

OUT IN FRONT

2019

BRAIN AND BEHAVIORAL HEALTH

COVER STORY

Going the distance

*Stem cell patient takes recovery
one step at a time*

Interleukin 33

*Could this common protein
stop Alzheimer's disease?*

Heroes of the opioid crisis

*Taming the flames
of addiction*



UTHealth®

The University of Texas
Health Science Center at Houston

UTHealth's Comprehensive Campaign

To improve health care and the well-being of our families, friends, and neighbors, we are planning for our first comprehensive campaign focusing on three themes that resonate most with our community.

BRAIN AND BEHAVIORAL HEALTH



Brain and Behavioral Health conditions are common and affect multiple areas of a person's life including movement, thought, mood, body function, and mental state. We are susceptible to a myriad of brain-related disorders throughout every stage of life and even more so as we age.

HEALTHY AGING



Healthy Aging is all-encompassing, spanning from preconception to geriatric care and integrating all organ systems in the body. We care for families across the life continuum to help our community celebrate more of life's precious moments.

WOMEN'S AND CHILDREN'S HEALTH



Women's and Children's Health begins before we are born, and it carries us through some of our most treasured moments—from genetic counseling for expectant mothers to pediatric medicine and instructional tools that address the education and developmental needs of all children.

STORY LEGEND

The many faces of UTHealth are dedicated to delivering exceptional care to people of all ages, training the health care leaders of tomorrow, and conducting groundbreaking research to improve the health and well-being of our communities. Each story in *Out in Front* is aligned with one or more of these mission areas, indicated by the icons below.



EDUCATION



RESEARCH



PATIENT CARE

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ABOUT THE COVER

Scott Zettner (left) enjoyed an active lifestyle before a hemorrhagic stroke struck him down during a bicycle race. Following a year of rehabilitation to learn to walk and talk again, Scott was making progress but not yet back to his pre-stroke self. In January 2019, he met with a stroke specialist at McGovern Medical School at UTHealth to see if a novel stem cell treatment would improve his symptoms more than a year after his stroke.

Six months after his first stem cell treatment, Scott has increased mobility and improved speech—signs that he is moving further down the road of recovery.

“There is no scientific
study more vital to man than
the study of his own brain.
Our entire view of the universe
depends on it.”

—
Francis H.C. Crick



WITH GRATITUDE

When brain function is altered—whether from injury, disease, or the normal aging process—it has a profound impact on overall physical and psychological health.

At UTHealth, our clinical and research experts are committed to uncovering the foundation of brain and behavioral health, developing innovative treatments that challenge the status quo, and educating tomorrow’s health care leaders who will care for generations to come.

I am proud to share this year’s ***Out in Front: Brain and Behavioral Health*** publication, which highlights some of the ways our students, faculty, and researchers are addressing these conditions—from tackling homelessness through mental health programs and community outreach, to exploring regenerative medicine that enhances recovery long after experiencing a stroke, to tracing the genetics of brain aneurysms.

These advances are made possible by the generosity of donors like you. We are grateful for your shared vision of improving the health and well-being of our friends and neighbors.

On behalf of the patients, families, and communities you are helping, we say: **Thank you.**

Giuseppe N. Colasurdo, MD

UTHealth President
Alkek-Williams Distinguished Chair



During a 36-mile bicycle race in Sam Houston National Forest, Scott Zettner suffered a hemorrhagic stroke. Photographer Ken Lim captured this photo of Scott with his daughter riding behind him just moments before Scott's stroke.



Stroke-related deaths occur
every 4 minutes.



There are about
610,000 new strokes
reported each year.



The rate of strokes
in individuals who have had
a previous stroke is 25%.



The estimated yearly cost of
health care and missed work from
strokes is \$34 billion.

**based on statistics in the United States*



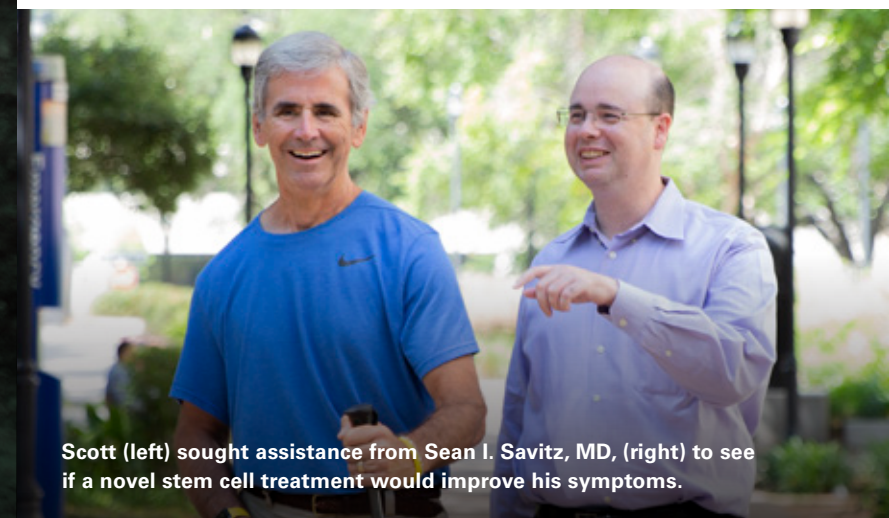
GOING THE DISTANCE

STEM CELL PATIENT TAKES
RECOVERY ONE STEP AT A TIME

Scott Zettner never has a bad day. Not even after blood vessels ruptured in his brain and turned his life upside down.

"I have good days, and I have great days," says the 62-year-old stroke survivor. "And I never give up."

The avid cyclist and marathon runner had joined his younger daughter, Kristen, for a 36-mile bicycle race on March 25, 2017, when a hemorrhagic stroke sent him to the ground and began leaking blood into his brain.



Scott (left) sought assistance from Sean I. Savitz, MD, (right) to see if a novel stem cell treatment would improve his symptoms.

“Kristen asked him to smile and say his name, but he couldn’t,” says Scott’s wife, Peggy.

Scott’s stroke initially hid deep inside the brain where surgeons rarely operate. Survival rates for hemorrhagic stroke can dip below 40%, and even patients who survive can face severe disability. When the bleeding moved further up in his brain the next day, his doctors in Conroe, Texas, seized the opportunity to perform surgery and relieve the pressure.

Once he awoke and recovered from surgery, Scott set his mind to tackling his rehabilitation with an athlete’s determination. “I didn’t know how long it would take, but I was going to get through it,” he remembers.

Scott completed six weeks of initial rehab at TIRR Memorial Hermann. Within five months after his stroke, he was out of his wheelchair, walking without a cane and standing in the shower. Now, he can manage a mile walk in 25 minutes—a step toward reclaiming the life he once knew.

His never-quit attitude made such an impression on his therapists in Houston and San Antonio that they asked him to visit their struggling patients. “I tell them I got a second chance, and I encourage them to never, never, never give up hope,” Scott says.

Despite making headway on his recovery, Scott continued to have trouble controlling his extremities. In 2018, about a year after the stroke, Scott was introduced to Sean I. Savitz, MD, who conducts research to determine if stem cells can help reduce the brain damage caused by a stroke. Savitz estimates the window for stem cell treatment for acute stroke is between 10 and 36 hours, maybe longer.

Even though Scott was beyond the initial estimated treatment window, Savitz thought that stem cell treatment could improve Scott’s condition. Savitz applied to the Food and Drug Administration (FDA) for a special compassionate use approval after determining Scott had no other effective treatment options. In January 2019, nearly 22 months after his stroke, Scott received a transplant from a healthy donor.

“His range of motion, his ease of movement, everything was quicker, and he was speaking a whole lot better,” Peggy says.



“We’ve been very pleased with Scott’s progress. We have seen improvements in his muscle strength. It’s been encouraging, which is why we are ready to apply to the FDA to move from a single-patient to a 10-patient study of patients like him, months, even years after a stroke,” says Savitz.

“I will run again, and I will ride again,” Scott says.
“God has a very good way of working with this.”



