the heartbeat, gently squeezing the heart to increase blood flow. The soft, robotic device is collapsible and can be implanted through minimally-invasive surgery.

The company says hospital stays following device implantation would be 80 percent shorter than for long-term LVADs, and adverse effects could be at least 30 percent fewer, compared to both short-term and long-term LVADs. And most patients with heart failure are too



CorInnova CEO William Altman holds up a device that encases the heart and squeezes, to increase blood flow.

sick to be eligible for an LVAD anyway, which is where CorInnova believes it can serve as an alternative. CorInnova also says the device can help solve another problem—heart failure that occurs after heart attack, due to structural changes in the heart. Outfitting those patients with the device could help prevent the heart from enlarging following a heart attack by enhancing the correct motion of the heart, Altman said.

Since 2015, the device has been tested in 20 large animal studies, primarily at Texas Heart Institute and at Texas A&M University. Preliminary results show that it can increase cardiac output by 50 percent in animals.

For now, the company is focusing on clinical applications in which the device would be used for about a week, although one device tested successfully for 100 days. CorInnova leaders believe that, theoretically, they can create a device that can be used for at least three years.

Next year, the company will begin designing a version of the device that is sized for humans, and by the end of 2021, it hopes to complete its first study in 6 to 10 people.

For Altman, the work his company is doing is personal. “My father-in-law died two years ago from heart failure,” he said. “He is precisely the kind of person who could have used this device.”

Pressure-relief channel

Alleviant Medical is developing a new, minimally-invasive device that relieves pressure buildup in the left atrium of the heart, one of the key drivers of heart failure.

Millions of patients suffer from congestive heart failure, and



Alex Arevalos, Ph.D., chief technology officer of Alleviant, speaks with Avni Patel, chief operating officer, who is holding a model of the atrial chamber.

Alleviant expects its pioneering therapy to be a good fit for about a quarter of them—those sick enough to be hospitalized occasionally, but healthy enough that they don’t yet need a heart transplant.

The company is making rapid progress. The device is being tested on pigs at Houston Methodist Hospital and Texas Heart Institute, and functioning as intended, said CEO and co-founder Jacob Kriegel, M.D.

“Our early results have been promising and exciting,” Kriegel said. “The last couple months have included a dramatic increase

in testing the device, rather than conceptualizing and prototyping the device.”

Congestive heart failure mainly affects older adults. Over time, the heart’s pumping mechanism grows weaker and the organ can’t circulate blood effectively. Patients experience a buildup of pressure in the left atrium of the heart, leading to shortness of breath and a feeling often compared to drowning, due to a buildup of fluid in the lungs. The condition can result in several hospitalizations per year and, eventually, may require a heart transplant.

Congestive heart failure is

notoriously difficult to treat. Prescription medication can treat the symptoms but does not address the root problem, Kriegel said. Other interventions may require inserting a stent in the heart, which also comes with risks.

In recent years, Kriegel said, researchers have discovered that reducing left atrial pressure can improve symptoms. Alleviant’s innovation is a sort of “pressure-relief channel” that creates a connection between the left and right atrium of the heart, allowing blood to flow from the former to the latter. “Basically, we’re shifting pressure around to a different area of the heart that can handle it much better,” Kriegel said.

In 2017, Alleviant was one of five firms that received the first round of investments from the TMC Venture Fund.

“They have already captured a lot of attention from investors and strategic partners, so hopefully this revolutionary method of alleviating congestive heart failure will soon be available in the market,” said Garaizar, director of the fund.

Alleviant is a “TMC company, born and bred,” Kriegel said. The device grew out of its founders’ participation in TMC Biodesign, TMC’s one-year innovation fellowship, and the company matured while it participated in TMCx, TMC’s business accelerator. Now, it’s based out of TMCx+, TMC’s coworking space for health care startups.

“The cardiovascular community here is strong,” Kriegel said. “I think it’s been a big advantage for us to be here.” ■

A Visit to the Dentist Leads to a Heart Diagnosis

Dental student takes a patient's vitals manually and finds a problem

BY BRITNI R. McASHAN



Chris Conser, a UTHealth School of Dentistry student, examines Desiree Pearson of Pearland, Texas.

Desiree Pearson of Pearland, Texas, is grateful that Chris Conser, a University of Texas Health Science Center at Houston (UTHealth) School of Dentistry student, took the time to check her vital signs before she had a filling replaced last spring.

"In March, I had just turned 63 years old and I was tired and I've never been like that," Pearson recalled. "But I just thought it was part of being 63."

