



ABIGAIL WEXNER RESEARCH INSTITUTE

# DISCOVER

A NEW ERA IN PEDIATRIC RESEARCH



**NATIONWIDE  
CHILDREN'S®**

*When your child needs a hospital, everything matters.*



## WORLD-CLASS FACILITIES FOR LIFE-CHANGING RESEARCH

Research at Nationwide Children's continues to grow and flourish. Over the last decade, National Institutes of Health (NIH) funding awarded to investigators at Nationwide Children's quadrupled. The amount of child health research space on our campus tripled. The Wexner Institute for Pediatric Research (Research Building I) opened in 1987 with 136,580 square feet of dedicated research space. In the years since, we opened two additional research buildings. Now, with the addition of Research Building IV, a companion to Research Building III, dedicated research space across campus grows to 800,000 square feet. The two buildings function as one complex, connected on each floor and by a common entrance hall and central staircase.





## RESEARCH BUILDING IV HIGHLIGHTS

### **Support for interdisciplinary collaboration and changing research needs.**

Lab, office and support modules are planned in “neighborhoods” and designed to be adaptable with movable tables. A dry lab hub is centrally located between and adjacent to wet labs, and a central staircase and elevator also provide fluid access to all floors and areas.

### **Flexible space for effective meetings of any size.**

Research Building IV is equipped with a variety of high-tech conference rooms, huddle areas, workspaces and break areas. An upgraded, state-of-the-art video wall enhances presentations in a larger, 35-person seminar room.

### **New campus green space where employees can flourish.**

An open, multiuse lawn framed by tree-lined walking paths is accessible from Research Building III, Research Building IV and the Conference Center. A large, covered entryway, outdoor dining area and power-equipped food truck parking space all face the expansive new “quad”

— along with the windows providing natural light and beautiful views throughout the building, including in tissue culture and procedure rooms.

### **Inclusive design to welcome everyone.**

Gender-neutral, single-stall restrooms are located throughout the building, and ablution rooms are available for performing cleansing rituals before prayers.

### **Resources for spreading important news and highlighting accomplishments.**

A video wall in the lobby showcases the research institute’s story, and digital displays on each floor share updates for all research employees and for each center.

### **Energy-efficient features that keep research operations cost-effective and sustainable.**

An independent heat recovery system for the vivarium and wet labs, independent air handling systems for the wet labs and office spaces, independent cooling system for closets that house servers, and special sensors in the lobby area, allow for more energy efficient air flow and temperature control throughout the building.

### **The Abigail Wexner Research Institute is integrated into the clinical enterprise of Nationwide Children’s Hospital. Main campus highlights include:**

- 1,563,577 square feet of inpatient space.
- 406,751 square feet outpatient space.
- 759,447 square feet of education and support areas.
- Largest neonatal network and provider of inpatient pediatric surgeries in the United States.\*

*\*Most recent data from CHA-member pediatric hospitals, based on highest number of ICU beds and inpatient surgeries.*







## ABIGAIL WEXNER RESEARCH INSTITUTE AT NATIONWIDE CHILDREN'S HOSPITAL

As an international leader in pediatric research, science is thriving at Nationwide Children's. The behavioral, basic and clinician scientists within the Abigail Wexner Research Institute (AWRI) at Nationwide Children's are redefining pediatric health care with best outcomes for every child in mind.

One of the largest pediatric research centers in the United States, the AWRI is ranked in the top six for National Institutes of Health funding among free-standing children's hospitals. The centers of emphasis are structured to support multidisciplinary team science and discovery, enabled by outstanding shared resources. Each center is home to faculty members working in contiguous space and collaborating with talented staff, postdoctoral fellows, graduate students, residents and other students.

In 2022, AWRI added twenty new research-intensive faculty and more than 150 talented team members, and we look forward to continuing to grow our team in the years to come.



Dennis R. Durbin, MD, MSCE

*President of the Abigail Wexner Research Institute at Nationwide Children's Hospital*

### RESEARCH FAST FACTS

**2022**

Record year in  
extramural grant funding  
to the institution:

**> \$150 million**  
for the first time ever.

**2022**

Record year for  
NIH Prime funding:

**> \$60 million**  
for the first time ever and  
**> 100 NIH**  
awards for the  
first time ever.

**1740 publications**

from Nationwide  
Children's experts

**19 NIH institutes**

are funding work here –  
broadest range of  
institutes ever



## INTRODUCING CYNTHIA GERHARDT, PHD, CHIEF CLINICAL RESEARCH OFFICER

Cynthia Gerhardt, PhD, director of the Center for Biobehavioral Health in the Abigail Wexner Research Institute at Nationwide Children's Hospital, has been appointed Chief Clinical Research Officer (CCRO) at Nationwide Children's. Dr. Gerhardt is also a professor of Pediatrics and Psychology at The Ohio State University and program director in the Center for Clinical and Translational Science, a partnership between Ohio State and Nationwide Children's to accelerate scientific discovery.

As CCRO, Dr. Gerhardt will focus on the development and oversight of clinical research operations across Nationwide Children's, with an overall goal of facilitating impactful clinical research throughout the organization. She oversees the full life cycle of the clinical research process, with an emphasis on increasing quality, compliance and efficiency along with promoting a culture of excellence among investigators and clinical research staff. The Biostatistics Core, Clinical Research Services, and the Human Research Protection Program at Nationwide Children's, which includes the Institutional Review Board (IRB) report to Dr. Gerhardt as part of this role.

Dr. Gerhardt is the author of over 185 peer-reviewed publications and is currently the principal investigator or co-investigator on more than over \$40 million in grant funding. She also holds the Janet Orttung-Morrow, MD, and Grant Morrow, III, MD, Endowed Chair in Pediatric Behavioral Health at Nationwide Children's. She is president-elect of the Society of Pediatric Psychology and is a member of the editorial boards of the *Journal of Pediatric Psychology* and *Clinical Practice in Pediatric Psychology*.

To learn more about clinical research at Nationwide Children's visit:  
[NationwideChildrens.org/research/clinical-research](https://NationwideChildrens.org/research/clinical-research)

"Our unprecedented investment in clinical research ensures a rich environment where scientific discoveries are rapidly translated into innovations at the bedside and equitable care. Together, our work can improve the lives of all children in our community and worldwide."

