



Nationwide Children's Hospital

2021–2022 Annual Report





**At Nationwide
Children's Hospital,
we're not just committed
to transforming our
organization.**

We're dedicated to transforming child health care for every family, even if they never step foot on our campus. We're doing this through perseverance, commitment and an unwavering faith in our team's ability to achieve the high bar set in our most audacious strategic plan yet.

One year in, we've faced COVID variants and a seemingly unending pandemic, we've faced staffing shortages, supply chain issues, and many other challenges that health care organizations face. But what makes us different is our response. We view each challenge as an opportunity to learn, grow and make a difference in the lives of our **patients, families, faculty** and **employees**.

With One Team and One Focus – Leading the Best Outcomes for Children Everywhere

— we are proud to be
**Nationwide Children's
Hospital**

Honors and Achievements

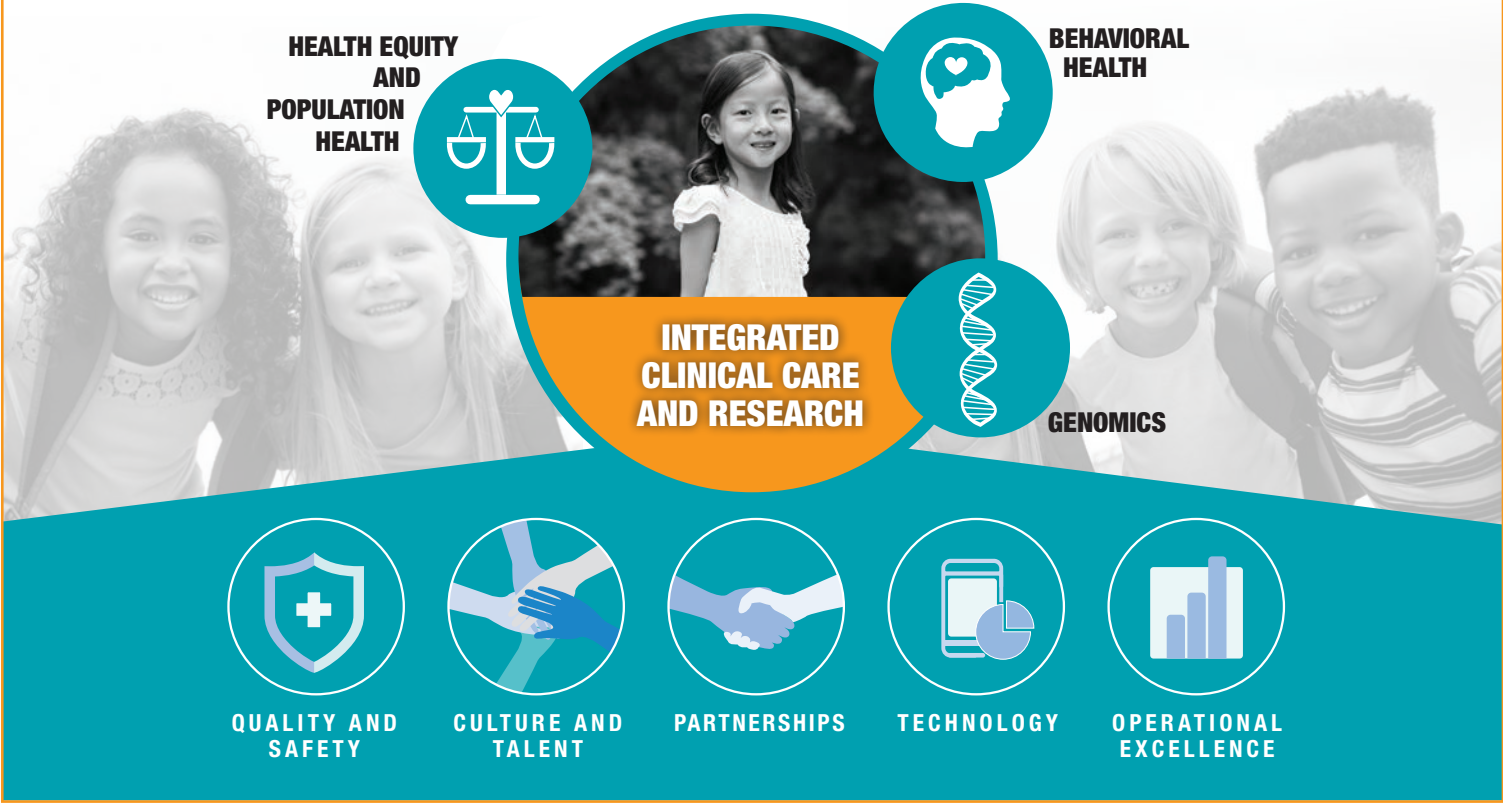


Once Again Named to the Honor Roll of Best Children's Hospitals and ranked in all 10 specialties by U.S. News & World Report



- More than 1.6 million visits, patients from all 50 states and 46 countries came to Nationwide Children's for care
- Top 10 pediatric research institution in National Institutes of Health funding
- More than 84,850 donors contributed more than \$51.4 million to support the hospital's mission
- Four-time American Nurses Credentialing Center Magnet® designation for nursing excellence
- More than \$358 million in charity care and community benefit services provided annually
- Fully accredited by the Association for the Accreditation of Human Research Protection Programs and AAALAC International, a private, nonprofit organization that promotes humane treatment of animals in science through a voluntary international accreditation program

2021-2026
LEADING THE JOURNEY TO
BEST OUTCOMES
FOR CHILDREN EVERYWHERE



In 2021, Nationwide Children's Hospital announced the most ambitions 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.

We are empowered by tremendous community support, a record of success in clinical care and research, genomics, behavioral health and health equity and population health. This unique ecosystem of expertise, passion and focus on the whole child makes Nationwide Children's a place full of people, ideas and possibilities found nowhere else.

- We are integrating talent, quality and technology to achieve best outcomes for all patients.
- We are breaking barriers to positively impact every child's future potential.
- We are expanding and sharing an innovative model for behavioral health care.
- We are revolutionizing the next frontier of pediatric health through genomics and personalized medicine.

LEARN MORE ABOUT THE STRATEGIC PLAN.



One year ago, Nationwide Children’s Hospital embarked on the most ambitious strategic plan in our 130-year history.

We had long been on “the journey to best outcomes” for our patients. The growth and deepening of the hospital’s mission over the previous two decades, however, has positioned us to become an institution that is leading the journey — not only for our patients, but for children around the world who can benefit from our discoveries.

Our plan shows that we are more committed than ever to better health for each child. As you’ll see in this annual report, the Nationwide Children’s team has spent the last year delivering on that commitment.

We have built new destination programs, integrating research and clinical care so that children who come to us from all 50 states and more than 40 countries can receive the most cutting-edge care for some of the most challenging conditions.

We have launched Nationwide Children’s Hospital Toledo, allowing families of northwestern Ohio access to our world-class programs so they don’t have to travel out of state.

We have accelerated our efforts in genomic medicine to guide the precision treatment of disease, and to help characterize pediatric cancers in a national effort to benefit children.

We have strengthened our behavioral health system of care, which is a model of how partners can work together to do everything from preventing mental health issues to managing children already in crisis.

We have doubled down on our population health efforts, such as Healthy Neighborhoods Healthy Families, to create high-quality affordable housing, educational opportunities and workforce training for our neighbors.

We have advanced tangible initiatives in our Stand Against Racism, Stand For Health Equity to remove barriers that keep children and families from thriving.

Each part of the hospital, every clinical division and research center, has spent the last year helping children and families achieve the best possible outcomes. I am proud of our team’s accomplishments, and I am proud to share them with you.

TIM ROBINSON
CEO
Nationwide Children’s Hospital



Nationwide Children’s Hospital has always been an important part of the community it serves. As a philanthropic partner and member of its Board of Directors, I’ve had the honor of witnessing, up close, how this hospital has become a national and international pediatric care leader.

Now, in my first year as chair of the board, it’s my privilege to work closely with the Nationwide Children’s leadership team to support and guide the hospital’s ambitious plans for the future.

Nationwide Children’s innovations are changing what it means to be a children’s hospital. The focus continues to be on integrated research and clinical care to benefit the children and families it serves and, every day, the hardworking team at Nationwide Children’s is saving lives.

But building on that ambition, the hospital is also improving child health in the broadest possible way, by addressing longstanding child health inequities.

Working with many partners, Nationwide Children’s develops affordable housing to improve central Ohio communities. It has also created a first-of-its kind model, called Pediatric Vital Signs, to measure and improve the health of children across an entire population. And it has developed the country’s most comprehensive behavioral health system of care, because a child’s wellbeing goes beyond physical health.

Children’s hospitals have not always thought like this. Nationwide Children’s is showing that it is possible.

It’s my pleasure to introduce this annual report, which provides a snapshot of all Nationwide Children’s Hospital is accomplishing now, as well as the ways it is laying the groundwork for the future. I’m proud of what Nationwide Children’s is doing, from revitalizing neighborhoods to making discoveries on the cutting edge of science and know it will continue to make a difference for generations to come.

