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Dr. Ima Ebong leads diversity, equity and inclusion efforts within the UK Department of Neurology. When people are engaged, passionate, and doing what they want to do, that translates into better patient care.

Working Toward a Healthier Tomorrow

Everything we do at UK HealthCare’s Kentucky Neuroscience Institute (KNI) is focused on building a healthier tomorrow for residents across Kentucky, and beyond. As the leaders of neurological and neurosurgical care for the Commonwealth, we provide the best possible comprehensive treatment of patients with complex neurological conditions and prioritize innovation and research to optimize care based on nearly real-time scientific breakthroughs.

What sets KNI apart from other institutions in the state and region is our access to cutting-edge treatments that are not widely available elsewhere. A seamless collaboration between neurology and neurosurgical teams, as well as collaborative work in clinical and translational science, ensures that our patients have access to the most advanced care.

Our high-quality clinical care isn’t limited to our Lexington location, though. Via the UK HealthCare- Norton Healthcare-Stroke Care Network, VizAI hub-and-spoke hospitals, and multiple outreach clinics and clinical agreements, we collaborate closely with physicians and hospitals across the state to provide the right care in the right place at the right time.

Through our relentless commitment to research, we are able to discover new, innovative ways to treat neurological disease and provide state-of-the-art care for patients across the state. In fiscal year 2021, more than $78.3 million was secured in extramural grants and contracts to support research in the neurosciences at the University of Kentucky.

In the pages that follow, you’ll see how we continue to invest in the future of neurological and neurosurgical care. From unprecedented improvements and new additions to our facilities, to new ways of recruiting, educating and improving work-life balance for our providers, we commit to continually solidify and expand the base from which we can build a healthier tomorrow. You’ll see the faces of our clinicians and our scientists who are leading the charge. You’ll read about an innovative imaging study designed to pinpoint seizure activity in the brain, and a uniquely structured clinic designed to better diagnose and treat children with neurodevelopmental disorders.

It’s all thanks to our talented, dedicated doctors, nurses, researchers, lab technicians, pharmacists, social workers, and it’s thanks to our partners in care, like you.

Together, we are propelling Kentucky toward a healthier, healthier future.

Larry B. Goldstein, MD, FAMA, FANA, FAAN
Co-Director, UK Kentucky Neuroscience Institute
Chair, Department of Neurology

Linda Van Eldik, PhD
Co-Director, UK Kentucky Neuroscience Institute
Director, UK Sanders-Brown Center on Aging

Craig Van Horne, MD, PhD
Chair, Department of Neurosurgery
Co-Director, UK Brain Restoration Center

“Whom people are engaged, passionate, and doing what they want to do, that translates into better patient care.”

Dr. Craig Van Horne
The faculty and staff are the most valuable resource group of investigators. With more than 320 faculty and challenging patient population with complex comes and satisfaction, and change lives. Investing in crucial to attract and retain the best and brightest erers in their efforts with financial management, Priority Area (NRPA) further supports neuroscience Organization, led by Dr. John Slevin, assists research-translational neuroscience research.

Significant research and mentoring opportunities are evident every day as they improve patient out- research and mentoring opportunities "We're an academic institution so it's essential that we develop their own programs. "We allow them to grow and expand, and we give them the support to do that," said van Horne. Structured mentoring programs for neurologists and neurosurgeons are an essential part of faculty development. In the Department of Neurology, Dr. Gregory Jicha helped develop a program in which every faculty member has at least two more senior faculty mentors. They meet a minimum of twice a year to review goals, barriers and progress in achieving academic advancement. “We’ve been quite successful and neurosurgeons are an essential part of faculty and teaching.” Faculty are encouraged to build and expand, and we give them the support to do that,” said van Horne.

The Neurosurgery Department’s mentoring program involves all levels. Senior faculty members mentor junior faculty, while both senior and junior faculty serve as mentors for residents. Senior residents also mentor the newer residents. “It’s been a really successful program,” said van Horne. As a mentor, I learn a lot from the mentees, so the benefit goes both ways. When people start to do it, they realize there’s a lot to learn from what the younger people are doing if you have an open mind.”

The importance of diversity KNI has also emphasized diversity, equity and inclusion (DEI) to address inequities faced by colleagues and patients. Initiatives include a commitment to recruit from underrepresented groups and ensure everyone strives in an environment free of racism and bigotry. The university-wide Neuroscience Research Priority Area (NRPA) focuses on clinical and KNI has also embraced diversity, equity and inclusion. That investment will help achieve a more diverse group of future physicians in the field, said van Horne.

Another objective is to encourage young people from underrepresented groups to pursue careers in the neurosciences. That investment will help achieve a more diverse group of future physicians in the field, said van Horne.

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KNI MAKES INVESTMENTS IN THE EDUCATION, TRAINING AND OUR MOST VALUED RESOURCE: OUR PEOPLE

"We’re an academic institution so it’s essential that we take time to teach our residents and we take time to do research," said Dr. Craig van Horne, chairman of the Department of Neurosurgery. "We can carve out that time and make sure they have goals around research and teaching." Faculty are encouraged to build and develop their own programs. "We allow them to grow and expand, and we give them the support to do that," said van Horne.

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DR. LARRY GOLDSTEIN

The committee’s efforts have received positive feedback. In 2021 and 2022, the committee received the Sarah Bennett Holmes Award from the UK Women’s Forum. They also earned a prestigious Women in Medicine booster award to explore burnout across the College of Medicine. Preliminary results from the committee’s research showed higher emotional exhaustion campus-wide when compared to published group averages for other medical professionals and educators. Interestingly, and Mahuwala, those who engaged in physical and leisure activities experienced significantly lower burnout and significantly higher personal accomplishment.

Using these findings, the committee organized a number of events, including hikes, virtual Zumba, virtual movie nights and cooking classes. Other wellness offerings have included acupuncture and massage provided by the UK Integrative Medicine & Health program. The Department of Neurology reported lower burnout in 2022 compared to other departments, suggesting the committee activities may have had a positive impact.

Work-life balance is hard for everyone, but particularly for doctors, said Mahuwala. Meaningful work and a supportive environment with a sense of community are two of the keys to combating burnout. Recognition of the problem is essential because stressed-out physicians are more likely to make mistakes or leave the profession altogether. The cost of losing one physician ranges from $500,000 to $1 million. “It is a systemic problem. Although one committee cannot solve it all, it is the start of a positive change,” she said. “That’s why national level awareness is needed, similar to the increased awareness around diversity.”

Worthwhile efforts

Faculty, residents, APPs and staff are the backbone of KNI, and efforts to invest in them have a positive impact now and into the future, said Dr. Goldstein. “They’re what make the whole system work. If we don’t value them and invest in them and support them, they’re more likely to leave. There is a very large gap nationally between the supply of neurologists and neurologic specialists. People have choices, and we want them to choose us and to stay here. The way you do that is value their contributions and pay attention to what they do every day.”

KNI is a great place for faculty and staff who want to have a collegial atmosphere and cooperative environment to work in, said van Horne. “We have a lot of opportunities for subspecialties within neurosurgery,” he noted. “When you come here, you really pursue what you want. When people are engaged, passionate and doing what they want to do, that translates into better patient care.”

“Physicians at KNI lead the charge against neurological disease in Kentucky.”

DR. LARRY GOLDSTEIN

Supporting well-being

Dr. Zabeen Mahuwala chairs the Department of Neurology’s Wellness and Resilience Committee, a group she formed to help combat burnout and support well-being among faculty and residents. Mahuwala, an associate professor of neurology, says a 2021 Medscape national survey showed neurologists have one of the highest burnout rates among physicians. Female neurologists are at higher risk than men due to their traditional role of caregiver.

“As neurologists, our work demands time with our patients,” said Mahuwala. “We have long visits with patients, talking with them and examining them. And people who spend more time in direct patient care and outpatient clinics have a higher rate of burnout.”

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BUILDING THE FUTURE TODAY

NEW FACILITIES EXPAND NEUROLOGICAL CARE FOR KENTUCKIANS

As demand for neurological care increases, so has the need for state-of-the-art facilities and technology. This investment in infrastructure at UK HealthCare’s Kentucky Neuroscience Institute (KNI) is also an investment in the people of Kentucky; it is tangible proof of KNI’s mission to offer comprehensive care and innovative treatments.