— Cynthia Gerhardt, PhD, Chief Clinical Research Officer, Abigail Wexner Research Institute







## NATIONWIDE CHILDREN'S HOSPITAL NAMES FIRST CHIEF DATA SCIENCES OFFICER

Peter White, PhD, has been named the inaugural Chief Data Sciences Officer (CDSO) of the Abigail Wexner Research Institute (AWRI) at Nationwide Children's Hospital. In his role, Dr. White leads biomedical data science initiatives to support Nationwide Children's mission as a leader in pediatric health care innovation.

As a member of the AWRI senior leadership team, Dr. White is responsible for building and executing a comprehensive data science strategy across AWRI, including the integration and analysis of disparate big data sources such as genomic and electronic health record data as well as using artificial intelligence and machine learning techniques to derive insights for the diagnosis and treatment of pediatric diseases. He oversees a team of data scientists, software developers, cloud engineers, data architects, analysts and other professionals to support these efforts.

"Over the years, Peter has demonstrated his passion for innovation in genomics and translational bioinformatics. He envisions a future where genomics is a routine part of pediatric care," notes Dennis Durbin, MD, MSCE, president, AWRI. "In his new role as CDSO, he will work to empower our research community with cutting-edge data science capabilities and promote a culture that values making data accessible, removing barriers to access, and promoting transparency, collaboration, and information sharing. His leadership in biomedical data science will substantially support Nationwide Children's mission as a leader in pediatric health care innovation."

Dr. White is a research scientist and innovator with expertise in genetics and genomics, biomedical data sciences, precision medicine, big data, and cloud computing. He is also the Battelle Endowed Chair in Quantitative and Computational Biology at Nationwide Children's and a tenured professor of Pediatrics at The Ohio State University College of Medicine. Prior to this new role, he held the position of senior director in the Steve and Cindy Rasmussen Institute for Genomic Medicine (IGM) at Nationwide Children's. In that role, he directed the Computational Genomics Group, leading IGM's efforts to develop a cutting-edge genomic medicine program.

Dr. White's internationally recognized research program uses computational strategies to analyze and interpret genomic data, resulting in significant advances in genomic medicine. His work has led to the discovery of novel genetic origins of disease, new clinical diagnostic methods, and the optimization of treatment and outcome prediction. He is the principal investigator of Nationwide Children's rare disease genomics program, discovering novel genetic causes for patients with rare or undiagnosed genetic diseases. He also is leading a new cardiovascular genomics translational program, "COURAGE for Kids: Cardiac OUTcomes Research by Application of GENomics."

Dr. White received his doctorate in Molecular Biology from the University of Cambridge, England, and completed his postdoctoral training in the Department of Genetics at the University of Pennsylvania. He has over 25 years of experience in the fields of genomics and biomedical data sciences, is the recipient of multiple grant awards from the National Institutes of Health and has authored more than 120 peer-reviewed publications.

"I'm both humbled and excited to have been given this new opportunity to pursue the vision of transforming pediatric research through data-driven innovation," says Dr. White. "Throughout my career at AWRI, I have had the opportunity to empower our research community with cutting-edge capabilities in genomics, data analysis and interpretation. This new initiative will create a hub for the biomedical data sciences and collaboration, supporting cutting-edge research and translation into the world-class care that defines Nationwide Children's."





## ABIGAIL WEXNER RESEARCH INSTITUTE SENIOR LEADERSHIP



**Dennis R. Durbin, MD, MSCE**  
*President*



**Cynthia A. Gerhardt, PhD**  
*Chief Clinical Research Officer*



**Peter White, PhD**  
*Chief Data Sciences Officer*

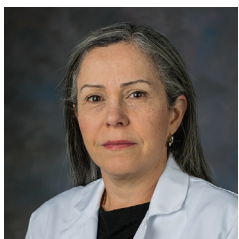


**Amy J. Roscoe**  
*Vice President of Strategic Planning and Finance*



**Matthew McFarland, RPh, PhD**  
*Vice President of Commercialization and Industry Relations*

## CENTER LEADERSHIP



**Nilsa Ramirez, MD**  
*Director, Biopathology Center*



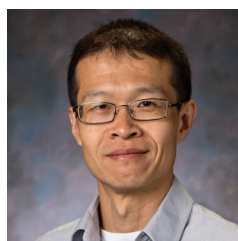
**Kathryn Vannatta, PhD**  
*Interim Director,  
Center for Biobehavioral Health*



**Vidu Garg, MD**  
*Director, Center for  
Cardiovascular Research*



**Deena Chisolm, PhD**  
*Director, Center for Child Health  
Equity and Outcomes Research*



**Ruoning Wang, PhD**  
*Interim Director, Center for  
Childhood Cancer Research*



**William Smoyer, MD**  
*Director, Center for Clinical  
and Translational Research*



**Kevin Flanigan, MD**  
*Director, Center for  
Gene Therapy*



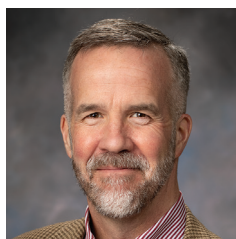
**Gary Smith, MD, DrPH**  
*Director, Center for Injury  
Research and Policy*



