

THE INSTITUTE FOR REHABILITATION AND RESEARCH

TIRR JOURNAL

Summer 2024

RESEARCH AIMS
TO HELP PEOPLE
AGING WITH SPINAL
CORD INJURY

MULTIDISCIPLINARY
COLLABORATION, FOCUS
ON COMMUNITY GUIDE
WORK AT BRAIN INJURY
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COVER STORY

Yani Jones recovers from near-comatose state to excel in academics

Aiyana “Yani” Jones came to the Disorders of Consciousness (DoC) Program at TIRR Memorial Hermann after autoimmune encephalitis left her in a near-comatose state. Yani had just been diagnosed with lupus; it was the summer of her junior year of college, and the disease had caused severe complications.

“She went through a lot,” recalls Yani’s aunt, Paulette. “She had a tracheotomy; they had to remove fluid from her brain. They had to remove all of her hair to perform surgery. She was in the hospital for about two months before she went to TIRR Memorial Hermann for rehab.”

Clinicians in the DoC Program carefully assessed Yani to detect signs of consciousness. Despite being characterized as near comatose while in the acute-care hospital, the care team quickly found out that Yani was actually able to understand and follow commands with her right arm.

“It’s common that we see patients mislabeled as either in a comatose state or a vegetative state while they’re actually able to perform tasks like answering questions accurately,” explains Jean Woo, MD, an attending physician in the Brain Injury Program at TIRR Memorial Hermann. “Usually, in acute care hospitals, their main goal is to keep patients alive and medically stable, so they don’t have the manpower or the resources to look for all these subtle behaviors to assess patients’ level of consciousness.”

Dr. Woo and her team worked with Yani to help her answer “yes and no” questions by moving her arms: one motion for “yes,” a different motion for “no.”

“It can still be really hard to communicate because I cannot ask open-ended questions such as ‘How do you feel?’. We have to use questions such as, ‘Are you feeling okay?’” Dr. Woo notes. “It’s better than not having any communication system, but patients are kind of held hostage to our questions. If we’re not asking the right questions, there’s no way the patient can express what they want to express.”

“The therapy that she got at TIRR Memorial Hermann was great. They worked with her a lot, and they worked with our family a lot, just trying to get her to a point where she could function as much as possible. She’s doing great.”

Once Yani demonstrated that she could accurately answer questions, she moved on to using alternative augmentative communication, where she wrote sentences by navigating a board with letters. It was slow-going, but Yani never hesitated in her recovery.

“She’s a fighter,” says another aunt, Angela. “The staff at TIRR Memorial Hermann never left her out of the loop. They included her in all conversations, everything. They allowed her to help with her recovery decisions.”

Communication was the first step in regaining function and played a major role in helping Yani en-

gage with her other rehabilitation interventions. Yani worked hard to rebuild strength in her muscles and to relearn abilities such as swallowing, while tapering off sedating medications that had been used to keep her stable.

“The therapy that she got at TIRR Memorial Hermann was great,” Paulette says. “They worked with her a lot, and they worked with our family a lot, just trying to get her to a point where she could function as much as possible. She’s doing great.”

Eventually, with the support of her family, Yani returned to college through online courses while attending

rehabilitation. Now, Yani is able to drive a power wheelchair, swallow food and fluid by mouth without requiring supplemental nutrition via feeding tube and type on her cellphone and tablet for communication as well as schoolwork. After graduating with a degree in biology and a minor in Spanish, Yani was admitted to graduate school and is working toward a master’s degree.

“She’s a college graduate, and in grad school right now; she’s very intelligent,” Angela says. “She knows what she wants, what she’s going to accept, what she’s going to allow. She’s not going to let just anything happen.” ■

Community Outreach engages area partners, promotes importance of health

A deepening commitment to community engagement intended to promote healthy lifestyle choices has become a core focus of the TIRR Memorial Hermann rehabilitation team.

While adaptive sports programs have long had a presence at TIRR Memorial Hermann, recent developments have broadened the scope of community outreach, involving a wider swath of patients, families and partners in the Greater Houston area. Since 2019, when the need for increased community outreach was identified during a strategic planning session, there has been a renewed focus on improving what had been done traditionally, through the development of a Community Outreach Plan.

“Traditionally, we’ve had a large sports presence, but we knew there was more we could be doing in the

community in order for us to grow our presence,” says **Catherine Murray, OTR, MOT**, the rehabilitation manager at TIRR Memorial Hermann. “After people go through this life-changing injury, disease or accident, and everything is turned upside down, we wanted to provide options for when they were ready to get back out there.”

As part of this effort, a Community Health Needs Assessment was developed to gain a comprehensive understanding of the health needs in TIRR Memorial Hermann’s service area and guide the health system’s planning efforts to address those needs. While planning, special attention was given to the needs of the vulnerable populations, unmet health needs or gaps in services as well as input from community partners.

“The involvement of TIRR Memorial Hermann speaks to the fact that the programs will be well done; our

employees will be there,” Murray says. “This helps make programs comfortable for the participants. We can’t own everything all the time, so we questioned how we can help the community become more inclusive, engage community partners and work with organizations that have a similar mission so that the initiatives continue to live on.”