Sean I. Savitz, MD

Frank M. Yatsu, MD Chair in Neurology
Professor, Department of Neurology
Director, Vascular Neurology Program
McGovern Medical School at UTHealth

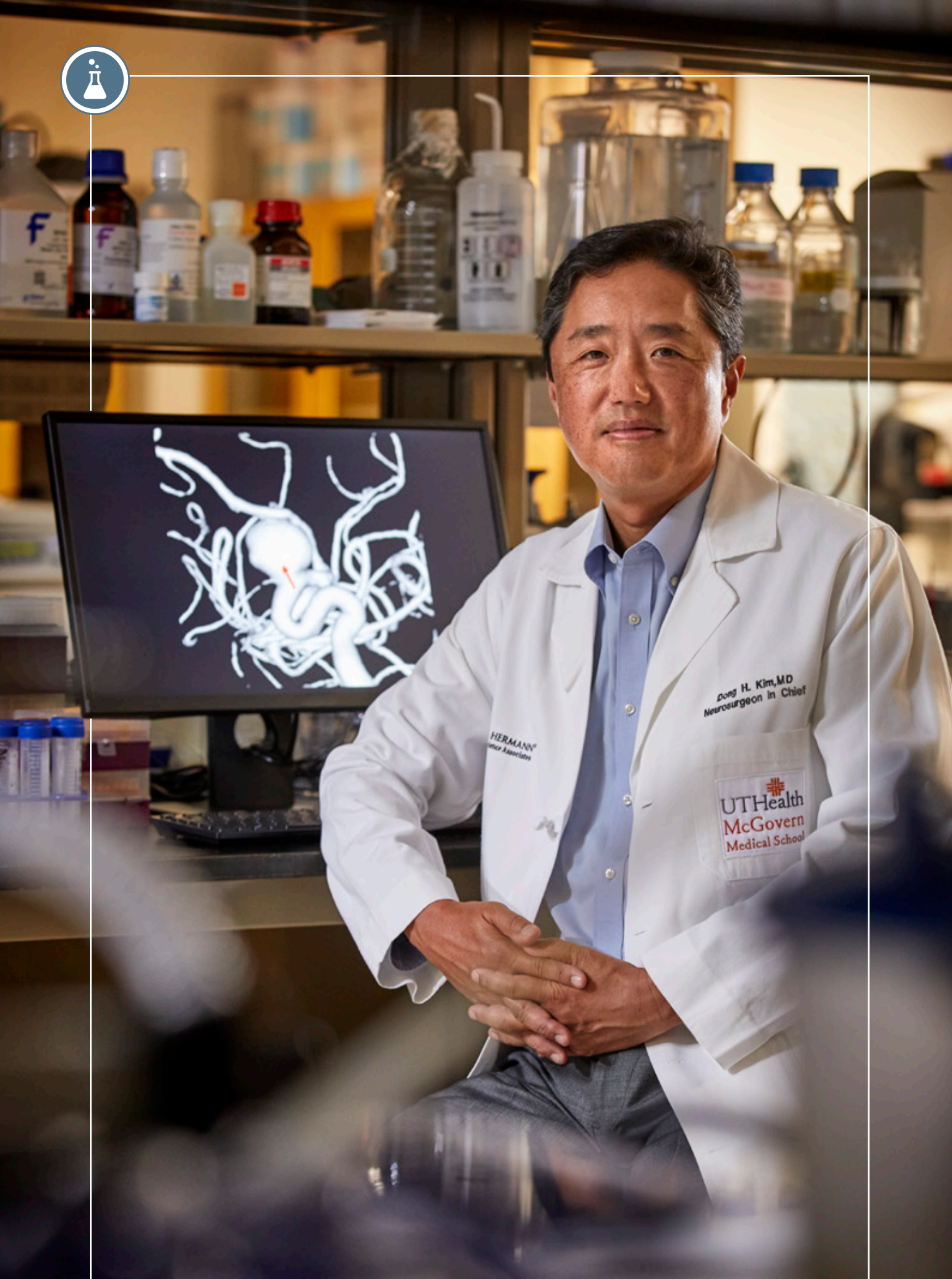
Director, Institute for Stroke and
Cerebrovascular Disease
UTHealth

SIX SCHOOLS, ONE GOAL

IMPROVING OUTCOMES AND LIVES
FOR STROKE PATIENTS

The Institute for Stroke and Cerebrovascular Disease at UTHealth, directed by Savitz, is a collaboration among all six UTHealth schools to address the full continuum of care for stroke patients and their families.

- **McGovern Medical School at UTHealth** is investigating the use of stem cells, which includes enrolling the first United States patient in a global clinical study of a stem cell therapy injected directly into the brain to treat stroke disability.
- **Cizik School of Nursing at UTHealth** is developing quality-of-care improvements, particularly for patients who develop mental health issues after stroke. For example, post-stroke anxiety can reach the level of post-traumatic stress disorder.
- **UTHealth School of Public Health** is demonstrating how investing in resources to treat stroke patients faster and more efficiently not only provides better outcomes for the patients, but it also benefits the hospitals and the health care system.
- **UTHealth School of Biomedical Informatics** is collecting hundreds of CAT scan images to determine the extent of salvageable brain tissue after a stroke. The use of this Big Data—or “gold standard”—imaging will benefit community hospitals, which may not have advanced scanners, by allowing local physicians to send their scans to UTHealth physicians who will use the “gold standard” data in diagnosis and treatment.
- **UTHealth School of Dentistry** faculty are helping other health care providers to learn what roles gut bacteria and mouth organisms play in stroke.
- **The University of Texas MD Anderson Cancer Center UTHealth Graduate School of Biomedical Sciences** provides training programs for our graduate students who work in laboratories to find better treatments and prevention strategies for stroke.



BRINGING A SILENT KILLER TO JUSTICE

TRACING THE GENES BEHIND A DEVASTATING BRAIN CONDITION

Day and night, a deadly specter trails nearly 6 million Americans—roughly the combined populations of Houston and Los Angeles. It leaves no footprints, makes no sounds, and strikes wantonly with cruel precision. Fortunately, UTHealth neurosurgeon Dong H. Kim, MD, is working to bring this boogeyman—better known as a brain aneurysm—to light.

A brain aneurysm is a bulge in a blood vessel in the brain that can leak or rupture, causing life-threatening bleeding. Typically, it lurks unseen until it bursts, causing a cataclysmic headache accompanied by severe symptoms such as nausea, visual disturbances, seizure, and loss of consciousness. Without prompt treatment, bleeding in the brain can result in permanent disability or death.

While treating patients at the Mischel Neuroscience Institute at Memorial Hermann-Texas Medical Center, Kim noticed some of his patients had family members who also had a brain aneurysm. “We knew there had to be a genetic underpinning,” he says. “If we can find the problem gene, we can predict who will get a brain aneurysm and treat them more effectively.”

In 2000, Kim began studying families with a history of brain aneurysms by collecting DNA samples and medical histories to create a database. His team has since studied about 800 families in search of clues that could help solve this mystery.

Kim’s team made a major advance when they became the first to discover a genetic mutation that almost always leads to the development of brain aneurysms. They uncovered the mutation in the protein coding gene THSD1 that can form weak spots in cerebral arteries, which can cause rupture and lead to catastrophic bleeding.

“There are many genes that play a small role in the development of brain aneurysms,” Kim explains. “Our discovery was the first to identify a gene that plays a significant role. A mutation in THSD1 almost guarantees that the individual will get a brain aneurysm.”

Kim’s investigation into THSD1 promises to dispel the fog surrounding brain aneurysms. Although a treatment is still out of grasp, it is now possible to predict who in certain families is likely to get a brain aneurysm.

“My vision is to one day have a blood test that can identify young adults who are likely to develop a brain aneurysm. Combined with a treatment to prevent them from forming, we could wipe out this silent killer.”

Dong H. Kim, MD

Nancy, Clive, and Pierce Runnells
Distinguished Chair
Professor and Chair, Vivian L. Smith Department
of Neurosurgery
McGovern Medical School at UTHealth



NIGHT OF THE LIVING BRAIN

WHEN KIDS AND BRAINS COME TOGETHER



Once a year, and not on Halloween, Houston kids get to hold a real human brain. Not a plastic replica. A real one. Pretty icky and neat at the same time.