**Lauren Bakaletz, PhD**  
*Director, Center for  
Microbial Pathogenesis*



**Patrick Gallagher, MD**  
*Director, Center for  
Perinatal Research*



**Chris Breuer, MD**  
*Director, Center for  
Regenerative Medicine*



**Jeff Bridge, PhD**  
*Director, Center for Suicide  
Prevention and Research*



**Chris Walker, PhD**  
*Director, Center for  
Vaccines and Immunity*



**Linda Baker, MD**  
*Co-director, Kidney and  
Urinary Tract Center*



**John David Spencer, MD**  
*Co-director, Kidney and  
Urinary Tract Center*



**Brian Becknell, MD, PhD**  
*Research Director, Kidney  
and Urinary Tract Center*



**Richard Wilson, PhD**  
*Executive Director, Steve and  
Cindy Rasmussen Institute  
for Genomic Medicine*



**Elaine Mardis, PhD**  
*Co-executive Director, Steve  
and Cindy Rasmussen Institute  
for Genomic Medicine*



## OUR STRATEGIC PLAN

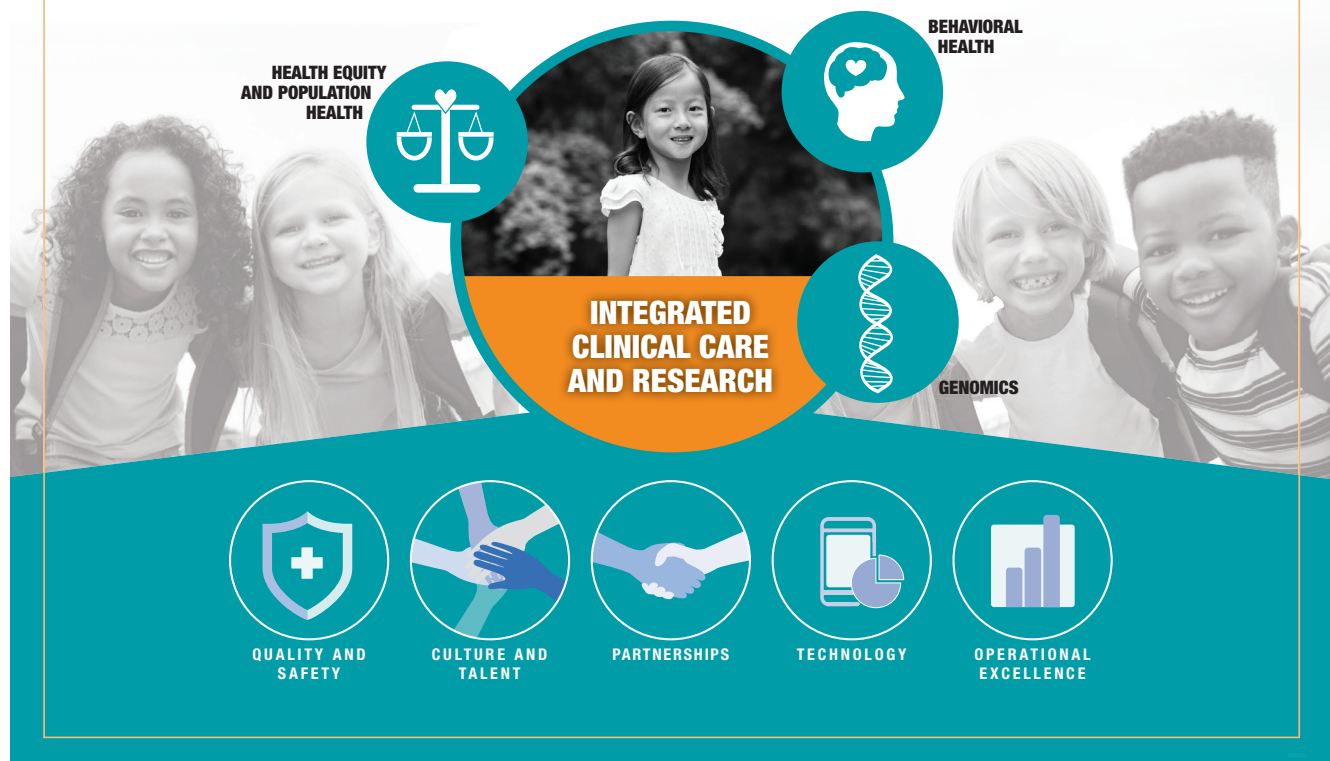
In 2021, Nationwide Children's Hospital announced the most ambitious strategic plan in our 130-year history: a five-year, \$3.3 billion commitment to transform health outcomes for all children. At the center of this plan is integrated clinical care and research.

"At the Abigail Wexner Research Institute at Nationwide Children's, we are excited to achieve this compelling and impressive strategic plan. Research is a foundational component to the success of the organization – from basic sciences discovery to team-based translational scientific and clinical programs to outcomes-based population and equity research. The research that happens here creates a path to best outcomes for all children."

— Amy J. Roscoe, Vice President Research Strategic Planning & Finance

2021-2026

### LEADING THE JOURNEY TO **BEST OUTCOMES** FOR CHILDREN EVERYWHERE



## STRATEGIC ACHIEVEMENTS SINCE 2021:

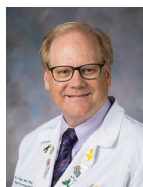
- Partnering with The Ohio State University, we announced a new Proton Therapy Center, anticipated to open on Ohio State's Wexner Medical Center's West Campus in October 2023.
- A gene therapy for Duchenne muscular dystrophy was conditionally approved by the FDA. It is the second gene therapy from Nationwide Children's to be approved.
- Nationwide Children's became one of the first pediatric hospitals in the nation with a dedicated, on-site islet isolation facility. Our team includes the most experienced, board-certified TPIAT surgeon in the country.
- Investigators in the Center for Childhood Cancer and Center for Cellular Therapy and Cancer Immunology present first-in-children trial of natural killer cells for acute myeloid leukemia.
- Investigators began enrolling patients in a first-of-its-kind clinical trial of an innovative application of a closed, disposable cell-seeding technology for tissue-engineered vascular grafts (TEVG) for the Fontan procedure in children with congenital heart disease.
- Investigators completed the first clinical trial of a probiotic biofilm formulation by Scioto Biosciences, a startup founded by scientists at Nationwide Children's to bring microbiome therapeutics to the marketplace, to protect against disease in infants.

## NOTABLE FUNDING AWARDS FROM THE NATIONAL INSTITUTES OF HEALTH (NIH)

### T32 Training Program in Basic & Translational Pediatric Oncology Research



Steve Lessnick, MD, PhD



Tim Cripe, MD, PhD

#### National Cancer Institute

The Ruth L. Kirschstein National Research Service Award (NRSA) (T32) supports a training program for three graduate students and three postdoctoral researchers/fellows per year.

### Center for Accelerating Suicide Prevention in Real-world Settings (ASPIRES)



Jeff Bridge, PhD



Cynthia Fontanella, PhD

#### National Institute of Mental Health

The new center aims to accelerate the development and implementation of interventions to reduce youth suicide. The award provides \$14 million over five years.

### Molecular Characterization Initiative



Elaine Mardis, PhD



Nilsa Ramirez, MD

#### National Cancer Institute

The collaboration among the NCI, Children's Oncology Group and Nationwide Children's aims to collect, analyze, and report clinical molecular data to support COG-affiliated clinicians as part of the NCI Childhood Cancer Data Initiative.