Five “Community Outreach Priorities” were highlighted:

- Prevention of Injury/Illness
- Wellness: Recreation & Arts Inclusion
- Wellness: Emotional Well-being
- Access to Health Care via Transportation
- Exercise Is Medicine® Campaign

Murray and her team oversee the Recreation & Arts Inclusion initiative, which focuses on increasing the emotional well-being of patients through activities with community partners, events, and opportunities for recreation and arts. Key to the process has been development of an Adaptive Recreation, Leisure, Sports and Arts Guide, which consists of a detailed list of local, statewide and national parks, recreation organizations, arts resources and sports opportunities.

“The guide lists groups which have been vetted,” Murray explains. “We know they are legit, as we had partnered with them, sent patients to them or they’d been started by former patients. We made sure we were selecting resources that we knew and had experience with.”

Additionally, Murray stresses the importance of the resources being available to everyone, not just former TIRR Memorial Hermann patients. Area meetups and events have included adapted ballroom dancing at the Fred Astaire Dance Studios, adapted jiu-jitsu at Rilion Gracie West Houston, inclusive watercolor painting at Ironworks Marketplace hosted by Sew Great and Wonder Boho Art and regular pickleball nights at Chicken N Pickle in Webster. This spring will see the debut of a golf event at Houston’s Memorial Park.

“We’ve pivoted to doing more events and really building relationships with our community partners,” Murray says.

“At TIRR Memorial Hermann, we are in the business of promoting health and we want to reach the community,” adds Lauren Proe, PT, DPT, the weekend therapy manager. “We want to have community involvement in exercise and getting people moving again. It helps them build relationships in the community and increase socialization, which is important for maintaining their overall health.”

In her role leading the community outreach Exercise Is Medicine program, Proe has spearheaded the process of gathering resources by region in the greater Houston area. These include free exercise classes held at community centers, adaptive exercise programs, senior classes and wheelchair-friendly parks. An evening event hosted in partnership with the Ed Thompson Inclusive Park, located in Pearland, has helped introduce to the community the fully inclusive, 9,200-square-foot playground. A second such playground is currently being planned.

“Everybody knows that exercise is important, but when we say the word ‘exercise’ people can cringe,” Proe says. “We have the opportunity to teach people that play is exercise, and so play is medicine. If you don’t know what the community has to offer and you have a disability, you might not go in search of it. It’s our responsibility to improve the health of our community by providing them with the resources that our communities offer.”

The initiatives have been successful. Murray says feedback from people who are being treated as outpatients at TIRR and those who have participated in the events has been very favorable.

“They have said how these events really made them feel like a person again and provided a safe environment for them to try something new, or to safely return to something they used to do before their injury,” she explains. “The highest-rated benefit was socialization. The participants and their families are meeting other people who are in similar situations, getting back out into the community and having fun.” ■



Disorders of Consciousness Program maximizes recovery for patients with brain injuries



The Disorders of Consciousness (DoC) Program at TIRR Memorial Hermann provides state-of-the-art care for patients in an unresponsive wakefulness or minimally conscious state.

“We specialize in the diagnosis, management and treatment of patients with severe brain injuries who are clinically nonresponsive or considered to be in an unresponsive state,” notes **Abana Azariah, MD**, the Clinical Chief of the DoC Program at TIRR Memorial Hermann. “Most of these patients have a lot of physical restrictions that limit their ability to participate in traditional rehab therapy; therefore, they require DoC programs like ours, so that we can engage with them in a more specialized way.”

Disorders of consciousness can arise from a variety of types of brain injuries, including traumatic brain injuries and injuries due to hypoxia, stroke or aneurysm rupture. The DoC Program at TIRR Memorial Hermann admits and treats patients regardless of the etiology of their injury.

“We believe every patient in a disorder of consciousness state—regardless of etiology—deserves a chance at accessing inpatient rehabilitation,” says **Ryan Stork, MD**, the medical director of the Brain Injury Program at TIRR Memorial Hermann. “We have more of a belief of at least providing access to these programs for the opportunity to demonstrate progress and then go from there.”

Patients with DoC have difficulty responding to or interacting with their environment to varying degrees. When a patient first comes to the TIRR Memorial Hermann DoC Program, a multidisciplinary care team works closely with them to characterize their ability to consistently respond to and interact with different stimuli. The team in the DoC Program works together to employ specialized interventions tailored to each patient’s specific needs.

“Often, what we find is when patients in an unresponsive wakefulness enter our program, our multidisciplinary therapy team, with neuropsychology and the physicians—we’re usually able to detect that they actually are conscious but often have difficulty demonstrating consciousness due to motor impairments or other neuromuscular deficits caused by their brain injury. For instance, a patient might know what we are asking for them to do, but may be unable to perform the task because of these neuromuscular impairments,” Dr. Stork explains. “The Disorders of Consciousness Program exists, outside of obviously helping the brain recover and giving intensive therapies for that... to identify, and as best as we’re able to, to eliminate any barriers that might be impairing a patient’s ability to respond in a meaningful way.”

A variety of hurdles may prevent a person from reaching their highest

levels of consciousness and cognitive function. Medical hurdles may include hydrocephalus, which results from improper levels of cerebrospinal fluid around the brain, or spasticity, which prevents muscles from relaxing. Poorly managed seizures can affect patient responsiveness, which is also affected if a patient is on sedation medications. Sedating medications can hinder a person’s ability to engage with their environment.

“All too often, the assumption is that a patient’s brain is not working if they can’t move to respond to a question, that they’re not understanding what we’re asking them to do,” Dr. Stork says. “But in reality, they often do understand; it’s just that their body has motor impairments preventing them from responding the way that we’re asking them to. What the therapists and the multidisciplinary team here are incredibly helpful with is helping to tease that out. Sometimes it can take days to weeks for the therapy team to figure out what position the patient needs to be in in order to maximize their ability to move.”