Four recent projects have increased both the number of patients KNI is able to care for and the range of services it offers. These projects are concrete examples of KNI’s commitment to Kentucky today and well into the future.

A new neurological unit

A new inpatient unit dedicated to patients with complex neurological disorders opened in July 2022. With more than 66,000 square feet of space, the expansion—on the 5th floor of Pavilion A of the University of Kentucky Albert B. Chandler Hospital—provides enough space for all neurological inpatient services to be on one floor.

Neurology and neurosurgery faculty and staff contributed to the unique design and layout. “This new space is specifically dedicated to the care of patients with complex neurological disorders in an environment that also supports their families and friends,” said Dr. Larry Goldstein, chairman of the UK College of Medicine’s Department of Neurology and co-director of KNI.

The state-of-the-art space features 32 dedicated progressive care rooms and 20 intensive care rooms. Advanced epilepsy monitoring units (EMUs) use continuous video-electroencephalogram (EEG) monitoring technology to evaluate, diagnose and treat patients.

The new unit features a physical/occupational therapy gym and a radiology suite with portable CT scanner. The expansion also includes a comfortable lounge space for families and visitors, as well as flexible classroom, workroom and conference space for KNI team members.

Expanding memory care

The Sanders-Brown Memory Clinic’s new home provides a seamless, less stressful experience for patients. The one-stop shop for memory care and support opened at the end of 2021.

The expanded clinic space is critical to the internationally renowned UK Sanders-Brown Center on Aging’s mission of advancing dementia research and patient care. Located on the UK HealthCare – Turfland campus, the 15,000-square-foot clinic more than doubles the capacity of the previous space. The clinic also includes:

• Co-located services, including cognitive testing, gait analysis, cortical analysis and EEG/EMG testing
• Dedicated space for social work consultations and patient education/resource rooms
• Separate general and extended waiting areas
• New telemedicine space
• Better parking and wayfinding
• Space for community programs

The expansion also allows the clinic to conduct more clinical trials and will improve the competitiveness of the UK Alzheimer’s Disease Research Center when competing for rapidly expanding federal research funding on aging.
Child-friendly neurology clinic
With the guidance of providers and staff, the new warm and friendly UK Child Neurology clinic opened at the Turfland campus in March 2021. The child neurology clinic has a private kid-friendly waiting room, along with a laboratory and MRI services right around the corner. Even the design of the parking lot was configured with the safety of children in mind, especially those who need wheelchairs or walkers for mobile assistance.

“The new location is supported by state-of-the-art telecommunication capabilities, provides for easy access and will optimize the patient/family experience for children with neurological conditions,” Dr. Goldstein said.

“Interventional radiology expansion
Demand for interventional procedures continues to grow as more people qualify for these less invasive options. KNI recently opened a new Interventional Services facility to accommodate that growing demand. The newly renovated, 50,000-square-foot facility has rooms to grow in the coming years. It features:

• 66 new preparation and recovery rooms
• Nine procedure rooms
• State-of-the-art imaging
• Neurointerventional radiology
• Interventional radiology
• Interventional cardiovascular services

The facility, on the first floor of Pavilion A at UK Chandler Hospital, features a new lobby that provides a warm and comforting space for patients and their families.

“There is no better example of what the power of advanced medicine at UK HealthCare really means other than this new facility with its state-of-the-art technology, futuristic design and most importantly, a very caring, empathic and highly skilled staff and provider,” said Dr. Driss Raissi, medical director for interventional services and the interventional radiology division chief. “Kentuckians will have access to world-class minimally invasive surgeries without having to leave the comfort of their home state.”
A SYMPHONY OF SUPPORT

KNI HELPS TRUMPETER ADIEL NÁJERA RETURN TO HIS PASSION AFTER BATTLING SERIES OF STROKES

On a Sunday afternoon in April, Adiel Nájera’s world turned upside-down.

The 25-year-old University of Kentucky doctoral student knew something was wrong. Earlier that week, he’d experienced exhaustion, chills, pains and trouble driving. On this spring weekend in 2022, he slept through his alarm and missed church, then found himself disoriented and barely able to move.

Weak and unable to leave his apartment, Adiel FaceTimed his parents, who quickly knew the situation was dire because of his slurred speech and confusion. Hours later, his parents and brother were on a flight to Lexington, and Adiel was in a fight for his life.

‘The biggest steps of my life’

Music – and trumpet in particular – are in Adiel’s DNA. He’s a Trumpet Performance major and his father, Paul, is a retired band director and trumpet player himself who still gives lessons to musicians. Adiel’s brother, Johniel, is a Music Education major at Baylor University in the family’s native Texas.

“Having a priest there was important to us,” said Paul, who feared his son might not make it out of surgery.

“We're a very high-volume referral center for vascular neurosurgery, so we get a lot of cases,” Dr. Dornbos said. “You always have to be very conscientious about each individual patient. But when you do it that many times over and over, you definitely have better outcomes.”
Adiel's family is grateful for their experience.

"At the end of this surgery where they removed part of Adiel's brain, we had this amazing human being of a doctor come in and talk to us," said Adiel's mother, Johjania, of Dr. Dornbos. "He was so caring, yet so professional, so approachable and kind. It made a world of difference to us. The confidence that we knew he truly cared, it wasn’t just a job."

"He truly saved our son’s life," Johjania said. "His hands, his knowledge, his caring just saved him. And we’re forever grateful.”

Paul praised Dr. Stenbock and Adiel’s healthcare team for their life-saving care, as well as their compassion toward the family at a frightening time.

"That man is my new hero," Paul said. "He tolerated my questions and was very gracious. I owe these people more than I can ever give them.”

'He’s a pretty remarkable guy’

Adiel has worked hard through occupational, speech and physical therapy to reach his pre-stroke level of motor and musical skills. It’s been a frustrating road at times. But through dedicated practices with the help of his father, his brother, and UK trumpet professor Dr. Jason Devel, Adiel’s trumpet skills are improving every day. Dr. Dornbos says Adiel’s family has played a major role in his rapid recovery.

"His family is awesome," Dr. Dornbos said. "He’s a pretty remarkable guy, and he has really good family support. Those two things make a big difference.”

Dr. Dornbos expects Adiel to make a near-complete recovery and says he’s at fairly low risk for another stroke.

"When young people have strokes, it’s kind of a blessing and a curse because their recovery tends to be better: Their brains are more adaptable," Dr. Dornbos said. "He’s probably at a slightly higher risk of stroke than the general population, but because it’s happened to him before: he’s not at tremendously higher risk.”

'The best medicine’

Adiel performed his trumpet in a concert with the UK Wind Symphony just five months after an inexplicable series of strokes thrust him into the biggest challenge of his young life. Even more remarkably, this concert took place only three months after he was medically cleared to begin playing his instrument again. He’s on course to earn his Doctorate of Musical Arts in Trumpet Performance, and he is determined to achieve his goal of teaching and playing trumpet professionally.

Adiel is forever grateful for all the treatment he’s received from UK HealthCare. But his favorite therapy has been with him since birth.

"Music is indescribable," he said. "It’s something past words and something past feelings. It’s some of the best medicine in the world.”

"I’m very grateful the doctors inpatient to outpatient were able to go with me and get me here. There are no words that can describe it, but it was beyond wonderful what they were able to do.”

—ADIEL NÁJERA
Coverdell Grant Brings Partners Together to Reduce Kentucky’s Stroke Risks and Deaths.

When the University of Kentucky and partners across the state were awarded a coveted Paul Coverdell National Acute Stroke Program Grant in 2021, the bar was set high for the collaboration that aims to reduce Kentucky’s high rate of death and disability from stroke.

The project hit the ground running by creating the Kentucky Stroke Improvement Cooperative (KSCI) to provide collaborative leadership for the initiative, said Dr. Larry B. Goldstein, co-director of the Kentucky Neuroscience Institute, chairman of the UK Department of Neurology and principal investigator for the project.