KIRT WALKER
Chair
Nationwide Children’s Hospital Inc.
Nationwide Children’s Hospital
Board of Directors



(Left to Right)
Rustin Morse, MD,
Catherine Krawczeski, MD,
Dennis Durbin, MD,
Oluyinka Olutoye, MD, PhD

DEAR FRIENDS AND COLLEAGUES,

These continue to be unprecedented times in health care. Collectively, we must not let challenges impede progress. At Nationwide Children’s Hospital, our bold strategic plan and *One Team* philosophy continue to guide us. At all levels and in every corner of the organization, our people and their commitment to achieving the *Best Outcomes* for every patient have been inspiring.

This past year, we’ve had more than 1.6 million visits with patients from all 50 states and 46 countries around the globe! We’ve established destination centers in fetal medicine, kidney and urinary tract care and research, as well as liver and pancreas care.

Our commitment to integrate clinical care and research, as outlined in the strategic plan we unveiled one year ago, continues to expand. Our programs in gene and cell therapies, neuro-oncology, regenerative medicine and the newly established total pancreatectomy with islet autotransplantation (TPIAT) program are premier examples of this commitment. We are investing in research and translating discoveries into meaningful therapies that benefit not only our local patients and families but also those around the country and around the world. In addition, we continue to focus locally on meeting the needs of youth and families with a comprehensive behavioral health system of care and with our ambitious population health agenda, which aims to reduce health disparities and improve health equity.

All of this is possible because of the dedication and expertise of our faculty and staff. Their commitment to excellence, collaboration, compassion and drive to achieve make Nationwide Children’s the unique place it is. In this edition of the annual report, we highlight some of our *One Team* members who have inspired us this past year. Join us as we celebrate what *One Team* with one focus can do, just one year into our most aspirational — and inspirational — strategic plan to date.

DENNIS R. DURBIN, MD, MSCE

*President, Abigail Wexner
Research Institute*

CATHERINE D. KRAWCZESKI, MD

*Physician-in-Chief
Chair, Department of Pediatrics*

RUSTIN MORSE, MD

Chief Medical Officer

OLUYINKA O. OLUTOYE, MD, PhD

Surgeon-in-Chief

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[Photography in this report involves images from 2021 and prior, those not reflecting masks or social distancing were taken pre-COVID-19.]



INTEGRATED CARE AND RESEARCH

With more than 1,000 faculty working in over 100 subspecialties and 14 research centers, Nationwide Children’s clinical innovations and research serve children in Ohio and around the world.

While all of our service lines offer world-class care, some of our programs have established themselves as destination programs, with patients, faculty and staff traveling from far and wide to be part of the amazing things happening at Nationwide Children’s. These programs include: Neuro-Oncology, Center for Colorectal and Pelvic Reconstruction (CCPR), Pancreas and Liver Care Center and Fetal Center.

Beyond destination programs, we have advanced research programs that are translating new discoveries to the bedside each day. As leaders in Cell and Gene Therapy and Genomics we are helping children in central Ohio and around the world through discovery and innovation.



“At Nationwide Children’s, we are advancing the integration of clinical care and research by challenging the idea of what it means to be truly integrated. As we work to engage more patients and families in research, we will also engage, educate and train all faculty, staff and employees to create an organization where research is driving clinical care and clinical care is also driving research, with a singular mission of advancing best outcomes for all children.”

Dennis Durbin, MD, MSCE, President, Abigail Wexner Research Institute

NEURO-ONCOLOGY: POWER IN CONSORTIA

Brain and spinal cord tumors account for about 1 in 4 cases of pediatric cancer diagnosed each year. Sadly, 25% of patients with brain and spinal cord tumors do not survive 5 years past diagnosis.

If there is a collaborative effort to find new discoveries for pediatric brain and spinal cord tumors, our team is part of it.

Launched by Maryam Fouladi, MD, in 2017, and currently housed at Nationwide Children’s, the **CONNECT** (COLlaborative Network for NEuro-oncology Clinical Trials) **Consortium** includes 18 international partners designed to provide early-stage evaluations of the most promising therapies to children with the poorest prognoses. Learnings from CONNECT are passed along to larger consortia to help speed up bigger trials.

Founded by previous neuro-oncology co-director Jonathan Finlay, MD, and based at Nationwide Children’s, the **NEXT Consortium** supports a multi-national clinical trial for young children with newly diagnosed brain and spinal cord malignant embryonal tumors. With more than 60 sites around the world, these trials improve both the rate of survival, and the quality of that survival for children.



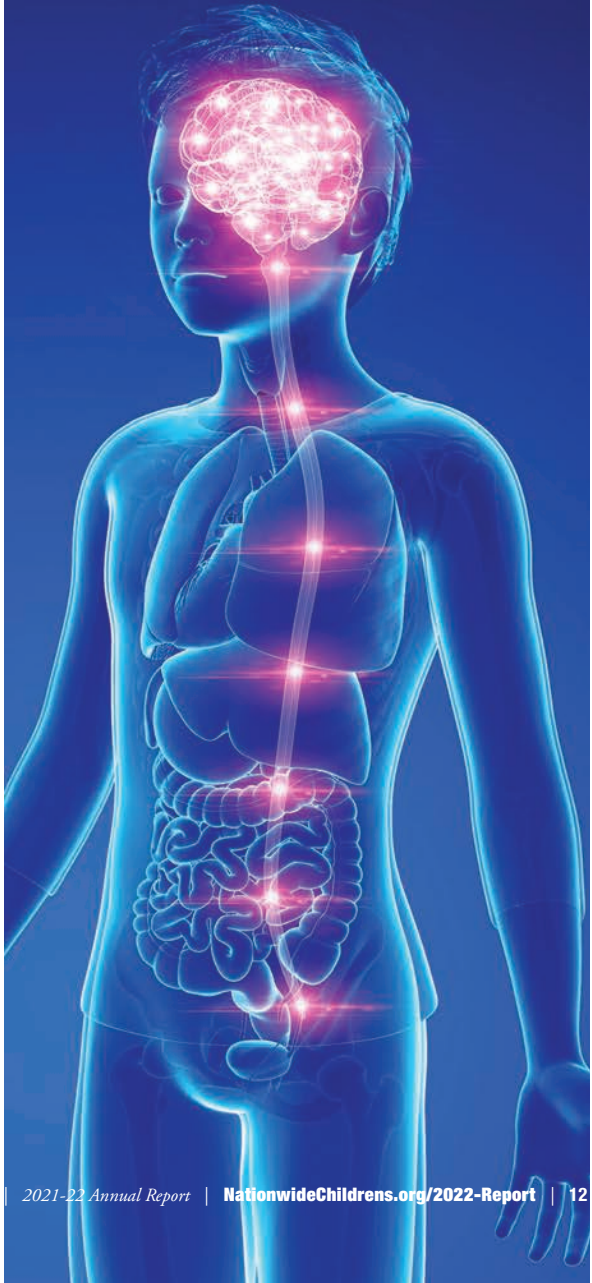
“It will take more than just neurosurgeons, or clinicians, or geneticists or pharmacokineticists — it’s truly going to take a village to find cures for pediatric

brain and spinal cord cancers. The beauty of our community is that the researchers and clinicians are extremely collaborative. By being so, we’ve made huge strides together.”

*Maryam Fouladi, MD,
Medical Director, Pediatric Neuro-Oncology Program*

Nationwide Children’s is also part of other top cancer research consortia:

- Children’s Oncology Group (COG)
- Beat Childhood Cancer
- GAIN (Genomic Assessment Improves Novel Therapy)
- NANT (New Approaches to Neuroblastoma Therapy)
- PBMTC (Pediatric Blood and Marrow Transplant Consortium)
- PBTC (Pediatric Brain Tumor Consortium)
- PIDTC (Primary Immune Deficiency Treatment Consortium)
- PNOC (Pacific Pediatric Neuro-Oncology Consortium)
- STAR (Sickle Cell Transplant Alliance)
- Sunshine Project
- TACL (Therapeutic Advances in Childhood Leukemia & Lymphoma)



CENTER FOR COLORECTAL AND PELVIC RECONSTRUCTION: COMMITTED TO LIFELONG, QUALITY CARE

The Center for Colorectal and Pelvic Reconstruction (CCPR) is leading the way in providing high quality care for children diagnosed with colorectal conditions. Research shows that our approach to care, providing high volume reconstructive surgery for primary and re-operative cases where appropriate and pediatric and adult bowel management programs, improves outcomes and increases quality of life for our patients and their families.

TELEHEALTH FOR BOWEL MANAGEMENT

During the pandemic, the CCPR team made a dramatic shift to telehealth for patients in the bowel management program. They were thrilled to see that not only was telehealth feasible for this program, but it was also safe and effective. With 60-70% of patients coming to the program from out of state, adding telehealth has enabled patient support on a new level. It has also improved surgical follow up for families that travel a long distance for care.



“With some of our international patients, they would come to us for surgery, and I would never see them again. Now, I can follow up with them through telehealth visits with the families and the referring provider or case worker. We’ve done multiple such international follow ups.”

Richard Wood, MD, Director, Center for Colorectal and Pelvic Reconstruction

CARE FOR THE WHOLE PATIENT, FOR THEIR WHOLE LIFE

At Nationwide Children’s, every child diagnosed with a colorectal or pelvic condition is handled with an individualized treatment plan. Because of the complexity of many conditions, some children require care throughout their life. Our team is committed to providing optimal outcomes and quality of life from newborns, through potty training, puberty, sexual function and childbearing.

