

BARROW Neurological Institute

at **PHOENIX CHILDREN'S Hospital**

Winter 2015

100% for Brody



When three-year-old Brody Moore caught a stomach bug that had been going around among the neighborhood kids, his parents Christine and Michael didn't worry too much. They figured that like the others who got it, his symptoms would subside and the illness would pass.

But that didn't happen.

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Pediatric Neurocritical Care and Stroke Program: What You Should Know

When a child suffers a stroke, diagnosing the condition quickly and accurately is key. It's important for physicians to immediately identify, evaluate and treat pediatric stroke.

That's why Barrow Neurological Institute at Phoenix Children's Hospital created the comprehensive Pediatric Neurocritical Care and Stroke Program, a multidisciplinary team with availability 24 hours a day, seven days a week that brings together physicians, nurses, therapists, social workers and education coordinators from several departments, including neurosurgery, neurology, the pediatric intensive care unit, neuroradiology, epilepsy and rehabilitation.

The program provides children with severe neurological injuries immediate and continual access to state-of-the-art technology, diagnostic and monitoring services, along with therapeutic guidance from professional care providers with extensive experience and training in the area of pediatric neurocritical and stroke care. Stroke patients are treated using medication neuroprotective measures, which include maintaining adequate blood pressure and supplying fluids.

Patients may also require aggressive physical rehabilitation. Following inpatient discharge, our team follows up with patients in specialized stroke, traumatic brain injury and cardiac arrest clinics to ensure all patients are provided with the necessary evaluation and treatment. Neuropsychological testing, formal sleep studies and services, rehabilitation therapies, cognitive rehabilitation and epilepsy consultations are provided if necessary to improve the quality of life of our young patients.

Founded in 2012, the Pediatric Neurocritical Care and Stroke Program is made of a core group of physicians and neuro-intensivists, who assume an advanced subspecialized consultation role for patients with severe neurological injury. These physicians have

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“Our goal is to deliver the best patient- and family-centered care to each child who comes to us.”

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P. David Adelson, MD
 Director, Barrow Neurological Institute at Phoenix Children's Hospital
 Chief, Pediatric Neurosurgery/
 Children's Neurosciences

From the Director

Dear Barrow Neurological Institute at Phoenix Children's Hospital Supporter,

Brody is a young child who suddenly had a decline in his neurological status. Physicians at a local hospital determined he had a progressive stroke in his brain and brainstem. He received supportive care and his family was told that he would likely die due to the location of his stroke. It was a devastating conversation, but despite the complexity of the problem and the high risk for long term problems, Brody was transferred to Barrow Neurological Institute at Phoenix Children's Hospital. Once there, he underwent intensive and state-of-the-art treatment and is now on the road to recovery.

Stroke, or lack of sufficient blood flow to the brain, causes part of the brain to die. It is a very common neurological disease and a leading cause of death and disability in our older population. However, stroke is not a disease that affects just the elderly. Thousands of children suffer strokes every year in the United States from incidents like difficult childbirth leading to cerebral palsy to abnormal clotting, causing an obstruction of normal cerebral blood flow.

At Barrow at Phoenix Children's we believe it is important to provide the highest level of stroke care for pediatric patients, despite it being relatively uncommon to other pediatric diseases. The Pediatric Neurocritical Care and Stroke Program at Barrow at Phoenix Children's, provides comprehensive treatment and care for those children who suffer strokes, as well as lead the way for early diagnosis and intervention to optimize outcomes for these children.

John Condie, MD, pediatric neurologist, along with pediatric intensivists Paul Liu, MD, and Sandra Buttram, MD, lead the multidisciplinary team that provides evaluation, management and treatment for children of all ages who have suffered a stroke and those who are at increased risk for neurological problems because of other medical conditions.