Shortly before treating Pearson, Conser had attended a lecture by

Shalizeh Patel, D.D.S., an associate professor at UTHealth School of Dentistry, about the importance of taking vitals manually at the beginning of every patient visit.

"I'm a big advocate of students taking their time, getting to know their patients and taking vital signs appropriately," Patel said. "A lot of students are in a rush because they are trying to get things done and they get in the habit of using the electronic cuff monitors and many of those are not calibrated or working properly."

Years ago, Patel learned firsthand how important it is to pay attention to a patient's vital signs. She had a professor who was passionate about taking vitals manually, as well, back when it was a lot less common for dentists to do so. Soon after, she went home to visit her family and realized her dad wasn't feeling well. She took his vitals and found that he was having heart problems.

Similarly, Conser was able to detect Pearson's heart trouble while taking her vitals manually.

"So I did it the old school way with the cuff that you inflate and by feeling her wrist with my finger for a pulse," Conser said. "I started taking her blood pressure and something was a bit off and I was really uncertain, so I took it one or two more times."

On this occasion, human touch proved to be Conser's most valuable tool.

"In Mrs. Pearson's case, the electronic cuff gave a reading of her blood pressure and pulse, but it didn't provide the rhythm of the



Conser takes Pearson's blood pressure.

pulse and that is how it was missed by her medical doctor," Patel explained.

Conser quickly became concerned and went to get help from another professor. As part of the curriculum at UTHHealth School of Dentistry, dental students treat patients under the supervision of experienced clinical faculty.

"I knew something was wrong," Conser said. "I could hear the pulse—it is a bit quicker than when you are feeling the wrist—but it just sounded weird. I set aside the blood pressure and took her pulse with my fingers. The first time I took it, her pulse was alternating between a slower and a faster beat and then again I was still uncertain and hoping I was making a mistake. I took it again and this time her heart was outright stopping for seconds at a time."

The attending professor felt the same thing and immediately referred Pearson to a doctor.

"I had no idea something was wrong," Pearson recalled. "I think it was maybe the second or the third time and he said I need to go get my professor, and I was a little nervous. I was in for a filling and his professor said ... 'You need to go straight to your doctor.'"

Pearson was referred to a cardiologist at Memorial Hermann Pearland Hospital, where she was diagnosed with a heart rhythm disorder known as sick sinus syndrome. According to the Heart Rhythm Society, sick sinus syndrome is a group of symptoms that indicate the heart's natural pacemaker, the sinus node, is not working.

"The cardiologist told me no driving and no stairs, but I live in a three-story house so I would just do them really fast," Pearson said. "He said sick sinus syndrome wouldn't kill me, but if I was driving down the highway and passed out ... you don't have a warning, you're just out."

Within a month of her visit with Conser, Pearson received a pacemaker and is feeling like herself again.

"It is not just this case," Patel explained. "There are a lot of diseases that have oral manifestations that can be ignored because most medical doctors don't look in the mouth. That is why it is so important for our students to not only detect these diseases, but also to have the knowledge to treat or to refer the patient to the right health care provider to receive the appropriate treatment."

Conser said taking the time to listen to his professor and patient saved the day.

"I didn't have a special talent; all I did was listen to my professor," Conser said. "Anyone who felt Mrs. Pearson's pulse would have noticed something was wrong." ■

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How Are We Most Likely to Die?

Opioid overdose is now one of the top five causes of death in the United States

BY SHANLEY PIERCE

For the first time in United States history, people are more likely to die from accidental opioid overdoses than car crashes.

According to a recent report from the National Safety Council, a Congressionally-chartered non-profit that promotes health and safety, a person born in 2017 has a greater chance of dying from an opioid overdose (one in 96) than a motor vehicle crash (one in 103). This makes opioid overdose, considered accidental, one of the top five causes of death, behind heart disease, cancer, chronic lower respiratory disease and suicide.

“For the longest time, injury had been one of the leading causes of lost life in young people. Now opioid overdoses and other drug overdoses are overtaking that. This happened very quickly,” said John Harvin, M.D., a trauma surgeon at Memorial Hermann-Texas Medical Center and associate professor in the division of acute care surgery at The University of Texas Health Science Center at Houston’s McGovern Medical School. “The way that it has exponentially increased has been quite shocking.”

Illicit fentanyl has largely driven the opioid epidemic in the U.S. In December 2018, the U.S. Centers for Disease Control and Prevention’s (CDC) National Vital Statistics System report showed that fentanyl-involved overdose deaths surpassed the number of deaths from heroin and oxycodone. Fentanyl, a synthetic opioid painkiller, is 80 to 100 times stronger than morphine and 30 to 50 times more potent than heroin.

