



Neuro-Oncology Care Done Differently



When your child needs a hospital, everything matters.



The Neuro-Oncology Program's clinical expertise and comprehensive care options — coupled with its extensive research program and a wealth of supporting programs and resources throughout the hospital — make stories like Sophia's possible.

#SophiaTheBrave!

Meet the Difference: Internationally Renowned Physicians



Neuro-Oncology at Nationwide Children's

Nationwide Children's Hospital is incredibly excited to welcome Maryam Fouladi, MD, MSc, FRCP as co-director of the Neuro-Oncology Program.

As an internationally known expert in pediatric brain tumors, Dr. Fouladi brings a wealth of knowledge to continue the unprecedented program built by previous co-director Jonathan Finlay, MB, ChB, FRC and neurosurgical co-director Jeffrey Leonard, MD.

"As an investigator and a clinical provider, I have a deep appreciation of the symbiotic relationship between research and treatment. Nationwide Children's is uniquely positioned to accelerate every area of pediatric neuro-oncology, and I'm excited to be a part of it."

- Maryam Fouladi, MD, MSc, FRCP, co-director, of the Neuro-Oncology Program

Dr. Fouladi will continue develop and conduct phase I clinical trials, with a particular focus on diffuse intrinsic pontine gliomas (DIPG), and will continue her work as the founder and chair of the DIPG Registry and CONNECT, an international consortium focused on developing and testing novel therapies in early-phase clinical trials.

Dr. Fouladi serves as chair of the Collaborative Network for Neuro-Oncology Clinical Trials and the CNS Committee of the Children's Oncology Group.

Prior to joining Nationwide Children's, Dr. Fouladi trained at the Hospital for Sick Children and subsequently at St Jude Children's Research Hospital where she remained on Faculty for 8 years, before being recruited to direct the Brain Tumor Center at Cincinnati Children's Hospital Medical Center. There she rose through the ranks to become an endowed professor and the Marjory J. Johnson Endowed Chair in Brain Tumor Translational Research. She received her medical degree from the University of Toronto.

"We are fortunate to have a world-renowned pediatric neuro-oncologist in Dr. Fouladi take over our program from another international leader like Dr. Finlay. Dr. Fouladi has a strong sense of purpose and vision to find cures for children with brain tumors, and we know she will take this program and the field to new heights."

- Timothy P. Cripe, MD, PhD, chief of the Division of Hematology and Oncology

Meet the Difference: Internationally Renowned Surgeons



Neuro-Oncology at Nationwide Children's

Jeffrey Leonard, MD, is co-director of the Neuro-Oncology Program, chief of the Section of Neurosurgery at Nationwide Children's Hospital, a principal investigator in the Center for Childhood Cancer and Blood Diseases at the Abigail Wexner Research Institute, and a professor of Neurological Surgery at The Ohio State University College of Medicine.

As chief of Neurosurgery, Dr. Leonard has helped to cultivate the full spectrum of care for neurological patients including the Neuro-Oncology Comprehensive Clinic. Constant innovation and full-circle care are part of what has led the Neurology and Neurosurgery Programs at Nationwide Children's to be consistently ranked as one of the best in the country by *U.S. News & World Report*.

"I chose to come to Nationwide Children's because of its commitment to cultivate excellence in every facet of care. Our Neuro-Oncology Program is proof of that. We're known internationally thanks the outstanding capabilities of our team and support from our clinical peers around the world."

- Jeffrey Leonard, MD, co-director, Neuro-Oncology Program

His efforts in the investigative areas of neurosurgery and neuro-oncology include groundbreaking work with Dr. Finlay exploring the role of exosomes in medulloblastomas. His laboratory at Nationwide Children's and work at The James Comprehensive Care Center are primarily directed at investigating molecular pathways in gliomas, and in particular, pilocytic astrocytomas.

In addition to his extensive academic work, Dr. Leonard is a member of pediatric neuro-oncology organizations such as The Society for Neuro-Oncology, The International Society for Pediatric Neuro-Oncology and the American Society of Pediatric Neurosurgeons. He was elected to the editorial board of the *Journal of Neurosurgery: Pediatrics* in 2019.

Prior to joining Nationwide Children's, Dr. Leonard spent 11 years as a faculty member at Washington University of St. Louis and a member of the neuro-oncology team. During that time, he also served as the co-director for the Pediatric Neurocritical Care Program and the Neuro-Oncology program at St. Louis Children's Hospital.

"Dr. Leonard's collaborative leadership style and dedication to research has enabled the creation of one of the most unique and comprehensive neuro-oncology programs in the country. He fosters a culture of constant communication and thoughtful problem-solving as a team, and it shows in the quality of our patient care."