“We identify and address any issues that could be impairing a patient’s consciousness,” Dr. Azariah adds. “We often find that some of the issues that impair their consciousness are reversible. We trial very specific interventions to help with recovery of consciousness. Interventions can include pharmacology, sensory

interventions, cognitive assessments or behavioral assessments. We, of course, address any active medical issues, but we’re also very specialized in managing the common complications that can accompany these brain injuries.”

In addition to removing hurdles to communication, the DoC team at TIRR Memorial Hermann provides patients with pharmacologic treatments designed to stimulate brain function.

“We’re treating the body by addressing issues such as skin integrity, joint range of motion, tracheostomy care, PEG weaning, pain and positioning,” Dr. Azariah says. “We do this by developing formal sitting and standing programs, and bed positioning and wheelchair positioning protocols, for each patient. We know that verticalization enhances consciousness and improves wakefulness, therefore we try our best to get patients up and out of bed. In addition to our amazing therapy teams, we also have specialized teams like our wound care team, respiratory therapy team and nutrition team each bringing their expertise to the table. This comprehensive approach to the body sets our patients up for success.”

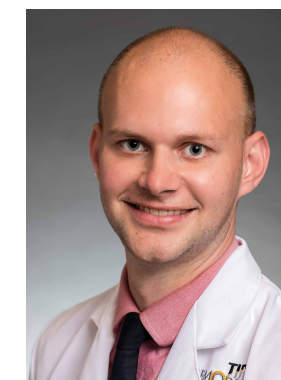
The DoC team is also focused on preserving patients’ minds by minimizing sedation and promoting wakefulness, through management of polypharmacy or by sensory stimulation, according to Dr. Azariah. Patients are also regularly evaluated

in neurobehavioral assessments to “help us understand how they are responding from a cognitive standpoint and what their limitations may be,” she says.

“If they didn’t go to a DoC Program, many of our patients—possibly permanently, but definitely for months—would be left without a communication system,” Dr. Stork adds. “We’re developing a communication system for them, and this likely can’t be done in any other setting. That’s really, really valuable.” ■



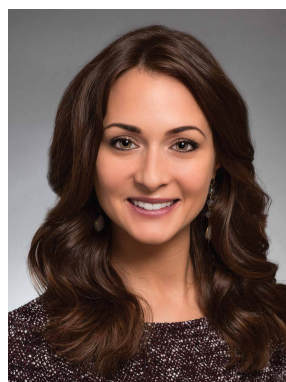
Abana Azariah, MD



Ryan Stork, MD



State grant to enhance workplace safety and Neurobehavioral Program at TIRR Memorial Hermann



Lindsey Harik, PhD

The Texas Department of Health and Human Services recently awarded TIRR Memorial Hermann a nearly \$200,000 grant to enhance workplace safety, reduce violence against nurses and improve care for brain injury patients.

As one of the nation's leading rehabilitation and research hospitals, TIRR Memorial Hermann has a specialized neurobehavioral program that treats brain injury patients who exhibit "challenging behaviors." **Lindsey Harik, PhD**, a neuropsychologist and program manager, says these behaviors occur in more than half of individuals who sustain moderate to severe brain

injuries and can include both verbal and physical aggression.

"The issue is a concern for the hospital because the demand for neurobehavioral care and therapy is growing rapidly," Dr. Harik explains. "In fiscal year 2023 alone, there was a 166% increase in patient admissions to the program."

Among the health care providers and staff who interact with brain injury patients, Dr. Harik says the nursing staff can be at risk for experiencing workplace violence because much of their work involves being in close physical proximity to patients and they work with patients for extended periods of time.

In addition to injuries, nurses frequently experience anxiety, emotional exhaustion and burnout that leads to increased turnover.

TIRR Memorial Hermann has diligently addressed the problem in recent years by taking a number of actions, including:

- Providing training and ongoing courses for nurses on brain injuries and patient behavior management.
- Creating dedicated care teams and treatment spaces for brain injury patients who demonstrate challenging behaviors.
- Establishing a special code that is broadcast throughout the hospital when a patient demonstrates challenging behaviors that involve imminent harm to themselves, staff, patients or visitors. The code prompts highly trained personnel to respond.
- Reviewing the latest medical research and literature on the topic at clinical meetings.
- Developing a behavioral rating tool designed specifically for monitoring brain-injury-related behaviors in the inpatient setting. "Although these actions have been very beneficial, the grant will enable TIRR Memorial Hermann to further strengthen efforts to prevent or decrease workplace violence and

improve nurse retention," Dr. Harik emphasizes.

Specifically, the funding will be used to provide several staff members with more advanced training in techniques to manage brain injury patient behavior and de-escalate potentially volatile situations; they, in turn, can share the training with all nurses in the program.

"This will be an important additional step because research shows that when caregivers feel equipped to manage patient behavior, they in turn feel safer, less stressed, and have greater job satisfaction," Dr. Harik notes. "The initiative will also benefit brain injury patients by preventing them from harming themselves and others, eliminating disruptions to their care and therapy and helping them achieve better outcomes."

To measure the success of the training, hospital researchers will:

- Monitor incidents of workplace violence against nurses by brain injury patients.
- Survey nurses on a regular basis about their professional quality of life and psychological well-being.
- Track the turnover rate for nurses who work in the neurobehavioral program.

