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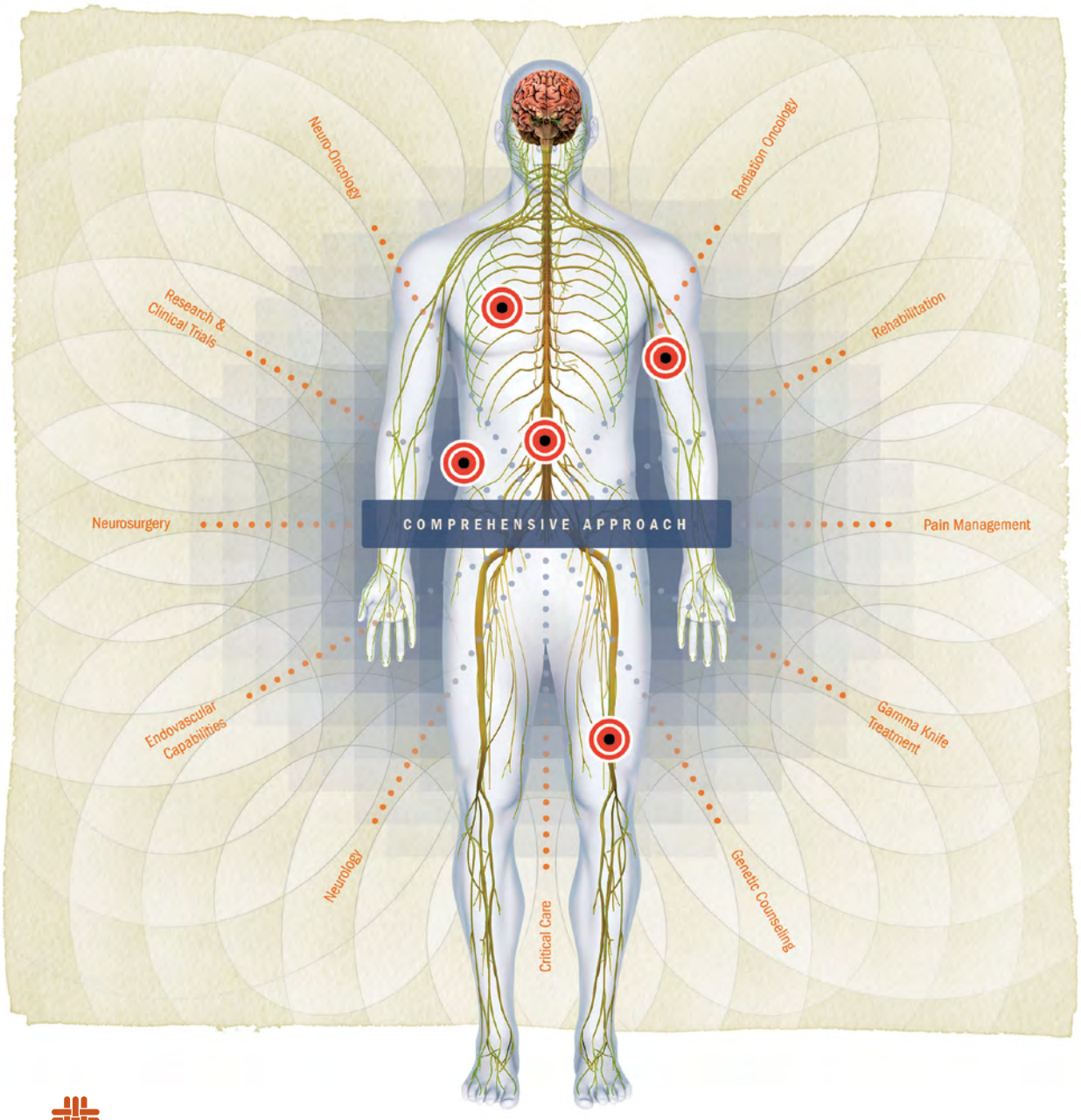

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MEMORIAL® HERMANN
Texas Medical Center

In This Issue

It Takes *a* Team—And Other Lessons Patients Teach Us

Regardless of how smart we are as individuals, medicine is about teamwork. At the Memorial Hermann Mischer Neuroscience Institute at the Texas Medical Center, we are hundreds acting as one, practicing medicine in innovative ways that improve outcomes and patient satisfaction. We've taken that spirit of teamwork a step further by creating clinics in which two or more specialists see patients in one visit. In addition to working together to reduce patient anxiety at a stressful time, combined clinics make for quicker and better decision-making, better use of healthcare dollars and reduced time between diagnosis and treatment.

"A GOOD TEAM MAKES THE DIFFERENCE BETWEEN SUCCESS AND FAILURE. THE WORK OF INDIVIDUALS MOVES US AHEAD, BUT TEAMWORK GIVES US OUR EDGE."

August Nuñez is one beneficiary of this approach – we'd like to express our gratitude to him for sharing his story. Debilitating pain caused by severe spinal stenosis became the primary focus of his life. Thanks to the specialized expertise and close working relationship of neurosurgeon Daniel H. Kim, M.D., and interventional pain management specialist Nadya Dhanani, M.D., Mr. Nuñez is achieving his goal of life without pain medication. We learn from each of our patients.

Through the Mischer Neuroscience Institute's new Innovation and Quality (IQ) Program, physicians are organizing data to improve physician and service performance, finding innovative ways to measure quality and track long-term outcomes and increasing infrastructure support to enable faculty to conduct more patient-centered research. The program gives experienced researchers greater opportunity to test novel treatments in clinical trials and transition the results of that research to clinical practice – to the benefit of patients.

With this issue, we welcome seven physicians and a genetic counselor to the Institute and UTHealth Medical School: pediatric neurosurgeon Manish Shah, M.D., neurosurgeon George Al Shamy, M.D., interventional pain management specialist Nadya Dhanani, M.D., neurologist Courtney M. Preston, M.D., neurologist Fatima Ibrahim, M.D., neurologist Ankit Patel, M.D., neuro-intensivist Shirish Satpute, D.O., and genetic counselor Krista Qualmann. We'd also like to extend our congratulations to the members of our departments who were singled out for recognition in *Houstonia* magazine's 2014 listing of Top Doctors in Houston. We're proud of their clinical accomplishments, commitment to teaching and research productivity.

A good team makes the difference between success and failure. As Dr. Mya Schiess observes in *Through the Patient's Eyes,* "The best teams are those that work well together while maintaining an independent thinking process. In the end you have more confidence in the decision." It's a delicate balance. The work of individuals moves us ahead, but teamwork gives us our edge.

With best wishes,

DONG H. KIM, M.D.

Director, Memorial Hermann Mischer Neuroscience Institute at the Texas Medical Center

Professor and Chair, Vivian L. Smith Department of Neurosurgery
UTHealth Medical School

JERRY S. WOLINSKY, M.D.

Co-director, Memorial Hermann Mischer Neuroscience Institute at the Texas Medical Center

Interim Chair, Department of Neurology
Bartels Family and Opal C. Rankin Professor of Neurology
Director, Multiple Sclerosis Research Group and MRI Analysis Center
UTHealth Medical School

All *the* King's Horses *and* All *the* King's Men

A Patient Benefits from Close Collaboration between Neurosurgery and Pain Medicine

"All the king's horses and all the king's men couldn't put Humpty together again," August Nuñez says, quoting the nursery rhyme. "But in my case they did."