As part of an intense need to understand this complex problem, Barrow at Phoenix Children's recently received a \$2.8 million grant from the National Institutes of Health as part of our partnership with the Translational Genomics Research Institute and Barrow Neurological Institute at St. Joseph's Medical Center and Hospital to study the impact of hemorrhagic stroke and brain injury. Specifically, our focus will be on intraventricular hemorrhage in newborns in the neonatal intensive care unit and evaluate

the potential of biomarkers to improve our diagnosis and prognosis of these types of hemorrhages, but also to evaluate the impact of treatment on outcomes. This study will get us one step closer to learning what is unique in pediatric stroke so we can provide the best quality care and improve the long term outcomes for these children. It will help us increase the accuracy of current treatments, as well as create new ones.

This issue of our newsletter provides a short introduction to our Pediatric Neurocritical Care and Stroke Program, including an overview of our services and the story of Brody, our young boy who suffered a stroke after catching a viral illness.

Additionally, I am pleased to tell you that in March 2016, we're looking forward to the 20th Annual Children's Neuroscience Symposium on March 5 through 8 that will take place at The Scottsdale Plaza Resort in Scottsdale, Arizona. We'll feature nationally prominent faculty and guest speakers to provide information and updates on the latest in pediatric neuroscience. All are welcome and we encourage you to visit the event website for more information at barrow.phoenixchildrens.com/CNS2016.

If you haven't yet read our 2014 Annual Report, you can find it at barrow.phoenixchildrens.org/about-barrow-at-phoenix-childrens/annual-report. It contains an overview of our comprehensive neurological services, heartwarming patient stories and details about our research and educational efforts to improve the health and quality of life of children with neurological and psychiatric diseases and disorders.

Our success is directly related to your support. We have many areas in need. Your contributions, both financial and personal, are well appreciated. Please think of us this holiday season.

Lastly, I cannot reiterate enough, please continue to send me suggestions and comments about improving this publication, and any way we can enhance the care and services we provide to the children in our community and beyond.

Thank you!

P. David Adelson, MD

Pediatric Neurocritical Care and Stroke Program: What You Should Know

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advanced knowledge of real-time interpretation of electroencephalogram (EEG) waveforms, trends and integrative patient-specific neurological imaging interpretation, multimodal neurological monitoring data, bedside neurological exam and the neurological consequences of complex intensive care unit disorders, medications and interventions.

The program is overseen by P. David Adelson, MD, director of Barrow at Phoenix Children's and chief of pediatric neurosurgery. John Condie, MD, co-director of the program and pediatric neurologist specializing in stroke, is dual board-certified in child neurology and neurocritical care. He is an active member of the International Pediatric Stroke Society and serves as the primary investigator for research and participation through the society. Sandra Buttram, MD, the other co-director of the program, is triple board-certified in pediatrics, pediatric critical care and neurocritical care. She is an active primary investigator for several multi-institutional projects that relate to the treatment and prognosis of patients with severe neurological injuries.

In 2015, the program hired its first fellow, Tara Mangum, MD, for the one-year Pediatric Neurocritical Care Fellowship.

Stroke care is available at Phoenix Children's Hospital at any time. For more information or to refer a patient, call (602) 933-1000 and request the Pediatric Neurocritical Care and Stroke Program team be paged.



When a child suffers a stroke, diagnosing the condition quickly and accurately is key.

The Pediatric Neurocritical Care and Stroke Program treats patients with many types of disorders, which include:

- Severe traumatic brain injury
- Acute arterial and venous strokes
- Status epilepticus and refractory status epilepticus
- Severe bacterial and viral infections of the CNS
- Cerebral anoxia due to cardiac arrest and drowning
- Abusive head trauma
- Intracranial hemorrhage
- Severe metabolic, hepatic and inflammatory encephalopathy

Pediatric Stroke Team



John Condie, MD
 Pediatric neurologist specializing in stroke
 Co-director, Pediatric Neurocritical Care and Stroke Program



Sandra Buttram, MD
 Pediatric neurologist
 Co-director, Pediatric Neurocritical Care and Stroke Program