Results from the data sources will be studied to assess the long-term benefits of the additional education.

To date, little research has been performed on the subject in the national and international medical communities, according to Dr. Harik. "We hope our study will contribute to the body of evidence confirming the effectiveness of the techniques and assist in developing guidelines for health care organizations to reduce aggression against nurses by brain injury patients," she says.

TIRR Memorial Hermann is eager to launch the new grant-funded training later this year to empower nurses to feel more confident and competent in managing challenging behaviors, Dr. Harik adds, noting, "We're striving to provide the safest possible work environment so our nurses can thrive in helping brain injury patients maximize their recovery while experiencing dramatically less workplace violence." ■

"We hope our study will contribute to the body of evidence confirming the effectiveness of the techniques and assist in developing guidelines for health care organizations to reduce aggression against nurses by brain injury patients." - Dr. Harik

TIRR researchers to study effect of hospital sleep environment on delirium



Farhaan S. Vahidy,
PhD, MBBS, MPH, FAHA

Farhaan S. Vahidy, PhD, MBBS, MPH, FAHA, associate vice president and chief scientific officer at TIRR Memorial Hermann, is the principal investigator for a study grant funded by the Patient-Centered Outcomes Research Institute to investigate whether improving in-hospital sleep environment can influence hospital-acquired delirium.

“Delirium presents itself as a complex and troublesome neurological syndrome,” explains Dr. Vahidy, who will lead this project across four Houston-area hospitals. “Delirium is characterized by an acute change in attention, awareness and cognition. Patients who are either predisposed or who experience precipitating factors undergo transient states of altered arousal, from reduced responsiveness to severe agitation.”

Delirium is particularly common in the older adults who are critically ill and have preexisting dementia or cognitive impairment. The condition can be difficult to study due to its transient nature and as such there are no effective treatments.

While much is unknown about management of delirium, research is conclusive that individual patients who experience delirium during their hospitalization do poorly on multiple outcomes. “Patients who experience delirium have been

shown to have longer hospital stays, higher rates of readmission, higher mortality, increased cost of care and poor long-term cognitive and functional outcomes,” Dr. Vahidy says. “So, prevention and mitigation of delirium is imperative. Understanding which patients are more likely to experience delirium, what factors can contribute to delirium and getting ahead of it by minimizing such factors is the key.”

Based on these findings, Dr. Vahidy and his colleagues began thinking about the effect that sleep may have on delirium, and how hospital environment can often be antagonistic to sleep. “Research has shown that reduced sleep can have a negative effect on the blood-brain

barrier and the brain’s glymphatic system, both of which prevent toxic substances from accumulating in the brain,” Dr. Vahidy notes.

Due to the connection between sleep and delirium, Dr. Vahidy and his colleagues started exploring what can be done for patients so they can sleep better in the hospital setting. “There are many reasons why sleep in the hospital can be difficult,” he says. “The workflow across our hospitals is fragmented, with several clinical and ancillary activities such as monitoring, medication administration, blood draws, room cleaning and so on, each having its own schedule. This often results in our patients being repeatedly or even continuously

disturbed throughout the night. Often, there is little differentiation between daytime and nighttime.

The study, which started in April, is built around a sleep hygiene intervention that is aimed at creating a more sleep-friendly environment in the hospital. The five-year project is hoping to eventually record data on approximately 11,000 patients. It has been designed to alter the workflow of a typical hospital unit and focuses on a multimodal bundled intervention that includes reducing disturbances during the night by limiting staff interactions, changing unit workflows to be more cohesive, reducing light and sound intensity, keeping patients more active during the daytime and using smart

technology for patient monitoring and producing a sleep-friendly environment.

“When we look at hospital data for patient satisfaction, one of the top persistent complaints in an acute care environment is that patients have frequent sleep and nighttime disturbances,” Dr. Vahidy says. “This study was really driven by patients’ feedback and the findings will potentially benefit everyone. Patients will get better sleep and have improved outcomes, which will also help their caregivers, and the health care system will benefit from enhanced patient satisfaction and reduced costs.” ■



Research aims to help people aging with spinal cord injury

Due to enhancements in health care and technology, people with spinal cord injury (SCI) are living longer, and the need is increasing for research into how to best provide care as these individuals adapt to challenges brought on by aging. An SCI Model Systems grant, awarded to TIRR Memorial Hermann earlier this year, is enabling the development of an innovative health promotion program aimed at engaging people with SCI, providing them with tailored education and peer engagement designed to address their unique challenges.

“We build our research based upon input from consumers regarding important issues they are facing,” says **Susan Robinson-Whelen, PhD**, an investigator at the TIRR Memorial Hermann Spinal Cord Injury and Disability Research Center. “This project came about in part from focus groups we held when we were approaching the Model Systems grant application and trying to narrow down what we wanted to explore.”

Feedback, as communicated to Dr. Robinson-Whelen and her colleagues, was loud and clear.

“Aging was a significant issue, and with it came a lot of challenges,” Dr. Robinson-Whelen notes. “Studying aging, and particularly developing an intervention program for people who are aging with SCI, was something they felt was a strong need.”

One community advisor commented how, following SCI, one is surrounded by support and encouragement, with whole teams of specialists dedicated to teaching you how to live with this injury. However, once returned to home and the community, as the years pass, aging presents a myriad of changes and addressing them can often feel like a task that is left to be handled alone.