Nuñez is a beneficiary of the teamwork of neurosurgeon Daniel H. Kim, M.D., FACS, FAANS, and interventional pain management specialist Nadya Dhanani, M.D. Thanks to their specialized expertise and close working relationship, the 70-year-old is walking, touting the quality of care he received and going about his life pain free.

"DEBILITATING PAIN BECOMES THE PRIMARY FOCUS OF THOSE WHO LIVE WITH IT. BECAUSE WE KNOW THAT PAIN AFFECTS MOOD, EMOTIONAL STATE, THE ABILITY TO BE EFFECTIVE AT WORK, RELATIONSHIPS WITH PEOPLE AND RESPONSE TO TREATMENT, WE'RE MORE AGGRESSIVE ABOUT TREATING IT."

DANIEL H. KIM, M.D., FACS, FAANS
Director, Reconstructive Spinal and Peripheral Nerve Surgery
Professor, Vivian L. Smith Department of Neurosurgery
UTHealth Medical School

NADYA DHANANI, M.D.
Clinical Assistant Professor, Vivian L. Smith Department of Neurosurgery
UTHealth Medical School

Nuñez first saw Dr. Kim in 2011 with severe lumbar stenosis and spinal disease – the result of aging and arthritis. "He had developed significant neurogenic claudication that caused right sciatic nerve pain. We were able to resolve the problem and provide relief with a simple decompressive laminectomy," says Dr. Kim, who is director of reconstructive spine and peripheral nerve surgery at the Memorial Hermann Mischer Neuroscience Institute at the Texas Medical Center and professor of neurosurgery at UTHealth Medical School. An expert in minimally invasive spinal surgery, Dr. Kim is a preeminent researcher in peripheral nerve repair through nerve transfer and nerve graft, and is also recognized for his work in neurorehabilitation through robotics and cortical stimulation, spinal biomechanics and innovative neuromodulation treatments for chronic pain.

After the decompression, Nuñez did well for about a year. When he developed new symptoms that included pain in the opposite leg, he underwent a second surgery at another institution. Three months later, he was back in Dr. Kim's office with severely worsened leg pain and, after two spinal surgeries involving the removal of bone, instability in the affected lumbar vertebrae. In March 2012, Dr. Kim performed a revision spinal fusion and fixation using titanium hardware.

"There is no spine surgery that resolves everything and ensures the patient will never need another surgery," Dr. Kim says. "No matter how good we are at spine surgery and how successful the procedure is, the result won't last forever. Patients may get a few good years but as they continue to age, the problem continues to worsen. When pain recurs, it's not uncommon for them to shop around for another spine surgeon. Often their next experience is negative. I've had over 20 years of experience performing spine surgeries in my career. I've heard the stories of many patients."

A year and a half later, in December 2013, Nuñez came back to Dr. Kim when he developed recurrent low back pain. "August said he did really well after his last surgery but now suddenly had lower back pain again. We see this often, which is why we decided to build a comprehensive spine program."

Dr. Kim recruited Dr. Nadya Dhanani from The University of Texas MD

For patients with debilitating pain, both surgical and nonsurgical approaches are employed as indicated, with treatment tailored to each patient.

Anderson Cancer Center. Fellowship trained in pain medicine and specialized in interventional pain management, she focuses primarily on spine- and cancer-related pain. When Nuñez returned after his third surgery, Dr. Kim referred him to Dr. Dhanani, who prescribed a bilateral medial nerve branch block.

"Patients may have flare-ups of pain but don't need or won't tolerate another spine surgery," she says. "By injecting an anesthetic near the small medial nerves that connect to specific facet joints, we can deaden the nerve endings to relieve pain. Typically we inject several levels of the spine in one procedure. A selective block of painful nerve endings around the spinal joints can eliminate back pain syndrome."

In the last decade, pain management has assumed a more central role in medicine. Physicians and other healthcare providers are more aware of the effects of pain on the body; some refer to pain as the fifth vital sign as a result of the Veterans Health Administration's 1999 initiative to focus the attention of medical professionals on the measurement and documentation in the electronic medical record of patients' self-report of pain.

"Debilitating pain becomes the primary focus of those who live with it," Dr. Dhanani says. "Because we know that pain affects mood, emotional state, the ability to be effective at work, relationships with people and response to treatment, we're more aggressive about treating it."

She describes pain medicine as part science and part intuition. "We observe best practices, but the treatment I deliver is also a little bit of me trying to figure out the source of the pain. Much of what we do is data driven, but to some extent pain medicine is an art, which is why research in pain medicine is so important. In the grand scheme of things, it's a fairly new field. The potential to develop it further is what attracted me to pain medicine, but the down side is that we as clinicians know we have a lot more to learn."

For his part, Nuñez is pleased with the result. "My pain felt like I was dragging a lead ball behind my back," he says. "Other doctors had tried to relieve it but nothing worked. I took all kinds of arthritis medicine and had two spinal injections that didn't help. After seeing Dr. Dhanani, the pain went away. I may be Humpty Dumpty but I've been put back together again by some very good doctors."

Dr. Dhanani describes Nuñez as a very motivated patient. "He didn't want to be on medication for a long period of time," she says. "He wanted to remain active, doing what he enjoys. He was a little at the end of the rope when he came to me, and wasn't convinced that any treatment would make a difference. Fortunately, we were able to help him, and I feel great about that."

Managing Pain *from the* Physical Medicine *and* Rehabilitation Perspective

At Memorial Hermann Memorial City Medical Center, physical medicine and rehabilitation specialist G. Silky Patel, M.D., is part of a team of physicians providing west Houston residents with access to tertiary spine and pain medicine previously available only in the Texas Medical Center. At Mischer Neuroscience Associates Memorial City, Dr. Patel works side by side with neurosurgeons Paul Boone, M.D., and Baraa Al-Hafez, M.D., in a patient-centered clinic, providing comprehensive, one-stop care for spine and neck issues.

"I provide a variety of treatments for patients with spine and musculoskeletal pain who are either physically or mentally not ready for surgery," says Dr. Patel, who is fellowship trained in pain management and holds a faculty appointment in the Vivian L. Smith Department of Neurosurgery at UTHealth Medical School. "We are great proponents of the conservative approach to managing spine and musculoskeletal pain but are also well versed in interventional and surgical techniques if they are needed. People with pain can be helped if we understand the causes."

"PAIN SIGNALS KEEP FIRING IN THE NERVOUS SYSTEM FOR WEEKS, MONTHS OR YEARS. THERE MAY HAVE BEEN AN INITIAL ACCIDENT OR A DISORDER CAUSING THE ONGOING PAIN. REGARDLESS OF THE ORIGIN, THERE ARE NEW WAYS TO MANAGE IT."

Spine and musculoskeletal pain conditions often affect older adults. "Pain signals keep firing in the nervous system for weeks, months or years," Dr. Patel says. "There may have been an initial accident or a disorder causing the ongoing pain. Regardless of the origin, there are new ways to manage it."

As a physiatrist trained in pain medicine, Dr. Patel performs nerve conduction studies and electromyography to help diagnose the cause of the problem. She offers a range of treatments based on diagnosis – from physical therapy to epidural injections for cervical and lumbar radiculopathy. For other spine disorders she performs facet joint injections, radiofrequency ablation, kyphoplasty and spinal cord stimulation. She also offers corticosteroid and/or hylagen joint injections for knees, hips and shoulders, and performs botulinum toxin injections.