Paul Miu, MD
 Intensivist physician

How to Refer:
 (602) 933-1000

Barrow at Phoenix Children's Epilepsy Center Recognized

Barrow Neurological Institute at Phoenix Children's Hospital is proud to announce it was again recognized by the National Association of Epilepsy Centers (NAEC) as a Level 4 epilepsy center. Level 4 epilepsy centers have the professional expertise and facilities to provide the highest-level of medical and surgical evaluation and treatment for patients with complex epilepsy. Congratulations to John Kerrigan, MD; Randa Jarrar, MD; Matthew Troester, MD; P. David Adelson, MD; Makram Obeid, MD; Korwyn Williams, MD; and all involved who make Barrow at Phoenix Children's Arizona's only NAEC-designated Level 4 epilepsy center.

Seven Physicians Recognized as Top Docs

Congratulations to the following Barrow at Phoenix Children's physicians for being selected as *Phoenix Magazine's* Top Doctors for 2015: Robin Blitz, MD, developmental pediatrics director; Saunder Bernes, MD, pediatric neurology; Allen Kaplan, MD, pediatric neurology; Kara Lewis, MD, pediatric neurology; Randall Ricardi, DO, psychiatry; Matthew Troester, MD, pediatric neurology; and Jacob Venter, MD, psychiatry.

Two Physicians Recognized as Castle Connolly Top Doctors

Congratulations to Robin Blitz, MD, developmental pediatrics director, and P. David Adelson, MD, Barrow at Phoenix Children's director and pediatric neurosurgery division chief, for being named Castle Connolly Top Doctors for 2015. Castle Connolly is recognized as one of the most objective physician-rating organizations in the U.S.

We are dedicated to helping children achieve their highest level of independence through the use of specialized pediatric clinical interventions and state-of-the-art pediatric equipment and age appropriate, developmentally selected activities.



Michael Krueer, MD
Neurology

Bethany Norton
Neurogenetics Program
Manager

Raul Echeverri Guerra, MD
Neuroscience Fellow

Tara Mangum, MD
Stroke Fellow

Laura Freeman, PhD
Neuropsychology Fellow

Jamal McClendon, MD
Neurosurgery

Christina Ortega, PsyD
Neuropsychology Fellow

Funda Bachini, MD
Psychiatry

Danica Denton, DO
Psychiatry

Nadia Dominquez-Molina, MD
Neurology



The 20th Annual Children's Neuroscience Symposium will be held March 5 – 8, 2016 at the Scottsdale Plaza Resort in Scottsdale, Arizona. This symposium features top physicians, nationally prominent faculty and guest speakers. Discussions will focus on the latest topics and case studies in pediatric neuroscience that will give pediatric providers a robust toolkit that includes that latest information to assess neurological conditions, manage patient care and tips on working collaboratively with the specialist in providing the most comprehensive care.

We're proud to welcome keynote speaker, Margaret L. Bauman, MD, a distinguished pediatric neurologist and research investigator. Dr. Bauman has been a pioneer in the study and treatment of autism for the past 25 years. As one of the world's foremost physicians in her field, she is highly respected for the outstanding clinical care she provides. For more information on the symposium and to register, visit phoenixchildrens.org/CNS2016. All are welcome.

Autism Comorbidities: Care for the Child with Autism in a Medical Home, Jan. 9

Pediatricians and primary care physicians are invited to attend Autism Comorbidities: Care for the Child with Autism in a Medical Home on January 9, 2016 in the Melvin L. Cohen Conference Center. The conference will provide training on diagnosing children with autism spectrum disorders in practice and via telemedicine. The conference is organized by Early Access to Care – AZ, a program sponsored by Phoenix Children's Hospital that equips providers around Arizona with the training needed to diagnose and treat autism spectrum disorders. Registration is now open. Visit barrow.phoenixchildrens.org for more information.

Fifth Annual Current Topics in Sports Medicine

Join us at Concussions: 2016 Conference, held in conjunction with the CACTIS Foundation, on March 5, 2016 at the Scottsdale Plaza Resort. The conference is designed to educate and inform physicians, certified athletic trainers (ATCs), health care providers and all specialists managing sports injuries and concussions. Special pricing is available for attendees of the conference and symposium. To register, visit events.phoenixchildrens.org/3.

