

A Global Leader in Treating Children with Complex Brain Conditions



**Nicklaus
Children's
Hospital**

Brain Institute

Mission

To bring new hope to children with neurological disorders; saving young lives, improving quality of life and enhancing productivity for a lifetime.

Vision

To expand our status as the world leader in pediatric neurosciences, collaborating with other institutions globally and providing a full spectrum of care and subspecialty excellence to children with neurological disorders.





About Nicklaus Children's Brain Institute

The brain of a child is unique. It is not simply a small version of the adult brain. During infancy and childhood, more than a billion brain cells develop into highly specialized integrated networks, a critical process that shapes learning and acquisition of skills. This process is very complex, making the developing brain particularly vulnerable to neurological disorders. Unfortunately, brain disorders in children are very common and the number of children affected is on the rise nationwide.

The Nicklaus Children's Brain Institute was created to meet this growing challenge, assembling a world-renowned team to offer hope and healing to families caring for a child with a brain disorder. Together, these specialists balance safety and efficacy to achieve the best possible outcomes and quality of life for children with neurological conditions.

A World Leader: Helping Families From Across The Globe

Expertise and experience second to none

Founded in 2001, Nicklaus Children's Hospital's Brain Institute is the nation's first comprehensive medical program dedicated solely to the care of the developing brain. It brings together world-renowned specialists in numerous pediatric neuroscience subspecialties with cumulative clinical experience unparalleled in the United States. The team fosters integrated research and offers the latest in assessment and treatment for children with disorders of the brain, spinal cord and peripheral nerves.

This leadership and commitment to developing new treatments draws children and families from around the world in search of answers to complex medical questions. Many of the program's greatest successes are children who could not be helped at other centers.

Since 2008, the institute has been ranked among the nation's top-tier programs for pediatric neurology and neurosurgery by *U.S. News & World Report*. The clinical and research leadership of the program serves as a beacon to families confronting the uncertainty of a child with a brain disorder, offering the latest treatments and assessment techniques, many of which were developed by the Brain Institute team.

Florida residents benefit from world-class care without having to venture beyond the borders of their home state. And children worldwide are facing brighter futures thanks to the Brain Institute's commitment to advancing frontiers of scientific research and innovative treatment, saving young lives, and improving quality of life and productivity for a lifetime.



This is a place where innovation is a way of life. Where hope supplants fear. And where compassion and breakthrough medicine are brought together to create a better tomorrow for children with brain disorders and the families who love them.

A Tradition of Innovation

Over the past two decades, the Institute's neurospecialists have established a tradition of innovation that has led to international accolades for several of its clinical specialty programs. The Nicklaus Children's Hospital Brain Institute:

- Was one of the first in the world to implant intracranial electrodes and define parameters to guide surgery for medically resistant epilepsy in children with normal magnetic resonance imaging (MRI) scans, leading to the largest successful surgical experience in the world
- Pioneered a cerebral stimulation technique that is now used throughout the world to accurately locate critical brain functions in the child in order to maximize outcomes and safety of epilepsy and brain tumor surgery
- Developed a novel endoscopic technique to remove tumors located deep in the brain
- Was one of the first in the world to apply functional MRI and tractography to define active networks and their connections in the developing brain
- Is a world leader in innovating optical technologies for novel clinical applications
- Was among the first in the nation to use minimally invasive laser methods to remove seizure-causing brain tissue
- Was among the first in the nation to implant pacemaker devices to control seizures in children
- Was among the nation's first to use magnetic-resonance guided focused ultrasound – a form of incisionless surgery – to ablate centrally located brain tumors in young patients experiencing tumor-associated seizures

A Full Spectrum of Care

The Nicklaus Children's Hospital Brain Institute provides state-of-the-art medical and surgical care for children with a full spectrum of neurologic disorders including autism, attention deficit and learning disorders, birth defects, spasticity and movement disorders, headaches, seizures, sleep disturbances, brain and spinal cord tumors, trauma, metabolic conditions, stroke and infections.

Supported by advanced neurodiagnostic technologies, a neurosurgical suite, critical care facilities, and child life services, the physicians develop the latest treatment strategies that are safe and highly effective in meeting the needs of individual children. They also offer investigational clinical trials of the latest pharmacological treatments for a wide range of neurological conditions. Quality of care measures emphasize patient safety and satisfaction.