"Because pain and function are intertwined, I consider the individual in terms of his or her functional goal," she says. "The course of treatment for a 75-year-old grandmother who wants to hold her grandchild is less aggressive than that of an athlete whose goal is to return to sport."

Regardless of the cause, pain is debilitating. "Pain becomes the patient's primary focus. This is what propels us to continue our research into the causes of pain," says Dr. Patel, whose most current research has focused on subcutaneous and peripheral nerve stimulation for the treatment of Horton's neuralgia and chronic paroxysmal hemicranias, as well as kyphoplasty for treating vertebral compression fractures.

"We pride ourselves on our spine center," she adds. "It's rare to find a comprehensive approach to spine care – neurosurgery, physical medicine and rehabilitation, interventional pain management and the ability to perform electromyography – under one roof."

When patients are not ready for surgery, pain management offers relief through more conservative approaches.

The IQ Program: A Search *for* New Ways *to* Improve Quality *and* Expand Research

A new program at the Memorial Hermann Mischer Neuroscience Institute at the Texas Medical Center is organizing data to improve physician and service performance, fostering innovative ways to measure quality and track long-term outcomes, and increasing infrastructure support to enable faculty to conduct a range of clinical trials and patient-centered research.

"DR. KIM HAS ASSEMBLED A TEAM OF MORE THAN 30 PHYSICIANS, RESEARCHERS, QUALITY IMPROVEMENT AND IT SPECIALISTS, BIOSTATISTICIANS, DEPARTMENT CHAIRS, DIRECTORS, RESEARCH NURSES, FELLOWS AND OPERATIONS STAFF, AND CHARGED THEM WITH THE CREATION OF AN INFRASTRUCTURE THAT WILL HELP US CONDUCT INNOVATIVE STUDIES, PROMOTE OUR QUALITY EFFORTS AND FIND INNOVATIVE WAYS TO IMPROVE QUALITY."

The Innovation and Quality (IQ) Program uses data to help physicians improve their compliance with proven, evidence-based guidelines and create new measures that will lead to better care and improved patient outcomes. "When providers receive detailed feedback about their performance, it helps them identify areas in which they can improve. The simple act of raising awareness can lead to rapid improvement," says Dong H. Kim, M.D., director of the Mischer Neuroscience Institute and professor and chair of the Vivian L. Smith Department of Neurosurgery at UTHealth Medical School. "Physicians receive feedback about their performance using metrics they defined and data they validated. Because the data is credible to them, they respond to it quickly with ideas for improvement."

DONG H. KIM, M.D.
Director, Mischer Neuroscience Institute
Professor and Chair, Vivian L. Smith Department of Neurosurgery
UTHealth Medical School

One goal of the IQ Program is the creation of datasets for neurosurgical conditions that will be used to monitor overall physician performance. "For instance, in cases of traumatic brain injury we monitor our performance by adding our own metrics to specific measures recommended by the National Institute of Neurological Disorders and Stroke," says Georgene Hergenroeder, RN, CCRC, assistant professor of neurosurgery and IQ Program director. "Each of our patients will be assessed using standardized neurological outcomes measures at specified intervals so that we can determine how they are progressing compared to baseline and to group norms for their neurological condition. These metrics will also be incorporated into our clinical trials to determine if the study drug or device is having the desired impact.

"We measure our performance by our patients – their outcomes and their satisfaction. By analyzing the combined metrics, we can determine where we can improve our performance," Hergenroeder says. "For instance, American Diabetes Association Guidelines for critically ill patients and American Heart Association/American Stroke Association Guidelines recommend that patients' blood glucose levels be maintained to avoid extremes. We are monitoring blood glucose levels by disease type as well as by provider. Physicians are notified routinely of the percentage of their patients and patient days that fell either inside or outside of the acceptable range."

Physicians and nurses at the Mischer Neuroscience Institute have successfully tracked standard quality metrics for the past few years, says Miriam Morales, director of strategic analytics. Now,

they're looking at physician performance and interventions in meaningful ways that tie these and other metrics directly to outcomes.

"Dr. Kim has assembled a team of more than 30 physicians, researchers, quality improvement and IT specialists, biostatisticians, department chairs, directors, research nurses, fellows and operations staff, and charged them with the creation of an infrastructure that will help us conduct innovative studies, promote our quality efforts and find innovative ways to improve quality," Morales says. "By integrating all of our data, we can see in real time how patients are doing on neuro-critical lab values such as oxygen saturation, intracranial pressure and potassium management. This takes us beyond the information available in the electronic health record for a look at individual physician performance.

"We are constantly asking questions and modifying our IQ tools," Morales says. The infrastructure we're creating will track a range of outcomes – pain, neurological worsening, functionality, cognition, quality of life and others – across various subsets of our patient population. "We can track how well our doctors are adhering to a protocol. We can find better ways to track outcomes. Once we have the infrastructure in place, we'll have access to a rich data source that includes long-term outcomes and enables us to identify the best interventions for a particular condition. We can then tie that data to decisions about future research, enabling us to positively impact patient outcomes throughout the timeline of patient care."

The IQ Program team meets regularly to collaborate on research trials and to track quality measures.

Clinical research is crucial to optimizing care and providing patients with state-of-the-art treatment options.

Physicians affiliated with the Mischer Neuroscience Institute are melding research and clinical practice. Patients are evaluated, and those who meet qualifying criteria are invited to participate in innovative research studies. In addition, neuroscience patients are offered the opportunity to participate in research by consenting to allow their tissue samples to be banked in the Neuroscience Research Repository (NRR) for current and future research. As an example, Dr. Kim and Teresa Santiago-Sim, Ph.D., have used the NRR to collect samples and detailed genetic data on intracranial aneurysm patients and their family members. Through this important effort, a gene mutation present in a subset of patients who develop intracranial aneurysms has been identified.

The gene mutation was evaluated in animal models to confirm its contribution to the disease process. The finding is clinically useful and is a guide for close monitoring of patients with a family history of aneurysm who have the mutation. Future study of this gene is expected to uncover underlying genetic mechanisms.

Clinical trials, which test novel treatments to advance cures, are only available at select centers for patients who meet very specific study criteria. Prior to offering a study to patients, the study design and the test treatment undergo rigorous testing as well as scientific and ethical reviews of risk and benefits.

"Through clinical trials patients collaborate with us to improve the care of future patients as well as their own care," Dr. Kim says. "The IQ program relies on experienced researchers testing novel treatments in clinical trials and transitioning the results of that research to clinical practice. The IQ staff will help faculty by providing administrative and regulatory support, with a 24/7 on-call system of clinical nurses to monitor and enroll patients into trials, and a team to provide statistical analyses."

"ONCE WE HAVE THE INFRASTRUCTURE IN PLACE, WE'LL HAVE ACCESS TO A RICH DATA SOURCE THAT INCLUDES LONG-TERM OUTCOMES AND ENABLES US TO IDENTIFY THE BEST INTERVENTIONS FOR A PARTICULAR CONDITION. WE CAN THEN TIE THAT DATA TO DECISIONS ABOUT FUTURE RESEARCH, ENABLING US TO POSITIVELY IMPACT PATIENT OUTCOMES THROUGHOUT THE TIMELINE OF PATIENT CARE."