More than 130 Americans die each day from opioid overdose, according to the CDC. Approximately 29 percent of patients who had a prescription for opioids to treat chronic pain

misused the drugs. In addition, 80 percent of heroin addicts first used prescription opioids.

“When you look at the data, there’s definitely a role that the medical community has played in this problem,” Harvin said.

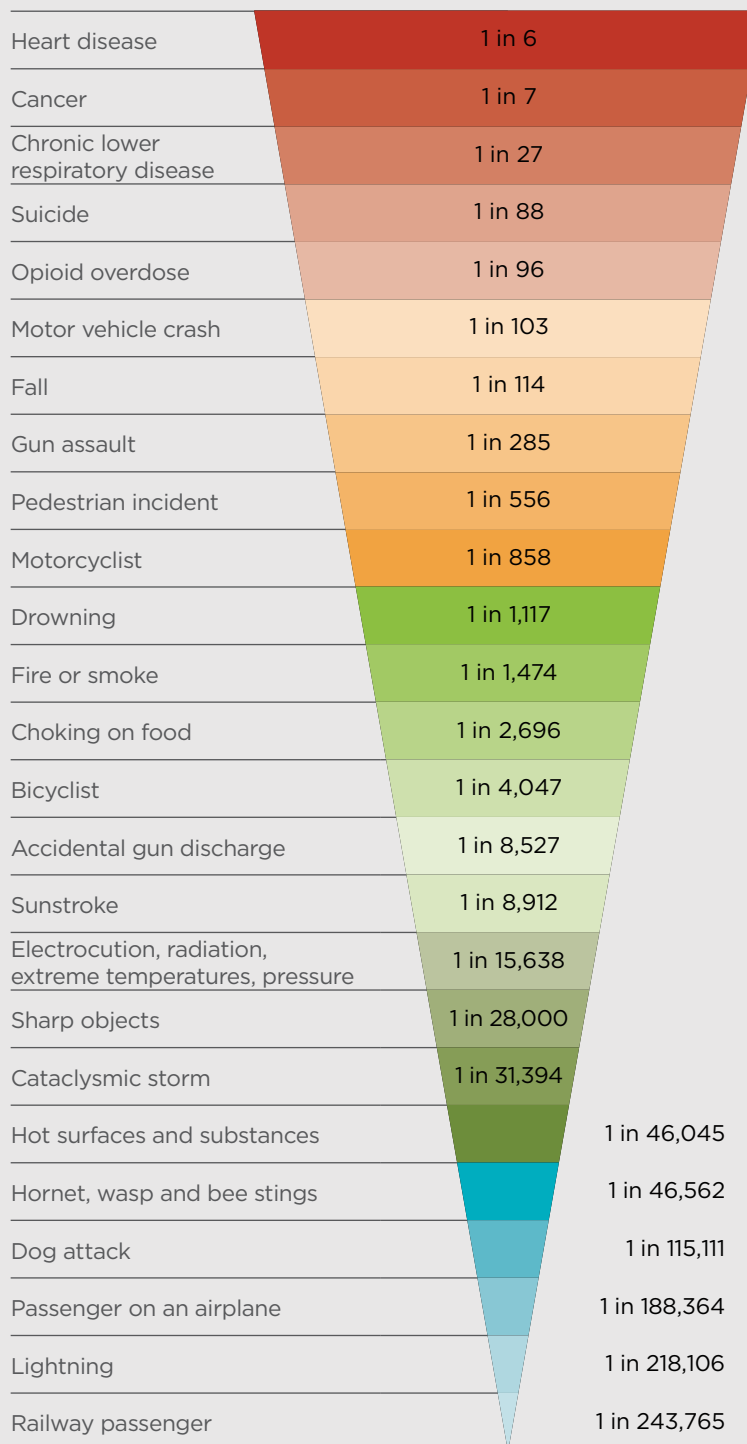
The Joint Commission, an independent, U.S. nonprofit that administers voluntary accreditation programs for hospitals and other health care organizations, issued pain management standards in 2001 to help address the underassessment and inadequate diagnosis of pain. The standards, some critics charge, encouraged more aggressive treatments that included opioids, leading to the misguided notion that pain was the fifth vital sign.

Critics say health care providers over-prescribed opioids to eliminate pain and unwittingly ushered in an opioid epidemic. The Joint Commission, it should be noted, disputes this characterization and says its pain standards did not cause a rise in opioid prescriptions. The organization wrote in 2016 that it doesn’t endorse pain as a vital sign and doesn’t require the use of drugs to manage patients’ pain.