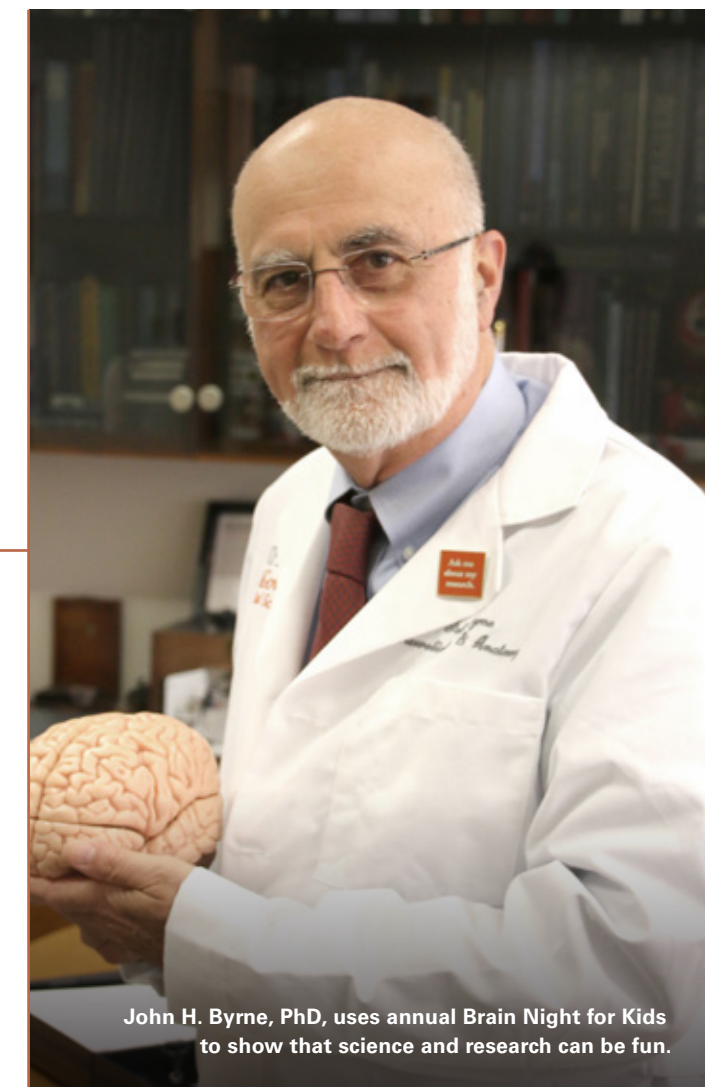
"The kids are really impressed with that," chuckles John H. Byrne, PhD, the brains behind the annual Brain Night for Kids at The Health Museum in Houston.

The event began in 2001 as part of International Brain Awareness Week organized by the Dana Foundation. "We wanted to introduce elementary school students to research in general and brain research in particular," says Byrne. "Thanks to support from the Ellwood Foundation, we engage them in free, fun, hands-on science activities that help them learn a little about the brain. We also hope to inspire them to study science and maybe become a neuroscientist, neurologist, or neurosurgeon."

About 450 kids and parents attend each year, along with more than 50 volunteers from UTHealth, Rice University, and Texas Woman's University. Demonstrations range from using an egg to show the importance of bike helmet safety to comparing brains of different species. Children can also build their own nerve cells using pipe cleaners.

This year, participants taped electrodes to their skin, which let them see the electrical activities in their muscles as they moved their hands or squeezed an object. "That's a real eye opener to link electricity with their bodies," Byrne says.

As for that brain—it was on loan from the Department of Neurobiology and Anatomy at McGovern Medical School at UTHealth as an example to show kids how science and research can be exciting and fun. It's a no-brainer.



John H. Byrne, PhD, uses annual Brain Night for Kids to show that science and research can be fun.

John H. Byrne, PhD

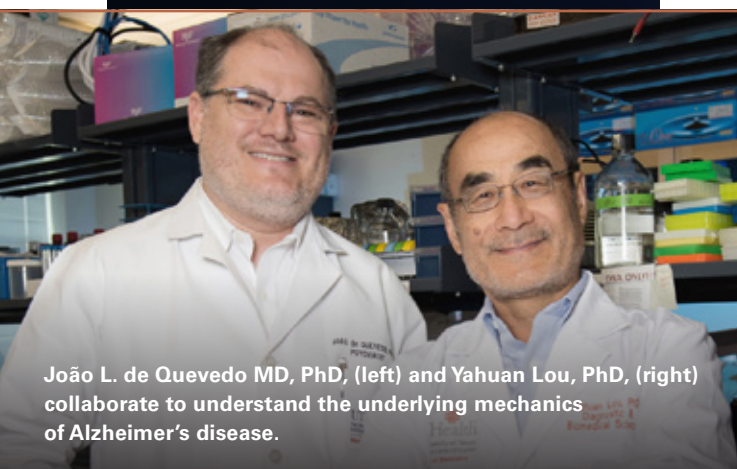
June and Virgil Waggoner Chair
Professor, Department of Neurobiology and Anatomy
Director, Neuroscience Research Center
McGovern Medical School at UTHealth

Neuroscience Program
MD Anderson UTHealth Graduate School

INTERLEUKIN

33

COULD THIS COMMON PROTEIN STOP ALZHEIMER'S DISEASE?



João L. de Quevedo MD, PhD, (left) and Yahuan Lou, PhD, (right) collaborate to understand the underlying mechanics of Alzheimer's disease.

João L. de Quevedo, MD, PhD

Professor and Vice Chair of Faculty Development and Outreach
Director, Translational Psychiatry Program
Director, Treatment-Resistant Depression Clinic
Faillace Department of Psychiatry and Behavioral Sciences
McGovern Medical School at UTHealth

Yahuan Lou, PhD

Professor, Department of Diagnostic and Biomedical Sciences
UTHealth School of Dentistry

The human brain, with its countless mysteries and complex links, may represent the next frontier of discovery and innovation. UTHealth researchers Yahuan Lou, PhD, and João L. de Quevedo, MD, PhD, are helping us to understand what makes our brains unique and to find better treatments, preventions, and cures for brain disorders.

Alzheimer's disease is one of the great fears associated with getting older. And with good reason. An estimated 5.8 million Americans are living with the disease—approximately the combined populations of Houston, San Antonio, Dallas, and El Paso. Within a generation, that number could reach nearly 14 million.

"Alzheimer's disease is the most common type of dementia that causes problems with memory, thinking, and behavior," explains Lou. "It is characterized by the presence of amyloid plaques and tangles composed of proteins with an alternative folding in the cerebral cortex and hippocampus."

As we approach our 40s, we experience a sudden aging in neurons in the cerebral cortex and hippocampus, which interferes with the body's ability to detoxify or repair damaged DNA and proteins. Researchers call this oxidative damage.

"Normal neurons respond to the oxidative damages by turning on machineries to repair DNA breaks or by discarding abnormal proteins through natural processes, similar to taking out the garbage," Lou says. "Thus, neurons become healthy again. Interleukin 33 is critical to this process."

Interleukin 33 is a protein that helps keep our tissues healthy as we get older. Aging accelerates when too much Interleukin 33 leaves our organs. Lou noticed this while studying premature ovarian failure. Removing Interleukin 33 caused the ovary to shrink faster than normal. This led him to wonder if Alzheimer's disease results from the normal decline in the amount of this protein, which is in abundance in our brains.

To find the answer, Lou formed a collaboration with a researcher from the Faillace Department of Psychiatry and Behavioral Sciences at McGovern Medical School at UTHealth: de Quevedo.

The team tested one group with artificially reduced Interleukin 33 levels and another with normal levels. The subjects with reduced Interleukin 33 levels did not perform as well on memory tests. They saw a change in the brain tissue of subjects with reduced levels of the protein.

"This is what we expected," de Quevedo says. "If you have the disease, you have worse performances compared with your peers of the same age without the disease."

Lou points out that when a middle-aged brain does not have the Interleukin 33 levels to remove "garbage," it becomes like the brain of a person 30 years older. "When this mechanism is broken, the brain becomes much older, leading to acceleration of aging, which leads to Alzheimer's disease and death," he says. "This is why middle age is a good time to look for Interleukin 33 and other biomarkers, such as those found in blood and urine, for early diagnosis of Alzheimer's disease."