That’s why the Center for Colorectal and Pelvic Reconstruction created the Transitional Care Clinic. Led by Director Alessandra Gasior, DO, the only colorectal surgeon in the United States to be fellowship trained in both pediatric and adult colorectal care, the Transitional Care Clinic offers CCPR patients the opportunity to gradually prepare for the world of adult health care.



Alessandra Gasior, DO, Director, Transitional Care Clinic



PANCREAS AND LIVER CARE CENTER: COMPREHENSIVE CARE FOR COMPLEX CONDITIONS

From imaging, advanced endoscopy and comprehensive pain management to complex surgical procedures and pioneering research endeavors, the Pancreas and Liver Care Center provides the complete range of clinical and surgical services for children with any type of pancreas or liver problem. Our comprehensive, patient-centered approach to pancreas and liver care involves a thorough evaluation of a patient’s health needs, with the application of the most appropriate and state-of-the-art treatment approaches.

A LIFE-CHANGING OPTION FOR DEBILITATING PANCREATITIS: TOTAL PANCREATECTOMY WITH ISLET AUTOTRANSPLANTATION (TPIAT)

TPIAT involves removing the entire pancreas and spleen, and majority of the duodenum, then reconstructing the gastrointestinal tract. The insulin-producing islets are isolated from the pancreas and then autotransplanted into the liver. The goal is to relieve pain and decrease insulin dependence — avoiding long-term diabetes. While TPIAT has been safely performed in adults for decades, only a few pediatric centers in the United States offer this procedure.

Successful islet isolation is essential for best outcomes and can be challenging in young patients. This underscores the need for an islet isolation team with advanced experience, like the one available at Nationwide Children’s — the only U.S. pediatric hospital with a dedicated on-site islet isolation facility. Our team includes the nation’s most experienced board-certified pediatric TPIAT surgeon, Jaimie D. Nathan, MD, and one of the world’s the most experienced pancreatic islet isolation experts, Balamurugan Appakalai, PhD.



Read about the new faculty leaders in the Pancreas and Liver Care Center in the Faculty Updates section on page 30 of this book.

THE FETAL CENTER: SEAMLESS, COMPASSIONATE, EXPERT FETAL CARE

The Fetal Center at Nationwide Children’s Hospital strives to deliver high quality care and the best possible outcome for each individual family, from diagnosis through delivery and long-term follow-up. Our team of leading medical and surgical experts ensure each patient has access to a comprehensive range of services and the most advanced treatment options for the full spectrum of fetal diagnoses.

As one of the few fetal centers in the United States that is located within a pediatric hospital, our program offers comprehensive services in one location, keeping mom and baby close to home and streamlining the number of appointments and visits needed by our patient families.

FETAL CENTER CLINICAL LEADERSHIP

“Research shows that having a comprehensive, full-spectrum team of providers early on can help babies reach their full potential over the long term. Our team works collaboratively with the patient’s own obstetrician and fetal medicine providers to develop a treatment plan that meets all the unique needs of every fetus, mother and family. I am incredibly proud of the team of experts that we have assembled to help every mother and child have their best possible outcome.”

*Oluyinka Olutoye, MD, PhD,
Surgeon-in-Chief*



*Oluyinka Olutoye, MD, PhD
Surgeon-in-Chief*



*Adolfo Etchegaray, MD
Chief of Fetal Medicine*



*Mickey Johnson, MHA, RN
Director of Fetal Services*

CELL AND GENE THERAPY: ACCELERATING HOPE AND INSPIRING THE FIELD

Nationwide Children’s researchers and clinicians are trailblazers in the fields of gene and cell therapy. As leaders in the field with numerous gene and cell therapy candidates in preclinical studies and clinical protocols, as well as the first FDA-approved gene therapy for systemic administration, our team is giving tremendous hope for families facing conditions ranging from cancer to neuromuscular and neurologic diseases and beyond.



“In addition to having world class facilities and resources, our team is made up of experts who value our culture of collegiality and collaboration. This environment of integration and mutual support makes the Center for Gene Therapy a place where we are proud to work together to bring new therapies to children around the world.”

Kevin Flanigan, MD, Director, Center for Gene Therapy

THE FUTURE OF NK CELL THERAPY

A collaboration of Dean Lee, MD, PhD, director of the Cellular Therapy and Cancer Immunotherapy Program, Meisam Naeimi Kararoudi, DVM, PhD, director of the CRISPR/Gene Editing Core, and Margaret Lamb, MD, pediatric BMT/Cell Therapist and principal investigator, has led to the development of new chimeric antigen receptor natural killer (CAR-NK) cells that are now the focus of new clinical study protocol in development.



Dean Lee, MD, PhD



*Meisam Naeimi
Kararoudi, DVM, PhD*



Margaret Lamb, MD

“Our team is thrilled to continue our work by bringing NK cell modifications to the clinic. We can now enhance NK cell function and redirect NK cells to identify specific tumor antigens with a single modification. Can we combine these modified NK cells with existing therapies to improve survival? This is what is coming in the next NK innovation wave.”

Dean Lee, MD, PhD, Director, Cellular Therapy and Cancer Immunology Program

Highlights in Cell and Gene Therapy*



Proof-of-concept study effective gene therapy approach to cancer



First-in-children trial of NK cells for acute myeloid leukemia



Cell therapy clinical trials underway



Gene therapy clinical trials underway

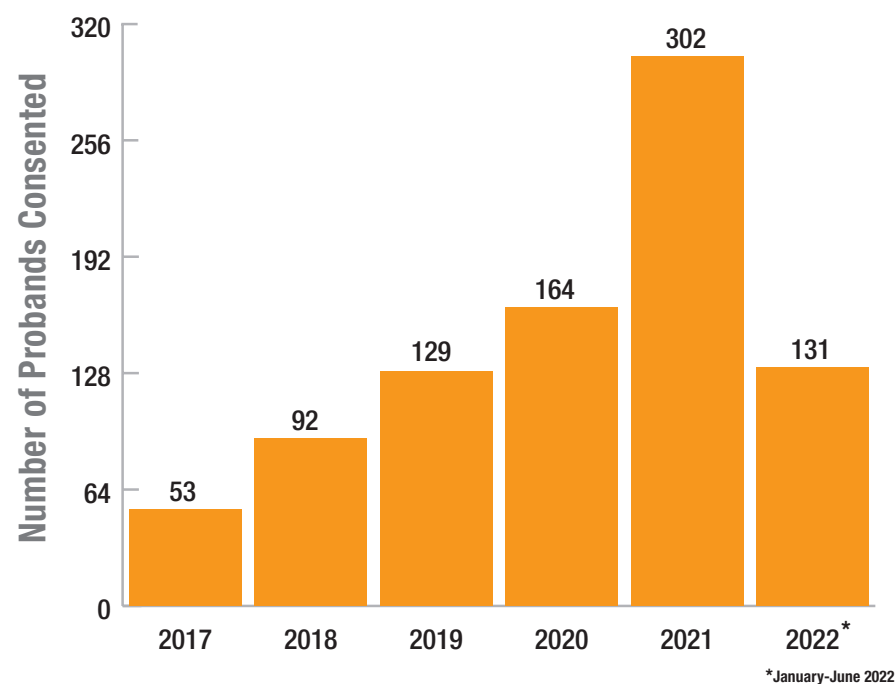
*2021-2022 academic year

EXPANDING GENOMIC MEDICINE AT NATIONWIDE CHILDREN'S

This past year has been a breakout in volume and depth of genomics studies at the Steve and Cindy Rasmussen Institute for Genomic Medicine (IGM) at Nationwide Children's as we continue to expand genomic medicine into more of our clinical programs. Probands are sequenced as part of the following protocols: cancer, epilepsy, rare disease, behavioral health brains, immunology, rapid genome sequencing, CFM2 and metagenomic next generation sequencing.

Translational Protocol Volumes

Annual Enrollment of Targeted Populations on IGM Developed Translational Genomic Sequencing Protocols



NEW INITIATIVE BRINGS PERSONALIZED DIAGNOSIS AND TREATMENT TO CHILDREN WITH SOLID TUMORS

The National Cancer Institute (NCI), Children's Oncology Group (COG) and Nationwide Children's are poised to change the direction of pediatric cancer diagnosis and care. New results from international efforts to characterize pediatric cancers have led to the Molecular Characterization Initiative: a project that aims to collect, analyze and report clinical molecular data to support COG-affiliated clinicians in choosing the best treatment for each child.

Nationwide Children's provides two critical aspects of the CCDI Molecular Characterization Initiative: the Biopathology Center, which oversees the COG Biobank, and the Steve and Cindy Rasmussen Institute for Genomic Medicine, which performs the clinical molecular characterization assays.



Richard Wilson, PhD



Elaine Mardis, PhD



Nilsa Ramirez, MD

"Executing multiple genomic tests to produce data that are interpreted through rapid and scalable computational analyses and lead to medically relevant results requires a highly integrated clinical environment. Our team is excited to be part of this incredibly worthy endeavor. We anticipate this project will fundamentally transform how we diagnose and treat children facing cancer."