\$2.8 million NIH grant will help study traumatic brain injury

The National Institutes of Health (NIH) has given a \$2.8 million grant to Barrow Neurological Institute at Phoenix Children's Hospital, Translational Genomics Research Institute (TGen) and Barrow Neurological Institute at St. Joseph's Hospital and Medical Center to study traumatic brain injury. As part of the grant, researchers with Barrow at Phoenix Children's will investigate the effects of intraventricular hemorrhage – a form of bleeding in the brain – in newborn infants. Congratulations to Jorge Arango, MD, and P. David Adelson, MD, for their work in this area of research.

Barrow at Phoenix Children's ranked #14 in the country by U.S. News and World Report

In June 2015, *U.S. News and World Report's* Best Children's Hospitals list ranked neurology and neurosurgery at Phoenix Children's Hospital, represented by Barrow at Phoenix Children's, as #14 in the country. U.S. News gathered clinical data from a detailed questionnaire sent to 184 pediatric hospitals. One-sixth of the score came from an annual survey of pediatric subspecialists and subspecialists in each specialty. They were asked where they would send the sickest children in their specialty, setting aside considerations of location and expense.



100% for Brody

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Brody's dizziness, vomiting and fatigue didn't go away. A pediatrician said the dizziness was likely from dehydration. Then, a family vacation was interrupted by his continuing symptoms. Other physicians who saw Brody advised his parents that the symptoms could be the boy wanting attention. But Christine knew better.

"We were really worried that he had something else wrong," Christine said. "We didn't know how bad it was but we knew it had to be something else."

Nine weeks after he first fell ill, Brody was brought to Phoenix Children's Hospital. A computerized tomography (CT) scan showed he was having strokes. The Pediatric Neurocritical Care Program team at Barrow Neurological Institute at Phoenix Children's Hospital immediately stepped in. The multidisciplinary program is comprised of physicians, nurses and therapists who treat patients from diagnosis to rehabilitation.

The team performed protective brain procedures on Brody, including a cooling technique that places a liquid-filled blanket that circulates cold temperatures underneath the body to help "reboot" the brain and protect it from damage. He also underwent multiple tests to keep an eye on his brain activity.

P. David Adelson, MD, chief of pediatric neurosurgery and director of Barrow at Phoenix Children's, performed decompression surgery on Brody, which allowed the swelling in his brain to decrease. Immediately after his treatment began, Brody could talk again and was making strides toward recovery.

"He didn't stop having strokes until he came to Phoenix Children's," Christine said. "We have loved everything here, including Dr. Adelson and his team."

After the surgery, Brody's therapy regimen began. For three hours a day, he attended inpatient occupational, physical and speech therapy sessions at Frances H. McClelland Rehabilitation Center at Phoenix Children's Hospital.

Brody's recovery looks promising, according to his therapists. His speech and language abilities have nearly returned to normal, he found his balance again and is able to pull himself up to a standing position, and is anticipated to begin walking independently again soon.

He was discharged from his inpatient stay in mid-September, nearly two weeks after he was first admitted. He'll continue his rehabilitation and therapy.