For example, a trial currently under way is based on what researchers have learned about brain trauma from previous trials conducted at Memorial Hermann-Texas Medical Center, UTHealth Medical School and collaborating centers across the country. Clinician researchers cool patients with brain trauma-associated subdural hematoma prior to surgical evacuation of the blood clot. Preliminary studies indicated that cooled subdural hematoma patients had better cognitive function at six months after injury than patients treated with standard care at normal temperature. The new trial, offered at Memorial Hermann-TMC and a few other centers, will definitively determine if cooling subdural hematoma patients prior to clot evacuation improves outcomes. If the treatment results in superior outcomes, it will be incorporated into standard care. As the IQ program expands, researchers will design new trials to help neuroscience patients reach their desired functional potential.

Through *the* Patient's Eyes

Behind the Scenes at Mischer Neuroscience Institute's Patient-centered Clinics

The impact of patient-centered care on clinical outcomes and patient satisfaction is well documented in the medical literature. As institutions across the country struggle to improve outcomes while reducing costs, the Memorial Hermann Mischer Neuroscience Institute at the Texas Medical Center and Mischer Neuroscience Associates, the Institute's arm in the community, are achieving both goals through clinics that revolve around the needs of patients.

Under the leadership of Dong H. Kim, M.D., director of the Mischer Neuroscience Institute and professor and chair of the Vivian L. Smith Department of Neurosurgery at UTHealth Medical School, the Institute is replacing the traditional physician-centered system with clinics in which teams of specialists see patients together. At the Brain Tumor Center, for example, patients with malignancies see both Dr. Kim and his neuro-oncologist partner in the same visit. If necessary, the radiation oncologist joins them.

The multidisciplinary approach at the Brain Tumor Center includes access to a genetic counselor, who can help patients and their families understand their genetic risk.

DONG H. KIM, M.D.
Director, Mischer Neuroscience Institute
Professor and Chair, Vivian L. Smith Department of Neurosurgery
UTHealth Medical School

"One office visit rather than two or three helps reduce the anxiety of patients at a stressful time," says Dr. Kim, who as director of the Institute leads Memorial Hermann's citywide neuroscience network. "We confer together on the case, which means quicker decision-making and ultimately, a better decision based on the opinions of multiple specialists. It reduces the time between diagnosis and treatment and makes better use of healthcare dollars by charging only one co-pay for the consultation."

Frequently, genetic counselor Krista Qualmann is called upon to consult with patients during an office visit. In cases involving hereditary cancer syndromes, she is available to explain inheritance patterns, provide education on the condition and discuss the risks, benefits and limitations of available genetic testing options. She also makes recommendations for screening, treatment and management, and provides supportive counseling.

"It's a privilege to work with patients in a new way," Qualmann says. "They have the benefit of meeting with an entire team without leaving the exam room. The process increases communication with patients and among physicians, which leads to improved outcomes. It's a far cry from the old paternalistic system of health care in which the doctor was the authority figure and the patient followed doctor's orders without taking an active role in healthcare decision-making."

Patients with malignant brain tumors also benefit from the close collaboration of an integrated tumor board that brings together multiple specialists – two or three neurosurgeons, a neuroradiologist, neuro-oncologist, neuropathologist and radiation oncologist – weekly. "Most tumor boards meet monthly," says neurologist Sigmund Hsu, M.D., who joined

Mischer Neuroscience Institute two years after leaving the faculty of The University of Texas MD Anderson Cancer Center. Dr. Hsu leads the Cancer Neurology Clinic for the treatment of patients with neurological issues resulting from chemotherapy, and the Brain Metastases Clinic, whose staff of affiliated neuro-oncologists, neuroradiologists, neuropathologists and neurosurgeons works closely with oncologists to provide personalized and innovative care to patients with brain tumors.

SIGMUND HSU, M.D.
Assistant Professor, Departments of Neurosurgery and Neurology
UTHealth Medical School

"It's extremely difficult to get that much physician firepower together in one room, and we do it weekly, which means we review almost every case," Dr. Hsu says. "The tumor board is a real-time collaboration that replaces the traditional paper trail of communication. It's an active examination of the facts to ensure that we're seeing all the pieces of the puzzle. We challenge each other. Sometimes we disagree, and through discussion to reach consensus, we raise the bar. That's what's unique about the Mischer Neuroscience Institute from the patient perspective. Patients benefit enormously from this collective expertise without having to spend their time seeing multiple specialists."

Patients with epilepsy and seizure disorders benefit from the same type of close collaboration at the Texas Comprehensive Epilepsy Program, the leading program in the southwestern United States for the diagnosis and treatment of epilepsy in patients of all ages. The center is also a leader in the development and implementation of innovative technologies for the diagnosis and treatment of epilepsy.

JEREMY SLATER, M.D.
Professor, Department of Neurology
UTHealth Medical School

"Many of our patients come from far afield – all across Texas and from several surrounding states," says Jeremy Slater, M.D., director of the epilepsy program and a professor in the department of Neurology at UTHealth Medical School. "Because of the distance they travel it's important for us to facilitate a seamless patient experience to avoid multiple visits. Our epilepsy surgery nurse coordinator, Jessica Johnson, integrates office visits between neurology and neurosurgery with diagnostic testing. If, at the end of the day, the clinician team, patient and family make the decision to undergo continuous monitoring, the patient is admitted at his or her earliest convenience, often the following day."

At a weekly two-hour adult and pediatric epilepsy conference, nine neurologists, two neurosurgeons, a neuropsychologist and a neuroradiologist review cases and make recommendations. "Epilepsy surgery is about careful integration of multiple types of data. Reviewing these together allows the team to develop a consensus about the best approach for each case," says neurosurgeon Nitin Tandon, M.D., director of the epilepsy surgery program and an associate professor in the Vivian L. Smith Department of Neurosurgery. "We review the medical history of each patient, all imaging studies, magnetoencephalography, neuropsychology and results of Phase 1 video EEG testing to arrive at a holistic understanding of the clinical epilepsy syndrome in each individual case. We go around the table sequentially and everyone renders an opinion, with the patient's neurologist speaking next to last. Then I weigh in as the surgeon. The ability to use the group's gestalt in each case allows us to arrive at a plan more tailored to each individual case. That, combined with our ability to leverage our innovative MEG, SEEG and stereotactic laser ablation techniques, provides our patients with options unavailable at most other centers."

NITIN TANDON, M.D.
Associate Professor, Departments of Neurosurgery and Pediatric Neurosurgery
UTHealth Medical School

Vigorous debates often precede a decision. "We discuss what type of procedure will produce the best outcome," Dr. Slater says. "When a host of experts makes the decision, it provides a greater degree of confidence in the process and result. Someone may bring up an issue no one else has considered. The patient and family know how the decision was reached and have an opportunity to give their input."

Pediatric epileptologist Gretchen Von Allmen, M.D., director of the pediatric epilepsy program and an associate professor of pediatrics at UTHealth Medical School, observes that the Texas Comprehensive Epilepsy Program is the only group in Texas in which neurologists specializing in pediatric epilepsy work closely together with those who treat adults. "We've always provided excellent care, but clinical integration and close collaboration have moved our program

"THE BEST TEAMS ARE THOSE THAT WORK WELL TOGETHER WHILE MAINTAINING AN INDEPENDENT THINKING PROCESS. IN THE END YOU HAVE MORE CONFIDENCE IN THE DECISION. THAT KIND OF TEAMWORK DOESN'T HAPPEN OVERNIGHT. IT'S BASED ON LONG-TERM EXPERIENCE. WE EACH BRING OUR PERSONAL APPROACH TO THE SCIENCE AND ART OF MEDICINE TO THE TABLE."