# 2022 PERFORMANCE INDICATORS

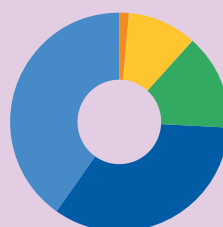
EXTERNAL FUNDING IN MILLIONS



## 2022 EXTERNAL AWARDS

FUNDING IN MILLIONS  
BY SOURCE

Program	\$2.4
Industry	\$15.9
Other	\$22.3
Federal Other	\$52.7
NIH Prime	\$62.4



2022  
**\$155.7**

## RESEARCH BY THE NUMBERS

	2020	2021	2022
Principal Investigators*	208	223	249
Research Fellows	71	92	78
Graduate Students	42	57	61
Employees	1534**	1460	1613
Publications	1600	1633	1740

\*Includes faculty from the Abigail Wexner Research Institute and faculty from Nationwide Children's Hospital with \$50,000 or more in research funding support.

\*\*In 2020, Andelyn Biosciences became a separate entity, resulting in approximately 100 employees moving from Nationwide Children's to Andelyn Biosciences.



## RESOURCES AND CORES

The Abigail Wexner Research Institute at Nationwide Children's Hospital has a wealth of resources available to ensure researchers have the tools they need to advance the hospital's mission. From core facilities to computational resources and regulatory offices, researchers have the support to enhance the health of children by engaging in high-quality, cutting-edge research according to the highest scientific and ethical standards.

The **Animal Resources Core** facilitates preclinical research by providing the highest quality animal husbandry, veterinary care and technical support in an ethical and compliant manner. It is accredited by the Association for the Assessment and Accreditation of Laboratory Animal Care (AAALAC) International, is registered as a research facility under the Animal Welfare Act (AWA) with the USDA and has an assurance on file with the NIH Office of Laboratory Animal Welfare (OLAW). An ARC Wellness Committee and Safety Committee ensures the health of the ARC faculty, staff and animals, and the High Resolution Research Imaging Core, previously the Small Animal Imaging Facility, provides a centralized imaging suite for in vivo studies in small animals, as well as Rodent Nuclear Medicine imaging rooms.

The **Biobehavioral Outcomes Core** employs a team of psychometricians who conduct developmental, neuropsychological and behavioral assessments for studying infants, children, adolescents, and adults with wide-ranging medical, developmental and psychiatric diagnoses. For investigators assessing behavioral, cognitive, emotional, or social outcomes and processes in their research, detailed procedural plans are developed for each study using core services to assist with research design, grant applications, scheduling participants, conducting assessments and post-processing data and preparing manuscripts describing these data.

The **Biologics Manufacturing Core** comprises more than 2,300 square feet of laboratory suites, including ISO 7 cleanrooms, a quality control laboratory, a process development laboratory and more for manufacturing a wide range of cellular therapeutic products, including natural killer (NK) cells, chimeric antigen receptor (CAR) T and NK cells, and tissue engineered vascular grafts, for clinical trials. The facility also manufactures irradiated CSTX002 feeder cells at clinical grade or research grade for ex vivo expansion of NK

cells for process development or preclinical validation. Current Good Manufacturing Processes (cGMPs) are followed for all cell-based therapy products.

The **Biopathology Center Processing and Banking Core** serves as a biospecimen processing and storage core for investigators at Nationwide Children's and The Ohio State University. It can support a variety of basic science and health care-related research projects. The core is equipped with the expertise and infrastructure of the Biopathology Center and provides a variety of services including biospecimen accessioning, processing, nucleic acid extraction and quality control, banking, distribution, redaction of personally identifiable information and digital pathology.

The **Biostatistics Resource** is an extension of The Ohio State University's Center for Biostatistics and assists researchers in study design, data analysis and interpretation of statistical results.

**Clinical Research Services** is designed to be a portal through which clinical investigators access streamlined coordination of services necessary to initiate clinical research projects, regardless of funding source. Support is provided for all types of clinical research studies from initiation to completion according to Good Clinical Practice and federal, state and institutional regulations and policies.

The **CRISPR/Gene Editing Core** at Nationwide Children's, in collaboration with The Ohio State University, provides investigators at both institutions with design and implementation of CRISPR/gene editing services. Scope may be brief to gather preliminary data for grant applications, large end-to-end projects such as genome screening or preclinical to bring novel uses of CRISPR/gene editing closer to the clinic.

The **Flow Cytometry Core** offers several platforms for phenotypic, functional and quantitative analyses of

## RESOURCES AND CORES

cells, cell-derived analytes and small particles. Additionally, the core offers data acquisition and analysis training and access to FlowJo analysis software.

The **Genomics Services Laboratory** offers advanced sequencing technologies to provide high quality genomics analysis as a critical clinical and research resource. Assistance is available for multiple aspects of next-generation sequencing, including library preparation, sequence generation, data analysis and advanced bioinformatics support for complex datasets.

The **Histopathology Core** is College of American Pathologists (CAP) accredited and provides services in histology and transmission electron microscopy. Services include human and animal tissue processing, embedding (paraffin), sectioning (formalin-fixed, paraffin-embedded (FFPE) tissue blocks and frozen optimal cutting temperature (OCT) compound-embedded tissues), and routine hematoxylin and eosin (H&E) staining. Selected special stains are also available. Additional specialized services such as serial sectioning, RNase-free handling, and slide scraping and macrodissection (for nucleic acid extraction) may be requested. Whole slide imaging of glass slides can be coordinated with the Biopathology Center Digital Pathology group.

The **Immune Monitoring Core** offers sample processing and multiple qualified platforms of immunological testing in support of pre-clinical studies and clinical research trials in cell and gene therapy. These include monitoring for anti-vector and transgene responses to adeno-associated viral (AAV) vector gene therapy in human and large animal models.

**IT Research & Innovation** collaborates with investigators to develop impactful and innovative health information technology (IT) solutions using data, analytics, technology and user experience designs. Services are offered in variety of areas such as research data management, machine learning, predictive modeling, information retrieval, geographic information science and custom application development (web/mobile/virtual reality). IT Research & Innovation also operates Graphics Support Services, which provides assistance with data visualization, medical and non-medical illustration, video and animation, and

more in collaboration with The Ohio State University Health Sciences Library Medical Visuals Department.

The **Microscopy Core** provides training, consultation and advanced support for widefield and confocal microscopy and image analysis. Expertise and assistance are available for all steps from study design to preparation of figures and manuscripts. Instrument training and user support for scanning electron microscopy (SEM), atomic force microscopy (AFM) and laser capture microdissection (LCM) is also available.

### OTHER

The **Ohio Supercomputing Center** is located on The Ohio State University campus, less than 10 miles from Nationwide Children's, and its Ruby Cluster, Oakley Cluster and Owens Cluster systems and other resources are available to Nationwide Children's researchers.