Informed by this feedback, Dr. Robinson-Whelen and her team—which includes Heather Taylor, PhD, director of TIRR Memorial Hermann’s Spinal Cord Injury and Disability Research Center, and Rosemary Hughes, PhD, of the University of Montana’s Rural Institute on Inclusive

Communities—began to develop the Living Longer and Stronger with Spinal Cord Injury (LLS) program.

“We are now collecting data on people participating in the SCI Model System Study who are 50 years post-injury,” Dr. Robinson-Whelen explains. “Due to advancements, people with SCI are living longer. In addition, people are experiencing their injuries later in life on average. Yet, their needs haven’t always been well addressed. People are living long, full lives and want to be independent as they age.”

While living longer is a welcome development, it presents multiple challenges. For example, people with SCI acquire age-related conditions such as heart disease, diabetes and high blood pressure at younger ages than others—a process referred to as accelerated aging. In addition, people with SCI have many secondary health conditions that affect them as a result of their condition. “As people age, they are not only progressing into the normal health conditions that come along with aging, but they may experience an exacerbation of secondary health conditions,” Dr. Robinson-Whelen says.

As the investigators learned from their community advisors, the issues encountered by the people aging with SCI extended well beyond the physical. Potential stresses include challenges associated with aging caregivers, shrinking social networks and adapting to the psychological effects of getting older.

“Initially, when we were outlining what this intervention would look like, we were primarily focused on physical health conditions,” Dr. Robinson-Whelen explains. “When we then met with our community advisors, they strongly emphasized psychological and social needs. Networks dwindle at the same time that needs increase. A core message of the program is to understand that change is natural, expected and necessary, and to proactively embrace that change rather than resist it. Across the board, there is the overlay of the psychological impact of the many changes they are facing.”

The LLS program was developed in close partnership with two senior advisors who are people living with SCI, a community advisory board of people aging with SCI and a medical and scientific advisory board. The program consists of eight weekly two-hour group

sessions hosted on Zoom and includes individuals with SCI from across the United States. Participants will include people with SCI who have been living with their injuries for at least 15 years, or who are at least 45 years of age. Each cohort—the first of which is already enrolled—will consist of 36 individuals: 20 randomized to an intervention group and 16 to a control group. Each of the group sessions will engage a peer co-facilitator who is living with SCI.

“This type of involvement is critical in intervention programs,” Dr. Robinson-Whelen notes.

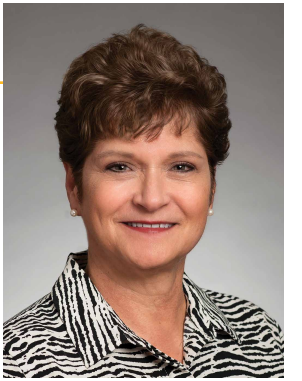
Sessions will include information and educational content, group discussion, action planning and relaxation exercises. Participants will be provided with a handbook that includes details on the topics of discussion, and resources to aid them in putting what they have learned into action.

Session topics will include:

- Managing pain
- Managing fatigue
- Preventing falls
- Caring for aging skin, muscles, bones, and joints
- Maintaining a healthy weight
- Staying physically active
- Maintaining bowel and bladder health
- Promoting psychological health
- Staying connected and safe in relationships

“Core features of the program include goal setting and action planning,” Dr. Robinson-Whelen says, adding that group discussion allows for peer-to-peer sharing of important tips and recommendations. “There is a real power to sharing experiences. Some of these tips may not be easy to find—even physicians may not know them. No one knows better than those who are living with SCI.”

To date, the team has had an amazing community response to their effort, enrollment for which will continue through the early fall of 2025. People with SCI who may be interested in participating in the study are invited to call 713.797.7572 or email TIRR.LLStudy@uth.tmc.edu. ■



Susan Robinson-Whelen, PhD



Message from the Chief Executive Officer



In my travels around the TIRR Memorial Hermann rehabilitation network and throughout Houston and beyond, I meet many current and former patients whose lives have been changed as a result of the care they received from our providers.

Rhonda Abbott, PT, FACHE

In a recent example, I stepped off the elevator here in our facility and

received a warm hug from a patient's wife as she and I met face-to-face for the first time, after emailing and talking by phone for several weeks. After that first meeting, I saw her and her husband frequently over the next several weeks. I could see he was moving toward recovery, and I was happy to be there when the couple was able eventually to walk out of our doors—together.

While I am thankful for the hug at the elevator, I am even more grateful to the wonderful team of caring and humanizing innovators I work with, as well as the patients and families—the people—who trust us with their care every day.

Whether rehabilitative goals within our four walls center around pain management, swallowing and speaking, activities of daily living or returning to work, all of them hold in common the use of creative and personalized approaches to improve health—and to truly make a difference in our patients' quality of life.

In this issue of the *TIRR Journal*, you'll read about advances in our Disorders of Consciousness Program and in the treatment of neurobehavioral disorders, which are in keeping with this spirit of innovation.

At TIRR Memorial Hermann, our "Road to Value" initiative is in keeping with the renewed emphasis on quality and outcomes in health care, and innovation is what gives our providers the tools to help patients with disabilities reach their goals.