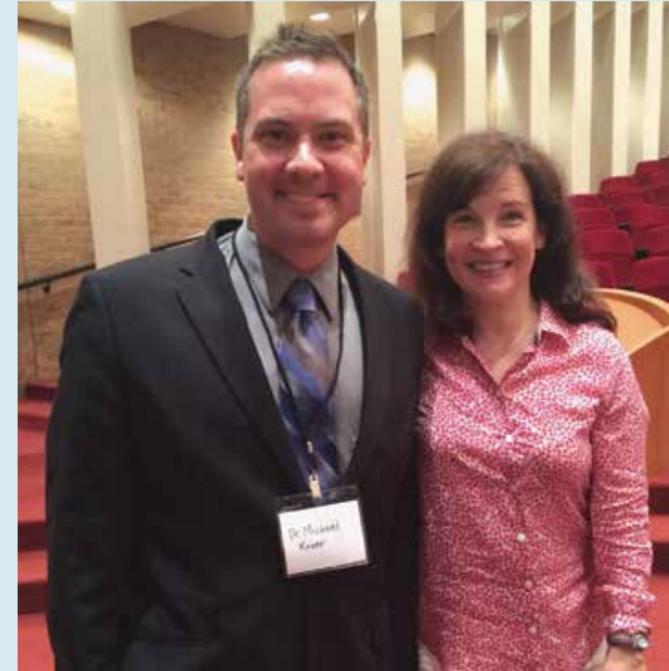
"We are amazed at his progress," Christine said. "It is amazing to Michael and me that in eight weeks, we went from critical care to laughing, talking and almost walking because of the amazing care he received."



"We have loved everything here, including Dr. Adelson and his team."

News and Recognition

Michael Kruer, MD, who leads the spasticity and movement disorders program at Barrow at Phoenix Children's, spoke at the first annual Cerebral Palsy Prep for Life Conference at Texas Scottish Rite Hospital in Dallas, Texas as an invited guest of the Alyssa V. Phillips Foundation. He spoke about the diagnostic treatment and implications of our ongoing work on the genetic basis of cerebral palsy.



Michael Kruer, MD, (above) stands with Dr. Jan Brunstrom-Hernandez, the organizer of the first annual Cerebral Palsy Prep for Life Conference at Texas Scottish Rite Hospital in Dallas, Texas. He presented on the diagnostic and treatment implications of ongoing work on the genetic basis of cerebral palsy.



Jonathan Lifshitz, PhD, director of Translational Neurotrauma Research Program, was invited to the International Pediatric Brain Injury Conference in England.

Ruth Bristol, MD, co-director of the craniofacial program at Barrow at Phoenix Children's, spoke at the American Association of Neurological Surgeons Conference in Washington, D.C. She discussed techniques for managing blood loss in craniosynostosis surgery. She also lectured this year in Tokyo, Japan.

P. David Adelson, MD, Barrow at Phoenix Children's director and division chief of neurosurgery, lectured on epilepsy surgery in Children at the European Association of Neurosurgical Societies Training Course in Lisbon, Portugal. This year, Dr. Adelson also lectured at conferences in Spain, Denmark, Germany and Italy.



P. David Adelson, MD, (left) is with Professor Johannes Schram from Bonn, Germany, at the European Association of Neurosurgical Societies Training Course in Lisbon, Portugal. At the conference, Dr. Adelson presented a series of lectures on epilepsy surgery in children.

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barrow.phoenixchildrens.org

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Supporting Children's Neurosciences

BARROW Neurological Institute at **PHOENIX CHILDREN'S Hospital**

While you prepare for your own future, you have the opportunity to impact the future of our patients with a legacy gift or bequest to Barrow Neurological Institute at Phoenix Children's Hospital. Legacy gifts and bequests have an enduring impact on the children treated at Barrow Neurological Institute at Phoenix Children's Hospital – patients who need our specialized care. Planned giving enables you to focus your philanthropic goals, while realizing significant income and tax benefits. Your visionary gift can help us provide a brighter future for our patients as you plan for your own.

We thank our supporters whose investments help us in the development of new paradigms for clinical care and cures for children. You can express your support of the Institute in ways that complement your own personal interests.

WHAT PHILANTHROPY SUPPORTS:

- Development, enhancement of existing and/or new clinical programs
- Funding cutting-edge programs in clinical, translational and laboratory experimental research
- Community and professional educational initiatives
- Institute's infrastructure supporting the biorepository and bioinformatics and data center.

WAYS TO GIVE:

- Make a memorial or honor gift
- Name an Institute's Fund
- Contribute to the Director's Fund
- Provide funds for Endowed Chairs for research and program leadership

**For more information call Kelly Hurter at (602) 933-2675
or visit phoenixchildrens.com/DonateBarrow**