In an effort to curb the opioid overdose crisis, the U.S. Department of Health and Human Services launched initiatives around five main areas: improving access to treatment and rehabilitation; increasing access to lifesaving opioid overdose reversal drugs, such as naloxone; expanding public health surveillance of opioid use; supporting pain and addiction research; and promoting pain management programs and practices among caregivers.

“Over time, we’ve learned a number of things: First off, you don’t always need opioids to treat patients,” Harvin said. “A lot of

ODDS OF DYING IN THE UNITED STATES*



* The figures here are statistical averages over the whole U.S. population and do not refer to any individual's odds of dying. Figures are based on the number of deaths, relative to the total, U.S. population, extrapolated across the average life expectancy of 78.6 years.

Source: National Safety Council “Injury Facts” (<https://injuryfacts.nsc.org/all-injuries/preventable-death-overview/odds-of-dying/>)

“For the longest time, injury had been one of the leading causes of lost life in young people. Now opioid overdoses and other drug overdoses are overtaking that. This happened very quickly.”

— JOHN HARVIN, M.D.

Trauma surgeon at Memorial Hermann-Texas Medical Center and associate professor in the division of acute care surgery at UTHealth's McGovern Medical School

this is driven by patient expectations, provider expectations, nursing expectations, family expectations. The more you address that, the easier everything else becomes because a lot of pain can be treated with things that are not opioids.”

In 2013, the Memorial Hermann Red Duke Trauma Institute implemented an opioid-minimizing pain cocktail to treat trauma patients. Instead of using hydrocodone, oxycodone or other types of opioids, this cocktail uses high doses of acetaminophen, non-steroidal anti-inflammatory drugs, gabapentin, lidocaine and ketamine to help patients alleviate pain.

The use of non-opioid analgesics was very controversial at the time because everyone felt that opioids were the pillar of acute pain management, Harvin said. Since then, though, the institute has reduced in-hospital use of opioids by 40 percent.

Opioid overdose falls under the category of unintentional and preventable injuries, the third leading cause of death, preceded by heart disease and cancer, respectively, according to the CDC.

“We’ve made significant strides in overall longevity in the United States, but we are dying from things typically called accidents at rates

we haven’t seen in half a century,” Ken Kolosh, the National Safety Council’s manager of statistics, said in a statement. “We cannot be complacent about 466 lives lost every day. This new analysis reinforces that we must consistently prioritize safety at work, at home and on the road to prevent these dire outcomes.”

Alex Harding, M.D., an assistant professor of emergency medicine at Baylor College of Medicine, said the council’s report sheds light on how people tend to overestimate certain risks of dying and underestimate the real, prevalent problems that are more likely to cause death.

“People should be cognizant of how preventable and actionable some of these things are—whether it’s heart disease, cancer or suicide—and recognize that we can be catalysts for change and for helping our fellow Americans,” Harding said. “We may not recognize what someone is going through, especially when [opioid use and suicides] have become so prevalent. Addiction is truly a disease. If we start treating it the same way we do heart disease and cancer, with the same kind of compassion, camaraderie and respect for your fellow man, then we can go far.” ■



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1 | HSIAO-TUAN CHAO, M.D., PH.D., instructor of pediatrics at Baylor College of Medicine and a child neurologist and postdoctoral researcher at the Jan and Dan Duncan Neurological Research Institute at Texas Children's Hospital, has been awarded the NIH Director's Early Independence Award from the High-Risk, High-Reward Research program.

2 | DEBORAH GORDON, executive vice president, chief administrative officer and chief legal officer at Memorial Hermann Health System, was recognized by the Houston Business Journal as one of 2018's "Women Who Mean Business."

3 | During a two-day clinic, therapists at **SHRINERS HOSPITALS FOR CHILDREN - HOUSTON** worked with patients on adaptive tricycles known as Amtrykes.

4 | JAMES P. ALLISON, PH.D., an immunologist at The University of Texas MD Anderson Cancer Center, received the Nobel Prize in Physiology or Medicine from H.M. King Carl XVI Gustaf of Sweden at the Stockholm Concert Hall on Dec. 10, 2018. Allison and Japanese immunologist Tasuku Honjo, M.D., Ph.D., shared the prize for their discovery of cancer therapies.

5 | BERT O'MALLEY, M.D., chancellor at Baylor College of Medicine, received the 2018 Louisa Gross Horwitz Prize from Columbia University.

6 | JACQUELINE T. HECHT, PH.D., associate dean for research, director of the Center for Craniofacial Research and distinguished teaching professor at The University of Texas Health Science Center at Houston (UTHealth) School of Dentistry, was elected Fellow of the American Association for the Advancement of Science.