Richard Wilson, PhD, Executive Director, and Elaine Mardis, PhD, Co-executive Director, Institute for Genomic Medicine, and Nilsa Ramirez, MD, Director, Biopathology Center

MEETING THE CHILDREN'S BEHAVIORAL HEALTH CRISIS HEAD ON

NATIONWIDE CHILDREN'S COMPREHENSIVE SYSTEM OF CARE FOR BEHAVIORAL HEALTH

In 2020, right before the COVID-19 pandemic, we opened the largest free-standing behavioral health center of its kind — cementing our commitment to children's mental and behavioral health. Since then, the pandemic has exacerbated the ongoing pediatric mental health crisis. But our work did not stop with the opening of a building. To address the rising need, we have developed a community-wide system of care that relies on cooperation, collaboration and innovation of hospital and community partners.

We conceptualize the community-wide system of care as a pyramid — the more intensive the level of care, the higher the level on the pyramid. Nearly all children can benefit from basic prevention programs, while only a relative few will need inpatient services. Each child, however, can receive the level of care they need.

We ensure that the various levels of care are seamlessly integrated to provide comprehensive care to children and their families over the course of their treatment. We also ensure that our care is informed by leading edge research and, in turn, supports ongoing research that will define future innovative treatments.

LEADERS IN INTEGRATING BEHAVIORAL HEALTH IN PRIMARY CARE

Primary care is a front door to the mental health system. It's the first place most parents go when they have a concern about their child's behavior and development. That's why Nationwide Children's Behavioral Health and Primary Care experts have been working together in integrated practices. Project ECHO is a model that allows primary care providers to present cases to behavioral health experts at Nationwide Children's via teleconference and receive support in managing common pediatric mental health concerns. In 2021, there were 155 ECHO sessions and 3,563 attendees.



"Our community work is intentionally designed to support local providers and agencies to address more mental health conditions at less-intensive levels, then refer to us when it's necessary. That increases capacity to help children at every level. We believe this comprehensive approach will ultimately reduce Emergency Department use for crisis patients and reduce readmissions to the highest levels of care."

David Axelson, MD, Chief of Psychiatry, Medical Director, Big Lots Behavioral Health Services

In addition, Nationwide Children's and Partners For Kids have developed a program to support community primary care practices that want to integrate behavioral health clinicians within their practice. Since launching in May 2022, 30 practices have explored, prepared for or implemented this program, and 13 practices were active within the program.



"Integration is not just about behavioral health crises. It's about how we develop relationships early and prevent problems later on. We're full partners in the care of the child — ready to jump in as needed to improve physical and mental health."

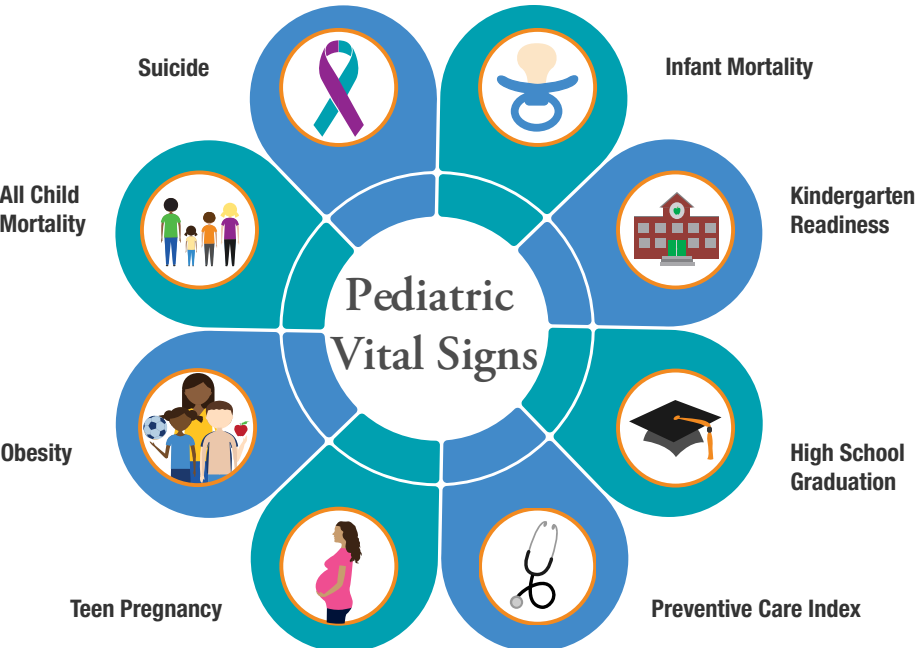
Whitney Raglin Bignall, PhD, Pediatric Psychologist Integrated into a Primary Care Clinic

INVESTING IN COMMUNITY WELLNESS THROUGH POPULATION HEALTH INITIATIVES



“Few hospitals, especially children’s hospitals, have the will or ability to take on population health challenges in their communities to the magnitude that Nationwide Children’s does. Our commitment to population health and our community spans from our award-winning Healthy Neighborhoods Healthy Families initiative to Partners For Kids — the nation’s largest pediatric Accountable Care Organization — to measuring and improving performance across eight Pediatric Vital Signs. We are proud to be an organization transforming children’s health — not just health care.”

Patty McClimon, Senior Vice President, Strategies and Facilities Planning



PEDIATRIC VITAL SIGNS

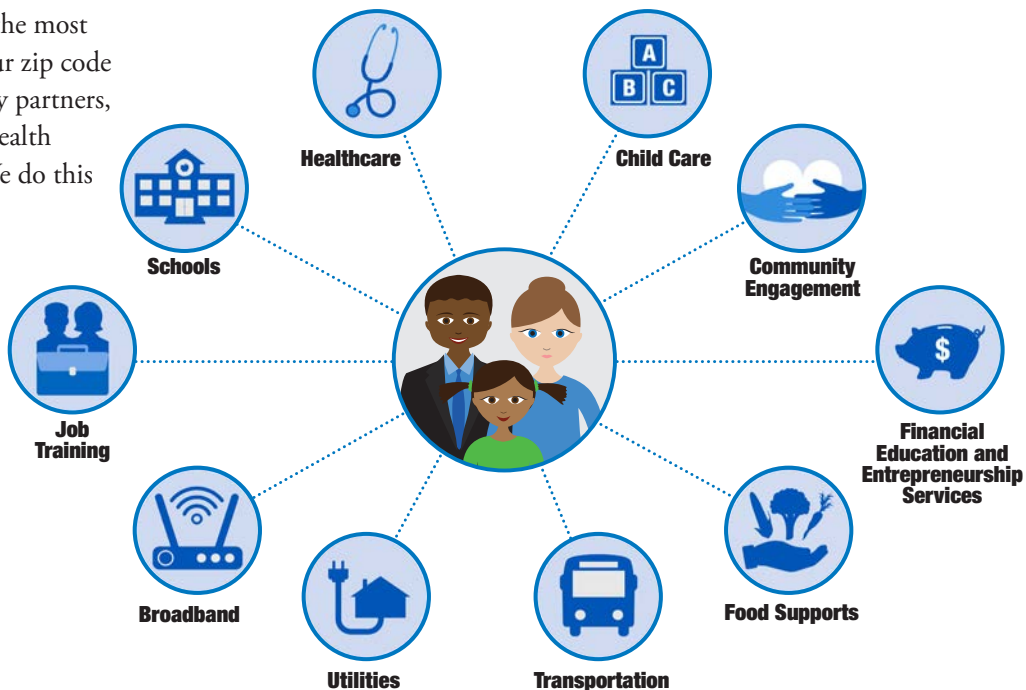
In the same way that traditional vital signs such as temperature and blood pressure give an indication of an individual child’s health, Pediatric Vital Signs is an effort to meaningfully measure the wellbeing of all children in Franklin County, Ohio, across eight metrics that span childhood.

The eight metrics of Pediatric Vital Signs are supported by the work of Healthy Neighborhoods Healthy Families, Partners For Kids®, and numerous other programs supported by Nationwide Children’s and our community partners.

HEALTHY NEIGHBORHOODS HEALTHY FAMILIES (HNHF)

HNHF is founded on the idea that one of the most important predictors of overall health is your zip code — where you live. HNHF, with community partners, fosters communities that support positive health outcomes for the families who live there. We do this by creating and sustaining mixed-income communities through home repairs, rentals and home buying programs in addition to investing in numerous wraparound services.

Wrap Around Services



Community Investments Highlights

96%
96% of children prepared for kindergarten after participating in readiness program

1,200
More than 1,200 residents of South Side and Linden zip codes employed by Nationwide Children's

500
500 houses impacted on Columbus's South Side and Linden neighborhoods

\$1.5 MILLION
In the 2022 tax season, Nationwide Children's volunteers helped 520 families claim more than \$1.5 million in tax refunds

15%
15% of the rental market on the South Side of Columbus managed by Nationwide Children's, keeping the area affordable for lower income families

Learn more about Population Health programs and initiatives at NationwideChildrens.org/Collaboratory



There is no commitment to population health without a deep commitment to health equity. We are committed to creating health equity for children. That is, we cannot say we have the best outcomes for children if we don't have the best outcomes for all children.”