Children with specific and complex medical needs are treated through comprehensive, multidisciplinary specialty programs that bring together myriad experts from multiple departments to assess and develop treatment plans tailored to the individual child. These programs offer a level of expertise, family directed care, and convenience that few other hospitals in the nation can offer.





Leading-Edge Diagnostics

The Neuromonitoring Center offers world-renowned expertise in invasive brain recording, mapping of critical cerebral function in children, and intraoperative sensory and motor-evoked potential monitoring that contributes to the success of the most challenging epilepsy, brain tumor, cerebral palsy, spina bifida, and brachial plexus reconstruction surgeries. The laboratory offers high-resolution electroencephalogram (EEG) that facilitates detection of even the most subtle abnormalities in the youngest of children. The laboratory also performs an extensive array of routine tests including video-EEG, evoked potentials, and electromyography (EMG). Polysomnograms and sleep latency tests evaluate sleep and apnea disorders.

The Neuroradiology Center is one of the first in the world to apply functional magnetic resonance imaging (MRI) and tractography to define active brain networks and their connection in children, a capability offered at only a few centers in the nation. The center also has the largest experience nationwide with single-photon emission computed tomography (SPECT) scans obtained early during a seizure to locate epileptogenic foci in children. The center offers a full spectrum of neuroimaging diagnostic services, including the latest computed tomography (CT)/MRI scan sequences, angiography and ultrasonography to support the detection of even the most subtle brain abnormalities.

Next-Generation Neurosurgical Suite

Neurosurgeries are conducted in a state-of-the-art neurosurgical suite equipped with advanced neuronavigation systems and an intraoperative MRI. This leading-edge suite provides enhanced efficiency and safety for neurosurgical services and offers a venue for expanded neurosurgical procedures, including functional surgery for epilepsy and movement disorders, and a platform for advanced neuroimaging research.

State-of-the-Art Neuro-Critical Care Units

A dedicated team of highly trained neuro-neonatologists, pediatric neurointensivists and nursing staff take care of neonates and children who are acutely ill as a result of brain injuries, such as hypoxia, trauma, tumors and severe infections, or who have undergone complex neurosurgical procedures. The units feature the most current monitoring equipment to detect seizures or changes in brain oxygenation and intracranial pressure.

Multidisciplinary Clinical Programs: An Integrated Team Approach to Complex Problems

The Nicklaus Children's Hospital Brain Institute is recognized for its comprehensive, multidisciplinary specialty programs, in which all medical resources are brought together for children with specific and complex medical needs to ensure optimal care and communications among team members. Multidisciplinary programs offered include:

Autism/Attention Deficit/Developmental Disorders Program

The program is internationally recognized and offers comprehensive care for autism and other developmental/cognitive disorders in children referred from all over the world. The center also coordinates community outreach projects that include the services of specialized medical and allied healthcare professionals, educational organizations, volunteer programs, and parent support organizations.

Brain Tumor Program

The Brain Tumor Program has the most experience in Florida caring for children with brain and spinal cord tumors. A dedicated team of pediatric neurosurgeons offers minimally invasive and traditional surgical techniques, supported by continuous intraoperative monitoring and navigation techniques to optimize preservation of healthy brain tissue and patient safety. The Brain Tumor Program is the only service in South Florida offering thermal laser ablation for benign brain tumors. Novel treatments include stem cell transplantation with high-dose chemotherapy and antiangiogenesis therapy. The multidisciplinary care team features neurosurgeons, neuro-oncologists, radiation-oncologists, neuropsychologists, and endocrinologists who collaborate to optimize care for children with brain and spinal cord tumors.

Brachial Plexus and Peripheral Nerve Injury Program

The Brachial Plexus and Peripheral Nerve Injury Program features a multidisciplinary team of neurology, neurosurgery, plastic and orthopedic surgery specialists. The team is supported by physical and occupational therapists, offering comprehensive management and rehabilitation for children with peripheral nerve injury.

Concussion and Brain Injury Program

The Concussion and Brain Injury Program provides for management and support for children who have sustained a brain injury, including concussions or more serious events. The program includes neurologic evaluation and assessment, care planning, support for resumption of school and other activities, and ongoing management as needed.