Philanthropic support enables researchers like Lou and de Quevedo to produce preliminary data needed to move research forward for federal funding. "Endowments provide the freedom to explore novel ideas and be more innovative," de Quevedo says. "With additional funding, we can move this idea forward and eventually convert our findings into improved patient care."

Lou believes controlling Interleukin 33 levels in middle age will reduce the brain's aging process. "It cannot cure Alzheimer's disease, but we can stop the progress."

And stopping can be a start.

ALZHEIMER'S DISEASE BY THE NUMBERS



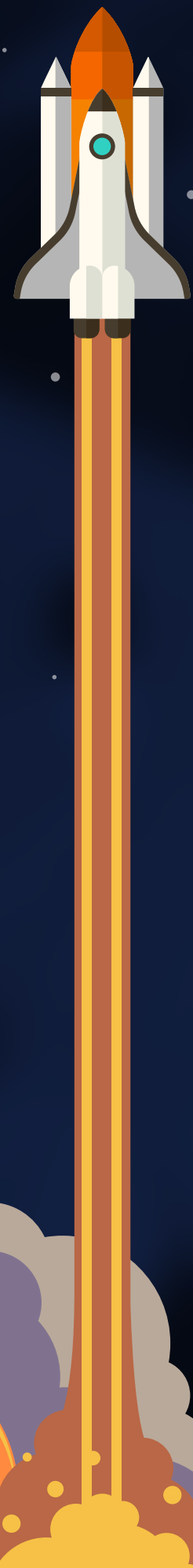
Alzheimer's disease is the **6th leading cause of death** in the United States.



5.8M Americans live with Alzheimer's disease.



Of all Americans diagnosed with Alzheimer's disease, **2 out of 3 are women.**



THE SKY IS THE LIMIT

TEENAGER TRIUMPHS OVER A RARE BRAIN CONDITION

Ryan Logan's teammates dubbed him "Bullet" for his lightning-quick jukes and his trailblazing speed—the 11-year-old's athleticism on the football field was unparalleled. With a wit that zipped quicker than his feet, he also excelled in gifted and talented classes and made friends across school. The only thing that reined him in were mysteriously recurring headaches and visual disturbances.

In February 2013, Ryan's doctors made a startling discovery: A brain scan revealed a grade 4 arteriovenous malformation (AVM), which is a massive tangle of abnormal blood vessels connecting arteries and veins in his brain. His snarled blood vessels were at risk of rupturing, which can cause life-threatening bleeding in the brain.

Researchers estimate brain AVMs occur in less than 1% of the population. There are often no symptoms, and half of people suffer a serious hemorrhage as the first sign.

Although doctors caught Ryan's brain AVM before further complications struck, they warned that surgical removal would be too dangerous.

"Learning our child has a ticking time bomb in his body was devastating," says Ryan's father, Mark. "It was an impossible situation. Removing it could debilitate him, but leaving it alone could cause his death."

To help ensure other families never have to endure this anxiety, the Logans decided to establish the Arteriovenous Malformation Research Foundation. "We had to help find a safer treatment for brain AVMs," says Mark.



Ryan's brother Peyton (left); parents, Mark and Sherri (center); and his twin sister, Reese (right), are the pillars of his support team.

Raising the stakes

Ryan's brain AVM raised the stakes in September 2014 when the AVM suffered a spontaneous hemorrhage that landed him in the hospital for three days. Because one rupture greatly increases the odds it will happen again, doctors believed surgery was his best shot to avoid a fatal brain bleed.

After consulting renowned specialists across the nation, the Logans met UTHealth neurosurgeon David I. Sandberg, MD. Sandberg's exceptional care earned the family's trust, and he devised a plan to remove Ryan's AVM with neurosurgeons P. Roc Chen, MD, and Arthur L. Day, MD. The surgery would take place in three procedures over six weeks in July 2015.

During the first procedure to block the artery and reduce blood flow into Ryan's AVM, the AVM began shutting itself down, triggering a deadly hemorrhage. Chen had minutes to save his life.

"Ryan would not be here today if it weren't for Dr. Chen," says Ryan's mother, Sherri. "Dr. Chen's expertise as both an interventional radiologist and neurosurgeon enabled him to immediately stop the bleeding and relieve the pressure in Ryan's skull."

Over the next six weeks, Ryan remained in a medically induced coma while Chen and Day worked to remove about 70% of the brain AVM.

Research to find a safer treatment

When the Logans heard that Chen was interested in starting research on AVMs, they sprang into action to raise support. Although brain AVMs are not hereditary, Chen's team believes they found a gene mutation that could unlock noninvasive therapies.

"Our family mission is to continue to fight AVM and be there for other families along the way," says Mark. "We established the AVM Research Foundation to help Dr. Chen discover a safer, noninvasive way to remove AVMs."

Since 2017, the AVM Research Foundation has helped raise \$350,000 to support Chen's research by hosting an annual crawfish boil, an annual golf tournament, and other events.



David I. Sandberg, MD

Dr. Marnie Rose Professor
in Pediatric Neurosurgery
Director, Division of Pediatric Neurosurgery
McGovern Medical School at UTHealth



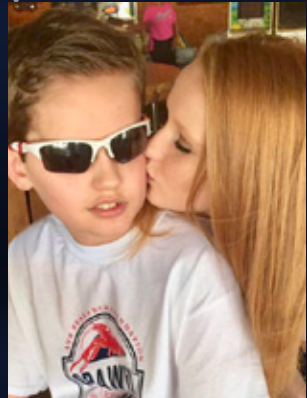
P. Roc Chen, MD

Associate Professor
Vivian L. Smith Department of Neurosurgery
McGovern Medical School at UTHealth



Arthur L. Day, MD

Professor
Director, Residency Program
Vivian L. Smith Department of Neurosurgery
McGovern Medical School at UTHealth



With years of recovery behind him, Ryan looks forward to his senior year of high school and spreading his wings after graduation.

Setting the pace

After nearly four years of physical, occupational, and speech therapy, Ryan's family felt there was one thing preventing Ryan from regaining bullet speed—frequent seizure activity that started after his AVM ruptured. The almost constant seizure activity interfered with his cognition and his ability to improve physically and mentally.

In February 2019, leading UTHealth epilepsy surgeon Nitin Tandon, MD, conducted a 16-hour procedure on Ryan—comprising of a functional hemispherectomy to disconnect the right side of Ryan's brain where seizure activity had taken root, removal of the remaining brain AVM, and a cranial vault reconstruction.

"Ryan's spirit and love of life are what strike me most," says Tandon. "As soon as he awoke from surgery, his wit returned, and you could sense a change."

At 17 years old, Ryan is diving into his senior year of high school—free from seizures and the looming threat of his brain AVM. Despite short-term memory loss and physical impairment, he is striving to regain the skills to live independently. "He's moving so quickly that we keep forgetting he just had major brain surgery," says Mark. "The sky is the limit for him."

"The care Ryan received at UTHealth was unbelievable," says Sherri. "There are so many others living with inoperable brain AVMs, but thanks to research like Dr. Chen's, those families will one day be able to rest easy."



Nitin Tandon, MD

Professor and Vice Chair, Vivian L. Smith
Department of Neurosurgery
Director, Epilepsy Surgery Program
McGovern Medical School at UTHealth

Neuroscience Program
MD Anderson UTHealth Graduate School

Founder and Co-Director, Texas Institute
for Restorative Neurotechnologies
UTHealth



Samden Lhatoo, MD

John P. and Kathrine G. McGovern
Distinguished Chair
Executive Vice Chair and Professor,
Department of Neurology
Director, Texas Comprehensive
Epilepsy Program
McGovern Medical School at UTHealth

Co-Director, Texas Institute for
Restorative Neurotechnologies
UTHealth



GQ Zhang, PhD

Professor, Department of Neurology
McGovern Medical School at UTHealth

Co-Director, Texas Institute
for Restorative Neurotechnologies
Vice President and Chief Data Scientist
UTHealth

TEXAS INSTITUTE FOR RESTORATIVE NEUROTECHNOLOGIES

The Texas Institute for Restorative Neurotechnologies aims to establish UTHealth as the nation's leading center for epilepsy care, research, and education. In February 2019, it became a reality behind the expertise of Tandon and two recent faculty recruits: Samden Lhatoo, MD, and GQ Zhang, PhD.