A **commercial clinical manufacturing facility**, operated by Andelyn Biosciences, a for-profit spin-off of Nationwide Children's, produces materials for Phase 1, 2 and 3 gene therapy clinical trials and ensures the safety of manufactured biologic products according to U.S. Food and Drug Administration (FDA) cGMP guidelines. This resource accelerates the hospital's gene therapy program.





## OPERATIONAL RESOURCES AND FACILITIES

The **Clinical Genomics Laboratory** performs high complexity molecular genetic analysis, cytogenetic analysis and advanced genomic testing. The laboratory is fully equipped with instrumentation and computational resources to perform diverse molecular, cytogenetic, and advanced genomic analyses. In addition, the laboratory includes facilities for sample accessioning, tissue culture, cytogenetic analysis, fluorescence in situ hybridization, nucleic acid extraction, nucleic acid amplification, microarray analysis, methylation analysis, next-generation sequencing (NGS), and local freezer storage.

The **Computational Genomics Group** oversees multiple platforms necessary to acquire, store and analyze large and complex data sets generated by the Steve and Cindy Rasmussen Institute for Genomic Medicine in collaboration with programs across the organization. The group continues to develop highly optimized solutions to address the substantial processing, networking and big data challenges arising from genomic science.

The **Institutional Animal Care and Use Committee (IACUC)** reviews all research activities involving the use of animals and operates in full accordance with the Animal Welfare Act and the Health Research Extension Act. The animal research program at Nationwide Children's has been accredited by the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC) since 1976, a distinction which indicates the highest standard of ethical and compliant animal research practices to ensure the humane treatment of animal subjects.

The **Institutional Biosafety Committee (IBC)** is responsible for evaluating and approving all research involving infectious or potentially infectious agents, recombinant DNA or RNA, and biological toxins. The committee ensures compliance with current safety regulations and guidelines as issued by the U.S. Departments of Health and Human Services and Agriculture, the National Institutes of Health (NIH) and the Centers for Disease Control and Prevention (CDC).

The **Institutional Review Board (IRB)** provides oversight of all research involving human subjects. For more than a decade, the Nationwide Children's has been accredited by the Association for the Accreditation of Human Research Protection Programs, Inc. (AAHRPP). This accreditation highlights clinical study participant safeguards that surpass state and federal requirements.

The **Office of Finance and Sponsored Projects** supports grant and contract funding throughout the entire lifecycle of an award, from application to closeout. The department offers expertise in review, submission and negotiation of extramural grants, contracts, and other sponsored programs.

The **Office of Research Compliance and Integrity** ensures all research is conducted according to the highest scientific and ethical standards and in compliance with regulations from the NIH, U.S. Food and Drug Administration (FDA) and all other government agencies with authority over research activities.

The **Office of Research Regulatory Affairs** helps move discoveries at the lab bench into clinical testing to develop novel approaches to prevent and treat pediatric diseases. The FDA closely regulates human participation in clinical trials involving new drugs and devices and the Office of Research Regulatory Affairs guides investigators through this complex submission, review and approval process.

### And Many More...

AWRI offers institutional support covering the entire spectrum of research. From teams dedicated to helping manage export controls, clinical monitoring, purchasing, glassware, intramural funding, high-performance computing and more, our researchers are enabled to achieve their goals.

## PARTNERSHIPS

Life-changing research is a team effort. Collaboration is as essential outside of the organization as it is within it. Some key partnerships between the Abigail Wexner Research Institute (AWRI) and other entities include the following.

### THE OHIO STATE UNIVERSITY

#### **Center for Clinical and Translational Science (CCTS)**

The Ohio State University's Wexner Medical Center and seven health science colleges and Nationwide Children's have come together to form the OSU Center for Clinical and Translational Science. Nationwide Children's receives funding annually in support of CCTS activities and are eligible to compete for pilot and training grants through CCTS.

#### **Ohio Perinatal Research Network (OPRN)**

Nationwide Children's and OSU have developed the OPRN, a research collaborative dedicated to better understanding preterm birth and its complications. A major effort of OPRN is a research repository for clinical data and specimens from infants delivered preterm and their mothers. Additional collaborating institutions include Ohio Health, Mt. Carmel and community partners in the Ohio Better Birth Outcomes (OBBO) project aimed at mothers and physicians to prevent preterm births.

#### **OSU Comprehensive Cancer Center – Arthur G. James Cancer Hospital and Richard J. Solove Research Institute (OSUCCC – James)**

A collaborative agreement between Nationwide Children's and OSUCCC – James broadens the study of childhood cancers and accelerates the transfer of key research findings to the clinical setting. The unique relationship among the institutions is stimulating novel research and developing collaborations in pediatric cancer-related studies that will also have applications to adults. Among the innovative outcomes of this collaboration are the Cellular Therapy and Cancer Immunology Program and a new proton therapy center, slated to open in 2023.

#### **And Many More...**

Nationwide Children's also collaborates with OSU through their joint Muscle Group and the Center for Microbial Interface Biology.

### OTHER

#### **Additional Ventures**

AWRI is the recipient of a \$1 million Innovation Fund, gifted by nonprofit foundation Additional Ventures. AWRI joins four other research institutions in a large-scale

coordinated research effort to identify new avenues to functionally cure patients with single ventricle heart defects (SVDs). Nationwide Children's awarded portions of the Additional Ventures funding to three projects led by investigators in The Heart Center, Center for Cardiovascular Research, Center for Regenerative Medicine, Division of Genetic and Genomic Medicine and Steve and Cindy Rasmussen Institute for Genomic Medicine.

#### **Children's Oncology Group (COG)**

COG, a member of the National Cancer Institute (NCI) National Clinical Trials Network (NCTN), is the world's largest organization devoted exclusively to childhood and adolescent cancer research. The Biopathology Center at Nationwide Children's oversees the NCI-funded biorepository for COG. At Nationwide Children's, around 74% of eligible oncology patients participated in clinical trials for new therapeutic agents, treatment delivery technologies and radiation treatment strategies available in partnership with COG and other consortia.

#### **PEDSNet**

PEDSNet is a large, national community of hospitals and health care organizations, researchers and clinicians, and patients and families. Nationwide Children's is a founding member of this multi-specialty network that conducts observational research and clinical trials across multiple children's hospital health systems.