Deena Chisolm, PhD, Director, Center for Child Health Equity and Outcomes Research, Abigail Wexner Research Institute

Faculty in the Center for Child Health Equity and Outcomes Research authored >100 peer-reviewed publications in 2022. National Institutes of Health R01 Grants were awarded to Center for Child Health Equity and Outcomes Research this year for research on the following topics:

- Impact of structural racism on maternal and child health in the Linden community
- Clinical trial of family nurse partnership for women with previous live births
- Racial/ethnic and geographic differences in pediatric tonsillectomy use
- Primary care algorithm development for early identification of young women with bleeding disorders
- Impact of COVID-19 pandemic on Safety Net performance, disparities and vulnerable children



SUPPORTING OUR ONE TEAM BY CHAMPIONING A DIVERSE WORKFORCE

In May 2022, Ray Bignall II, MD, nephrologist and assistant chief diversity and health equity officer at Nationwide Children's, was the keynote speaker for the Opening General Session at the Pediatric Academic Society (PAS) Meeting. His speech, titled "Over a Way That With Tears Has Been Watered: Why Achieving Health Equity Takes Trust and Guts," received a standing ovation.

Later during the conference, he was a guest on *Charting Pediatrics*, a podcast filmed live. There, he spoke on the importance of championing a diverse workforce. On an institutional level, Dr. Bignall elaborated on the need for physician workforces that reflect the communities that health care institutions serve — an effort Nationwide Children's has aggressively championed. In 2021, Pediatrics published a study from Nationwide Children's that showed how targeted interventions could increase resident diversity. On an individual level, he highlighted the responsibility physicians have to value and respect the diverse communities they serve, ensuring patients of all demographics know their providers care for them deeply and are working to provide equitable care.

"Inclusive excellence is when we are intentional about including the voices of people from across the spectrum of our institution — from the C-suite to the front line — and we understand and appreciate the value that every person can contribute to providing the best possible outcomes for children."

Ray Bignall, MD,
Assistant Chief Diversity and Health Equity Officer



EMPLOYEE RESOURCE GROUPS AT NATIONWIDE CHILDREN'S HOSPITAL

Our vision for our organizational culture is one that is inclusive and diverse and fosters **mutual respect**, where our staff and physicians are **valued and provided opportunities** to achieve their **full potential**. We recognize that an **inclusive and diverse** culture is grounded in a firm commitment to attract and retain talent which reflects the communities we serve. One way of supporting this goal is with our employee resource groups (ERGs). Our seven aligned ERGs include:

- All Equal – LGBTQ employees
- APAN – Asian Pacific American Network
- CapABLE – Persons with disabilities
- Connect With Us – Black and Multiracial employees
- HOLA – Hispanic/Latino employees
- LEAD – emerging professionals & leaders
- Military/Veterans

STAND AGAINST RACISM, STAND FOR HEALTH EQUITY

The hospital's Stand Against Racism, Stand For Health Equity initiative has been organized into seven pillars. These pillars are designed to:

- Encompass all intertwined aspects of our organization and work
- Help us identify ways to make antiracism and equity a priority
- Provide lenses we can use to evaluate ourselves and our progress



"I am incredibly proud of our commitment to diversity and inclusion. From the work of our employee resource groups and residency diversity teams to the efforts of individual employees who champion and support diversity. There is still much work to do, but our voices are stronger together. Here at Nationwide Children's, we stand as one team where everyone matters."

Olivia Thomas, MD, Chief Diversity and Health Equity Officer

LEADERS IN QUALITY AND SAFETY:
RAISING THE BAR ON CLINICAL EXCELLENCE

GROWING OUR PARTNERSHIPS
AND COLLABORATIONS

“Quality and safety’ are not just words on paper at Nationwide Children’s. They are at the heart of our institutional values. We believe quality and safety are as crucial for the future of health care as scientific and medical discovery.”

Timothy C. Robinson, Chief Executive Office

CENTER FOR CLINICAL EXCELLENCE

Established last year as part of the new strategic plan, the Center for Clinical Excellence is responsible for overseeing and advancing the quality program, including our innovative SCOPE framework in support of *Leading the Journey to Best Outcomes*. We are known for being a leading place to turn for the latest, most advanced thinking on quality and safety. Everything we do at Nationwide Children’s Hospital is focused on achieving best outcomes. Every day, patients and families put their trust in us. This is an honor, privilege and responsibility that we take seriously. Unequivocally, quality and safety — both patient and employee safety — are our top priorities.



“As *One Team* where *Everyone Matters*, we can take pride in knowing that we make a difference every day for patients and their families, as well as for our colleagues and coworkers. No matter the role, we all contribute to our mission of achieving the *Best Outcomes* for kids everywhere.”

Rustin Morse, MD, Chief Medical Officer

QUALITY HIGHLIGHT:
SIMULATION FOR SUCCESS IN FETAL SURGERY

Nationwide Children’s Simulation Program provides hands on learning utilizing high-fidelity patient simulators. In preparation for receiving patients with rare conditions in the new Fetal Medicine Center, our teams trained using the latest technology and under the guidance of world-renowned fetal surgeon and Nationwide Children’s surgeon-in-chief, Oluyinka Olutoye, MD, PhD.



Quality and Safety Highlights: By the Numbers

> 300

>300 days without a serious safety event

50%

50% reduction in unplanned extubations this year

25

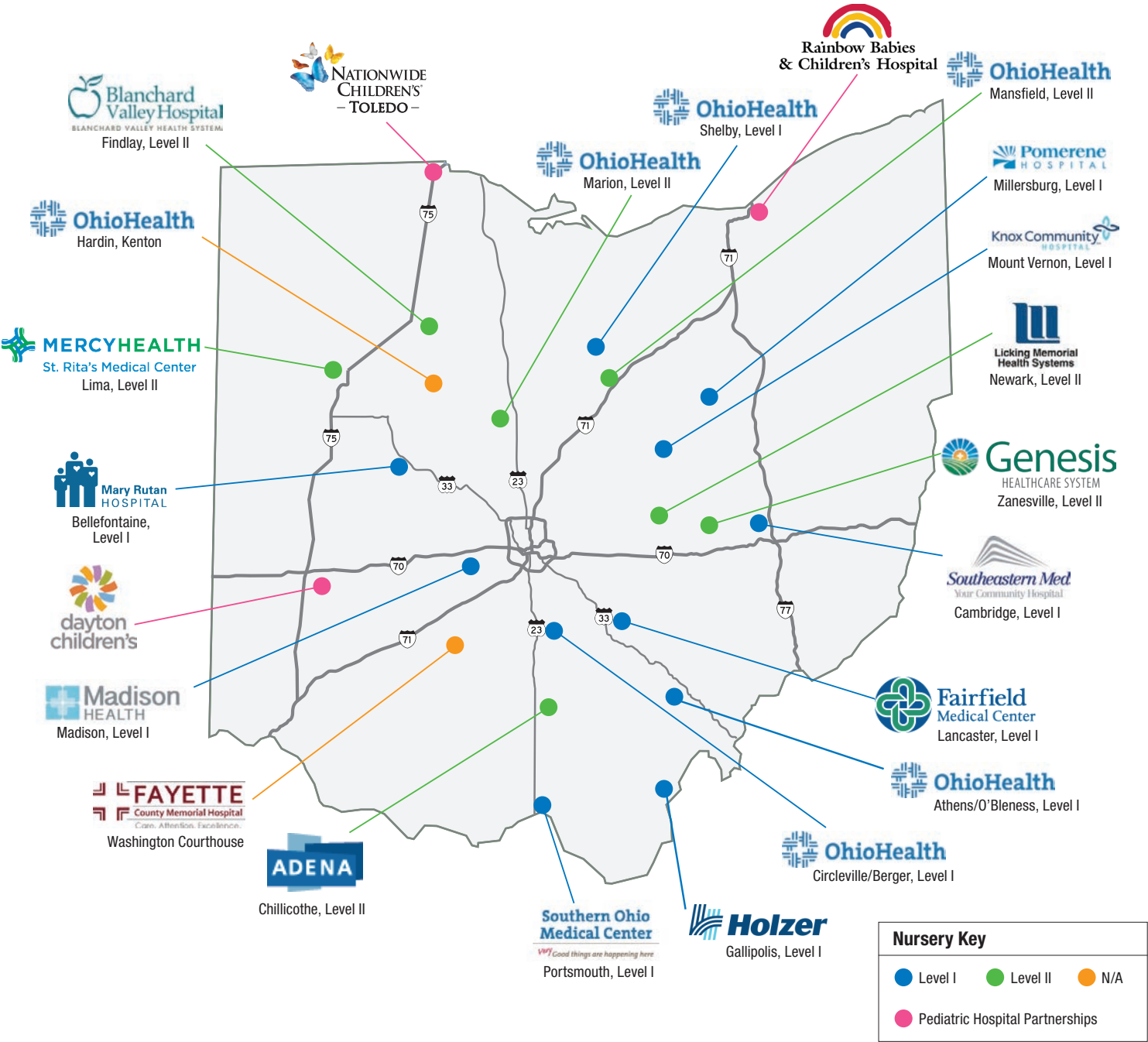
Over 25 new service line scorecards developed to evaluate performance across the SCOPE framework

50%

50% reduction in surgical site infections with our lowest rate in the last 5 years

20

Over 20 new clinical pathways developed and implemented



NATIONWIDE CHILDREN’S – TOLEDO: KEEPING CARE LOCAL FOR FAMILIES IN NORTHWEST OHIO

March 2022, Nationwide Children’s Hospital acquired Mercy Health Children’s Hospital in Toledo, Ohio. Nationwide Children’s-Toledo is dedicated to serving patients and families by facilitating clinical program development through physician recruitment, investment in programs, therapies, equipment and facilities, and continued collaboration — ultimately helping to keep patients and families in the Toledo area for care.