Tandon is at the forefront of leading-edge brain surgery that eliminates seizures with laser precision after pinpointing the source of the epilepsy with fine electrode probes. "Fueled by our groundbreaking work in epilepsy, the Texas Institute for Restorative Neurotechnologies will advance the clinical neurosciences of tomorrow," he explains. "We will extend our work to explore innovative therapies for functional neurosurgical disorders, brain-machine interfaces, neuroinformatics, Big Data, and precision neurological therapies."

Lhatoo specializes in the medical and surgical treatment of complex, difficult-to-treat epilepsy. He has a particular expertise in understanding the mechanisms of fatalities in patients with epilepsy and helping prevent them. "We have the right individuals in the right place to investigate critical problems such as sudden unexpected death in epilepsy, to improve the lives of patients in Texas and beyond," he says.

Zhang brings the power of data analytics to the diagnosis and management of epilepsy by developing innovative tools that enable experts to collect and evaluate vast amounts of data. "Information is power," he says. "Through leveraging our data, we will be able to broaden our impact to other neurological disorders in addition to epilepsy."

As co-directors of the Texas Institute for Restorative Neurotechnologies, Tandon, Lhatoo, and Zhang are positioning UTHealth to advance not just the field of epilepsy, but the entire field of brain and behavioral health.

LOUIS A. FAILLACE, MD

DEPARTMENT OF PSYCHIATRY AND BEHAVIORAL SCIENCES



A new name honors a lifetime commitment to improving brain and behavioral health.

At the time when our newly formed medical school was just entering the Texas Medical Center, Louis A. Faillace, MD, was championing brain and behavioral health. As founding Chair of the Department of Psychiatry and Behavioral Sciences at McGovern Medical School at UTHealth, he forged new frontiers in patient care, education, and research.

His dedication formed the foundation and vision of the department, and he led McGovern Medical School in initiating several important behavioral clinical affiliations, including our partnership with Harris County Psychiatric Center. Today, the department carries Faillace's legacy through new and expanded facilities, the nation's most talented minds in research and patient care, and the education of our future psychiatric leaders.

As we establish the paradigm of care that will inform the way we treat behavioral illnesses, we are grateful for Faillace's unwavering guidance and advocacy. In honor of his exemplary service and commitment to improving brain and behavioral health in our community, we are pleased to formally rename the department to the Louis A. Faillace, MD, Department of Psychiatry and Behavioral Sciences.



Louis A. Faillace, MD, (left) and Jair C. Soares, MD, PhD, chair of the Department, (right) joined government officials and community leaders to break ground on the UTHealth Continuum of Care Campus for Behavioral Health.

Through the years 1971–today



Throughout his remarkable career at McGovern Medical School at UTHealth, Faillace helped establish clinical and educational programs that make the Department of Psychiatry and Behavioral Sciences what it is today.

MIND MATTERS



Around 100 billion neurons interconnect



via trillions of synapses.

The brain weighs about



The brain is composed of approximately



75% water, as well as fat and protein.



While the brain accounts for 2% of the body's weight, it receives 20% of the body's blood supply.

If you laid out the blood vessels in your brain from end to end, they would stretch

halfway to the moon

(approximately 120,000 miles).



Everyone dreams an average of

4–7 dreams per night.



Your brain processes

50,000 to 70,000

thoughts each day.

THE CHANGING BRAIN



0 – 3
YEARS OLD



3 – 12
YEARS OLD



12 – 20
YEARS OLD



20 – 30
YEARS OLD



30 – 40
YEARS OLD



40 – 60
YEARS OLD



60+
YEARS OLD

HOW YOUR BRAIN AGES OVER TIME

Your brain is 80% of its adult size with 100 billion neurons at 2 years old.

Your brain is 85% developed, which includes your intellect, personality, motor skills, and social skills.

Your adult brain continues to develop and weighs about 3 pounds.

The frontal lobe, responsible for planning, judgment, and decision-making, finishes developing.

Your cognitive abilities continue to develop and improve.

While reasoning skills slow down, other measures of cognition improve, including moral decision-making and regulating emotions.

Brain mass begins to decrease, shrinking first in higher cognitive function and the encoding of new memories.

HEROES OF THE OPIOID

CRISIS

TAMING THE FLAMES OF ADDICTION



After struggling with opioid use disorder for seven years, 29-year-old Matt Bridgeman recalls slipping dangerously close to joining the more than 300 people who died of opioid overdoses in Harris County in 2018. The former forest firefighter had erected boundaries through two years of therapy, but they came tumbling down as opioids raged back into his life.

“I was at my lowest—homeless, jobless, and panhandling to scrape enough money together each day to support my addiction,” he says. “I wanted to get sober, but I couldn’t get into a treatment program without money or health insurance, so I just kept failing on my own.”

James R. Langabeer, PhD, EdD, says Matt’s story is a familiar one. “Most people struggling with an opioid addiction fight it alone,” he explains. “Isolated from society, they often find themselves unable to reach out for help.”

In spring 2018, Langabeer established the Houston Emergency Opioid Engagement System (HEROES) to remove the barriers that prevent people from receiving help by bringing help to them. HEROES is a joint initiative between McGovern Medical School at UTHealth and UTHealth School of Biomedical Informatics, composed of physicians, psychiatrists, social workers, drug counselors, peer recovery coaches, and first responders.

CLEARING THE PATH TO RECOVERY

“What makes HEROES unique is we work with the Houston Police Department, the Houston Fire Department, and emergency medical services to collect data on who is overdosing and where it is happening most,” says Langabeer. “We use that data to send out a paramedic and peer coach to visit people who have recently recovered from an overdose and to offer a comprehensive treatment program at no cost to them.”

While waitlists for medication-assisted treatment—combining medications with counseling and behavioral therapies—can stretch to months long, HEROES offers same-day enrollment through its partnership with Memorial Hermann-Texas Medical Center.



James R. Langabeer, PhD, EdD

Professor, Department of Emergency Medicine
McGovern Medical School at UTHealth

Professor, Health and Emergency
Analytics Research Team
UTHealth School of Biomedical Informatics

Professor, Department of Management,
Policy, and Community Health
UTHealth School of Public Health

Matt’s mother heard about HEROES in October 2018 and immediately made the call to enroll her son. “I was able to begin medication-assisted treatment that very same day—something I had tried to do for two months on my own,” Matt says.

With the physical cravings and withdrawal symptoms quelled, he was able to commit himself to weekly behavioral counseling and peer recovery meetings.

Over the next eight months, Matt rebuilt his life, repairing relationships and starting a job manufacturing and testing utility hoses in the oil and gas industry.

On Mother’s Day 2018, Matt remembers his addiction consuming his life. “My mother was the last person to have faith in me, and I never even called her,” he says. “I wanted this year to be different.”

In 2019, to celebrate his mother and his newfound sobriety, he took her to Comicpalooza to attend a panel hosted by actors from her favorite show, the HBO hit series Game of Thrones. “It was great to be able to go above and beyond for her and to appreciate her for everything she has done for me,” he says.

At the time of our interview, Matt was eight months into recovery. While 90% of individuals with opioid use disorder who do not receive outreach and comprehensive treatment relapse within 90 days, HEROES flips the script. Early results have shown nearly 80% of program participants are sober and active in treatment for at least 90 days.

With more than 380 patients enrolled in the program, HEROES is working with the School of Biomedical Informatics to investigate the data and compare it with figures across the nation. “Our goal is to create a local model for cities across the nation to replicate,” says Langabeer.

Based on the program’s success, in early 2019 the Texas Health and Human Services Commission granted the program \$1.85 million, and the United States Department of Justice awarded \$350,000. This funding will expand the program’s reach and allow HEROES to serve more patients across Southeast Texas. Langabeer hopes to earn philanthropic support for HEROES to study the genetic components behind opioid use disorder to create targeted interventions for patients.

“So much evidence is still lacking on opioid use disorder,” says Langabeer. “But the creativity and innovation of the School of Biomedical Informatics is helping us transform data into real solutions to save lives and end the opioid epidemic.”