Although it is early in the process, we have identified eight strategies that will have the biggest impact in reducing stroke deaths and disability. Stroke is the fifth leading cause of death in Kentucky, other state agencies and health organizations. It is administered through the Kentucky Regional Extension Center to the Kentucky Board of Examiners for Emergency Medical Services. We believe working together with those who have expertise in their areas will move us more quickly to finding solutions to the problem.

The project is a partnership between the UK College of Medicine, UK HealthCare, the Kentucky Department for Public Health’s Heart Disease and Stroke Prevention Program, the University of Louisville and a number of other state agencies and health organizations. It is administered through the Kentucky Regional Extension Center at UK, directed by Brent McMune.

“Gathering good data”

One of the Kentucky Stroke Improvement Cooperative’s most significant hurdles is linking more data and expanding starting efforts to improve stroke-related health outcomes and reduce risk factors. Better educate the public about the causes of stroke and how to reduce their risk.

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“When we are working together, we are able to leverage and integrate programs that are already on the ground and get buy-in for new programs we may need. Our priority is to save lives and prevent disability and death.”

“The pockets of population most affected and to develop ways to reach them.”

One of the most significant hurdles the group is working on overcoming, Dr. Goldstein said, is linking patients and their data throughout a network of hypertension, the single most important treatable risk factor. The project is close to achieving a way to match patient records no matter the provider or location — from clinics and health systems to identify patients with hypertension, the single most important treatable stroke risk factor.

Crucial to the effort to reach those most underserved, and to efficiently manage the project, is the need for more data and the development of an integrated data management system. Statistics already reveal that Appalachian counties have a stroke mortality rate 6% higher than the rest of the state and 14% higher than the nation. Researchers are digging into available databases to determine the pockets of population most affected and to develop ways to reach them.

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Dr. Neil Toupin sees patients in a child-friendly space, conducive to observation of their natural behavior when placed in a stimulating environment.

NEMO TO THE RESCUE
A ONE-STOP SHOP FOR KIDS WITH NEURODEVELOPMENTAL ISSUES

Children with complex neurodevelopmental problems commonly have many visits with multiple specialists only to experience delays in diagnosis or misdiagnosis. For their caregivers, navigating the healthcare system can be frustrating, stressful and expensive.

“Thanks to the opening of UK HealthCare’s Neurodevelopmental Evaluation and Management Optimization (NEMO) Clinic, families can now come to one convenient location where their children are assessed and treated by an entire team of experts. Thanks to the opening of UK HealthCare’s Neurodevelopmental Evaluation and Management Optimization (NEMO) Clinic, families can now come to one convenient location where their children are assessed and treated by an entire team of experts. Thanks to the opening of UK HealthCare’s Neurodevelopmental Evaluation and Management Optimization (NEMO) Clinic, families can now come to one convenient location where their children are assessed and treated by an entire team of experts. Thanks to the opening of UK HealthCare’s Neurodevelopmental Evaluation and Management Optimization (NEMO) Clinic, families can now come to one convenient location where their children are assessed and treated by an entire team of experts. Thanks to the opening of UK HealthCare’s Neurodevelopmental Evaluation and Management Optimization (NEMO) Clinic, families can now come to one convenient location where their children are assessed and treated by an entire team of experts. Thanks to the opening of UK HealthCare’s Neurodevelopmental Evaluation and Management Optimization (NEMO) Clinic, families can now come to one convenient location where their children are assessed and treated by an entire team of experts. Thanks to the opening of UK HealthCare’s Neurodevelopmental Evaluation and Management Optimization (NEMO) Clinic, families can now come to one convenient location where their children are assessed and treated by an entire team of experts. Thanks to the opening of UK HealthCare’s Neurodevelopmental Evaluation and Management Optimization (NEMO) Clinic, families can now come to one convenient location where their children are assessed and treated by an entire team of experts. Thanks to the opening of UK HealthCare’s Neurodevelopmental Evaluation and Management Optimization (NEMO) Clinic, families can now come to one convenient location where their children are assessed and treated by an entire team of experts. Thanks to the opening of UK HealthCare’s Neurodevelopmental Evaluation and Management Optimization (NEMO) Clinic, families can now come to one convenient location where their children are assessed and treated by an entire team of experts. Thanks to the opening of UK HealthCare’s Neurodevelopmental Evaluation and Management Optimization (NEMO) Clinic, families can now come to one convenient location where their children are assessed and treated by an entire team of experts. Thanks to the opening of UK HealthCare’s Neurodevelopmental Evaluation and Management Optimization (NEMO) Clinic, families can now come to one convenient location where their children are assessed and treated by an entire team of experts. Thanks to the opening of UK HealthCare’s Neurodevelopmental Evaluation and Management Optimization (NEMO) Clinic, families can now come to one convenient location where their children are assessed and treated by an entire team of experts. Thanks to the opening of UK HealthCare’s Neurodevelopmental Evaluation and Management Optimization (NEMO) Clinic, families can now come to one convenient location where their children are assessed and treated by an entire team of experts. Thanks to the opening of UK HealthCare’s Neurodevelopmental Evaluation and Management Optimization (NEMO) Clinic, families can now come to one convenient location where their children are assessed and treated by an entire team of experts.
The overall point of the study is to better localize where in the brain a seizure is happening,” said FINDERS principal investigator Brian Gold, PhD, professor, Department of Neuroscience, who feels the group’s efforts could potentially impact even more patients than those who are drug resistant are at risk of injuries or even death from their seizures. For these patients in particular finding a way to control their seizures has been problematic.

Dr. Gold explains, “Currently, it can be difficult for neurosurgeons to have exactly where to operate. With better information that we’re getting through FINDERs about exactly where the seizure is in the brain, it will help with neurosurgical planning. The surgeon can extend the tissue that is causing the seizure and not other tissue that is still functioning normally.”

Typically, physicians have used video EEG and MRI to pinpoint the location of a seizure in the brain. “Taking this concept to the next level, FINDERs members are studying the merger of EEG and fMRI for epilepsy evaluation in addition to newer imaging modalities,” said Flavius Raslau, MD, neuroradiologist Flavius Raslau, MD, professor in the departments of neuroscience and neurology and medical director of the Epilepsy Monitoring Unit, who brings his expertise in neuroimaging to the team. “This technique requires an interdisciplinary collaboration.”

Research like this has never been done before in Kentucky.”

Finding a new treatment option

Several of these patients we have already developed a connection with and they are eager to be part of something that might provide answers,” said Dr. Bensalem-Owen. “They want to contribute. Additional funding would help ensure that the trial can continue, a point not lost on Dr. Bensalem-Owen who feels the group’s efforts could potentially impact patients across the nation. She also believes that the FINDERs Alliance is the impetus needed for other multidisciplinary projects to take off. "One of the most interesting things about ELHS is that, it’s not about one person’s work. We can pull together. Because they keep us from getting stagnant. At the end of the day, it’s not about one person’s work. We can accomplish so much more for our patients when we pull together.”

A collaborative approach to care

More than 260 NAEC epilepsy centers nationwide, KNI joined the Epilepsy Learning Healthcare System (ELHS) in 2022, becoming just one of 15 clinical NAEC member centers throughout the country. ELHS is a learning health system in which all stakeholders—clinicians, researchers, patients and their families, and nonprofit organizations—they design, implement and share the results of collaborative research and quality improvement efforts. ELHS members are working on numerous initiatives including:

• Developing national quality measures
• Offering real-time data support and improved electronic data transfers
• Testing innovations that transform epilepsy care

"One of the most interesting things about ELHS is their philosophy that little changes bring bigger changes and better patient outcomes. If, we identify a problem and then try making a small change, we can easily quantify if it’s working and outcomes,” said Dr. Bensalem-Owen. “These partnerships, and collaborations like FINDERS, are very important because they keep us from getting stagnant. At the end of the day, it’s not about one person’s work. We can accomplish so much more for our patients when we pull together. “

FINDERS ALLIANCE IMPROVING EPILEPSY CARE THROUGH NEUROIMAGING

She is working closely with co-principal investigator Brian Gold, PhD, professor, Department of Neuroscience, and neurologist Flavius Raslau, MD, associate professor, Department of Radiology, who brings his expertise in neuroimaging to the team. In addition to the physicians and scientists on the project, specialized staff such as EEG technicians and nurses are vital to the study.