- Timothy P. Cripe, MD, PhD, chief of the Division of Hematology and Oncology

Experience the Difference: Comprehensive and Compassionate Care

Cancer Genomics and Genetics

By combining world-class genomic and genetics expertise with clinical specialists uniquely trained to translate laboratory findings to the clinic, personalized cancer therapy is now a reality for many neuro-oncology patients whose cancer has not responded to traditional therapies, or patients who have relapsed or are at high risk for relapse.

This is done through our Institute for Genomic Medicine's (IGM) Cancer Genomics Protocol — a comprehensive clinical- and research-based genomic profile intended to inform diagnosis, aid in treatment decisions, evaluate eligibility for certain trials and therapies, and offer information on prognosis. More than 170 patients received genomic profiling through this protocol in its first 2.5 years, and 93% of tests resulted in medically meaningful information for patients' diagnosis or treatment.

In 2021, the IGM will begin to offer genetic tumor profiles as clinically available tests to support even more physicians and patients. In addition, new international partnerships, participation in research consortia and widespread data sharing will further aid IGM's novel research and therapeutic development in neuro-oncology and rare childhood cancers.

Neuropathology

Patients at Nationwide Children's have the benefit of an entire team of pediatric neuropathologists onsite to speed the proper diagnosis and grading of tumors. In addition to working on each of our own patient's cases, our neuropathologists serve as central reviewers for a wide range of international consortia and cooperative group trials, including Children's Oncology Group (COG) trials for ependymomas, high grade gliomas/astrocytomas and medulloblastomas.

In addition, they perform central pathology review for the NEXT Consortium international Head Start-4 trials for medulloblastomas and other CNS embryonal tumors, the prospective phase II GEmprox trial for recurrent primary CNS germ cell tumors, "Tumor Paint" trials and many others. The team will also serve as neuropathology experts for the hospital's participation in the Pediatric Brain Tumor Consortium.

"Few institutions combine this level of neuropathology and biopathology, genomics, immunotherapy, basic science and clinical research infrastructure and expertise under one roof, and in such a collaborative way. The sense of teamwork here is unparalleled—everyone is working together to make things better for patients. This is the spirit and set-up that will help us reach the next horizon for pediatric brain tumor therapy."

- Dr. Maryam Fouladi, co-director, Neuro-Oncology

Neuroradiology

The Department of Radiology provides comprehensive imaging resources for neuro-oncology patients, with a focus on multidisciplinary integration and translational patient care. The Advanced Neuroimaging Core offers cutting-edge imaging technologies and the latest developments in acquisition, analysis and visualization capabilities across the spectrum of pediatric neurological disorders.

We provide advanced tumor imaging, with support from experienced technologists and child life specialists. All examinations are supervised and interpreted by expert subspecialty neuroradiologists. Weekly neuro-oncology tumor boards are conducted with detailed team reviews of imaging and clinical findings, thus ensuring the best possible diagnosis and treatment planning options for our patients.

Survivorship

The Oncology Long-Term Follow-Up Clinic offers ongoing services to patients who were treated for any form of pediatric cancer. Visits include time with an oncologist, nurse practitioner and nurse clinician, social worker, psychologist, dentist, genetics counselor and nutritionist. Individualized advice and education are available to patients (no matter where they received their original treatment) as they age and transition to college or the work force, relocate, start a family or experience other life changes.

Our Survivorship Program adheres to Children's Oncology Group standards for helping survivors with their long-term follow-up care. It also offers referral services to help link survivors to other resources that can benefit their current and future health and wellbeing.

Fertility

Improvements in treatments mean an increasing number of children and adolescents survive to adulthood and consider having kids of their own. However, some cancer therapies may cause infertility, which can hurt patients' future quality of life.

That's why Nationwide Children's offers a comprehensive Fertility and Reproductive Health Program. Specialists in pediatric endocrinology, oncology, gynecology, urology and psychology collaborate to provide a range of preservation options before cancer treatment begins. The program also offers reproductive counseling on an ongoing basis and engages in clinical research to improve the experience and services.

Physical Medicine and Rehabilitation

As part of our weekly Comprehensive Care Clinic, our rehabilitation specialists work with neuro-oncology patients to maintain or regain physical and occupational abilities that may be compromised due to disease or therapy side effects. This helps our patients maximize quality of life and avoid or adapt effectively to any permanent loss in function.

That's why Nationwide Children's offers a comprehensive Fertility and Reproductive Health Program. Specialists in pediatric endocrinology, oncology, gynecology, urology and psychology collaborate to provide a range of preservation options before cancer treatment begins. The program also offers reproductive counseling on an ongoing basis and engages in clinical research to improve the experience and services.