Ultimately, that is our mission and that is what we value. ■

Rhonda Abbott, PT, FTPTA

Senior Vice President and Chief Executive Officer
TIRR Memorial Hermann System Executive for Rehabilitation Services, Memorial Hermann Health System

EDUCATION

Neuropsychology Education Program rains professionals of tomorrow in an underserved field

Neuropsychology remains an underappreciated and underserved field in the United States. There is a shortage of practitioners with the expertise needed to address unique and constantly evolving neuropsychological health care needs of patients recovering from life-altering brain injuries and illnesses. TIRR Memorial Hermann, in partnership with McGovern Medical School at UTHealth Houston, along with several hospitals and medical programs in the Texas Medical Center, has developed a structured, two-year postdoctoral fellowship in clinical neuropsychology.

The program positions TIRR Memorial Hermann at the forefront of education in the field nationally, with graduates practicing both within the Memorial Hermann Health System and in health care settings across the country. Over the course of its history, the program has produced more than 35 clinical neuropsychologists with specialty training in managing patients who have traumatic brain injury, traumatic spine injury, multiple sclerosis, and disorders of consciousness, as well as those recovering from a stroke, brain tumor, and/or limb loss.

"The role of the clinical neuropsychologist is really to support our colleagues in rehabilitative medicine by helping to address any emotional, cognitive and/or neurobehavioral concerns that may hinder patients' rehabilitation and recovery," explains Jacob M. Williams, PhD, the director of the Department of Rehabilitation Psychology/Neuropsychology at TIRR Memorial Hermann and a licensed psychologist.

However, despite the importance of this care, particularly for patients with neurobehavioral disorders that directly impact their recovery (e.g., agitation), "there are only a handful of training programs like ours across the country," Dr. Williams adds.

The training programs at TIRR Memorial Hermann enroll one postdoctoral fellow affiliated with UTHealth Houston and one intern affiliated with the Baylor College of Medicine Menninger Department of Psychiatry and Behavioral Sciences program (similar to a medical residency, according to



Dr. Williams) each year. A number of recent alumni have joined the clinical team, including Xuan Jesson, PhD, and Karina Loyo, PhD, both of whom are clinical neuropsychologists within the Brain Injury and Stroke Program at TIRR Memorial Hermann, and Lindsey Harik, PhD, a clinical neuropsychologist with the health system's Neurobehavioral Brain Injury Program. Another is Zinat Taiwo, PhD, who works with the TIRR Memorial Hermann Challenge Program, which provides comprehensive services to assist brain injury and stroke survivors with community integration. The current postdoctoral fellows are Amanda Wisinger, PsyD, and Andrew DaCosta, PsyD, with Robiann Broomfield, MA, as the intern.

TIRR Memorial Hermann's Neuropsychology Fellowship Program, led by Training Director Petya Demireva, PhD, is aligned with a scientist practitioner model and follows Houston Conference guidelines for specialty training in neuropsychology. The program leverages TIRR Memorial Hermann's reputation for offering

advanced training in brain injury rehabilitation, in both inpatient and outpatient settings.

Training includes advanced supervised clinical experiences, multiple specialty clinical rotation opportunities and a comprehensive didactics program (with a course in medical applied neuroscience and neuroanatomy, among other subjects). Across the two-year program, fellows complete four six-month major rotations three days per week, for a total of 24 hours weekly. The program also allows for three six-month minor rotation experiences as chosen by the fellow.

In addition, following an initial period of training and supervision, postdoctoral trainees and interns are quickly directly engaged in patient care, gaining valuable experience. Fellows in the program can customize their training by selecting experiences across settings, including inpatient and outpatient rehabilitation, neurology, and oncology.

"We've helped to train a good

number of clinicians who have gone to work in a variety of settings, both within TIRR Memorial Hermann and other health systems all over the country," Dr. Williams says. "Our graduates are comfortable working with a wide range of patients who have significant disabilities due to life-altering injuries and illnesses, and are able to help keep families informed about the next steps in recovery for their loved ones."

The program is also designed to prepare fellows for American Board of Professional Psychology board certification in clinical neuropsychology, an achievement for neuropsychologists that recognizes individuals who have passed further vetting and examination by a group of their experienced colleagues.

Finally, because the program is based in one of the world's largest medical centers, neuropsychology fellows have access to numerous research supervisors who are leaders in their respective fields and fellows are guided to choose projects in line with their individual goals.

"Being able to train the next generation of clinicians is really an essential part of what we do and our overall mission at TIRR Memorial Hermann," Dr. Williams notes. "There aren't many places that offer this kind of training program with this kind of focus, and ultimately our patients benefit through access to highly trained professionals, and our field does as well." ■

Multidisciplinary collaboration & focus on community guide work at Brain Injury Research Center

At TIRR Memorial Hermann's Brain Injury Research Center (BIRC), **Shannon Juengst, PhD, CRC**, is spearheading efforts to explore the intersection of science, technology and community interaction in order to provide novel ways of caring for individuals with traumatic brain injuries (TBIs).

For Dr. Juengst, who is a senior scientist and clinical investigator at the BIRC, the journey to this work—and to Houston—was somewhat nontraditional.

"Compared to many researchers, my background is rather unique," she says. "I have a master's in rehabilitation counseling, with a specialty in working with people with disabilities. I have always been interested in working with people with cognitive disabilities, brain injuries in particular, but also have a background working with people with numerous other conditions that affect cognition and the brain."

Such work, Dr. Juengst notes, cemented her interest in the importance of mental health and returning people to work, leisure activities, social relationships and other elements of life that mean the most to them.

Following receipt of her PhD in rehabilitation science from the University of Pittsburgh, Dr. Juengst completed a postdoc fellowship in the university's physical medicine and rehabilitation department. The work involved an emphasis on neurobiology and biomarkers, a divergence from her counseling work.