Stereo EEG gives physicians a minimally invasive diagnostic tool to help pinpoint the foci of epileptic seizures.

up to another level. We've added new faculty and advanced technology, including stereo EEG. Our patients are the real beneficiaries. When they turn 18, they transition smoothly to the adult side in one system that provides care from childhood through adulthood."

GRETCHEN VON ALLMEN, M.D.
Associate Professor, Division of Child & Adolescent Neurology, Department of Pediatrics
UTHealth Medical School

The Mischer Neuroscience Institute Movement Disorders and Neurodegenerative Diseases Program, known as UT MOVE, operates four patient-centered specialty clinics – Spasticity Management, Deep Brain Stimulation (DBS) Selection and Programming, Botox® Injection and Intrathecal Baclofen Pump Therapy. Because rehabilitation is integral to good outcomes, movement disorders specialist Mya Schiess, M.D., and her team work closely with physical and occupational therapists and speech-language pathologists in inpatient and outpatient clinics and at TIRR Memorial Hermann to research new approaches that improve treatment. Their expertise extends to Memorial Hermann The Woodlands Hospital, where a new UT MOVE Clinic was established in 2013, and they also see patients at Memorial Hermann Northeast Hospital in Humble.

MYA SCHIESS, M.D.
Professor and Vice Chair, Department of Neurology
Adriana Blood Endowed Chair in Neurology
UTHealth Medical School

Dr. Schiess, who holds the Adriana Blood Chair in Neurology at UTHealth Medical School, works closely with neurosurgeon Albert Fenoy, M.D., in the DBS Selection and Programming Clinic. "The best teams are those that work well together while maintaining an independent thinking process," she says. "In the end you have more confidence in the decision. That kind of teamwork doesn't happen overnight. It's based on long-term experience. We each bring our personal approach to the science and art of medicine to the table."

ALBERT FENOY, M.D.
Assistant Professor, Vivian L. Smith Department of Neurosurgery
UTHealth Medical School

Like physicians at each of the patient-centered clinics at Mischer Neuroscience Institute and Mischer Neuroscience Associates, Dr. Schiess and her team are very involved in the lives of their patients. "We work with sleep labs, nutritionists, neuropsychologists and rehabilitation specialists. We're terribly comprehensive in our approach. We really are a full-service station."

Pitching *in to* Help Haitian Children *with* Hydrocephalus

Last December, a 12-member neurosurgical team extended their practice beyond the walls of the Memorial Hermann Mischer Neuroscience Institute at the Texas Medical Center, Children's Memorial Hermann Hospital and UTHealth Medical School to Haiti, where they spent five days on a medical mission to treat children with hydrocephalus.

"We left Houston in the wee hours of a Wednesday morning, arrived in Port-au-Prince that afternoon and went straight to the clinic where families were waiting outside in rows of folded chairs set up in a shaded area," says Jamie Wright, a fourth-year M.D./Ph.D. student at UTHealth Medical School. "After evaluation by neurosurgery and anesthesia, 25 patients were scheduled for surgery. We oriented ourselves very quickly and were in two ORs by 8 a.m. the following morning, ready to operate."

The Houston team was met at the Port-au-Prince airport by a representative of Project Medishare, a Miami-based organization dedicated to providing comprehensive health and development services in Haiti. Project Medishare mobilized the first medical team on the ground in Haiti just 12 hours after the devastating 2010 earthquake and, through medical volunteers, treats more than 180,000 people annually. The contributions of physicians and staff members affiliated with Mischer Neuroscience Institute and Children's Memorial Hermann Hospital were generously supported by a gift to the Memorial Hermann Foundation from Miami resident Dick Bassett, who joined the team in Haiti.

In addition to Jamie Wright, the team – seven physicians and four operating staff members – included David I. Sandberg, M.D., FAANS, FACS, FAAP, chief of pediatric neurosurgery at Mischer Neuroscience Institute and

"YOU LEARN VERY QUICKLY ON MISSION TRIPS THAT YOU CAN'T PRACTICE MEDICINE LIKE WE DO IN THE UNITED STATES. RESOURCES ARE LIMITED, AND YOU HAVE TO PITCH IN AND DO WHATEVER NEEDS TO BE DONE."

Neurosurgeons, residents and nurses from Memorial Hermann and UTHealth worked closely to treat the pediatric patients with hydrocephalus.

Children's Memorial Hermann Hospital and an associate professor in the Vivian L. Smith Department of Neurosurgery and the department of Pediatric Surgery at UTHealth Medical School; Manish Shah, M.D., clinical assistant professor of neurosurgery; Maria Matuszczak, M.D., professor and director of pediatric anesthesia at UTHealth Medical School; Allison Keyser, M.D., clinical assistant professor of anesthesiology; neurosurgery residents Sebastian Villarreal, M.D., and Sean Meiner, M.D.; anesthesiology resident Ashley Upton, M.D.; OR nurses Linda Mobley, RN, Dorothy Serralles, RN; and surgical technologists Katrina Meshell, RN, and Angelita Maclao, CST.

Because Haiti lacks a dedicated pediatric neurosurgeon, children with hydrocephalus – a highly treatable condition – remain untreated to the point of debilitation or death. "I was surprised to see the number of patients who had come from all over the country to see Dr. Sandberg," Linda Mobley says. "We don't see cases like this in the United States because we treat the disorder much earlier. The desperate condition of the patients, the gratitude of their parents and the babies' smiles made the trip worthwhile on so many levels. You learn very quickly on mission trips that you can't practice medicine like we do in the United States. Resources are limited, and you have to pitch in and do whatever needs to be done."

Dr. Sandberg, who has participated in many medical missions, was most impressed by the teamwork of the group. "It was a remarkable collaboration," he says. "We couldn't have asked for a better

During their mission trip, the pediatric neurosurgery team performed procedures on 25 patients who otherwise wouldn't have received surgical treatment.

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UTHealth Medical School

team. We worked together to prepare for the trip and brought in all our own surgical supplies and equipment. To do eight surgeries in a day, you have to be incredibly efficient. Everyone involved pitched in and did whatever needed to be done to help these kids. It was a very rewarding experience."

Dr. Matuszczak has served on other medical missions and says they are always challenging. "You never know exactly what to expect, especially when you travel to a country you've never visited before," she says. "We managed difficult cases we generally don't see in the western world, and yet our team worked together as if we do this every day. For me, it's always about making sure the anesthesia is as safe as we provide at home, even though we're working in an environment that's not as safe as a hospital in the United States. Making all the right decisions for these critically ill children took incredible teamwork from all sides."

Wright, who has hydrocephalus and coordinates the Hydrocephalus Association's Houston Community Network, says it's an experience she'll never forget. "It was a powerful and humbling mixture of emotions," she says. "There was the joy of seeing how happy and grateful the parents were, and the kids, who have gone through so much but are still happy and smiling. Having been through the surgeries myself, I'm very grateful for the medical care we have here. If I had been born just a couple of hours away by plane, I wouldn't be the person I am today."

The pediatric neurosurgery and pediatric anesthesia teams from Mischer Neuroscience Institute, Children's Memorial Hermann Hospital and UTHealth Medical School make an annual mission trip to Haiti during the holiday season in conjunction with Project Medishare.