The Neuro-Oncology Program By the Numbers

14

PEDIATRIC NEURO-ONCOLOGISTS
AND NEUROSURGEONS

3

CHILD PSYCHOLOGISTS

3

PATHOLOGISTS

1

ADVANCED PRACTICE NURSE

18+

ONGOING NEURO-ONCOLOGY
CLINICAL TRIALS

50+

CENTERS WORLDWIDE IN THE
HEAD START 4 CLINICAL TRIAL

905

PATIENT VISITS
OCTOBER '18 - SEPT '19

8

NEURORADIOLOGISTS

Additional support from a team of nurse navigators,
social workers, school liaisons and child life specialists.



Meet the Difference: The Future of Neuro-Oncology Research and Innovation

Developing Innovative Treatments for Relapsed Brain Tumors

Nationwide Children's pediatric neuro-oncologist Ralph Salloum, MD, is the site's co-Primary Investigator of The Pediatric Brain Tumor Consortium (PBTC), through which he leads two Phase I studies testing new targeted therapies for patients with recurrent and refractory CNS tumors.

"Nationwide Children's recent joining of the PBTC is a reflection of the institution's scientific excellence, its clinical expertise in pediatric neuro-oncology and exceptional infrastructure in clinical trials. This is an exciting opportunity to expand our patients' access to new treatments and clinical trials and in turn offer these options to children with relapsed CNS tumors in our partner institutions." – Ralph Salloum, MD

The PBTC includes 16 academic centers and children's hospitals located in the United States and Canada.

Next Generation of Medulloblastoma Trials

In collaboration with national and international researchers, Dr. Salloum is leading a clinical trial studying a new investigational drug, CX-4945, to specifically target medulloblastoma of the SHH subgroup in children, adolescents and adults with progressive disease. Additionally, he will lead the next Children's Oncology Group (COG) study for patients with newly diagnosed, average-risk medulloblastoma. This study uses molecular-based risk-stratification of medulloblastoma and aims to reduce cisplatin-induced ototoxicity with sodium thiosulfate (STS). It will be offered to patients in more than 200 participating hospitals.

New Discoveries in High-Risk Brain Tumors

Recently joining Nationwide Childrens, Rachid Drissi, PhD, brings a wealth of knowledge and innovation to the field of neuro-oncology. In addition to other pursuits, Dr. Drissi key contributions include discoveries on DNA damage repair mechanisms and the role of telomeres/telomerase in high-risk brain tumors. Dr. Drissi is particularly focused DIPG and high-grade gliomas, evaluating the biological underpinnings of high risk brain tumors and translating these findings from bench to bedside in scientifically rational, innovative studies through the consortiums like PBTC and CONNECT.

Discover the Difference: World-Renowned Research Programs

The CONNECT Consortium

Launched in 2017 by Dr. Fouladi and her colleagues, CONNECT has grown to an 18-site international consortium designed to nimbly conduct small-scale trials on the most promising therapies. By combining currently available therapies with novel agents, the group aims to improve outcomes for children with brain tumors with the poorest prognoses through synergistic drug combinations.

The consortium's early-phase results and learnings are then passed along to larger consortia to help speed the way to bigger studies. By taking the initiative to address regulatory hurdles and remove the barrier to initial data collection, these pilot studies facilitate faster larger-scale research on a wide selection of potential therapeutic combination regimens that might otherwise have remained uninvestigated.

The NEXT Consortium and Head Start Clinical Trials

Nationwide Children's has joined forces with The Ohio State University to run the only current multi-national prospective clinical trial in North America for young children with newly diagnosed medulloblastoma and other brain and spinal cord malignant embryonal tumors. The NEXT Consortium is a collaborative research model that unites multiple research centers with the goals of improving both survival and the quality of that survival by minimizing or even avoiding radiation therapy to the brain and spinal cord.

As of October 2019, the Head Start 4 clinical trial had 51 institutions throughout North America participating, with an additional 12 institutions in the process of joining. Head Start 4 provides molecular profiling of enrolled patients' tumors to help clinicians identify significant prognostic markers and tailor therapy accordingly. By doing so, it aims to speed up the understanding and use of the most advanced emerging therapies in pediatric oncology, hematology and bone marrow transplant.

The Pediatric Brain Tumor Consortium (PBTC)

Nationwide Children's is now a member of the PBTC, an elite group of 16 North American neuro-oncology programs chosen to design the next generation of studies to improve outcomes for children with high-risk brain tumors.

Membership in this consortium opens Nationwide Children's as a new site for children to receive novel therapies through the most cutting-edge clinical trial protocols. Participation in this premier group will foster collaborative opportunities for the Institute for Genomic Medicine and the neurosurgical team and basic scientists at Nationwide Children's to help advance neuro-oncology research everywhere. It also enables advancement in critical neuropsychological and long-term outcomes research to reduce morbidities for brain tumor survivors.