Inpatients in the adult Epilepsy Monitoring Unit, which is concentrating on the postictal state — the period after the seizure subsides — are the best candidates for the trial. Coordination between various team members and proximity to imaging equipment is key to performing the studies during this phase of a seizure. "Typically, patients have used video EEG and MRI to pinpoint the location of a seizure in the brain. Taking this concept to the next level, FINDERs members are studying the merger of EEG and fMRI for epilepsy evaluation in addition to newer imaging modalities. "Stimulatios and continuous EEG-fMRI scanning can determine the cerebral area showing changes in the fMRI signal in response to epilepsy- form discharges occurring in the EEG," explained Dr. Bensalem-Owen. "This technique requires an interdisciplinary collaboration."

The project is being undertaken by the Functional Imaging for NeuroDiagnostics for Epilepsy and Resective Surgery (FINDERS) Alliance, a collaboration between neuroscientists, neurologists, neuroscientists, physiologists, neuroradiologists, neurosurgeons, engineers and others from UK’s colleges of medicine, engineering and public health.

"The overall point of the study is to better localize where in the brain a seizure is happening,” said FINDERS principal investigator Brian Gold, PhD, professor in the departments of neuroscience and radiology at the University of Kentucky College of Medicine. Before FINDERS could bring patients into the mix, there was a significant amount of groundwork that needed to be written new protocols. We literally started from ground zero when compared to other UK COAM Unions.”

"Research like this has never been done before in Kentucky."

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Dr. MERIEM BENSALEM-OWEN

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As such, the FINDERS Alliance is one of many exciting parts of the robust program. Partnerships with organizations such as the Epilepsy Foundation of Kentucky, which provides education, support and outreach for patients and families, are also valuable.

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INTEGRATED RESEARCH ACCELERATES DEVELOPMENT OF INNOVATIVE TREATMENTS

With more than 340 faculty and trainees from 36 departments and nine colleges performing research in the neurosciences, the sum is better than its parts,” said Dr. Larry B. Goldstein, co-director of the Kentucky Neuroscience Institute and chairman of the UK Department of Neurology. He and Linda Van Eldik, PhD, who is also the director of the Sanders-Brown Center on Aging, are co-directors of the NRPA. "Research is increasingly showing the relationship between sleep problems and chronic health issues, including conditions such as obesity, diabetes, Alzheimer’s and stroke,” Dr. Goldstein said. "One of our goals in the NRPA is to tackle the health issues most impacting Kentucky’s residents."

“Research is increasingly showing the relationship between sleep problems and chronic health issues, including conditions such as obesity, diabetes, Alzheimer’s and stroke.” Dr. Larry B. Goldstein

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"Our guiding strategy from the start was to provide broad, long-term support for neuroscience investigators. With more than 340 faculty and trainees from 36 departments and nine colleges performing research in the neurosciences, the sum is better than its parts," said Dr. Larry B. Goldstein, co-director of the Kentucky Neuroscience Institute and chairman of the UK Department of Neurology. He and Linda Van Eldik, PhD, who is also the director of the Sanders-Brown Center on Aging, are co-directors of the NRPA.

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Right: Ann Stowe, PhD – with a research interest in stroke, notably in post-stroke plasticity and in neuroinflammation brain injury and repair – is an integral part of KNI’s neuroscience research priority area at UK.

“What began as a travesty led to us determining how best to accommodate all of the people working in the CRO who were already working on top of each other,” said Dr. Slevin. “The space we now have allows us to bring everyone together in one central location on campus. It is much more conducive to running the program because we have sufficient space for everyone, can connect with each other quickly, and have all of our active research files with us instead of in boxes in various locations.”

With the goal of being a center for the rapid deployment of trials, the CRO staff of 17 includes clinical research nurses, clinical coordinators and regulatory personnel. Among its activities are:

- A translational, investigator-initiated series of studies unique to UK, evaluating the effect on both movement and cognition of implanting peripheral nerve grafts during deep brain stimulator neurosurgery in participants with Parkinson’s Disease (PD), led by principal investigator (PI) Craig van Horne, MD, PhD
- PD and other movement disorder investigations, including the National Institute of Health-sponsored “RELIANCE: Web-based Automated Imaging Differentiation of Parkinsonism,” led by site PI John Slevin, MD
- UK ALS (Lou Gehrig’s disease) Treatment Center of Excellence conducting multicenter therapeutic industry-sponsored trials under the Healey ALS Platform led by site PI Edward Kasarskis, MD, PhD
- Pediatric migraine investigations, including “A Study of Lasmiditan (LY573144) Treatment in Children Aged 6 to 17 with Migraines,” led by site PI Sharoon Qaiser, MD
- Epilepsy and multiple sclerosis trials, including “A Phase 2, Randomized, Double-Blind, Placebo-Controlled Multicenter Study to Evaluate the Efficacy and Safety of ALXN2050 in Adults with Generalized Myasthenia Gravis,” led by site PI Zabeen Mahuwala, MD

“It’s really a very exciting time to be involved in clinical trials in the neurosciences. The opportunities the CRO offers may not be readily available to patients and their providers in private practice,” said Dr. Slevin. “We are heavily invested in the academic aspects of being a clinical department of the university.”

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EDUCATING TOMORROW’S
NEUROSCIENCE LEADERS

The Kentucky Neuroscience Institute and University of Kentucky College of Medicine are dedicated to training the next generation of neurological care providers and ensuring that the current generation has access to the latest educational opportunities.

Neurology residency
The UK College of Medicine Department of Neurology is proud of a long tradition of excellence in neurological training that was started in the 1960s by the department’s founder, Dr. David B. Clark, with a mission to produce the best clinical, research and academic neurologists.

Child neurology residency
The child neurology program is unconventional in its integration of the adult and child experiences. The incoming PGY-3 residents begin their training on the child neurology service. Child neurology has its own inpatient service in UK HealthCare’s Kentucky Children’s Hospital as well as seeing pediatric patients in consultation in the children’s hospital and in the pediatric and neonatal intensive care units.

Neurosurgery residency
The goal is to provide an education in the theoretical and technical aspects of neurological surgery so that residents will be equipped for either clinical practice or academic neurosurgery.

Neurology fellowships
The UK Department of Neurology offers multiple advanced fellowship training programs in the following specialties: neuropsychology, epilepsy, geriatric neurology, headache, movement disorders and vascular neurology. Each program is tailored to the needs of fellows of that particular subspecialty.

Neurosurgery fellowship
The UK neurosurgery fellowship program offers opportunities for learning while caring for very complex patients in the Bluegrass Region. Each fellowship is designed as a unique educational program, meant to complement the residency training program. Current surgery fellowships are available in endovascular, spine deformity, and stereotactic and functional surgery.

Neuroscience programs
In addition to advanced clinical education, the UK College of Medicine provides research and training opportunities in neuroscience, ranging from molecular and cellular neurobiology to neuroimaging, from understanding basic neuroscience to investigating mechanisms and treatments of central nervous system disorders due to aging, injury, and disease.

Continuing medical education
Not only does UK offer educational opportunities for students, residents and fellows, the university offers continuing medical educational (CME) opportunities for fully licensed physicians. There are many opportunities to acquire CME credits either from attending the grand rounds or various conferences.
KNI SNAPSHOTS

With the goal of creating a healthier Kentucky, the UK Kentucky Neuroscience Institute (KNI) is the preeminent destination for neurological and neurosurgical care in the Commonwealth. KNI is committed to providing superior care, based on leading-edge research that addresses a multitude of neurological needs. This annual report not only celebrates but drives the spirit behind the providers, clinicians and additional staff of KNI.

The following pages recount the milestones for 2022, which include “snapshots” that provide insight at a glance into how KNI is improving care across the state and conducting research that has the potential to impact the nation.