The HEROES quick-response team includes a paramedic and recovery coach who visit people after they suffered an overdose to offer the opportunity to enroll in a comprehensive treatment program at no cost.

From left to right are Katherine Kirages, MSW, Program Coordinator; Jessica Yeager, Recovery Coach; James R. Langabeer, PhD, EdD; and Andrew Kincannon, Houston Fire Department Paramedic and Firefighter.

FRAGMENTED



BUILDING RELATIONSHIPS TO END HOMELESSNESS



Within the walls of your house, you have a roof to protect you from rain, a door to close to make you feel safe, and most importantly, a place to call home.

Yet many do not have this essential element from Maslow's hierarchy of needs. In fact, Texas ranks fourth among states with the largest number of homeless individuals. Each night, more than 4,000 people in the Greater Houston area sleep without permanent housing—39% of those are unsheltered living under bridges or in tents.

While this number has ebbed and flowed over the decades, many remain chronically homeless, slipping through the holes of a tattered safety net of services and becoming high utilizers of health care.

Through a \$2.5 million grant from the Substance Abuse and Mental Health Services Administration of the United States Department of Health and Human Services, Jane Hamilton, PhD, is leading an effort at UTHealth to combat behavioral disorders and homelessness.

Many chronically homeless individuals have struggled with mental illness all their lives, crippled by limited resources that leave them unsheltered. Hamilton says their primary diagnosis usually falls into one of four categories: schizophrenia, post-traumatic stress disorder, major depression, or bipolar disorder.

"There is a lot of stigma that makes them harder to house," explains Hamilton. "It also takes a higher level of functioning to be in a shelter."

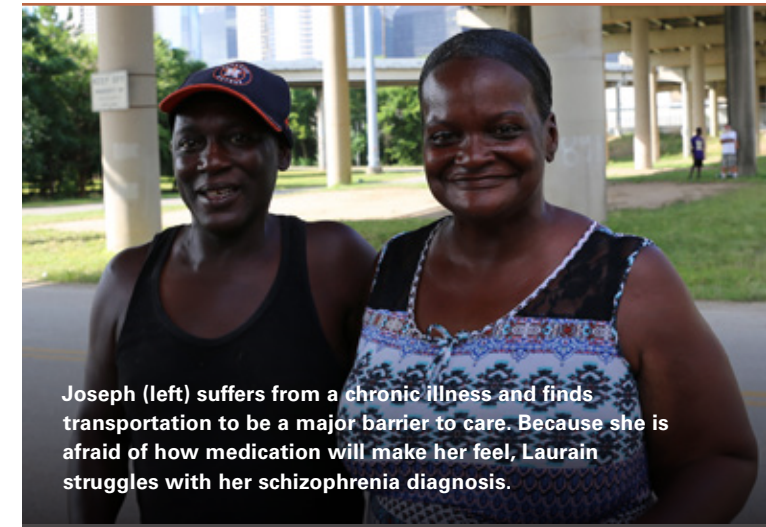
Amplifying the impact of their disorder, unsheltered individuals are reluctant to take a medication that changes the way they feel. "They tell me that they don't have a door, a place to be safe," explains Hamilton. "So they worry about taking something that makes them feel a little different."

Over the past 30 years, the percentage of adults over 50 years old in the homeless population increased from 11% to approximately 50%, revealing a problem compounded by time.

"I was driving around downtown Houston one evening when I saw all these people with white hair sleeping under a warehouse overhang," remembers Hamilton. Often, family members who were once caring for them have died, leaving behind someone with medical comorbidities who is incapable of self-care.

On Jan. 18, 2019, Hamilton's team added evidence-based mental health counseling and social services at The Beacon to improve patient access to and integration with primary care services provided by Healthcare for the Homeless. Within the first four months, her team enrolled 82 patients of the 500 the five-year grant is designed to treat. Eligible individuals with behavioral health needs are enrolled in a continuum of services, including evidence-based therapy and social services to assist patients with all needed benefits including Social Security Disability and to link patients with primary care, housing, and supported employment services.

Ninety percent of the patients her team treats have reported experiencing trauma. "Because the therapy offered in the program is trauma-focused, it is well-received by the patients," she says. "They haven't had access to this type of therapy in the past, and many even complete their in-between-session homework."



Joseph (left) suffers from a chronic illness and finds transportation to be a major barrier to care. Because she is afraid of how medication will make her feel, Laurain struggles with her schizophrenia diagnosis.



After losing his wallet, DeWayne finds it challenging to navigate the process of acquiring a new identification card, which is required to access most social services.

But the integration of services doesn't stop there. A common barrier for services is not having a government-issued ID. Many patients in the study grew up in the foster care system and moved around a lot, sometimes losing their ID card in the process.

"I had one patient who was born in Maine but entered the foster care system in California. She didn't have her birth certificate to get an ID, so she's been sleeping on the sidewalk for three years," says Hamilton. "Our team helped her get her birth certificate, and she has received 35 therapy sessions in five months to address past trauma."

Housing assessments must be conducted every 90 days for individuals to maintain eligibility for permanent supportive housing, which is a primary outcome of Hamilton's work. This requirement introduces another barrier. "If they don't get their housing assessment done every 90 days, no one follows up," says Hamilton. "So we hired a dedicated housing assessor and have become a partner with Houston Coalition for the Homeless, the organization managing Housing and Urban Development funds for our region." As a result, Hamilton's team helped 23 people gain housing in less than five months—many of whom had outdated housing assessments when they enrolled in the program.

"People actually cry once we start moving them into housing because they are so scared and so frustrated with their lives. They just can't believe it's finally happening," says Hamilton.

Many feel like the system has failed them. But with helping hands and research to improve services, Hamilton's team is building relationships—and trust—to change the trajectory.

"Chronic homelessness is a sad thing that just shouldn't happen," says Hamilton, "especially when they have mental disabilities and cannot navigate complex and fragmented systems. By reducing chronic homelessness, we are making a positive impact on the health care system and, most importantly, the individuals."



Lynn grows frustrated with the lack of availability of services to meet her basic needs each day.



Jane Hamilton, PhD, MPH

Assistant Professor, Faillace Department of Psychiatry and Behavioral Sciences
McGovern Medical School at UTHealth

PRIMARY MENTAL ILLNESS DIAGNOSES AMONG THE CHRONICALLY HOMELESS



BIPOLAR DISORDER



SCHIZOPHRENIA



MAJOR DEPRESSION



**POST-TRAUMATIC
STRESS DISORDER**

TRUCK STOP CHRONICLES

As a public health researcher with a background in sexual health studies, Vanessa Schick, PhD, wanted to enhance the health of women experiencing homelessness who engage in sex work for socioeconomic reasons. She joined forces with J. Michael Wilkerson, PhD, to investigate the health needs of individuals engaged in sex work and other individuals who make up the community of truck stops throughout Texas. What she thought would be a one-time visit revealed the complexity of these women's needs and quickly morphed into regular visits.

By immersing herself in the space, Schick and her team found that these women's needs were much lower on Maslow's hierarchy than expected. "Any efforts to promote sexually transmitted infection screening would have been meaningless without addressing the underlying issues: food, shelter, security," Schick explains.

In one early interview, an older woman shared that she had a good night; she had slept in a friend's tent. "When I probed further, she said everyone fights over tents, but she didn't have a home—referring to a tent as a home," says Schick. "Not only were they living in tents, but many were even without the minimal safety and security that a tent could provide." That night, Schick bought tents to hand out the next visit.

As part of the investigation, Schick helps connect the limited number of services available to people experiencing homelessness outside of urban areas, which is further complicated by weak public transportation.

"Some days, it feels like a family gathering. People are supportive of one another and welcoming to us," says Schick. "Other times, it feels dangerous. Some people would engage with me as though I was working at the truck stops. It gave me the tiniest bit of insight into the disrespect that these women encounter daily."

As the truck stop story lingers, Schick continues to bring her public health toolbox to help this disenfranchised population. "What's complicated about the truck stop narrative is there aren't good and bad guys," she says. "There are just a lot of people trying to get by."