AS PART OF THE \$3.3 BILLION STRATEGIC PLAN, EXPANDED FACILITIES AND PROGRAMS REQUIRE

ADDITIONAL FACILITIES TO SUPPORT OUR MORE THAN 1.3 MILLION PATIENT VISITS EACH YEAR.

MASTER FACILITIES PLAN : 2021-2026 CAMPUS ZONES AND PLANNED EXPANSION

Blue Zone: Ambulatory Outpatient

Orange Zone: Research

Tan Zone: Inpatient

Purple Zone: Acute Outpatient

Yellow Zone: Planned Inpatient Expansion



1 Livingston Orthopedic & Surgery Center

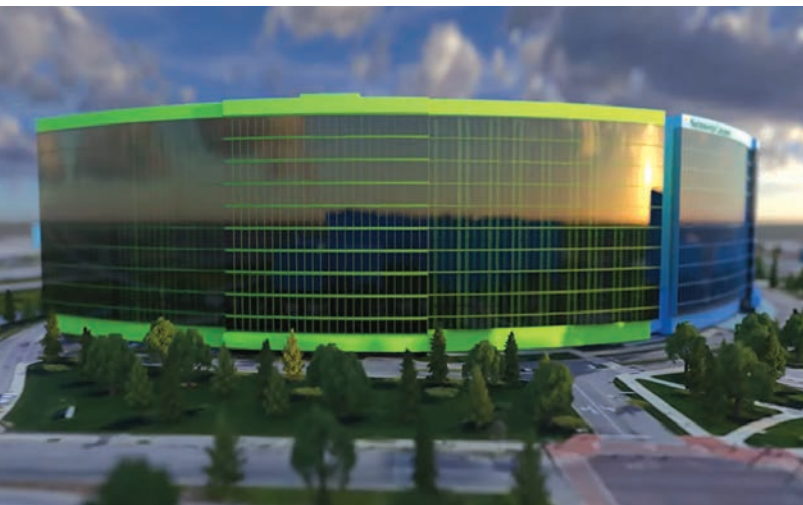
2 Research Building IV

3 Research Building V

4 Inpatient Tower

P Parking Garage

C Conference Center



NEW HOSPITAL TOWER

The **new hospital tower** will mirror the existing 12-story inpatient facility, slated for planning and breaking ground within the five-year strategic plan.



RESEARCH CAMPUS EXPANSION

Research Building 4, currently under construction, will open in 2023 with expanded wet bench and dry lab space.



LIVINGSTON ORTHOPEDIC & SURGERY CENTER

New **Livingston Orthopedic & Surgery Center** to open in 2024 with 270,000 square feet dedicated to high quality, multidisciplinary care in orthopedics and sports medicine.



PROTON CENTER

Nationwide Children's and The Ohio State University are bringing the first proton therapy treatment facility to central Ohio. The proton center will be located in the new 340,000 square-foot outpatient facility under construction on Ohio State's west campus. It will utilize 55,000 square feet and is expected to open in 2023.

FACULTY HONORS AND UPDATES

Faculty Award Highlights



Christopher Breuer, MD

Christopher Breuer, MD, Named 2022 Allen Distinguished Scholar in Pediatric Research

Dr. Breuer, director of the Center for Regenerative Medicine at the Abigail Wexner Research Institute at Nationwide Children’s, is the 2022 recipient of the award given in honor of former Nationwide Children’s CEO, Steve Allen, MD. Dr. Breuer is a pioneer in tissue engineering, developing the first tissue engineered vascular graft to be implanted in a human with his collaborator Toshiharu Shinoka, MD, PhD. As leader of the center, he has advanced tissue engineering research to encompass numerous innovations, fostered a global network of collaborators and advocated for public education and support for regenerative medicine.



Lauren Bakaletz, PhD

Lauren Bakaletz, PhD, Honored by AAAS as Lifetime AAAS Fellow

The American Association for the Advancement of *Science* (AAAS) is the world’s largest general scientific society and publisher of the Science family of journals. Dr. Bakaletz, director of the Center for Microbial Pathogenesis in the Abigail Wexner Research Institute at Nationwide Children’s, was elected to the newest class of AAAS Fellows, among the most distinct honors within the scientific community. Dr. Bakaletz and her team study the molecular mechanisms that underlie polymicrobial biofilm-mediated chronic and recurrent infections of the respiratory tract, including otitis media. Dr. Bakaletz’s research has also led to 43 patents and two biotechnology startups.



Carlo Di Lorenzo, MD

Carlo Di Lorenzo, MD, Honored With the 2022 Shwachman Award by NASPGHAN

Dr. Di Lorenzo, chief of the Division of Gastroenterology, Hepatology and Nutrition at Nationwide Children’s, has been named the recipient of the 2022 Shwachman Award. The award is given by the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN) to a person who has made major, lifelong scientific or educational contributions to the field.



Jorge Vidaurre, MD

Jorge Vidaurre, MD, Receives Arnold P. Gold Foundation Humanism in Medicine Award From Child Neurology Society

Dr. Vidaurre, attending neurologist and director of the Neurophysiology Lab at Nationwide Children’s, received the 2022 Arnold P. Gold Foundation Humanism in Medicine Award from the Child Neurology Society. The award honors a medical school faculty physician who exemplifies the qualities of a caring and compassionate mentor in teaching and advising medical students.



Gary Smith, MD, DrPH

Gary Smith, MD, DrPH, Receives Safe States Award

Dr. Smith, director of the Center for Injury Research and Policy in the Abigail Wexner Research Institute at Nationwide Children’s, was awarded the 2021 Alex Kelter Vision Award at the Safe States Annual Conference. This award, originally known as the Vision Award and re-named the Alex Kelter Vision Award in 2006, is Safe States Alliance’s highest honor, recognizing individuals who have brought leadership and vision to the field of injury and violence prevention.



Gail Besner, MD

Gail Besner, MD, Receives 2021 Sheen Award From the American College of Surgeons

Dr. Besner, chief of Pediatric Surgery at Nationwide Children’s and principal investigator in the Center for Perinatal Research in the Abigail Wexner Research Institute at Nationwide Children’s, received the 2021 Dr. Rodman E. Sheen and Thomas G. Sheen (Sheen) Award. The award is given to physicians who are working on the frontiers of medical science doing work that holds great promise, who are also involved in teaching and research.



Jerry Mendell, MD

Jerry Mendell, MD, Honored With 2021 Bernard Sachs Award From the Child Neurology Society

The Child Neurology Society Bernard Sachs Award is given annually to honor someone of international status leading research in neuroscience, with relevance to the care of children with neurological disorders. Dr. Mendell, pediatric neurologist and pioneer in gene therapy research for neuromuscular diseases, received this award for his seminal studies on the use of gene therapy for individuals with neuromuscular disease.



Maya Iyer, MD

Maya Iyer, MD, MEd, Receives Inspiration Award From the American Medical Association

The AMA Women Physicians Section Inspiration Award honors and acknowledges physicians who have offered their time, wisdom and support throughout the professional careers of fellow physicians, residents and students. Dr. Iyer is an emergency medicine physician and pediatric emergency medicine fellowship faculty member.



Alex Wagner, PhD

Alex Wagner, PhD, Receives Genomic Innovator Award From the National Human Genome Research Institute

The NHGRI Genomic Innovator Awards support highly innovative work by early career genomics investigators from consortia or other team-science efforts. All awardees work on critical, emerging topics in genomics. These awards recognize creative endeavors with great potential to accelerate future genomics research. Dr. Wagner is a principal investigator in the Steve and Cindy Rasmussen Institute for Genomic Medicine at Nationwide Children’s. His lab works to improve the actionability and throughput of clinical variant interpretation.



Chris Ouellette, PhD

Chris Ouellette, PhD, Receives Caroline Hall Award for Clinically Innovative Research From the Pediatric Infectious Diseases Society

Dr. Ouelette earned the award for his work that was published in *Nature Communications* in 2020. The work looked at blood genome expression profiles in infants with congenital cytomegalovirus infection, which affect up to 1% of live births worldwide. The Hall Award for a Clinically Innovative Research Paper by a Junior Investigator was established to celebrate Dr. Hall’s contributions to the field of pediatric infectious diseases and will be presented annually to a first-authored faculty member of a paper best illustrating Dr. Hall’s innovation through clinical teaching and research biotechnology startups.



Anup Patel, MD

Anup Patel, MD, Named President of Child Neurology Foundation

Dr. Patel, pediatric neurologist at Nationwide Children’s, will be president of the CNF for the next two years. He is also medical director of clinical outcomes, accreditation and regulatory compliance at Nationwide Children’s and director of Complex Epilepsy Clinic.