Total Neuroscience Institute Patient Visits

<table>
<thead>
<tr>
<th>Year</th>
<th>Neurology</th>
<th>Neurosurgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2018</td>
<td>26,509</td>
<td>14,011</td>
</tr>
<tr>
<td>FY 2019</td>
<td>24,478</td>
<td>12,241</td>
</tr>
<tr>
<td>FY 2020</td>
<td>25,098</td>
<td>12,801</td>
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<tr>
<td>FY 2021</td>
<td>26,663</td>
<td>15,646</td>
</tr>
<tr>
<td>FY 2022</td>
<td>25,105</td>
<td>13,757</td>
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</table>

KNI SERVES KENTUCKIANS WITH REcurring HEADACHES

Headaches affect millions of men, women and children each year, but only 4% of those experiencing severe, recurring headaches — known as migraines — seek medical care from headache specialists, according to the Migraine Research Foundation.

But chronic and frequent headaches do not have to be left untreated. The Kentucky Neuroscience Institute’s (KNI) Headache Program offers specialized care and highly trained physicians who focus on evaluation and headache management.

Specialists
1 Board-certified Adult Headache Specialist
1 Board-certified Pediatric Headache Specialist
1 Neurologist with special interest in Headache and Sleep Disorders
1 Neuro-Ophthalmologist with interest in IIH and Headache
1 Interventional Neuroradiologist with special training in CSF leaks and Vascular Imaging
4 APPs
1 Adult and 1 Pediatric Nurse who specialize in taking care of complex headache populations

Conditions
The neurologists specializing in headaches at KNI use a multidisciplinary approach to diagnose and treat headaches while providing education, preventing the onset of headaches and offering symptom relief. KNI offers treatment for:
1. Chronic migraine headaches
2. Cluster headaches
3. Refractory Headaches

Treatments
Dependent upon the condition, KNI offers pharmacological intervention including infusions, nerve blocks, Botulinum injections, consideration of devices and minimally invasive treatments; and in rare cases, neurosurgical intervention. Unique to KNI, collaborative partners include:
1. Interventional Pain
2. Interventional Neuroradiology
3. Orofacial Pain
5. ENT
6. Plastic Surgery
7. Neurosurgery
8. Cardiology

KNI in Collaboration

KNI offers access to UK Specialty Pharmacy and its pharmacists who specialize in modern therapeutics.

The only active fellowship training program in the region, KNI trains the next generation of clinicians to meet the challenge of delivering complex care.

Research
Clinical research on innovative drugs and devices
One of very few sites evaluating a PFO closure device in the treatment of migraine with aura
Participation in patient outcomes research to evaluate different therapies for children and adolescents with headaches.
EPILEPSY PROGRAM RECOGNIZED NATIONALLY

KNI TEAM ADVANCING EPILEPSY CARE AT HOME AND ACROSS THE NATION

Kentucky Neuroscience Institute’s Epilepsy Program provides specialized care to children, adolescents, and adults living with epilepsy. The KNI team is trained to help those living with seizures follow a personalized treatment plan to manage their specific needs.

As a Level 4 National Association of Epilepsy Centers (NAEC) accredited center, KNI offers the most advanced monitoring, testing and treatments for complex types of epilepsy. The multidisciplinary team and epileptologists at KNI are experts in treating those with drug-resistant epilepsy or uncontrolled seizures.

### Specialists
- 7 Adult and 2 Pediatric Epileptologists and Neurophysiologists
- 1 Dedicated Neurosurgeon
- 1 Neuropsychologist
- 1 Dedicated Neuroradiologist
- Dedicated registered EEG technologists
- Epilepsy-trained EMU staff
- Faculty and staff holding appointments on national boards, foundations and other entities directing advancement in epilepsy care nationwide

### The UK difference
- Recent expansion of adult epilepsy monitoring unit (EMU) from 6 beds to 12, making it the largest EMU in Kentucky
- Dedicated 3-bed pediatric EMU to provide monitoring and care in a child-friendly environment
- Long-term video-EEG monitoring in the EMU, ICU, outpatient and inpatient EEGs as well as ambulatory video-EEG studies
- Special diagnostics such as Wada, ictal SPECT studies, intraoperative monitoring and BMI
- 24/7 EEG coverage
- Active surgical program with phase II intracranial monitoring
- Multidisciplinary conferences to discuss complex epilepsy cases

### Research
- Active multidisciplinary team funded by National Institutes of Health to find therapeutic strategies that reach neurovascular inflammation and repair blood-brain barrier dysfunction in epilepsy
- Neurodiagnostic alliance working to bring advanced neuroimaging techniques into use in the clinic. These will improve localization of seizures, diagnosis, and treatment options through the development of new brain-imaging methods (see page 20)
- Interdisciplinary team to research how changes in brain metabolism affect and are affected by disease
- Active work through the Clinical Research Organization to participate in clinical research trials and studies, ensuring patients have access to the most advanced treatment options

### Awards and accreditations
- NAEC Level 4 Epilepsy Center
- ABRET LTM/EMU accreditation
- ABRET Electromyography Lab accreditation

### Data

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Outpatient Visits</th>
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</thead>
<tbody>
<tr>
<td>FY 2022</td>
<td>5,613</td>
</tr>
<tr>
<td>FY 2021</td>
<td>5,693</td>
</tr>
<tr>
<td>FY 2020</td>
<td>5,836</td>
</tr>
<tr>
<td>FY 2019</td>
<td>5,976</td>
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</tbody>
</table>

*Epilepsy & Neuromuscular Outpatient Visits by Fiscal Year*
RETURNING CONTROL TO PATIENTS WITH NEUROMUSCULAR DISEASE

When nerves fail to function well, a person’s control over their entire body can be affected, causing a variety of symptoms ranging from muscle weakness, to loss of sensation and balance, to chronic pain. Neuromuscular disorders, which are diseases of the peripheral nervous system, are challenging to diagnose and treat, and often leave patients feeling helpless in their healing.

The UK HealthCare Neuromuscular Disorders team specializes in addressing these diseases. Specifically, they diagnose and treat conditions affecting the peripheral nerves, muscles, the autonomic nervous system, the nerve-muscle junction and the spinal cord.

**Specialists**
- 2 Neuromuscular fellowship-trained MDs
- 2 Neurophysiology fellowship-trained MDs
- 1 dedicated ALS-specific MD, PhD
- 5 Electromyographers
- 2 Dedicated EMG technicians

**Conditions**
- Amyotrophic lateral sclerosis (ALS) or Motor neuron diseases (MNDs)
- Muscle disorders including myopathy and muscular dystrophy
- Peripheral neuropathy and nerve injuries/compressions
- Chronic inflammatory demyelinating polyradiculoneuropathy (CIDP)
- Guillain-Barré syndrome (GBS or AIDP)
- Myasthenia gravis (MG)
- Rarer conditions including periodic paralysis, Stiff-person syndrome (SPS), Myotonia

**The UK difference**
- Comprehensive and advanced diagnostics including electromyography (EMG) including single-fiber EMG, neuromuscular ultrasound, and nerve/muscle biopsies to determine etiologies of neuromuscular disorders
- ALS Association Certified Treatment Center of Excellence in Kentucky
- ABPN neuromuscular subspecialty-certified providers
- EMG “bootcamp” training to ensure highest quality diagnostic testing

**Research**
- Over 10 currently active clinical trials, allowing patients access to the latest medical therapies before they are widely available
- Investigator-initiated original research studies on the pathophysiology and impact of various neuromuscular disorders
- Dedicated ALS research team, working to understand familial ALS, disease causation and progression, and striving to improve longevity and quality of life in ALS patients

**KNI SNAPSHOTS NEUROMUSCULAR DISORDERS**

**The UK difference**

- Comprehensive and advanced diagnostics including electromyography (EMG) including single-fiber EMG, neuromuscular ultrasound, and nerve/muscle biopsies to determine etiologies of neuromuscular disorders
- ALS Association Certified Treatment Center of Excellence in Kentucky
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**Data**

- **Outpatient Visits in FY 2022***
  - 5,613

- **Neuromuscular & Epilepsy Outpatient Visits by Fiscal Year***
  - FY 2022: 5,613
  - FY 2021: 5,635
  - FY 2020: 5,631
  - FY 2019: 5,657
  - FY 2018: 5,670

*Neuromuscular & Epilepsy Outpatient Visits reflect combined statistics.
THE SPINE SPECIALISTS

PATIENTS BENEFIT FROM KNI’S COLLABORATIVE APPROACH

The complexities of spinal surgery demand advanced technology and a medical team with diverse expertise. The neurosurgeons at Kentucky Neuroscience Institute (KNI) offer patients an advanced multidisciplinary approach to spine care. From spinal aging, tumors and injuries to less common ailments such as scoliosis, KNI’s experienced physicians work hard to ensure that all patients receive high-quality, highly personalized care.