News *of* Note

Fifteen Physicians Named Among Houston's Top Doctors for 2014

Fifteen physicians affiliated with the Memorial Hermann Mischer Neuroscience Institute at the Texas Medical Center and UTHealth Medical School have been named to *Houstonia* magazine's 2014 listing of Top Doctors in Houston. They include neurosurgeons Dong H. Kim, M.D., Peng Roc Chen, M.D., Arthur Day, M.D., Albert Fenoy, M.D., Joseph Hsieh, M.D., Daniel H. Kim, M.D., David I. Sandberg, M.D., and Nitin Tandon, M.D. Neurologists named to the list are Suur Biliciler, M.D., Giridhar Kalamangalam, M.D., Sean I. Savitz, M.D., Mya Schiess, M.D., Paul Schulz, M.D., Jeremy Slater, M.D., and Jerry Wolinsky, M.D. Physicians named to the 2014 list were selected based on nominations solicited from nearly 16,000 medical professionals practicing in eight counties in the Greater Houston area.

DONG H. KIM, M.D.
Director, Mischer Neuroscience Institute
Professor and Chair, Vivian L. Smith Department of Neurosurgery at UTHealth Medical School

Dr. Dong Kim is director of Mischer Neuroscience Institute and professor and chair of the Vivian L. Smith Department of Neurosurgery at UTHealth Medical School. As director of the Institute, he leads the clinical neuroscience efforts for the Memorial Hermann Health System as well as UTHealth Medical School. Dr. Kim is noted for his experience with brain tumors and cysts of all types, and also leads ongoing investigations into the origin, development and treatment of brain aneurysms, genetic changes in brain tumors and the use of stem cells to treat spinal cord injuries.

P. ROC CHEN, M.D.
Assistant Professor, Vivian L. Smith Department of Neurosurgery
UTHealth Medical School

Dr. Roc Chen is an assistant professor of neurosurgery at UTHealth Medical School. Prior to joining the medical school and Mischer Neuroscience Institute, he was an assistant professor of neurosurgery, director of the Cerebrovascular and Neuroendovascular Program and director of the Skull Base Program at Baylor College of Medicine. Dr. Chen specializes in carotid and vertebral occlusive diseases; intracranial aneurysms and subarachnoid hemorrhages; intracranial occlusive diseases that require endarterectomy, bypass or stenting; brain arteriovenous malformations; and brainstem and cerebral cavernous malformations.

ARTHUR DAY, M.D.
Director of Clinical Education,
Mischer Neuroscience Institute
Professor and Vice Chair,
Vivian L. Smith Department of Neurosurgery
UTHealth Medical School

Dr. Art Day specializes in cerebrovascular and skull base neurosurgery and in microsurgical treatment of brain tumors and minimally invasive spinal surgery. A professor of neurosurgery and vice chair and director of clinical education in the Vivian L. Smith Department of Neurosurgery, Dr. Day practiced at the University of Florida for 25 years, ultimately rising to the positions of professor, co-chair and program director of the department of Neurosurgery. In 2002, prior to joining Mischer Neuroscience Institute, he moved to Boston as a professor of surgery at Harvard Medical School with a clinical practice at Brigham and Women's Hospital. He is past president of the Society of Neurological Surgeons and has held leadership positions in many other medical professional societies, and has received numerous awards and honors.

ALBERT FENOY, M.D.
Assistant Professor, Vivian L. Smith
Department of Neurosurgery
UTHealth Medical School

Dr. Albert Fenoy specializes in surgery for neck and back pain using minimally invasive techniques as well as complex instrumentation. He also specializes in cranial neurosurgery and deep brain stimulation for movement disorders such as Parkinson's disease and essential tremor. His research has focused on the electrophysiology and clinical manifestations of basal ganglia disease and electrophysiology of the human auditory cortex, as well as craniocervical junction abnormalities. He is an assistant professor of neurosurgery at UTHealth Medical School.

JOSEPH HSIEH, M.D.
Assistant Professor, Vivian L. Smith
Department of Neurosurgery
UTHealth Medical School

A graduate of Harvard Medical School, Dr. Joseph Hsieh holds both an M.B.A. and an M.P.H. from The Anderson School of Management and the School of Public Health at the University of California, Los Angeles. He specializes in complex spinal reconstruction as well as minimally invasive approaches to the treatment of deformity, fracture, myelopathy, spinal arteriovenous malformations, spondylolisthesis, disc herniation, spinal stenosis and spondylosis. He has presented his work on policy in neurosurgery and spine both nationally and internationally, and continues research on quality initiated during time he spent in Washington, D.C., as the Plante Policy fellow for the Congress of Neurological Surgeons.

DANIEL H. KIM, M.D., FAANS, FACS
Director, Reconstructive Spinal and
Peripheral Nerve Surgery
Professor, Vivian L. Smith Department of
Neurosurgery
UTHealth Medical School

Dr. Daniel H. Kim is director of reconstructive spine and peripheral nerve surgery at the Institute and professor of neurosurgery at UTHealth Medical School. An expert in minimally invasive spinal surgery – both endoscopic and robotic – peripheral nerve surgery and complex spinal reconstruction, Dr. Kim has won numerous awards and honors, authored hundreds of papers published in peer-reviewed journals and is the author of 17 surgical textbooks. He is a preeminent researcher in peripheral nerve repair through nerve transfer and nerve graft, and is also recognized for his work in neurorehabilitation through robotics and cortical stimulation, spinal biomechanics and innovative neuromodulation treatments for chronic pain.

DAVID I. SANDBERG,M.D., FAANS, FACS, FAAP
Director of Pediatric Neurosurgery
Associate Professor, Department of
Pediatric Surgery
Division of Pediatric Neurosurgery
UTHealth Medical School

Dr. David Sandberg holds joint appointments as an associate professor in the departments of Neurosurgery and Pediatric Surgery at UTHealth Medical School, and is co-director of the combined pediatric brain tumor program based at The University of Texas MD Anderson Cancer Center and Children's Memorial Hermann Hospital. Dr. Sandberg's major clinical interests include pediatric brain tumors, minimally invasive endoscopic approaches to brain tumors and hydrocephalus, congenital spinal anomalies, vascular malformations of the brain, spasticity and craniofacial disorders in children. His research interests focus on novel means of delivering therapeutic agents into the brain for the treatment of childhood brain tumors, and he is principal investigator of a clinical trial investigating, for the first time in humans, chemotherapy administration into the fourth ventricle of the brain. Dr. Sandberg is a member of the board of directors of the Foundation for International Education in Neurological Surgery.

NITIN TANDON, M.D.
Associate Professor, Departments of
Neurosurgery and Pediatric Neurosurgery
UTHealth Medical School

Dr. Nitin Tandon is an associate professor in the Vivian L. Smith Department of Neurosurgery. His clinical interests focus on epilepsy surgery, including stereoelectroencephalography, placement of subdural grid electrodes, amygdalo-hippocampectomy, anterior temporal lobectomy and neocortical resections; brain mapping and awake craniotomies; brain tumor surgery, including tumors in speech and motor

cortex, insular tumors, intraventricular tumors, pineal tumors, pituitary and parasellar tumors; cavernous malformation surgery; and microvascular decompression for trigeminal neuralgia. Dr. Tandon's research interests include brain mapping with functional MRI, electrical stimulation and diffusion tractography, and intracranial electrophysiology. His research has been published widely in peer-reviewed journals.

SUUR BILICILER, M.D.
Assistant Professor, Department of Neurology
UTHealth Medical School

Dr. Suur Biliciler is an assistant professor in the department of Neurology at UTHealth Medical School. Her clinical interests include nerve and muscle biopsies, as well as the diagnosis, treatment and management of all types of neuromuscular disorders. Her research focuses on muscular dystrophies and myopathies.