The Pacific Pediatric Neuro-Oncology Consortium (PNOC)

As a member of this large international consortium, Nationwide Children's participates in the translation of pre-clinical laboratory research to conduct early-phase clinical trials aimed at personalized therapy for pediatric brain tumors.

With more than 220 brain tumor specialists involved, PNOC works to quickly turn basic science data into novel agents targeting specific pathways in the development of brain tumors. The consortium also examines molecularly characterized alterations and the option for unique applications of existing drugs or patient-specific treatment strategies.

Additional in-progress research includes:

- Natural killer cell infusion (immunotherapy) for recurrent high-grade gliomas
- Modified measles virus for the treatment of recurrent medulloblastoma or recurrent atypical teratoid rhabdoid tumors
- Response-based radiation therapy for localized central nervous system germ cell tumors

Precision Neuroimaging Research

The Imaging Innovation and Research Office has a strong history of supporting cutting-edge clinical trials in neuro-oncology with a comprehensive team of radiologists, physicists, imaging scientists, research technologists, and study coordinators. The Advanced Neuroimaging Core supports advanced MRI technology and biomarker development including diffusion, perfusion, fingerprinting, elastography, functional MRI, and spectroscopy.

The Imaging Genomics Research Affinity Group facilitates collaborative interdisciplinary research in quantitative biomarker development, multi-omics and translational data analytics. This initiative is supported by a multidisciplinary team of physicians, researchers and scientists, as well as multicenter hospital and industry collaborations.

“At Nationwide Children's, our diverse and complex patient population, state-of-the-art radiology facilities, and extraordinary clinical and research collaborators distinguish us as leaders in precision neuroimaging. Together, we will transform the landscape of P4 medicine [predictive, preventative, personalized, participatory] for children with tumors of the brain and spine.”

- Dr. Mai-Lan Ho, director of Radiology Research and the Advanced Neuroimaging Core

Make the Difference: Educating the Next Generation of Experts

The Global Outreach Program

The best neuro-oncology care comes from the collaboration of expert neuro-oncologists, neurosurgeons, child psychologists, hematologists, pathologists, nurses, radiologists, rehabilitation specialists, social workers and more. Unfortunately, many low- and middle-income countries lack the resources required to support robust, multidisciplinary care teams. Children with central nervous system tumors in these regions often have lower survival and poorer quality of life.

That's why Nationwide Children's launched the first Global Outreach Program in pediatric neuro-oncology. Focused on improving outcomes for children with brain and spinal cord cancers in low- to middle-income countries (especially Central and South American nations), the program offers weekly multi-national teleconferences. During these meetings, clinicians from participating centers can discuss cases in real time and receive treatment guidance and management input from an entire team of neuro-oncology and related experts at Nationwide Children's.

Program leaders such as Co-Director Diana S. Osorio, MD, pediatric neuro-oncologist at Nationwide Children's, are developing a series of educational presentations on different brain tumors and their management strategies. Dr. Osorio also has plans to expand the program to include other resource-limited nations across the globe.

"Mentorship and training programs for the next generation of neuro-oncologists are the best possible legacies we can build, because they give the best possible gift to our current and future patients: the gift of capable physicians who will bring them more advanced treatments, increasingly informative research, faster cures and a better life."

- Dr. Jonathan Finlay, principal investigator, Head Start 4 Clinical Trial, and former co-director of the Neuro-Oncology Program



Clinical Neuro-Oncology Fellowship

Nationwide Children's has established a one-year Pediatric Clinical Neuro-Oncology Fellowship training program to train the next generation of leaders in the multidisciplinary management of childhood brain and spinal cord cancer.

In addition to their regular clinical care duties, our fellows participate in the Global Outreach Program's teleconferences with tumor specialists from around the world, broadening their exposure to the management of brain tumor patients in other regions and in resource-limited settings.

It is our belief that training the field's future leaders also requires involvement in clinical research. That's why our fellows help develop and lead early-phase clinical trials, and gain exposure to both basic and translational neuro-oncology/neuroscience research efforts through Nationwide Children's and The Ohio State University.

By the time physicians complete the Clinical Neuro-Oncology Fellowship, they have been mentored by and engaged in research with many of the world's leading neuro-oncology experts. It is our goal that each fellow leaves our program as an experienced and broadly engaged expert who can, in future positions, shape the



Referrals and Consultations

Online: [NationwideChildrens.org/Specialties/Neuro-Oncology](https://www.nationwidechildrens.org/Specialties/Neuro-Oncology)

Phone: (614) 722-8860 | Fax: (614) 722-8860

Physician Direct Connect Line for 24-hour urgent physician

Consultations: (614) 355-0221 or (877) 355-0221



**NATIONWIDE
CHILDREN'S®**

When your child needs a hospital, everything matters.