#### **REV1 Ventures**

Nationwide Children's is a sustaining member of Rev1 Ventures, an organization created to accelerate innovation, business growth, job creation and prosperity in the 15-county region of central Ohio. Rev1 Ventures works to create new companies, strengthen existing businesses, open doors to technology resources and support the attraction and retention of technology-based businesses.

#### **And Many More...**

Nationwide Children's also partners with Battelle Memorial Institute and many other organizations. Researchers at AWRI collaborate with a variety of institutions, present at national meetings, publishing in highly respected journals and earn national research grants to further their fields of study.



## EDUCATION AND TRAINING: INVESTING IN THE RESEARCH PIPELINE

Research education and training are vital to the mission of Nationwide Children's. Our investigators are teaching faculty in various departments at The Ohio State University College of Medicine, and a large number of trainees are based here, including residents and fellows in pediatrics and pediatric surgery, postdoctoral fellows, and high school, undergraduate and graduate students.

Faculty across the organization are dedicated to training and mentoring the next generation of scientists in pediatric research. Instruction occurs in informal and formal didactic sessions, one-on-one interactions and hands on laboratory training.

The **Office of Trainee Affairs (OTA)** oversees these training opportunities and the numerous programs, events, activities and resources available to support those who participate in them, including the **Research Institute Trainee Association (RITA)**.

RITA was formed to help train and prepare young scientists for careers in research. RITA is led by a team of trainees nominated and elected by their peers. They receive guidance and assistance from an advisory committee of faculty co-advisors and administrators. Because Nationwide Children's is a sustaining member of the National Postdoctoral Association (NPA), trainees are also entitled to NPA affiliate memberships at no additional cost.

Opportunities for paid or for-credit internships are available through AWRI Centers of Emphasis, including the Center for Cardiovascular Research and the Center for Child Health Equity and Outcomes Research, as well as programs like Research Safety. Additionally, the Summer Scientist Education Series is designed to expose all interested high school and early college students to the scientific method and careers in medical research through lectures that are open to the public.



# THE GROWING PIPELINE FROM DISCOVERY TO COMMERCIALIZATION – NATIONWIDE CHILDREN’S OFFICE OF TECHNOLOGY COMMERCIALIZATION

Nationwide Children’s Hospital has a remarkable track record of moving discoveries into the marketplace. Our Office of Technology Commercialization facilitates the transfer of new technologies, research and innovations to outside partners to benefit patients, the local community and the general public.

Our portfolio of more than 130 available technologies developed by our innovative researchers and clinicians is diverse and ever-growing. They span a wide array of research fields and categories of market applications and range from early-stage innovations to market-ready products.

By bringing impactful innovations to market, our office ensures novel technologies find their way beyond our walls. Innovation starts here, and it changes lives everywhere.



Explore our  
startups

“People might not intuitively think of a nonprofit hospital like Nationwide Children’s as a hotbed for technology commercialization. They should. Just like universities, we make substantial investments in commercialization of new discoveries and create job-producing startup companies. But even more importantly, we’re able to expand the benefits of innovation to improve the care and lives of children who may never set foot in our hospital.”

– Matthew McFarland, RPh, PhD, Vice President, Commercialization and Industry Relations at Nationwide Children’s

## TYPES OF INNOVATIONS



**Biomarkers:** Detect and measure normal biological processes, pathogenic processes or responses to interventions.



**End User Innovations:** Improve clinical or business practices and patient outcomes with improved/ novel medical devices and software.



**Gene Therapies:** Deliver new genetic material to replace impaired or harmful genetic material to treat various conditions.



**Therapeutics:** Prevent or treat diseases.



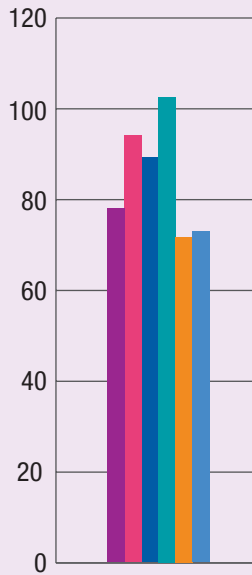
**Tissue Engineering Innovations:** Combine scaffolding, seeded cells and biologically active molecules into functional tissues, allowing a patient’s own cells to be used to grow new tissue or organs for repair.



**Research and Clinical Tools:** Enhance therapeutic or research activities.

# TECHNOLOGY COMMERCIALIZATION BY THE NUMBERS

## DISCLOSURES

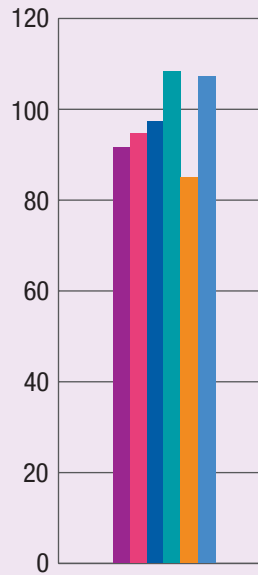


2017

2018

## CONTRIBUTORS

*A contributor is any Nationwide Children's faculty or staff member who submitted one or more invention disclosures.*