GIRIDHAR KALAMANGALAM, M.D., D.PHIL.
Associate Professor, Department of Neurology
UTHealth Medical School

Dr. Giridhar Kalamangalam specializes in epilepsy clinical neurophysiology. An associate professor of neurology at UTHealth Medical School, he has a special interest in diagnosis of paroxysmal disorders and management of refractory epilepsy, including pre-surgical evaluation.

SEAN SAVITZ, M.D.
Director, Stroke Program
Professor, Department of Neurology
UTHealth Medical School

Dr. Sean Savitz, a professor of neurology, holds the Frank M. Yatsu Chair in Neurology and is director of the Vascular Neurology Program and Fellowship at UTHealth Medical School. He is director of the Stroke Program at Mischer Neuroscience Institute and has a special interest in the use of stem cell therapy for stroke.

MYA SCHIESS, M.D.
Professor and Vice Chair, Department of Neurology
Adriana Blood Endowed Chair in Neurology
UTHealth Medical School

Dr. Mya Schiess is director of UT MOVE, a collaborative effort of Mischer Neuroscience Institute and UTHealth Medical School, with specialty clinics that include Spasticity Management, DBS Selection and Programming, Botox® and Intrathecal Baclofen Pump Therapy. She is a professor of neurology with clinical interests in the medical and surgical management of Parkinson's disease and Parkinsonian syndromes, tremor states, dystonia, ataxia and other neurodegenerative diseases.

PAUL SCHULZ, M.D.
Director, Dementia Program
Mischer Neuroscience Institute
Professor, Department of Neurology
UTHealth Medical School

Dr. Paul Schulz is professor and vice chair of the department of Neurology, and director of the Memory Disorders and Dementia Clinic at UTHealth Medical School. In 2010, he moved from Baylor College of Medicine to Mischer Neuroscience Institute, where he sees patients who have cognitive, behavioral or mood disorders. His group is investigating environmental and genetic risk factors for dementia in order to understand why it develops.

JEREMY SLATER, M.D.
Professor, Department of Neurology
UTHealth Medical School

Dr. Jeremy Slater is director of the Texas Comprehensive Epilepsy Program and medical director of the Epilepsy Monitoring Unit at Memorial Hermann-Texas Medical Center, where he is also medical director of neurophysiology. A professor in the department of Neurology, Dr. Slater has clinical interests in adult epilepsy and sleep disorders.

JERRY WOLINSKY, M.D.
Co-director, Mischer Neuroscience Institute
Interim Chair, Department of Neurology
Bartels Family and Opal C. Rankin Professor of Neurology
UTHealth Medical School

Dr. Jerry Wolinsky is co-director of Mischer Neuroscience Institute and interim chair of the department of Neurology at UTHealth Medical School, where he is also on the faculty of the Graduate School of Biomedical Sciences. He serves as director of the Multiple Sclerosis Research Group and the Magnetic Resonance Imaging Analysis Center at UTHealth Medical School. He is recognized among *The Best Doctors in America* and *America's Top Doctors,* and has authored more than 300 publications.

Mischer Neuroscience Institute and UTHealth Medical School Welcome Eight New Recruits

Seven physicians and a genetic counselor have joined the staff of the Memorial Hermann Mischer Neuroscience Institute at the Texas Medical Center and UTHealth Medical School.

GEORGE AL SHAMY, M.D.
Clinical Assistant Professor, Vivian L. Smith Department of Neurosurgery
UTHealth Medical School

Neurosurgeon George Al Shamy, M.D., specializes in a broad range of complex spine and cranial procedures. He received his medical degree with high distinction at the American University of Beirut in Lebanon. After serving as a postdoctoral fellow in the departments of Neurosurgery and Developmental Biology at Memorial Sloan Kettering

Cancer Center in New York City, he completed his neurosurgery residency at Baylor College of Medicine in Houston, where he was chief resident. Before joining Mischer Neuroscience Associates, he held a senior position at The University of Texas MD Anderson Cancer Center, providing care for patients with a variety of oncological brain and spine disorders.

Dr. Al Shamy is an elected member of Alpha Omega Alpha Honor Medical Society with past service on the Accreditation Council for Graduate Medical Education residency review committee. His research has been published in peer-reviewed journals, and he is coauthor of a book chapter on novel therapies for brain tumors. A clinical assistant professor in the Vivian L. Smith Department of Neurosurgery, he is fluent in English, Arabic and Armenian.

NADYA DHANANI, M.D.
Clinical Assistant Professor, Vivian L. Smith Department of Neurosurgery
UTHealth Medical School

Nadya Dhanani, M.D., is fellowship trained in pain medicine, specializing in interventional pain management. Her primary focus is spine and cancer-related pain.

Dr. Dhanani earned her bachelor's in biology at the Massachusetts Institute of Technology. She subsequently received her medical degree at Johns Hopkins School of Medicine in Baltimore. She completed her internship training at the University of Pittsburgh Medical Center and her residency in anesthesia, critical care and pain medicine at Massachusetts General Hospital, where she was chief resident. She served on the clinical faculty in the department of Anesthesia, Critical Care and Pain Medicine at Massachusetts General Hospital and was an instructor at Harvard Medical School. She relocated to Houston to complete her fellowship in pain medicine at The University of Texas MD Anderson Cancer Center.

FATIMA IBRAHIM, M.D.
Neurologist
Clinical Assistant Professor, Department of Neurology
UTHealth Medical School

Fatima Ibrahim, M.D., is a diplomate of the American Board of Psychiatry and Neurology, certified in neurology and sleep medicine. After earning her medical degree at the University of Madras in India, Dr. Ibrahim received training in internal medicine at New York Methodist Hospital in Brooklyn, and completed her neurology residency at The University of Texas Medical Branch at Galveston and Baylor College of Medicine in Houston.

Prior to joining Mischer Neuroscience Associates, Dr. Ibrahim was in successful private practice for eight years in Houston. She has expertise in the diagnosis and treatment of a broad spectrum of neurological pathology, with a special interest in sleep medicine. She practices at Mischer Neuroscience Associates The Woodlands and Mischer Neuroscience Associates North Houston.

ANKIT PATEL, M.D.
Neurologist
Katy Neurology

Neurologist Ankit Patel, M.D., practices at Katy Neurology, which is affiliated with the Memorial Hermann Mischer Neuroscience Institute at the Texas Medical Center. He holds a concurrent appointment as clinical assistant professor at UTHealth Medical School.

Certified by the American Board of Neurology and Psychiatry, Dr. Patel specializes in neuromuscular disorders, headaches, seizures, stroke and multiple sclerosis. He received his medical degree with honors at UTHealth Medical School, and completed his residency in neurology and a fellowship in clinical neurophysiology at the same institution. He has subspecialty training in electromyography/nerve conduction studies with an emphasis on disorders of the muscles and nerves, and in performing skin biopsies.

COURTNEY M. PRESTON, M.D.
Neurologist
Patient Centered Neurology

Neurologist Courtney M. Preston, M.D., is fellowship trained in neurophysiology with expertise in the performance and interpretation of electromyography. She specializes in neuromuscular disorders, including neuropathy, myopathy, myasthenia gravis and amyotrophic lateral sclerosis. Dr. Preston also has experience treating strokes, movement disorders, seizures and headaches.