7 | The department of epidemiology and population sciences at **BAYLOR COLLEGE OF MEDICINE** welcomed a permanent art exhibit focused on the "dirty dozen" cancers at waist level or below: anal, bladder, cervical, colorectal, intestinal, ovarian, pancreatic, penile, prostate, testicular, uterine and vulvar. Local nonprofit Cancer Below the Belt teamed up with artist Corey Scott to create abstract portraits related to each cancer.

8 | The Houston Exponential Capital Summit held at the **TMCx ACCELERATOR** in December drew leading investment and entrepreneurship experts from around the country.



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Credit: Nos. 1, 2, 3, 5, 6, 7, 10, 11, 13 courtesy photos; No. 4, © Nobel Media. Photo: Alexander Mahmoud; No. 9, Rendering Perkins+Will; No. 12, MD Anderson



9

9 | THE UTHEALTH CONTINUUM OF CARE CAMPUS FOR BEHAVIORAL HEALTH, a joint project owned by **TEXAS HEALTH AND HUMAN SERVICES** and operated by **UTHEALTH**, is shown in a rendering. Construction will begin this summer on the new Houston psychiatric facility that offers 240 beds. Slated to open at the end of 2021, the facility will be the first public mental health hospital built in Houston in more than three decades.



10



11



12

10 | CARLA ORTIGUE, M.D., an OB/GYN at The Women's Specialists of Houston at Texas Children's Pavilion for Women, was honored as Physician of the Year at the 29th Annual Scholarship Gala hosted by the Houston Medical Forum.

11 | SUSAN GREEN, M.P.H., lead project manager for Joseph Coselli, M.D., vice-chair of surgery and chief of cardiothoracic surgery at Baylor College of Medicine, was selected as a 2019 Michael E. DeBakey Fellow in the History of Medicine by the National Library of Medicine, part of the National Institutes of Health. The fellowship includes a \$10,000 grant to support her research.

12 | JOHN MENDELSON, M.D., president emeritus of The University of Texas MD Anderson Cancer Center and a scientist whose research helped pioneer a new type of cancer therapy, died Jan. 7 at his home in Houston at age 82. The cause of death was glioblastoma, an aggressive form of brain cancer.



13

13 | A ribbon cutting for the DAN L DUNCAN COMPREHENSIVE CANCER CENTER AT BAYLOR COLLEGE OF MEDICINE, which moved into its new clinic space on the 7th floor of the McNair Campus, included Ted Yank, administrator; Brandon Smaglo, M.D.; Matthew Ellis, M.D., Ph.D.; Mothaffar Rimawi, M.D.; Kent Osborne, M.D., director; Carolina Gutierrez, M.D.; Karla Sepulveda, M.D.; Edward Yen, M.D.; and Samantha Khan, nurse manager.

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February 2019

2/7

Speaker Bradford G. Hill, Ph.D.,
associate professor of medicine
at the University of Louisville

School of Medicine

James T. Willerson, M.D.,
Cardiovascular Science Seminars

Thursday, 4 – 5 p.m.

Texas Heart Institute

Denton A. Cooley Auditorium

6770 Bertner Ave.

vsweed@texasheart.org

832-355-9144

2/12 – 21

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2/14 – 15

Medical Oncology and

Hematology 2019:

Multidisciplinary Approaches
that Improve Coordination of Care

Conference

Thursday – Friday

7 a.m. – 5 p.m.

MD Anderson Cancer Center

Dan L Duncan Building (CPB),

Floor 8, Conference Center

1155 Pressler St.

Registration starts at \$50;

Register at mdanderson.org

AMBaring@mdanderson.org

713-563-7388

2/19

Advances in Medicine

During the American Civil War

History of Medicine lecture series

presented by Baylor College

of Medicine, featuring

Eugene Boisaubin, M.D.

Tuesday, noon – 1 p.m.

Baylor College of Medicine

Cullen Auditorium

1 Baylor Plaza

bat@bcm.edu

713-798-6590

2/21

Update on Trans-Catheter

Interventions in Congenital

Heart Disease

Houston Methodist DeBakey

Heart and Vascular Center—

Grand Rounds with

Jamil Aboulhosn, M.D.

Thursday, 8 – 9 a.m.

Houston Methodist Hospital

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6565 Fannin St.

tbarsamian2@houstonmethodist.org

346-238-5391

2/26

Safety Net Programs

Texas Medical Center

Health Policy Course

Tuesday, 5:30 – 7 p.m.

Third Coast Restaurant

6550 Bertner Ave.

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To register and view a live stream

of the event:

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Braes Heights, \$2.7+ mil.
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