Asuncion Mejias, MD

Asuncion Mejias, MD, PhD, Elected to Society for Pediatric Research Council

The Society for Pediatric Research (SPR) is an organization dedicated to creating a multidisciplinary network of diverse researchers to improve child health. Dr. Mejias has been elected to the SPR Council from the specialty area of Infectious Diseases. Dr. Mejias began her three-year term on June 1, 2022.



Amy Dunn, MD

Amy Dunn, MD, Appointed Chair of National Hemophilia Foundation’s Medical and Scientific Advisory Council (MASAC)

MASAC issues recommendations and advisories on treatment, research and other general health concerns for the blood and bleeding disorders community. Dr. Dunn’s term as chair began in spring 2022.

Division of Gastroenterology, Hepatology and Nutrition Expands Leadership and Capabilities



Brendan M. Boyle, MD

Brendan M. Boyle, MD, MPH, is section chief of Gastroenterology, Hepatology and Nutrition at Nationwide Children’s Hospital and associate professor of Pediatrics at The Ohio State University College of Medicine. Dr. Boyle is also co-director of the Inflammatory Bowel Disease (IBD) Center, with a clinical and research focus on treating children with Crohn’s disease and ulcerative colitis. He also serves as director of Quality Improvement for the GI division.



Cheryl E. Gariepy, MD

Cheryl E. Gariepy, MD, has been promoted to associate division chief for Research of Gastroenterology, Hepatology and Nutrition at Nationwide Children’s, in addition to being a professor of Pediatrics in The Ohio State University College of Medicine. She is also associate director of Research of the Pediatric Gastroenterology Fellowship, and the vice-chair of the Institutional Review Board for Human Subjects’ Research in the Abigail Wexner Research Institute.



Muhammad Khan, MD

Muhammad Khan, MD, MPH, FASGE, joined Nationwide Children’s as director of Diagnostic and Interventional Endoscopy. He has a special focus in endoscopic retrograde cholangiopancreatography (ERCP) and endoscopic ultrasound (EUS) in the diagnostic evaluation and therapeutic management of hepatopancreaticobiliary disorders. Dr. Khan is one of few physicians in the United States who performs per-oral endoscopic myotomy (POEM) procedures for achalasia, gastro-esophageal junction outlet obstruction, pyloric stenosis, gastroparesis, and other similar motility disorders in children.



A. Jay Freeman, MD

A. Jay Freeman, MD, MSc, joined Nationwide Children’s as medical director of Pancreatic Care for the Pancreas and Liver Care Center. Dr. Freeman, who is also professor of Pediatrics at The Ohio State University College of Medicine is leader in the care of children with pancreatic disorders as well as the GI and liver complications of cystic fibrosis. He has authored numerous manuscripts and participated in international position papers and guidelines and is an investigator in the International Study Group of Pediatric Pancreatitis: In Search of a Cure (INSPPIRE) study.



Praveen Goday, MD

Praveen Goday, MD, a pediatric gastroenterologist at Nationwide Children’s, has been named director of the Nutrition and Feeding Programs, which provide nutrition care throughout the hospital system and care to children with feeding problems. He is board certified in pediatric gastroenterology and nutrition.

Selected Faculty Appointments and Promotions

Continued

Maninder Singh Kalra, MD, PhD, Named Director of Nationwide Children’s Pediatric Sleep Disorder Center

Dr. Kalra joined Nationwide Children’s as the director the Pediatric Sleep Disorder Center. Dr. Kalra is board certified in pediatrics, pediatric pulmonology and sleep medicine.



Maninder Singh Kalra, MD



Debra Boyer, MD

Debra Boyer, MD, MHPE, Appointed Chief Medical Education Officer and Designated Institutional Official (DIO) at Nationwide Children’s

Dr. Boyer has been appointed chief medical education officer and Designated Institutional Official (DIO) at Nationwide Children’s. Dr. Boyer is also a practicing physician in Nationwide Children’s Lung and Heart-Lung Transplant Program. In her roles at Nationwide Children’s, Dr. Boyer oversees more than 85 residency and fellowship training programs, medical student programs and numerous other areas of medical education.



Kirsten Tulchin-Francis, PhD



Mary DiOrio, MD

Kirsten Tulchin-Francis, PhD, Joins Nationwide Children’s as Director of the Honda Center for Gait Analysis and Mobility Enhancement

Dr. Tulchin-Francis, a biomechanist and bioengineer, joined Nationwide Children’s as director of the Honda Center for Gait Analysis and Mobility Enhancement. She has more than 25 years of experience in biomechanics and studying the science behind how children and young adults with orthopedic conditions walk, jump and play.

Mary DiOrio, MD, Named Medical Director, Partners For Kids

Dr. DiOrio joined Partners For Kids as the medical director. Partners For Kids is the oldest and largest pediatric accountable care organization in the United States. Partners For Kids is responsible for the care of more than 470,000 children covered by Medicaid Managed Care across 47 counties.



Nick Jones



Angela Mingo

Nationwide Children’s Hospital Announces Two New Vice Presidents to Advance Population Health Efforts

Nick Jones and Angela Mingo have been named Vice President of Community Wellness and Vice President of Corporate Affairs, respectively. In his new role, Jones will continue leading Healthy Neighborhoods Healthy Families, which recently expanded into the Linden area, along with overseeing community relations, social determinants of health and social justice-related projects. Mingo’s new role comes with a special focus on northwest Ohio, where Nationwide Children’s took ownership of Mercy Children’s Hospital in March to bring compassionate and quality care close to home for the children of Toledo. Her role will emphasize communication and integration within the Toledo community, where she will continue the tradition of integrated community partnerships first embraced by Mercy Health.

Selected Grants

\$2 Million Grant Awarded to Nationwide Children’s Hospital to Increase Access to Trauma Services

Nationwide Children’s has been awarded a \$2 million grant from The Substance Abuse and Mental Health Services Administration (SAMHSA) to increase access to trauma services in Franklin and Licking Counties. The grant is part of SAMHSA’s National Child Traumatic Stress Initiative. The goal of the initiative is to transform mental health care for children and adolescents affected by trauma by improving the quality of community-based trauma treatment and increasing access to effective trauma-focused interventions.

The Center for Family Safety and Healing at Nationwide Children’s Hospital will partner with the Early Childhood Mental Health (ECMH) program and Clinical Medical Social Work team, both at Nationwide Children’s, as well as Ethiopian Tewahedo Social Services (ETSS), CelebrateOne, and community behavioral health agencies to provide regional services and national expertise. Increased access to evidence-based treatments, including Child Parent Psychotherapy (CPP), Perinatal Child Parent Psychotherapy (P-CPP) and Child and Family Traumatic Stress Intervention (CFTSI), is a key objective of the project.

Nichole Michaels, PhD, and Gary Smith, MD, DRPH, Receive \$5.6 million in Grant Funding from Centers for Disease Control and Prevention and National Institutes of Health

Dr. Michaels is a principal investigator in the Center for Injury Research and Policy in the Abigail Wexner Research Institute. Dr. Smith is the director of the Center for Injury Research and Policy. As co-principal investigators, they received funding for two R01 proposals. The first is focused on evaluating strategies for preventing drug overdoses among individuals who are involved in the criminal justice system. The second study is examining the use of fentanyl test strips as an overdose harm reduction strategy for Ohioans who use illicit drugs.

More than \$6.4M in National Institutes of Health (NIH) Funding for Kidney Research

The awards include a R01 Award to Bryce A. Kerlin, MD, for the investigation of thrombocyte-mediated podocyte injury mechanisms. Podocyte injury is a major determinant of chronic kidney disease progression. The Kerlin Lab has discovered that thrombin (the key effector enzyme of the blood coagulation system) damages podocytes in some forms of kidney disease. John David Spencer, MD, also earned a R01 grant to study insulin signaling and urinary tract infection (UTI) susceptibility in the bladder. Juan de Dios Ruiz Rosado, PhD, earned a K01 award to study the roles of macrophages and neutrophils in pyelonephritis and Ashley Jackson, PhD, earned a K01 award to study the role of the kidney’s urothelium. Emily Stonebrook, MD, earned a F32 grant to study the effects of obesity on UTI while Laura Schwartz, PhD, was awarded a highly competitive NIH Loan Repayment Grant to investigate histone deacetylases on UTI susceptibility.

Deena Chisolm, PhD, Awarded \$3.1 Million Over 5 Years From National Institutes of Health

Deena Chisolm, PhD, director of the Center for Child Health Equity and Outcomes Research in the Abigail Wexner Research Institute, was awarded \$3.1 million to research the impact of structural racism and discrimination on maternal and child health in Linden. The Targeted Investment Meaningful Engagement (TIME) study is funded by the Eunice Kennedy Shriver National Institute for Child Health and Human Development.

Allison Bradbury, PhD, Awarded \$1.2 Million as Part of Gilbert Family Foundation Gene Therapy Initiative Investment

Allison Bradbury, PhD, principal investigator in the Center for Gene Therapy in the Abigail Wexner Research Institute, was awarded \$1.2 million from the Gilbert Family Foundation. The Gilbert Family Foundation is a private foundation dedicated to accelerating a cure for neurofibromatosis type one.