"This was very formative, as it gave me an opportunity to start to really

interact with researchers and clinicians with different backgrounds, and to start to look at connections that spanned the initial biological effects of TBI all the way through community participation and meaningful activity," she recalls. "It was a really wide spectrum of work, and provided a great opportunity to learn how to speak different therapeutic languages."

She adds, "I make this point because one of the things that is a big focus of my work now—and is unique about it—is that everything is very multidisciplinary. Coming together with collaborators from a wide variety of backgrounds and areas of expertise has resulted in impactful, holistic projects, which will eventually help people with TBI the most."

It was at The University of Texas Southwestern in Dallas, where Dr. Juengst worked for five and a half years, that she met Angelle M. Sander, PhD, the current director and senior scientist of BIRC.

When Dr. Sander was looking to bring a new investigator to the BIRC team in Houston, she reached out. Dr. Juengst began her work with TIRR Memorial Hermann in September 2021, and moved to Houston in June 2022.

"What's really unique about TIRR Memorial Hermann is the focus on community participation, and staying connected with folks who come through rehab in order to make sure that long-term outcomes are the best for them," Dr. Juengst notes. "The kinds of connections we have with our patients and the community is really central to the work I do, and is

not necessarily typical at all organizations. That was the thing that really drew me to come here: having an opportunity to take the research and really translate it into practice more directly than at some institutions."

This connection with community and dedication to lifelong care for patients with TBI, which has always been central to the philosophy of TIRR Memorial Hermann, is becoming more broadly accepted in the medical community.

"What sets rehabilitation as a field apart from many of the more medical health care fields is that it's always been work that's done in partnership with the people you serve," Dr. Juengst explains. "There's been a big shift in medicine to have more of this community involvement, engagement of individuals and their care partners, professional care organizations. In rehab, we have always done this, and are uniquely poised to do so because so much of what we do is in the community already, is already focused on people and function in their daily lives."

Increased interest in viewing care through such a holistic lens, she adds, is helping to address issues that have been disproportionately affecting people with disabilities for decades.

"We can get individuals to a point where they are taking care of their self-care and daily functions—that is foundational," Dr. Juengst says. "But if that's all we did we wouldn't be happy."

Happiness, she adds, depends on building quality of life through relationships, engagement and social connection: things that make people feel like active, contributing members



of their communities.

"Dr. Sander and I have so much interest in mental health, community participation, leveraging technology for remote delivery and figuring out how do we do that in a way that focuses on health equity and serving underserved communities," Dr. Juengst notes.

The team at BIRC is partnering with experts and networks both nationwide and within TIRR Memorial Hermann, such as the Spinal Cord Injury and Disability Research Center.

"We are establishing partnerships which are important in order to take what information is available in other fields and apply it," Dr. Juengst explains. "This is far better than constantly trying to reinvent the wheel in areas we are not experts in."

Current projects and grant appli-

cations include partnerships aimed at addressing social isolation and loneliness, self-management of health care needs and how electronic problem-solving training can allow programs to scale in order to reach far larger numbers of people in need.

"We're really trying to take the work we've built and the evidence it gives us and look at ways to implement and scale and build partnerships with the community, health care systems, education systems and nonprofit organizations that serve individuals with disabilities," Dr. Juengst says. "We've tested these interventions, and we know they work. The question, then, is how do you get them to people?"

Ultimately, Dr. Juengst's hope is that the work she is conducting can be used to help individuals with a range of injuries.

"Patients with TBI, spinal cord injury, stroke, they have very different types of injuries with very different physical and cognitive consequences, yet some of the participation and mental health consequences are the same," she says. "We are interested in what we can do so as to not just treat each population in isolation. If approaches apply to people with different types of injuries, you've just covered a large percentage of the rehabilitation population that TIRR Memorial Hermann serves. Then you could look at whether this is something we can provide as part of a rehabilitation system for all rehab patients because we've shown that the same thing can benefit all of these different populations—that is the end goal." ■

Current Research Highlights at TIRR Memorial Hermann

BeHealthy: Chronic Disease Management for TBI

TIRR Co-Investigator: Angelle Sander, PhD

Summary: Growing evidence demonstrates traumatic brain injury (TBI) can be a chronic, dynamic health condition with persistent health and psychosocial issues. Identifying chronic brain injury is essential for managing associated lifelong conditions due to injury, and to improve health, independent function and societal participation for individuals with TBI.

Funding: National Institute on Disability, Independent Living, and Rehabilitation Research

Center for Wearable Exoskeletons

Investigators: Gerard Francisco, MD;

James Chang, PT, PhD

Researchers: Ruta Paranjape, MS, CCRP;

Marcie Kern, PT, MS

Summary: This ongoing research investigates novel applications of wearable robots for people with spinal cord injuries, stroke and multiple sclerosis.

Funding: Memorial Hermann Foundation

Improving Outcomes for Care Partners of Persons With Traumatic Brain Injury

TIRR Memorial Hermann Site Principal Investigator:

Angelle Sander, PhD

Summary: Care partners for people with moderate to severe TBI often assist with physical, mental, financial and leisure activities; as a result of these new caregiving responsibilities, it is common for these care partners to report problems with their own physical, mental and social health. This randomized controlled trial will examine the efficacy of a just-in-time adaptive intervention that uses objective mobile sensor data feedback to improve physical activity, sleep and health-related quality of life in 240 care partners of people with TBI.