Specialists

- 6 Spine Neurosurgeons
- 7 APPs
- 2 Registered Nurses
- Physical and Occupational Therapists dedicated to supporting spine patients

Conditions

- Disc removal
- Cervical disc herniation
- Gliomas (including astrocytoma, oligodendroglioma, ependymoma, and ganglioglioma)
- High cervical or caudal junction instability
- Neurofibromas
- Schwannomas (neuromas)
- Scoliosis
- Spinal cord herniation
- Spinal epidural or ganglion cysts
- Spine deformities
- Spine fractures and other spine injuries
- Spinal stenosis
- Spine tumors

Procedures

KNI surgeons are trained in the most complex procedures, allowing patients access to the latest potential treatment for whatever spinal condition they may have. Common procedures performed are as follows:

- Vertebral augmentation with balloon kyphoplasty
- Tumor ablation
- Minimally invasive spine fusion
- Cervical total disc replacement
- Cervical laminoplasty
- Complex reconstructive surgery

The UK difference

Close collaboration with experts from UK Orthopaedic Surgery & Sports Medicine, allowing access to nonsurgical treatment options for patients who may benefit from a more conservative approach.

Minimally invasive surgical techniques that cause less harm to surrounding bones and tissues, leading to less pain and faster recovery times for patients.

Team approach among neurosurgeons, vascular surgeons and ICU physicians to make even the most complicated surgeries as safe as possible.

Spinal navigation equipment used to make surgery safer and more precise, often limiting the amount of surgery necessary to treat a problem.

Research

KNI neurosurgeons benefit from a close partnership with the researchers and clinicians of the UK Spinal Cord and Brain Injury Research Center, focusing on advances in the following areas:

- Treatments to minimize damage and promote repair mechanisms following spinal cord or brain injury
- Strategies to promote neuronal regeneration, including gene therapy
- Mechanisms involved in axon guidance and myelination
- Implementation of advanced control systems for functional neuromuscular stimulation

Data

Spine Outpatient Visits by Fiscal Year

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Outpatient Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2022</td>
<td>1,018</td>
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- Tumor ablation
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- Cervical total disc replacement
- Cervical laminoplasty
- Complex reconstructive surgery

The UK difference

Close collaboration with experts from UK Orthopaedic Surgery & Sports Medicine, allowing access to nonsurgical treatment options for patients who may benefit from a more conservative approach.

Minimally invasive surgical techniques that cause less harm to surrounding bones and tissues, leading to less pain and faster recovery times for patients.

Team approach among neurosurgeons, vascular surgeons and ICU physicians to make even the most complicated surgeries as safe as possible.

Spinal navigation equipment used to make surgery safer and more precise, often limiting the amount of surgery necessary to treat a problem.

Research

KNI neurosurgeons benefit from a close partnership with the researchers and clinicians of the UK Spinal Cord and Brain Injury Research Center, focusing on advances in the following areas:

- Treatments to minimize damage and promote repair mechanisms following spinal cord or brain injury
- Strategies to promote neuronal regeneration, including gene therapy
- Mechanisms involved in axon guidance and myelination
- Implementation of advanced control systems for functional neuromuscular stimulation

Data

Spine Outpatient Visits by Fiscal Year

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Outpatient Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2022</td>
<td>1,018</td>
</tr>
</tbody>
</table>
SOLVING THE BIGGEST NEUROLOGICAL PROBLEMS FOR THE LITTLEST PATIENTS

A child’s neurological system is complex. And problems that arise in the brain or nervous system during childhood can cause serious complications and developmental delays. Age does not impact significance of care, so a child’s neurological system also requires advanced, high-quality levels of care and treatment. That’s where the Child Neurology team at UK HealthCare’s Kentucky Neuroscience Institute (KNI) can make a difference.

KNI’s providers—board certified in pediatrics, neurology and child neurology—have access to leading-edge care for the diagnosis, evaluation, management and treatment of pediatric neurologic conditions.

### Conditions treated

- **KNI** treats a comprehensive set of conditions affecting children, including but not limited to:
  - Brain injury
  - Brain tumor
  - Cerebral palsy
  - Concussion
  - Developmental disorders
  - Headaches
  - Injuries brain injuries
  - Muscle weakness (myopathy)
  - Neuroinflammation
  - Neurological problems of neonates in conjunction with UK Neurology
  - Neuromuscular disorders
  - Seizures
  - Stroke
  - Tics
  - Tremors disorder
  - Tuberous sclerosis

### The UK difference

- **Access to and treatment by UK HealthCare’s Comprehensive Stroke Center**, ensuring young stroke patients have access to the top level of stroke care
- **Dedicated child-neurology-trained epileptologists and 3 epilepsy-monitoring rooms housed in Kentucky Children’s Hospital** so young patients can be monitored, diagnosed and treated in a child-friendly environment
- **Advanced treatment, such as new genetic treatments currently available for some children with spinal muscular atrophy**
- **Close collaboration with DanceBlue** a Kentucky Children’s Hospital Neurology/Epilepsy Clinic, a multidisciplinary clinic that includes neurosurgery and pediatric hematologic oncology, treating primary and secondary brain tumors in children
- **The only multidisciplinary headache clinic in the region focused on children, teenagers and young adults ages 25 and younger**
- **Neurodevelopmental clinic comprised of a child neurologist, speech-language pathologists, occupational and physical therapists, psychologists and more – reducing a typically months-long process of diagnosing developmental disorders into a single-day visit (see page 18)**
- **Close collaboration with the Office for Children with Special Health Care Needs to make advanced neurological care accessible and affordable to families in Eastern Kentucky**

**Data**

| 5,224 | Outpatient Visits in FY 2022 |

**Research**

- **Ongoing work with Clinical Research Organization on new drugs and devices**
- **Participation in patient outcomes research to help determine best therapies and treatments in all areas of child neurology**
  - **Particular areas of focus include:**
    - New therapies for childhood migraine
    - New therapies for epilepsy in childhood
    - Outcomes for persons with Down syndrome
    - Molecular characterization of pediatric brain tumors
    - Organization of services for children with autism and related disorders

---

**Child Neurology inpatient unit**

- **Embedded in the Kentucky Children’s Hospital (KCH) and a dedicated child-neurology outpatient clinic space**, allowing kids and families to seek care in a warm, welcoming, child-friendly environment
- **Close work with KCH child life specialists, helping children master the challenging situations associated with illness and positively cope with anxiety from treatments**
One of the most common neurological conditions in the United States, multiple sclerosis (MS) affects more than 1,000 people in Kentucky and southeast Indiana, according to the National MS Society. Because MS impacts the brain, optic nerves and spinal cord, having a team of specialists on hand to address the unique challenges of MS is critical when it comes to patient care.

And the Multiple Sclerosis and Neuroimmunology program at the Kentucky Neuroscience Institute at UK HealthCare is equipped with the experts necessary to manage the complete spectrum of MS-related complications.