Vanessa Schick, PhD

Associate Professor, Department of Management, Policy and Community Health
UTHealth School of Public Health

J. Michael Wilkerson, PhD

Assistant Professor, Department of Health Promotion and Behavioral Sciences
UTHealth School of Public Health

THE KID NEXT DOOR

BREAKING THE BONDS OF SEXUAL EXPLOITATION



The first encounter Elizabeth Newlin, MD, had wasn't what she expected. The family appeared affluent. Well put together. The little girl, who had visible signs of abuse, was throwing the world's greatest tantrum in the middle of the emergency room—none of the doctors or nurses knew what to do.

"It wasn't until the next day that we knew she was being trafficked by her mother," she remembers. "As a trainee in South Carolina, it was traumatic." She adds that trafficking in South Carolina is not nearly as big of a problem as it is in Texas. In particular, Houston's close proximity to a major highway, large number of sexually oriented businesses, and nearby border has made it an epicenter for sex trafficking, sexual exploitation for commercial gain.

"It happens in all socioeconomic backgrounds across Houston and the suburbs. It can literally happen to anyone's daughter. It can be in your own home, and you're unaware," says Newlin. "Some trafficking happens in families; it can be generational."

Risk factors include being involved in Child Protective Services, living in the foster system, or running away from home. Approximately 90% of victims have a previous history of sexual abuse. Sometimes they are running away from abuse at home only to be picked up on the street.

Former Child Protective Services caseworker, forensic interviewer for sexually abused children, and staff psychologist at a children's advocacy center Danielle D. Madera, PhD, adds, "The other group of kids are missing something—few people are paying attention or looking for connections."

Newlin and Madera are leading efforts at UTHealth to care for sex trafficking survivors, capitalizing on strong relationships with the Harris County Juvenile Probation Department, the Harris Center for Mental Health and Intellectual and Developmental Disabilities, and TRIAD Prevention Program.



Elizabeth Newlin, MD

Associate Professor
Vice Chair, Child and Adolescent Psychiatry
Faillace Department of Psychiatry
and Behavioral Sciences
McGovern Medical School at UTHealth

Chief, Child and Adolescent Services
UTHealth Harris County Psychiatric Center

In early 2019, UTHealth received funding to open a 21-bed inpatient unit in collaboration with Harris County Juvenile Probation Department to provide a secure environment for survivors during treatment. Once a young person is identified as having been trafficked, the Juvenile Probation Department helps arrange for them to receive trauma-focused mental health treatment.

"A lot of times, they are detoxing or are not yet ready to engage in treatment," says Madera. "Often, their perpetrator will try to gain access or communicate with them. That was the real push for a unit where they can receive services in a secure environment."

Survivors are screened during visits to the emergency room or as part of justice system involvement, but asking the right questions is a necessity. "These kids have often been taught and rehearsed what to say to authority figures," explains Newlin. "Or they are street savvy because they are survivors and, by necessity, have had to survive some really difficult situations."

If untreated, these children—and the next generation—face significant psychiatric and physical health consequences. As victims get older, they become recruiters for other children.

Hospitalization, while a critical part of the solution, is not the answer in all cases. A young person being trafficked or at risk of being trafficked may not speak up in order to receive services. For that reason, Newlin and Madera are trying to proactively conduct outreach and engagement, an area that could benefit from philanthropic support.

"Youth want to engage in services, but Houston is so vast. Many obstacles get in the way of treatment," adds Newlin. "Transportation is a barrier for a lot of families."

Despite what they have endured, their resilience shines through. "Some of the kids who have been through treatment are now in the media as advocates trying to help others," says Madera. "They were able to grab onto a life preserver and want to give back to the kids who aren't yet there."

"They are truly survivors and fighters," adds Newlin.
"Give them another path, earn their trust, and you'll be amazed at what they can do."



Danielle D. Madera, PhD

Assistant Professor, Faillace Department
of Psychiatry and Behavioral Sciences
McGovern Medical School at UTHealth



Diane M. Santa Maria, DrPH, RN

Dean *ad interim*
Dorothy T. Nicholson
Distinguished Professor
John P. McGovern Distinguished
Professor in Nursing
Associate Professor,
Department of Research
Cizik School of Nursing at UTHealth

ENGAGING VULNERABLE YOUTH TO IMPROVE THEIR HEALTH

For Diane M. Santa Maria, DrPH, RN, it was a natural trajectory of her career.

"When I went to nursing school, I wanted to work in social justice, for adolescents and young adults—the highest risk and the most disenfranchised," she says.

This calling led her to homeless youth. "For the most part, these are young people who have been let down by the adults in their lives," explains Santa Maria. "Often, they are kicked out of their house or run away. Some feel like it's safer to be on the streets than where they were living."

Labor and sexual exploitation are high among these youth. Without a government-issued ID card, it is difficult to gain employment, and as a result, sometimes they work without being paid. Some youth are sexually exploited. Others reach a point where they think trading sex is safer than the risk for victimization while sleeping on the streets.

"These young people don't have the connections or someone to advocate for them," adds Santa Maria.

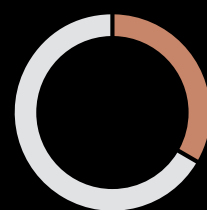
Santa Maria's research and community outreach efforts focus on the intersections between sexual exploitation, labor exploitation, homelessness, and sex trade—traversing these is a need for HIV prevention.

Youth experiencing homelessness are at especially high risk for HIV transmission, with prevalence estimates as high as 13%. In January 2019, Santa Maria received funds to study whether nurse case management, enhanced with motivational interviewing strategies and behavioral feedback, may increase adherence to behavioral and biomedical HIV prevention methods.

"The critical moment is when you have a young person and can change the trajectory of their life by intervening in targeted, evidence-based ways to reduce their time being homeless and prevent risks," she explains. "When people are cared for, their life circumstances change."



I-10 is the No. 1 route
for human trafficking in the
United States.



One-third of runaways enter
sex trafficking within **48 hours**
of leaving home.



Globally, one in three
children sex trafficked **are boys.**

IN THEIR SHOES



MEDICAL STUDENTS MODEL LIVING IN POVERTY

Some students stole to pay bills. Others begged. Still others deliberated whether to buy their child's medication or pay the mortgage. These acts—part of a simulated poverty experience for students at McGovern Medical School at UTHealth—illuminate the circumstances some of their future patients may face.

"Can they afford the medication you're prescribing? Are they sick because they don't have a place to live or access to food?" asks Rebecca Lunstroth, JD, who directs the simulation.

Lunstroth brought the first Community Action Poverty Simulation to the school in June 2018 to help medical students understand the challenges of living in poverty—challenges that may prevent some patients from following treatment regimens.

The simulation assigns students to "families" with unique life circumstances. During four 15-minute "weeks," students must acquire necessities like food and shelter, accessing community services while juggling responsibilities like child care, work, and illness.

"Health care only accounts for about 10%–20% of our overall health," Lunstroth says. "The rest comes from factors like where we live, how much we earn, and how much education we have. It's this 80%–90% that the poverty simulation really gets at."

Following the simulation, students debrief to process and discuss their experiences. Overall, students who participated in the simulation reported greater empathy toward people in poverty, while also expressing increased confidence in their ability to assess a patient's socioeconomic status and point the patient toward helpful resources.

McGovern Medical School incorporated the poverty simulation into its curriculum as an annual event, holding the second simulation in January 2019. Lunstroth hopes the experience will continue to help future doctors see impoverished patients—including those who struggle to adhere to treatment plans—with compassionate eyes.

"It's not that they want to be sick," she says. "They just have more pressing needs."



Rebecca Lunstroth, JD

Associate Director, McGovern Center for Humanities and Ethics
Assistant Professor, Family Medicine
McGovern Medical School at UTHealth



Students at McGovern Medical School at UTHealth navigate the stresses and tough decisions of life in simulated poverty—an experience the organizer hopes will help students build greater empathy for future low-income patients.

AGE-OLD ISSUES

IMPROVING MENTAL HEALTH TO IMPROVE PHYSICAL HEALTH FOR SENIORS



Getting older is a normal part of living.

“Our brain function changes, and we’re not as agile in our reasoning or verbal agility,” says Vineeth John, MD.

“As we age, we still learn, just at a slower rate and less efficiently,” explains John. “We may have trouble with recall and retrieval even though our IQ and vocabulary remain the same.”