A graduate of Baylor University, Dr. Preston received her medical degree at UTHealth Medical School in Houston. She completed neurology training and a fellowship in neurophysiology at the same institution. She has presented lectures on the genetics of amyotrophic lateral sclerosis and inclusion body myopathies, and is a member of the American Academy of Neurology. She practices at Patient Centered Neurology, which is affiliated with Mischer Neuroscience Associates.

KRISTA QUALMANN
Genetic Counselor, Mischer Neuroscience Institute
Instructor, Vivian L. Smith Department of Neurosurgery
UTHealth Medical School

Krista Qualmann provides adult genetic counseling services based on the evaluation of personal and family medical history. She received her bachelor's in biological sciences and graduated *summa cum laude* at Marquette University in Milwaukee, followed by a master's in medical genetics at the University of Cincinnati in Ohio.

Her clinical training includes work at Cincinnati Children's Hospital Medical Center; Riverside Methodist Hospital in Columbus, Ohio; Myriad Genetics & Laboratories in Columbus, Ohio; St. Elizabeth Healthcare in Edgewood, Kentucky; and the University of Michigan Comprehensive Cancer Center in Ann Arbor.

Her clinical interests include evaluating and educating patients with a personal or family history of hereditary neurological, brain or spine conditions. Her research involves working with other investigators at the Neurosciences Research Repository in the Vivian L. Smith Department of Neurosurgery to discover new genetic variants implicated in familial intracranial aneurysms and other neurological disorders.

SHIRISH SATPUTE, D.O.
Neuro-intensivist
Mischer Neuroscience Associates

Shirish Satpute, D.O., is board certified in neurology and clinical neurophysiology. He specializes in epilepsy and electroencephalography.

Dr. Satpute received his medical degree at the University of New England College of Osteopathic Medicine in Biddeford, Maine. He completed his residency in neurology as chief resident at the University of Maryland Medical Center in Baltimore, followed by a fellowship in clinical neurophysiology at Baylor College of Medicine in Houston. Prior to joining the Mischer Neuroscience Associates neuro-hospitalist team at Memorial Hermann Southwest Hospital, he served as a neuro-hospitalist and practice group leader at Memorial Hermann Memorial City Medical Center, where he was nominated as Physician of the Year in 2013. He is the co-author of research published in peer-reviewed journals; his work has been presented nationally and internationally.

MANISH SHAH, M.D.
Assistant Professor,
Department of Pediatric Surgery
Division of Pediatric Neurosurgery
UTHealth Medical School

Manish N. Shah, M.D., is fellowship trained in pediatric neurosurgery with special expertise in pediatric epilepsy, craniofacial and craniocervical spine surgery. He is also an expert in the surgical management of spasticity and dystonia in children, and performs selective dorsal rhizotomies, baclofen pump placements and advanced deep brain stimulation techniques.

Dr. Shah was recruited from Washington University in St. Louis after completing his fellowship at St. Louis Children's Hospital under the world-renowned pediatric neurosurgeon Tae Sung Park, M.D. He earned his undergraduate degree in physics at Princeton University and his medical degree at Vanderbilt University in Nashville, followed by a residency in neurosurgery at Washington University. He is the recipient of numerous awards and was elected to Sigma Xi Scientific Research Honor Society in 2002 and Alpha Omega Alpha Medical Honor Society in 2005.

He is an author of research articles published in peer-reviewed journals, as well as a book chapter entitled "Congenital and Acquired Abnormalities of the Thoracic and Lumbar Spine," published in *Youmans: Neurological Surgery.* Dr. Shah is a member of the American Association of Neurological Surgeons and the American Association of Neurological Surgeons/ Congress of Neurological Surgeons' Joint Cerebrovascular Section and Joint Pediatrics Section. He is a clinical assistant professor of neurosurgery at UTHealth Medical School.

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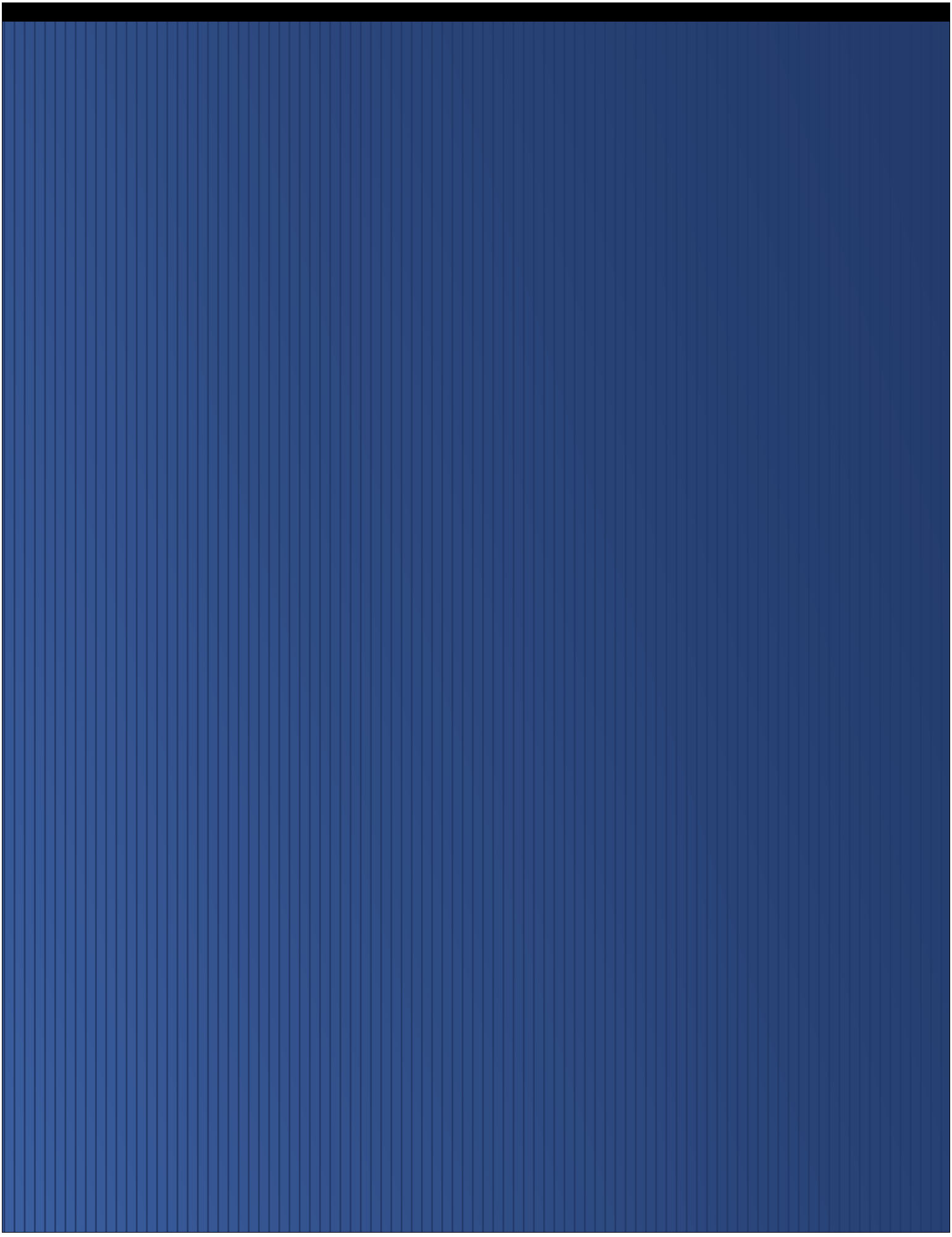

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