Funding: National Institutes of Health, National Institute of Nursing Research

Long-Term Trajectories of Cognition and Psychological Health in Civilians and Veterans

Principal Investigator: Shannon Juengst, PhD

Summary: Data from this study will improve understanding cognition and psychological health after TBI.

Funding: Memorial Hermann Foundation and Department of Defense

Neuromodulation and Neural Interfaces

Lead Investigator: Nuray Yozbatiran, PT, PhD

Researchers: Vanessa Bernal, BS, CCRP;

Kathryn Nedley, OTD, OTR, ATP

Postdoc: Kyuwan Choi, PhD

Summary: This ongoing research investigates the efficacy and efficiency of noninvasive brain and spinal stimulation on upper limb recovery function in patients with brain and spinal cord injuries.

Funding: Memorial Hermann Foundation, TIRR Foundation

Neurorehabilitation Research

Director: Sheng Li, MD, PhD

Researchers: Hao Meng, PhD; Shengai Li, MS

Summary: This ongoing research examines the pathophysiology of spasticity and effects of noninvasive stimulation on neuropathic pain and recovery of sensory and motor function.

Funding: National Institutes of Health; National Institute on Disability, Independent Living, and Rehabilitation Research; TIRR Foundation

Occupational Performance Coaching in Pediatric Patients With Spinal Cord Injury

Principal Investigator: Heather B. Taylor, PhD

Research Physical Therapist: Kristine Lopez, PT

Summary: The goal of the study is to evaluate the feasibility of conducting an occupational performance coaching program with parents of children with spinal cord injuries and to evaluate outcomes.

Funding: Craig H. Neilsen Foundation, 2018-2020

The Americans With Disabilities Act Participation Action Research Consortium (ADA-PARC); Advancing Participation Equity for People With Disabilities

Principal Investigator: Lex Frieden, MA, LLD

Co-Investigator: Vinh Nguyen, JD, MBA

Summary: The ADA-PARC is a research collaboration between all 10 regional ADA centers across the country that assess participation disparities experienced by people with disabilities after the ADA was signed into law.

Funding: National Institute on Disability, Independent Living, and Rehabilitation Research

Message from the Chief Medical Officer



Gerard E. Francisco, MD

The TIRR Memorial Hermann Disorders of Consciousness Program is yet another facet of the care services we offer that sets us apart from other health systems in the nation.

Our location in the Texas Medical Center means that we are steps away from the Red Duke Trauma Institute at Memorial Hermann-Texas Medical Center, one of the busiest Level I Trauma Centers in the nation.

Thanks to recent advances in critical care medicine, patients who have suffered a traumatic brain injury or stroke are now surviving in greater numbers than they did historically. However, many of them are emerging from their initial trauma with disorders of consciousness—in other words, with severely impaired levels of awareness and wakefulness. This includes coma or unresponsive wakefulness state.

The challenge for practitioners of rehabilitative medicine is, how can we make the most of the lives that were saved by our colleagues in critical care and medicine by helping these patients find ways to communicate and regain function?

To achieve this, our Disorders of Consciousness Program uses state-of-the-art innovations—both high-tech and low-tech—to assess and treat these patients to help maximize their potential recoveries and outcomes. These include therapeutic gait training using a ceiling-mounted body weight support harness system to promote “verticalization,” which improves muscle arousal and engages weight-bearing to mitigate risks for joint contractures and promote bone health.

The approaches used in the program are in keeping with TIRR Memorial Hermann’s position as a leader in rehabilitation and a pioneer in these care services nationally. In addition, the program accepts patients with non-traumatic brain injuries as well, in keeping with

the program’s unofficial mantra: “Everybody deserves a chance.” Through efforts such as these, we are always trying to innovate and we pride ourselves in being visionary. We have always been among the first in the world to adopt these novel approaches, and we will continue to be.

Ultimately, our patients benefit from our spirit of innovation as well as the “can-do, never-give-up” attitude of our clinical staff members who are always seeking state-of-the-art solutions to challenges new and old.

At TIRR Memorial Hermann, that is part of our history—and it will be part of our future. ■

Gerard E. Francisco, MD

Chief Medical Officer, TIRR Memorial Hermann



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About TIRR Memorial Hermann

TIRR Memorial Hermann, a leader in rehabilitation, does more than provide therapy. We provide rehabilitation beyond the health care setting for children and adults with a disabling injury or illness, and change lives by helping people regain the skills and confidence they need to reintegrate into the community and continue living full and meaningful lives. Our highly trained rehabilitation teams see the potential in every person they work with and develop that potential to the fullest through customized goal setting and treatment planning.

We work to maximize independence, restore function and improve the quality of life for our patients.

We have opportunities for outstanding rehabilitation professionals. If you are interested in joining our team at one of *U.S. News & World Report's* leading rehabilitation hospitals, view all available opportunities at memorialhermann.org, tirr.memorialhermann.org or ilru.org.

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To achieve these goals, we put the individual patient and their family at the center of the rehabilitation team and provide them with the information and skills they need to transition successfully to community settings.

TIRR Memorial Hermann is the best rehabilitation hospital in Texas and among the best in the nation, according to the *U.S. News & World Report's* Best Hospital rankings for 2023-2024. The rehabilitation hospital's ranking marks its 33rd consecutive year among the magazine's Best Hospital rankings.

To make referrals or schedule an appointment, call 800.44REHAB (800.447.3422) toll-free or 713.797.5942, or fax 713.797.5988.