Appropriately addressing behavioral issues of an aging population will become increasingly important as Texas and the rest of the nation enter the third decade of the 21st century. Today, Texas has an estimated 4 million residents age 65 and older. That number will nearly double to 7.5 million by 2040.

Older adults can have emotional or behavioral symptoms that are not connected to mental or neurological disorders, John explains. For example, pain resulting from illnesses and injuries can lead to depression in an older individual, but that does not mean the person suffers from clinical depression.

Discussions with patients about brain-related aging require helping them distinguish between healthy aging and pathological aging, according to Antonio Teixeira, MD, PhD. “If you have psychiatric problems, your brain is at risk of developing cognitive impairment and dementia. People sometimes avoid psychiatric tests out of fear of learning they have these conditions. This makes it difficult to help the patient delay the onset of a condition or take safety measures.”

“Specialized expertise in geriatric psychiatry helps us navigate symptoms and treat conditions appropriately,” says John, who teaches residents at McGovern Medical School at UTHealth to connect with the whole person. “I want to help them understand that geriatric psychiatry is seeing the patient as a person whose depression may be caused by frailty or loneliness or a heart that is failing, and not always from a neurological condition.”

As part of their commitment to help older adults with healthy aging, John and Teixeira collect clinical data to address health problems without prescribing medications. Polypharmacy—the use of multiple medications—is common for older patients and may lead to negative outcomes, such as falls, dangerous drug reactions, and death. Many times, older adults have more than one medical specialist because they have more than one issue, and confusion about medication names can add to the problem.



Vineeth John, MD

Professor
Vice Chair for Education
Director, Geriatric Psychiatry Program
Faillace Department of Psychiatry
and Behavioral Sciences
McGovern Medical School at UTHealth



Antonio Teixeira, MD, PhD

Professor
Director, Neuropsychiatry Program
Faillace Department of Psychiatry
and Behavioral Sciences
McGovern Medical School at UTHealth



UTHealth Consortium on Aging addresses the complex needs of older adults by providing comprehensive care for patients and their families.

Practicing medicine is more than writing prescriptions. “It involves not only diagnosing and explaining, but also listening,” explains Teixeira, adding that patients should adopt healthy habits such as eating healthy, getting adequate sleep, limiting alcohol consumption, and eliminating cigarette consumption. “It’s never too late to embrace good habits.”

Carmel B. Dyer, MD, leads UTHealth Consortium on Aging, of which John and Teixeira are members. She has been a champion of educating future and established doctors to look at the individual needs of the patient based on their unique situation. This is particularly true in terms of medications.



Carmel B. Dyer, MD

Nancy P. and Vincent F. Guinee, MD
Distinguished Chair
Roy M. and Phyllis Gough Huffington
Chair in Gerontology
Professor, Department of Internal Medicine
McGovern Medical School at UTHealth

Executive Director
UTHealth Consortium on Aging

“We want to make sure no one is on medication they don’t need. Lifestyle modifications help,” says Dyer. “It’s a discussion between physician and patient to determine what will be most efficient.”

HEALTHY HABITS FOR HEALTHY AGING



Eating
Healthy Meals



Getting
Adequate Sleep



Limiting Alcohol
Consumption



Eliminating Cigarette
Consumption

SHARING IS CARING

DENTISTRY STUDENTS IMPROVE OVERALL HEALTH THROUGH ORAL HEALTH CARE FOR SENIORS

UTHealth School of Dentistry students and faculty share their time and talents in Houston and surrounding communities, continuing a tradition that began in 1925. The school serves more than 3,000 patients each year through its community outreach, resulting in more than 7,000 treatments that include X-rays, cleanings, restorative treatment, and extractions.

In Houston, the School of Dentistry has a dental service and clinical rotation at Holly Hall Retirement Community. Aging-related oral diseases can impact brain and behavioral health and increase the need for preventive, restorative, and periodontal dental care. This is particularly true for older individuals who may be economically disadvantaged, disabled, or homebound.

Nearly 19% of seniors no longer have their natural teeth. Tooth loss can cause seniors to avoid fresh fruits and vegetables—basic elements of a healthy diet. Also, pain and difficulty speaking may lead to embarrassment, loneliness, and social isolation. Approximately half of adults over 65 have moderate or severe periodontal disease associated with stroke and other chronic conditions.

Visits to Holly Hall Retirement Community can turn into social calls, which are unexpected treats for residents and students. One resident was happy to see the students because she had not been to a dentist for quite a while. She also enjoyed their company, which included changing the television to the Smooth Jazz cable channel before they left.

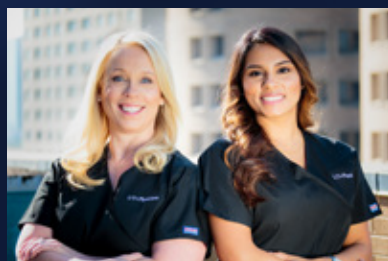
Changing channels and changing lives are all in a day’s work—and well worth it.



UTHealth School of Dentistry students provide oral health care to residents at the Holly Hall Retirement Community to improve their overall health.

Our vision is to provide excellence above all in the quest to be an acknowledged leader in the collaboration to treat, cure, and prevent the most common diseases of our time through education, research, and patient care.

ACADEMIC CLINICAL PRACTICES

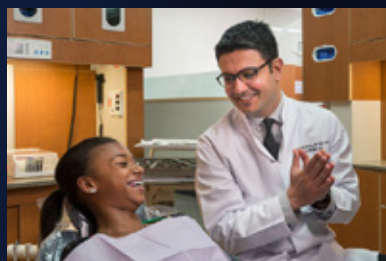


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The medical group
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Medical School

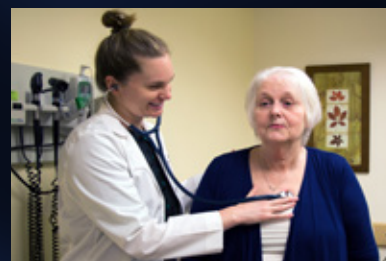
2,000+ clinicians
80 medical specialties
and subspecialties
1.8M+ patient visits
a year



UT★Dentists

The multidisciplinary
group practice of
the School of Dentistry

7,800+ patient visits
a year



UT★Health Services

The nurse-managed care
center of Cizik School
of Nursing

11,000+ patient visits
a year

PRIMARY TEACHING AND AFFILIATED HOSPITALS

Children's Memorial Hermann Hospital
Harris Health Lyndon B. Johnson Hospital
Memorial Hermann-Texas Medical Center

TIRR Memorial Hermann
The University of Texas MD Anderson Cancer Center
UTHealth Harris County Psychiatric Center

THANK YOU

Advancing brain and behavioral health is one of the many ways that UTHealth's community of experts is solving the greatest health challenges of our time.

To learn more about how we are discovering breakthrough advances in the prevention and treatment of disease, please contact:

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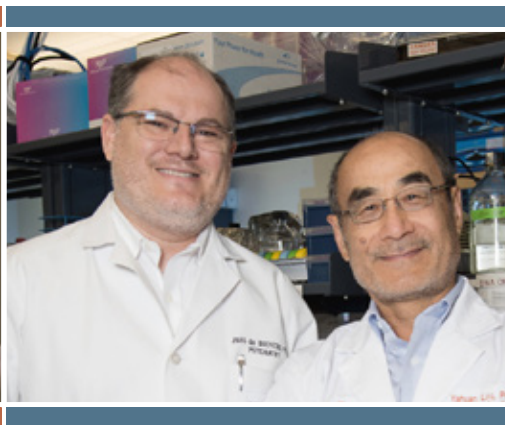
By supporting UTHealth, you help to create healthier lives in our community and well beyond. Together, we are on the frontier of discoveries that bring quality patient care to our communities.

OUT IN FRONT: BRAIN AND BEHAVIORAL HEALTH

2019

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RESEARCH



PATIENT CARE

The mission of UTHealth is to educate health science professionals, discover and translate advances in the biomedical and social sciences, and model the best practices in clinical care and public health.

We pursue this mission in order to advance the quality of human life by enhancing the diagnosis, treatment, and prevention of disease and injury as well as promoting individual health and community well-being.

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