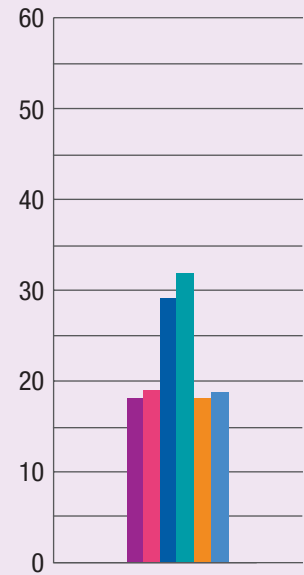
2019

2020

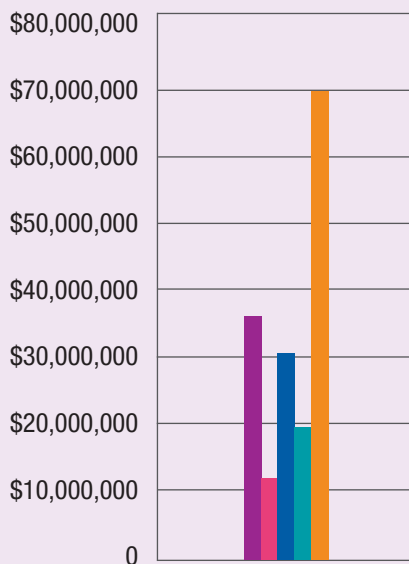
2021

2022

## NEW DEALS

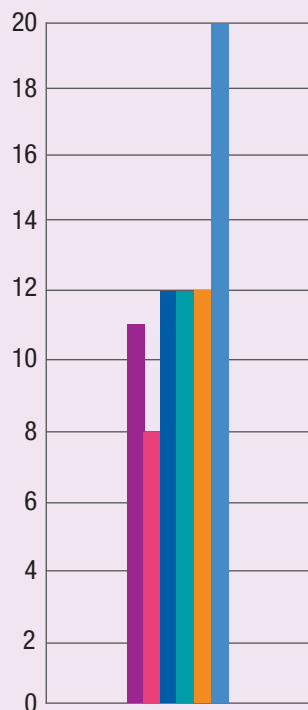


## TOTAL REVENUE\*

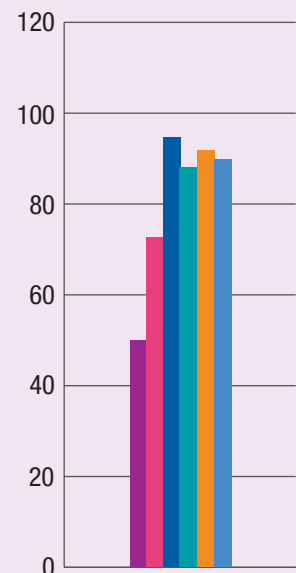


*\*2022 revenue unavailable at time of print.*

## U.S. PATENTS ISSUED



## U.S. PATENT APPLICATIONS FILED







## OUR CENTERS AND INSTITUTES

The Abigail Wexner Research Institute is organized into centers of emphasis and institutes, all of which facilitate interdisciplinary team science by transcending traditional academic boundaries. The structure supports discovery and translation, enabled by outstanding shared resources. Each center or institute is home to talented faculty members, staff, graduate students, residents, postdoctoral fellows and other trainees.

### **Biopathology Center**

**Director: Nilsa Ramirez, MD**

The Biopathology Center provides a full range of services related to biospecimen procurement, banking, processing and distribution. The team of 170 staff members manages more than 4 million biospecimens, including the National Cancer Institute (NCI)-funded biorepositories of the Children's Oncology Group and SWOG. The NCI-funded Pediatric Division of the Cooperative Human Tissue Network, Biospecimen Processing Center of the NCI's Center for Cancer Genomics and numerous collections from other sponsors are also part of the center.

### **Center for Biobehavioral Health**

**Interim Director: Kathryn Vannatta, PhD**

The Center for Biobehavioral Health is dedicated to improving the health and health care of children and their families. This is achieved through state-of-the-art research using a biopsychosocial approach. A special focus is placed on identification of factors associated with developmental risk and resilience across the life span, design and evaluation of new interventions, and dissemination and implementation of effective interventions into routine practice.

### **Center for Cardiovascular Research**

**Director: Vidu Garg, MD**

The Center for Cardiovascular Research conducts innovative, mechanism-based research leading to improved therapies and outcomes for patients with pediatric cardiovascular disease. The team's studies span the spectrum from basic science research to translational and clinical research performed in collaboration with clinicians from The Heart Center at Nationwide Children's.

### **Center for Child Health Equity and Outcomes Research**

**Director: Deena Chisolm, PhD**

The Center for Child Health Equity and Outcomes Research advances child health and wellbeing through research in and across clinical care, health services, health policy and community initiatives. Investigators in the center aspire to lead the nation in groundbreaking research that produces reduced disparities, vibrant communities, flourishing families and equitable and best outcomes for all children.

### **Center for Childhood Cancer Research**

**Interim Director: Ruoning Wang, PhD**

The Center for Childhood Cancer aims to transform the care of children, adolescents and young adults with cancer through research and clinical translation. The center continues to have exceptional growth and success in its research programs through strong integration and collaboration among laboratories in the center and clinical divisions, and with The Ohio State University Comprehensive Cancer Center—Arthur G. James Cancer Hospital and Richard J. Solove Research Institute and other programs.

### **Center for Clinical and Translational Research**

**Director: William Smoyer, MD, FASN**

The Center for Clinical and Translational Research strives to create an environment in which patients, families, researchers and clinicians work together to integrate evidence-based medicine with evidence-generating medicine. Such an approach ensures children benefit from the latest advances in both medical knowledge and innovative treatments to improve their health.

## OUR CENTERS AND INSTITUTES

### **Center for Gene Therapy**

**Director: Kevin Flanigan, MD**

The Center for Gene Therapy is dedicated to the development of novel genetically based therapies for inherited diseases. The mission is pursued by a dedicated team of laboratory scientists whose work is directed toward clinical applications and by the clinician scientists bring these new therapies into clinical trials. The center works closely with regulatory experts to drive promising therapies from bench to bedside.

### **Center for Injury Research and Policy**

**Director: Gary Smith, MD, DrPH**

The Center for Injury Research and Policy works globally to reduce injury-related pediatric death and disability. The center translates cutting-edge injury research into education, advocacy and advances in clinical care. From design changes in consumer products to new public policy, the center's influence is advancing child safety around the world.

### **Center for Microbial Pathogenesis**

**Director: Lauren Bakaletz, PhD**

The Center for Microbial Pathogenesis is dedicated to the development of a greater understanding of the molecular mechanisms by which microorganisms cause disease, as well as how humans respond to their disease states. Center faculty identify virulence mechanisms and define host immune response patterns, with the overarching goal of identifying opportunities to interfere with the disease process and/or promote our ability to combat and/or ideally prevent infectious diseases.

### **Center for Perinatal Research**

**Director: Patrick Gallagher, MD**

The Center for Perinatal Research has a unique, integrative approach to prematurity research that extends from before birth to long after. In close collaboration with the Section of Neonatology at Nationwide Children's and the OSU Division of Maternal-Fetal Medicine, the center conducts innovative basic, translational and clinical research focused on preventing preterm birth and improving prematurity-related outcomes.

### **Center for Regenerative Medicine**

**Director: Chris Breuer, MD**

The Center for Regenerative Medicine applies the principles of engineering, computer modeling and life sciences to develop biological substitutes to restore or improve tissue function.

### **Center for Suicide Prevention and Research**

**Director: Jeff Bridge, PhD**

Suicide has emerged as a leading cause of death for children and adolescents in the United States, but suicide is preventable. The Center for Suicide Prevention and Research conducts research aimed at understanding the epidemiology of child and youth suicide and suicidal behavior, examining risk and protective factors that contribute to youth suicide and suicide attempts, and developing and implementing evidence-based intervention strategies for health care settings, schools, community centers and faith-based organizations to prevent and reduce suicide and suicidal behavior among youth.