**EXPERT MS CARE AT UK HEALTHCARE**

**A TEAM OF SPECIALISTS COVERS THE CONDITION FROM ALL ANGLES**

### Specialists
- 1 MS fellowship-trained MD, PhD
- 1 Neuro-ophthalmologist
- 1 Neuropsychologist

Pharmacists trained to manage and educate patients on medication and infusion

### Physical and Occupational therapists

### Conditions
- Clinicians with the program are trained to manage a variety of neuroimmunologic disorders in addition to MS:
  - All MS subtypes, including progressive, relapsing-remitting and secondary progressive
  - Acute disseminated encephalomyelitis (ADEM)
  - Neuromyelitis optica spectrum disorder
  - Pediatric MS and related disorders
  - Sarcoidosis
  - Transverse myelitis
  - Other autoimmune diseases of the central nervous system

The UK difference

- Designation as a Center for Comprehensive Care by the National MS Society, recognizing that KNI upholds the highest standards for care
- Facilities equipped with sophisticated radiological and physiological testing technology to diagnose and monitor disease progression
- Experts in cognitive neurology and ophthalmology, pharmacy and neuropsychology, all trained to manage the unique needs of MS patients
- On-site infusion center delivering the most effective infusion therapies to our patients
- Occupational and physical therapists who have special training in MS and are dedicated to improving mobility and quality of life

Research

- Active participation in numerous clinical trials through the Clinical Research Organization
- Ongoing translational research in the following arenas:
  - Estimation of prevalence of autoimmune diseases using EHR data (collaborative study with Autoimmune Registry, NIH, Harvard and USC researchers)
  - Quantifying anterior visual pathway disorders
  - Diagnostic considerations in optic neuritis, a 10-year analytical study
  - Diagnosis and treatment of MS in minorities (collaborative study with VCU and UVA)

Data

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Total Outpatient Visits</th>
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<tr>
<td>FY 2022</td>
<td>1,495</td>
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<tr>
<td>FY 2020</td>
<td>1,200</td>
</tr>
<tr>
<td>FY 2019</td>
<td>1,150</td>
</tr>
<tr>
<td>FY 2018</td>
<td>1,100</td>
</tr>
</tbody>
</table>

KNI SNAPSHOT: MULTIPLE SCLEROSIS

2022 Annual Report | Kentucky Neuroscience Institute
UNDERSTANDING BRAIN-BEHAVIOR RELATIONSHIPS TO DIRECT THE BEST CARE

Conditions you cannot see, such as those impacting the way you think and/or the way you absorb and process information, can be the most difficult to understand and diagnose. The experts with the neuropsychology program at the Kentucky Neuroscience Institute can help.

When treating physicians and allied health providers need complex differential diagnostic questions answered, they can count on KNI’s team of neuropsychologists. UK HealthCare’s neuropsychology division includes world-renowned academic clinicians with research appointments in the Sanders Brown Center on Aging, one of the world’s leading centers on the science of aging.

Neurocognitive testing, also known as neuropsychological testing, is a comprehensive evaluation of the patient’s cognitive function by specific neurologic domains, (i.e., memory, attention, problem-solving, language, visuospatial, processing speed, motor, and emotion.) The neuropsychocognitive diagnostic service team is trained to perform these evaluations to help diagnose cognitive deficits that may have resulted from several causes, including neurodegenerative disorders such as dementia, stroke, Parkinson’s disease, cancer, epilepsy and traumatic brain injury. Once a proper diagnosis has been determined, the neuropsychologists can provide higher levels of patient care with an individualized treatment plan.

Specialists
- 4 PhD faculty members, specializing in Neuropsychology
- 1 Neuropsychology fellow
- 3 Dedicated Psychometrists

The UK difference
- Comprehensive neurodiagnostic testing, including cognitive and behavioral evaluation, memory assessment for dementia, cognitive testing pre- and post-brain surgery, evaluation of cognition after stroke, and assessment after injury
- Consultative integration within 24 UK HealthCare service lines and clinical programs
- Consultation service for 54 external regional hospitals and specialty practices across Kentucky, Ohio, West Virginia and Tennessee
- Faculty holding positions on regional, national and international boards and organizations, ensuring that UK is at the forefront of neuro-diagnostic service, breakthrough science, and process and protocol creation

Conditions consulted
- The program has broad experience with conditions and treatments such as (but not limited to): Adult and pediatric oncology
- Hydrocephalus
- Adult and pediatric trauma
- LVAD implantation
- ALS
- Meningitis
- Brain injury
- Movement disorders
- Dementia syndromes
- Multiple sclerosis
- Epilepsy & seizures
- Plastic surgery (cranial trauma)
- Encephalitis
- Neurolological
- Guillain Barre syndrome
- Stroke
- Glioblastoma
- Traumatic brain injury
- General neurology
- Secondary brain tumor
- General neurosurgery
- Trauma exposure
- Research
- Gluck Lab: neurobehavioral research lab focused on exploring novel interventions to aid in recovery for individuals with mild cognitive impairment due to traumatic brain injury
- Sponsorship by multiple agencies of the National Institutes of Health, Department of Defense, Department of Education, clinical trials and foundation grants

Individual faculty research interest in neurodegenerative disease, Alzheimer’s disease and related dementia, acquired brain injury, global health and sustainability, neurocognitive performances, neurogastronomy and chemosensory disorders, neuromodulation technology, and neurotoxicology

Data

Outpatient Visits in FY 2022

- 809

Neuropsychology Outpatient Visits by Fiscal Year

- FY 2022: 809
- FY 2021: 758
- FY 2020: 1046
- FY 2019: 809
- FY 2018: 552
COLLABORATIVE CARE PRODUCES GREATER RESULTS

The UK Memory Disorders Program and the Sanders-Brown Center on Aging join forces to provide the latest in dementia care.

Started by Dr. William Markesbery in 1969, the UK Memory Disorders Program has been a foundational clinic leading national and international efforts for early diagnosis and treatment for 53 years. The clinic has been fully integrated with the internationally recognized Sanders-Brown Center on Aging (SBCoA), since its inception in 1979 as a center for excellence in research, care, and treatment for Alzheimer’s and related dementias. This collaboration between research and clinical care gives patients access to the most advanced treatments and therapies, often before they’re widely available on the market.

In 1985, SBCoA was recognized and funded as one of the first of 10 Alzheimer’s Disease Centers by the National Institute on Aging. The program continues to offer state-of-the-art biomarker diagnostic capabilities, including: sophisticated 3 Tesla MRI with a focus on cerebrovascular disease, molecular PET imaging, spinal fluid testing and a wealth of experience in the new blood testing platforms for Alzheimer’s disease and related dementias that are coming into clinical practice today.

Specialists

2 MD, PhDs and 4 APPs trained in and dedicated to memory disorders

Shared team of neuropsychologists, geneticists, pharmacists, social workers, occupational and physical therapists who can augment care recommendations and develop comprehensive treatment plans

Over 10 research engagement specialists, medical team staff, psychologists, and coordinators

National recognition and leadership

Founding member of the International Working Group on the diagnosis of Alzheimer’s disease

Founding member of the Society for Frontotemporal Dementia

Engagement on the Executive, Steering, and Ethics Committees for the NIH/NIA National Alzheimer Clinical Trials Consortium

Leaders Engaged in Alzheimer’s Disease (LEAD-ASG), the Patient and Caregiver Study Group, the Empower the Patient and Caregiver Study Group, the Alzheimer’s Study Group, Senate Subcommittee on Alzheimer’s Disease, Washington, DC

Faculty presented Presidential Award for Lifetime Achievement, greater Cincinnati and Northern Kentucky Alzheimer’s Association chapter, Cincinnati, OH

Steering committee membership for the National Alzheimer’s Disease Neuroimaging Initiative (ADNI)

Conditions

The Memory Disorders Program at UK is not just for Alzheimer’s disease, but for all conditions throughout the lifespan that are associated with cognitive and behavioral decline on the basis of family history, genetics, and/or prior brain injury

Medicines that are designed to improve synaptic transmission, helping nerve cells talk to one another so the brain can function in a better way

Medicines that are designed to change the abnormal shape of dementia proteins and modify the genetic risks that lead to dementia

Data

Coverage area

While the KNI Memory Disorders Clinic serves as the leading memory and aging care center in the Commonwealth, the clinic, population and referrals come from other healthcare facilities across the nation.

The nearest centers of excellence can be found in Chicago, St. Louis, Indianapolis, IN, Raleigh, NC. This creates an environment where the KNI clinic serves a central role in providing memory care in the southeast and central United States.

Referrals from California to Oregon to South Dakota to Pennsylvania to Massachusetts to New York to South Carolina to Florida are routine in the clinic.

The Memory Disorders Program and the Sanders-Brown Center on Aging join forces to provide the latest in dementia care.

1,740 Outpatient Visits in FY 2022

Rural telemedicine clinic

The Rural Telemedicine Clinic is in operation since 2005. Designed to care for those with memory or other thinking problems in their own communities across the Commonwealth.