Congenital Spine Diseases Program

The multidisciplinary Congenital Spine Diseases Program brings together a comprehensive team to treat children with a full spectrum of spinal disorders. The team includes neurosurgeons, spinal surgeons and rehabilitation specialists who collaborate to provide a comprehensive care plan to support children and families. The surgical team's extensive experience, supported by state-of-the-art intraoperative neuromonitoring and other technologies, enhances surgical safety and preservation of spinal function.

Comprehensive Epilepsy Program

A flagship of the Nicklaus Children's Brain Institute is the Comprehensive Epilepsy Program, founded in 1980. The program is an international leader in the diagnosis, and medical and surgical treatment of pediatric epilepsy, offering treatment options that are available at only a handful of centers worldwide. Many of the program's greatest success stories involve children who could not be helped by other institutions. Highlights of the program include patient access to new and emerging medications for management of epilepsy as well as surgical interventions – including minimally invasive methods – for children with medically resistant epilepsy. Epilepsy surgery is supported by advanced brain mapping techniques that support optimal preservation of healthy brain tissue, contributing to patient safety and outcomes that are consistently among the best in the world.

Headache Program

Led by a dedicated specialist, the program provides comprehensive care for migraines and other headache disorders in children, including the latest innovative treatments to promote comfort and function for children experiencing headache disorders.

Hydrocephalus Program

The Hydrocephalus Program features one of the nation's most experienced teams in evaluation and treatment of hydrocephalus. The program offers prenatal and newborn evaluations and the latest minimally invasive endoscopic surgical methods, enabling treatment without shunt placement.

Ion-Channel Epilepsy Program

The Ion-Channel Epilepsy (Dravet syndrome) Program provides comprehensive care for children with genetically based epilepsy referred from all over the country. The multidisciplinary team includes neurologists and genetics specialists and offers diagnostic screening and the latest medical management, including participation in emerging clinical trials.

NeuroCardiac and Development Program

For some children with complex congenital heart disease, academic and behavioral and developmental issues may arise during the growing years. The NeuroCardiac and Development Program collaborates with the child's primary care physician and cardiologist to support coordinated multidisciplinary care to ensure the best possible neurodevelopmental outcomes and quality of life. Children identified as at risk are assessed at key intervals to ensure early identification and treatment of any neurodevelopmental issues. These assessments support the team in engaging resources to benefit the child as he or she enters school, becomes active in sports and achieves other milestones.

Neurocritical Care Program

Nicklaus Children's neurocritical care team, comprised of board-certified neurointensivists, neurosurgeons and neurologists, offers extensive expertise in the diagnosis and management of traumatic brain injuries, nervous system infections, hypoxic injuries, neuro-immune disorders, strokes, metabolic disorders, and severe uncontrolled epilepsies. The team, which provides care for a large volume of neurocritical care patients, offers advanced diagnostic and neuromonitoring techniques, and innovative management options, including therapeutic hypothermia, medication research trials, surgical interventions and evidence-based diets.



Neurogenetics-Metabolic Program

The Neurogenetics-Metabolic Program is a tertiary referral site for children with genetic-metabolic disorders affecting the brain. It offers multidisciplinary care and the latest in treatment options, including enzyme replacement trials. The program participates in Florida's expanded newborn screening initiative and educates physicians and allied health professionals to diagnose these disorders early and reduce many of the severe neurological complications.

Neuromuscular Program

The Neuromuscular Program offers evaluation, treatment and support for children with a full range of neuromuscular disorders, including cerebral palsy, muscular dystrophies, neuropathies, spinal muscular atrophy and congenital myopathies. The program brings together a multidisciplinary team, including neurologists, orthopedists, cardiologists, pulmonologists and geneticists to support the care of each individual child.

Prenatal/Fetal Disorders Program

A comprehensive program is being established to address the complex needs of high-risk fetuses to permit prenatal diagnoses and allow early medical and surgical interventions.

Rare Chromosomal Disorders Program

The Rare Chromosomal Disorders Program offers a multidisciplinary team of geneticists, neurologists, and other specialists to address the complex needs of children with rare chromosomal disorders that often have multisystem involvement.

Sleep Disorders Program

Supported by one of the largest pediatric polysomnography laboratories in the nation, the Sleep Disorders Program provides comprehensive management for sleep disorders and the impact they have on development.