### **Center for Vaccines and Immunity**

**Director: Chris Walker, PhD**

The Center for Vaccines and Immunity improves pediatric care through fundamental and applied research to generate novel, safe and protective vaccines against a variety of viral infections. Scientists in the center work to develop vaccines and antiviral agents for respiratory syncytial virus (RSV), hepatitis C virus (HCV), and cytomegalovirus (CMV) infection. They also study innovative vaccine technologies to replace traditional approaches.

**Learn more about our centers and institutes at**

**[NationwideChildrens.org/Research/Areas-of-Research](https://www.nationwidechildrens.org/Research/Areas-of-Research)**





## OUR CENTERS AND INSTITUTES

### **Kidney and Urinary Tract Center**

**Co-Directors:** Linda Baker, MD and

**John David Spencer, MD**

**Research Director:** Brian Becknell, MD, PhD

Investigators in the Kidney and Urinary Tract Center advance understanding of kidney and bladder disorders, including acute kidney injury, chronic kidney disease, urinary tract infections (UTI), congenital anomalies of the kidney and urinary tract (CAKUT), nephrotic syndrome and more. Clinician-scientists and basic scientists aim to discover new therapies and diagnostic approaches, validate them in preclinical models and translate these discoveries to the bedside to transform the management and prevention of these disorders.

### **Steve and Cindy Rasmussen Institute for Genomic Medicine**

**Executive Director:** Richard Wilson, PhD

**Co-executive Director:** Elaine Mardis, PhD

The Steve and Cindy Rasmussen Institute for Genomic Medicine is an interdisciplinary institute that seeks to introduce genomics into the practice of medicine across Nationwide Children's. The Institute provides a unique environment that combines state-of-the-art testing within its CAP/CLIA and New York State Department of Health certified clinical laboratory, advanced computational data analytics and IRB protocol-driven translational research efforts. These efforts partner providers with IGM expertise to fuel patient-centric research that explores the genetic and genomic underpinnings of diseases such as cancer, epilepsy, vascular malformations/overgrowth syndromes, psychiatric conditions and others. This process transforms patient care and makes genomic testing results accessible and meaningful for providers and the patients and families they serve.

### **Introducing Our Newest Institute: The Institute for Mental and Behavioral Health Research**

The Institute for Mental and Behavioral Health Research will be housed in the state-of-the-art Big Lots Behavioral Health Pavilion. In addition to collaborative efforts across the Nationwide Children's Hospital campus, institute members will work in collaboration with the OSU Department of Psychiatry and Behavioral Health and the OSU Institute for Behavioral Medicine Research. The mission of faculty within the institute is to conduct innovative translational, clinical, and epidemiological research focused on etiology, prevention, and treatment of mental, emotional and behavioral disorders.

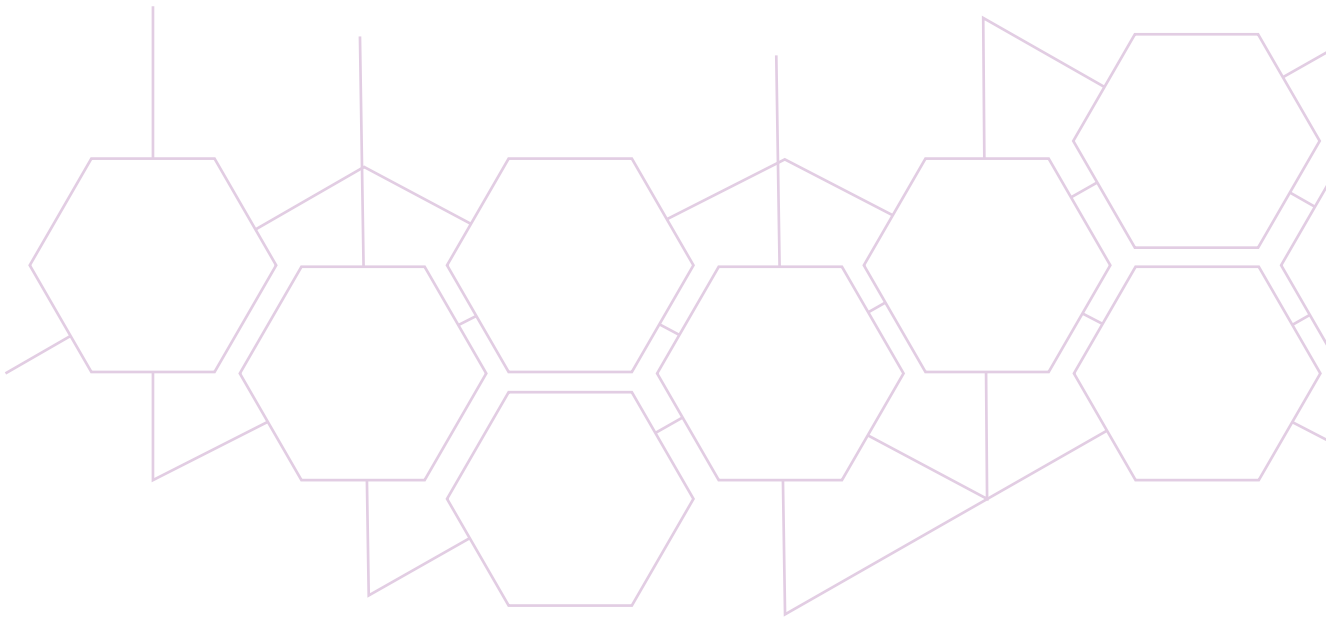
With 25,000 square feet of current research space and additional research space to be developed, the institute has flexibility for growth and offers ample room for staff and trainees. Embedded within the Institute for Mental and Behavioral Health Research is the Center for Suicide Prevention and Research (CSPR). Recently awarded a P50 grant from the National Institute of Mental Health, the CSPR hosts four principal investigators and a large staff to sustain the work of multiple NIMH-funded projects.



*The new Institute for Mental and Behavioral Health Research will be housed in the Big Lots Behavioral Health Pavilion — the largest facility of its kind on a freestanding pediatric hospital campus.*



Abigail Wexner Research Institute  
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**NATIONWIDE  
CHILDREN'S<sup>®</sup>**

*When your child needs a hospital, everything matters.*