Over 3,000 Kentuckians have taken advantage of this clinic, receiving state-of-the-art care in their own local communities.

The clinic operates weekly in a dedicated time slot to make sure access is always available.

A Rural Caregiver Education Program accompanies this clinic, receiving state-of-the-art care in their own local communities.

The clinic operates weekly in a dedicated time slot to make sure access is always available.
FORWARD MOVEMENT

KNI’S MOVEMENT DISORDERS CLINIC PROVIDES PATIENTS WITH SPECIALIZED CARE

The Kentucky Neuroscience Institute has a comprehensive clinical Movement Disorders Program strongly integrated with the University of Kentucky Parkinson’s Disease Research Center of Excellence and the Lexington Veterans Administration Parkinson’s Disease Consortium Center.

**Specialists**
- 4 Fellowship-Trained MDs
- 1 Functional Neurosurgeon
- 2 Dedicated APPs
- 1 Neuropsychologist
- Dedicated clinical research staff

**VAMC affiliate**
Two UK Healthcare movement disorders specialists staff the Lexington VA Medical Center’s Parkinson’s Disease Consortium Clinic that also includes speech therapists and a Clinical Research Coordinator. This clinic provides both care for Veterans, including access to DBS and Duopa, and training for Neurology residents.

**Conditions**
- We provide treatment for Hypokinetic Movement Disorders
- Essential or familial tremor
- Parkinson’s disease
- Parkinsonism-plus syndromes
- Stiff-person syndrome
- Huntington’s disease and other forms of chorea
- Drug-induced tremors, and tremors of metabolic and medical illnesses
- Rubral tremor
- Tremors seen in cerebellar disorders

**Treatment**
- EMG-guided botulinum toxin injections for movement disorders
- Deep Brain Stimulation (DBS) evaluation, surgery and programming
- Duopa enteral suspension (closely integrated with a single gastroenterologist placing all PEGs)

**Research**
- At any given time, the program has a portfolio of 10-15 multi-center industry-, government- and foundation-sponsored clinical trials
- Close collaboration with the UK Brain Restoration Center and the UK Parkinson’s Disease Research Center of Excellence. KNI studies the effect of autologous neural graft implantations into substantia nigra concurrent with DBS placement, as a means to slow the course of PD
- In collaboration with the UK College of Health Science, studies utilizing gait sensors are evaluating the effects of medication and patient perception of gait stability in PD and Parkinson syndromes
- Multiple neuroscientists in the UK Parkinson’s Disease Research Center of Excellence, engage in basic research of Parkinson’s disease, Huntington’s disease and other neurodegenerative diseases, and closely integrate with the Movement Disorder physicians in translational research

**Data**

<table>
<thead>
<tr>
<th>Movement Disorders Outpatient Visits by Fiscal Year</th>
<th>FY 2022</th>
<th>FY 2021</th>
<th>FY 2020</th>
<th>FY 2019</th>
<th>FY 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outpatient Visits</td>
<td>4,174</td>
<td>4,630</td>
<td>4,975</td>
<td>4,546</td>
<td>3,925</td>
</tr>
</tbody>
</table>

Outpatient Visits in FY 2022
TAKING STROKE HEAD ON

KNI SERVES AS A COMPREHENSIVE CENTER FOR STROKE CARE

Over 2,300 Kentuckians died of stroke in 2020 (the most recent year for which CDC data is available). Not only is it a leading cause of death in the Commonwealth, those who survive often face a lifetime of disability.

At UK HealthCare’s Kentucky Neuroscience Institute (KNI), the team is on a mission to provide the highest level of stroke care possible while turning those statistics around.

Specialists
7 Stroke Neurologists and 1 Stroke Fellow
3 Neurointerventionalists (2 Neurosurgeons and 1 Interventional Neuroradiologist)
3 Open Cerebrovascular Neurosurgeons
4 Neurophysiologists
1 Stroke Neurology Fellow and 2 Endovascular Fellows who take stroke calls
24/7 in-house neurocritical care
24/7 in-house stroke neurology team
Neuroscience-dedicated physical, occupational and speech therapy

The UK difference
To retain Comprehensive Stroke Center designation, KNI has to meet stringent protocols for the treatment of strokes and show that they are capable of treating the most complicated strokes 24/7.

Provides all advanced neuroimaging technologies (all MRI sequences including spectroscopy and tractography, CT, CT perfusion, angiography, ultrasound, transtemporal Doppler, TTE, TEE, cardiac MRI)
Neurointerventional radiology and cerebrovascular neurosurgery available 24/7
Multiple program oversight and quality improvement teams
Only ACGME-accredited vascular neurology fellowship in Kentucky
Acts as hub hospital for Via.ai sites throughout Kentucky, streamlining care coordination between hospitals and ensuring patients get the appropriate care

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Multiple program oversight and quality improvement teams
Only ACGME-accredited vascular neurology fellowship in Kentucky
Acts as hub hospital for Via.ai sites throughout Kentucky, streamlining care coordination between hospitals and ensuring patients get the appropriate care

Results and outcomes

Based on Vizient data for calendar year 2022, UK HealthCare has a substantially higher case mix index, indicating more complicated patients with more comorbidities, and yet KNI retains a lower mortality index as compared to other similar hospitals.

Stroke Patients by Type of Stroke FY 2022*

<table>
<thead>
<tr>
<th>Type of Stroke</th>
<th>UKHC</th>
<th>Other KY hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemorrhagic</td>
<td>81</td>
<td>685</td>
</tr>
<tr>
<td>Transient ischemic attacks</td>
<td>240</td>
<td>65</td>
</tr>
<tr>
<td>Intracranial hemorrhage</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Acute ischemic stroke</td>
<td>61</td>
<td>13</td>
</tr>
</tbody>
</table>

Percent of Patients with Acute Intervention FY 2022**

<table>
<thead>
<tr>
<th></th>
<th>UKHC</th>
<th>Other KY hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean door-to-needle time FY 2022 (lower is better)</td>
<td>37 minutes</td>
<td>46 minutes</td>
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Mean door-to-needle time FY 2022 (lower is better)**

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<tbody>
<tr>
<td>Hemorrhagic transition percentage FY 2022 (lower is better)*</td>
<td>0%</td>
<td>4%</td>
</tr>
</tbody>
</table>

KNI SNAPSHOTS STROKE 2022 Annual Report | 4746 | Kentucky Neuroscience Institute

Research
Engaged in more than 25 clinical research trails in stroke and cerebrovascular diseases, including multicenter randomized trials.

Awarded the prestigious Coverdell Grant, aimed at optimizing stroke prevention among those at high risk and improving care and outcomes for stroke patients throughout Kentucky (see page 14).

Translational projects with the Center for Advanced Translational Stroke Science.

Includes first tissue bank collecting brain blood and clots in acute stroke patients.

One of the only institutions in the world currently augmenting thrombectomy with investigational neuro-protective drug therapy.

Award winners
Kentucky Commission Comprehensive Stroke Center Rated as High Performing in Stroke by US News & World Report for 2022/2023

Based on Vizient data for calendar year 2022, UK HealthCare has a substantially higher case mix index, indicating more complicated patients with more comorbidities, and yet KNI retains a lower mortality index as compared to other similar hospitals.

Data

Mean door-to-needle time FY 2022 (lower is better)**

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KNI SNAPSHOTS STROKE 2022 Annual Report | 4746 | Kentucky Neuroscience Institute
AWARDS & ACCREDITATIONS

The Kentucky Neuroscience Institute offers the most advanced and robust set of specialty care in the state. We’re the only hospital in the area maintaining the standards required to receive the highest accreditations available in all of the following areas of care: stroke, epilepsy, ALS and multiple sclerosis. No matter the condition, we can help overcome it.

Through private support, the UK Kentucky Neuroscience Institute can fully realize its potential as a state-of-the-art, comprehensive academic center. Philanthropy enables our physicians, nurses and researchers to do what they do even better – make a difference in the care of not only Kentuckians but in individuals around the world. If you are interested in helping make an impact in the lives of those affected by neurological disease or trauma, contact:

UK HealthCare
Office of Philanthropy
P.O. Box 34184
Lexington, KY 40588
Phone: 859-323-6306