Spasticity and Movement Disorders

The Spasticity and Movement Disorders Program, the only service of its type in Florida, offers comprehensive care for children with cerebral palsy and spasticity, including advanced medical treatments, selective dorsal rhizotomy/baclofen pump insertions and orthopedic procedures to correct deformities. A multidisciplinary team comprised of neurosurgeons, orthopedic surgeons, neurologists, urologists, physical medicine and rehabilitation specialists offers personalized, tailored treatments to meet each child's individual needs, maximize movement, comfort and quality of life.

Tuberous Sclerosis Program

The Tuberous Sclerosis Program is one of the first comprehensive programs for children in the United States, and offers expertise in multisystem management of uncontrolled epilepsy and cardiac involvement. Offerings include some of the safest, and least invasive strategies, including laser ablation to cure intractable seizures, management of infantile spasms, as well as use of the ketogenic diet.



Novel Umbrella Centers

The Nicklaus Children's Hospital Brain Institute has begun establishing centers to provide care to serve the overarching neurological needs of children and families through new models of care delivery. The centers include:

Brain Wellness Center

The Brain Wellness Center promotes screening/prevention and neuroprotection initiatives with the goal of optimizing neurological development in children. Offerings will feature neuromodulation therapies and ancillary services including yoga classes and back-to-school neuro-rehab care for children who have sustained brain injuries. The program will focus on the needs of children during critical brain development ages, from fetal/prenatal stages through adolescence.

NeuroHome Center

The goal of the NeuroHome Center is to offer around-the-clock telemedicine access for children and families who may experience a neurological urgent care need. The center will use state-of-art virtual technologies, including telemedicine so that families can have immediate access to the best neurological care without the need for travel.



Research Initiatives and Academic Affiliations

To ensure that the Nicklaus Children's Hospital Brain Institute remains solidly at the forefront in its field, a team of neuroscientists has forged active collaborations with universities and industry partners to advance care.

Brain Function and Neuromodulation

Several scientists associated with the Brain Institute are developing advanced neuroengineering techniques to study functional dynamics and identify the most subtle abnormalities underlying neurological disorders. These studies will facilitate diagnoses, promote neuromonitoring in ambulatory and critical care settings and enhance neurosurgical guidance. They also support the development of novel neuromodulation therapies.

Non-Invasive Neurological Therapies

The Brain Institute has begun research on a revolutionary technology for noninvasive, effective and safe treatment of a large variety of common or devastating brain disorders. It allows:

- Targeted high-precision focal ablations of brain tissue. Benefits of this outpatient procedure compared to traditional methods include faster recovery and reduced pain.
- Targeted therapeutics by selective opening of the blood-brain-barrier to achieve greater concentrations of medications at specific brain sites to enhance efficacy with minimal side effects.

Pharmacogenomics

The Brain Institute has been involved in research on genomic markers to optimize the selection of medical therapies, enhancing their efficacy and safety. The initial focus of this personalized medicine strategy is on ion-channel epilepsies and brain tumors.



Educational/Social Initiatives

The Nicklaus Children's Hospital Brain Institute team also excels in education and social initiatives. It offers fellowship training for physicians seeking neurology and neurosurgery specialization from throughout the world. More than two-thirds of the fellows trained by the program during the past 25 years came from outside the United States. The Institute also hosted the world's first International Pediatric Epilepsy Surgery Symposium in 1989.

As part of its holistic approach to the care of children with neurological disorders, the Nicklaus Children's Hospital Brain Institute also organizes annual camps where children with epilepsy can share common experiences in a medically supervised setting.

The Comfort of Knowing You're With Nicklaus Children's Hospital

When you choose the Nicklaus Children's Brain Institute, you know you are receiving care at one of the finest hospitals in the country dedicated solely to children. Founded in 1950 by Variety Clubs International, Nicklaus Children's Hospital is South Florida's only licensed specialty hospital *exclusively* for children, with nearly 800 attending physicians and more than 475 pediatric subspecialists. The 309-bed hospital, known as Miami Children's Hospital from 1983 through 2014, is renowned for excellence in all aspects of pediatric medicine, with many programs routinely ranked among the nation's best by *U.S. News & World Report*. The hospital is also home to the largest pediatric teaching program in the southeastern United States and has been designated an American Nurses Credentialing Center (ANCC) Magnet facility, the nursing profession's most prestigious institutional honor. For more information, please visit nicklauschildrens.org.

Business Card