Nationwide Children’s Selected as Clinical Coordinating Center in Large National Clinical Trial Sponsored by National Heart Lung and Blood Institute

Led by principal investigators Jonathan Slaughter, MD, and Carl Backes, MD, the trial will investigate treatment options for infants with patent ductus arteriosus (PDA), a condition where a hole that allows a fetus to skip circulation to the lungs in utero fails to close after birth. The more than \$5.5 million, five-year grant to fund the trial will be divided between the clinical coordinating center and the data coordinating center. The Epidemiology Data Center at the University of Pittsburgh has been named the data coordinating center for the trial.

Nationwide Children’s Receives Training Program in Basic and Translational Pediatric Oncology Research Grant

A T32 grant was awarded by the National Institutes of Health/National Cancer Institute to fund the Training Program in Basic and Translational Pediatric Oncology Research at the Abigail Wexner Research Institute at Nationwide Children’s Hospital. The program, led by principal investigators Timothy Cripe, MD, PhD, and Stephen Lessnick, MD, PhD, aims to provide postdoctoral and graduate student trainees with the requisite skills and expertise to develop into successful researchers focused on pediatric oncology. The Training Program is located at Nationwide Children’s and also leverages the strengths of The Ohio State University as an academic partner. The program includes six positions: three postdoctoral/fellow positions and three graduate student positions.

5-year \$14 Million P50 Center Grant From National Institute of Mental Health Establishes New Suicide Prevention Center at Nationwide Children’s

The Center for Accelerating Suicide Prevention in Real-world Settings (ASPIRES) aims to accelerate the development and use of effective interventions to reduce suicide in children and adolescents. ASPIRES will extend work being conducted in the hospital’s Center for Suicide Prevention and Research (CSPR) and within Nationwide Children’s Behavioral Health Services. Jeff Bridge, PhD, director, CSPR and Cynthia Fontanella, PhD, a principal investigator in CSPR, will lead the new center, which includes 13 investigators.

Researchers Receive \$5 Million Funding Award Aimed at Improving Early Childhood Preventive Care Outcomes

Alex Kemper, MD, chief of Ambulatory Pediatrics at Nationwide Children’s Hospital and co-investigator of the project, and his team, in partnership with researchers at Seattle Children’s Hospital, have been approved for a \$5 million research funding award from the Patient-Centered Outcomes Research Institute (PCORI) for an innovative project that will test a community navigator model to improve the delivery of preventive care for young children and has a special focus on improving outcomes for Black children and their families.

Canice Crerand, PhD, Receive \$2.4 Million U01 Funding Award From National Institutes of Health

Dr. Crerand is a clinical psychologist and a principal investigator in the Center for Biobehavioral Health at Nationwide Children’s. The award funds a multi-site study that will evaluate demographic, medical and contextual factors associated with psychosocial and health outcomes over time. It will examine a large, diverse sample of young children who are enrolled in the Cleft Palate Registry/Research Outcomes Network study, with the goal of advancing clinical care and improving outcomes for this at-risk population.

Department, Section and Research Institute Reports



NATIONWIDE CHILDREN’S®
When your child needs a hospital, everything matters.



THE OHIO STATE UNIVERSITY
COLLEGE OF MEDICINE

A LETTER FROM THE DEAN OF THE OHIO STATE UNIVERSITY COLLEGE OF MEDICINE



Dear Friends,

Each fall I am filled with anticipation and excitement as we welcome a new cohort of learners to campus. We continue to advance innovative and inclusive educational programs with a goal to educate and support the most diverse and sought-after health science professionals in the world. The people and programs at Nationwide Children’s Hospital play a key role in enabling us to realize this goal.

What I love about teaching is witnessing our learners’ uncontainable excitement and striking passion. Their overwhelming desire to learn everything they possibly can about anatomy, biomedical science and patient care inspires me. Their curiosity and thoughtful questions remind me how important it is for me — for all our faculty at The Ohio State University College of Medicine — to always be at the top of our game, to regularly engage with the most current biomedical literature, to be true lifelong learners.

It is also important to offer a wide variety of specialized, clinical and research training to our future physicians and scientists. That’s why I am delighted that, among our more than 2,700 faculty members at the College of Medicine, more than 700 are in the Department of Pediatrics at Nationwide Children’s plus a number of faculty across other clinical departments. Our deep collaboration with Nationwide Children’s, one of the top pediatric hospitals in the world, enables the College of Medicine to be among the best places anywhere to become a physician, a health science professional or a scientist.

Nationwide Children’s plays a critical role in providing a rich educational experience for the College of Medicine learners. Here are some impressive highlights from the last 12 months:

- 224 third-year medical students completed core rotations in Pediatrics.
- 152 fourth-year medical students completed rotations (both required and elective).
- 11 first-year medical students completed a summer research experience at Nationwide Children’s.
- 50 first- and second-year medical students are completing their longitudinal clinical placements at Nationwide Children’s sites, where 38 Pediatrics faculty members serve as longitudinal practice preceptors.
- 14 of our graduating medical students (7.3%) went into Pediatrics and 9 selected Medicine/Pediatrics as their specialty.
- 28 graduate students from our Biomedical Sciences Graduate Program and Medical Scientist Training Program worked in labs at Nationwide Children’s.
- 109 students from our School of Health and Rehabilitation Sciences rotated at Nationwide Children’s.

I am very grateful for the strong partnership we enjoy with Nationwide Children’s, and I know that — together — we will transform the health of our communities through inclusive and innovative education, discovery and care.

Sincerely,

Carol R. Bradford

Carol R. Bradford, MD, MS, FACS
Dean, The Ohio State University College of Medicine
Vice President for Health Sciences, The Ohio State University Wexner Medical Center
Leslie H. and Abigail S. Wexner Dean’s Chair in Medicine
Professor of Otolaryngology – Head & Neck Surgery

DEPARTMENT OF PEDIATRICS

The mission of the Department of Pediatrics at Nationwide Children’s Hospital and The Ohio State University is to achieve excellence in teaching, research, academics, advocacy and administrative service. With great energy and enthusiasm, we promote the well-being of children, discover new knowledge to bring to bear on optimal child health and provide evidence-based, efficient and compassionate medical care to our patients and their families.

The department comprises 27 clinical divisions, the Steve and Cindy Rasmussen Institute for Genomic Medicine and 13 research centers of emphasis in the Abigail Wexner Research Institute. Department of Pediatrics faculty members have formal appointments in The Ohio State University College of Medicine.

Our faculty has an unwavering commitment to excellence and aspires to the highest levels of professionalism, humanism, diagnostic acumen, clear communication and compassion. We educate and mentor more than 350 third- and fourth-year medical students from The Ohio State University and train approximately 300 residents and subspecialty fellows each year. Our Center for Faculty Development oversees a robust program that strives to engage, support and educate our more than 500 faculty. An important mission of our department and hospital is the discovery and dissemination of new knowledge related to child health and health care delivery. This discovery mission is supported by more than \$105 million in research funding and we are ranked sixth among free-standing children’s hospitals in NIH funding.



A LETTER FROM THE CHAIR, DEPARTMENT OF PEDIATRICS



Dear Colleagues,

I had the honor of taking on the role of Chair of the Department of Pediatrics at Nationwide Children’s Hospital and The Ohio State University this year. I am thrilled to lead such talented and dedicated physicians, researchers and trainees in this vibrant, innovative organization.

At Nationwide Children’s Hospital, we provide state-of-the-art clinical care for children in central Ohio and around the world. Our training programs offer an outstanding education and research experience in an environment that supports professional growth and development. We foster diversity, inclusion and equity among our faculty and trainees through numerous programs, initiatives and investments.

Our strategic plan emphasizes our commitment to the integration of clinical care and research. From basic discovery science to clinical and population health research, our physicians, residents and fellows participate in research in meaningful ways to improve the care of children everywhere.

Our work extends beyond our campus and into the community. Through advocacy, population health, and health equity initiatives, we are meeting patients and families where they need us most. Whether it is integration of behavioral health during primary care visits, expansion of our school-based health clinics or working with community partners to create safe housing options, we believe in a holistic approach to child health.

This edition of the annual report celebrates the teams and programs that make Nationwide Children’s Hospital unique and that continue to inspire me each day. We are One Team. I hope you will join me in celebrating the accomplishments of the last year and in looking forward to all our transformational work to come.

Catherine Krawczeski

Catherine Krawczeski, MD
Physician-in-Chief at Nationwide Children’s
Professor and Chair, Department of Pediatrics, The Ohio State University College of Medicine

DEPARTMENT OF PEDIATRICS VICE CHAIRS



Rebecca Wallihan, MD
Vice Chair, Education



Valencia P. Walker, MD, MPH
Vice Chair, Health Equity and Inclusion



Linda Cripe, MD
Vice Chair,
Promotion and Tenure



Dennis Durbin, MD
Vice Chair, Research

2021 – 2022 NATIONWIDE CHILDREN’S RESIDENCY PROGRAM
NATIONWIDE CHILDREN’S HOSPITAL | THE OHIO STATE UNIVERSITY COLLEGE OF MEDICINE

PEDIATRICS RESIDENCY
PROGRAM DIRECTOR
Rebecca G. Wallihan, MD

INTERNAL MEDICINE/
PEDIATRICS RESIDENCY
PROGRAM DIRECTOR
Margaret Chase, MD

ASSOCIATE PROGRAM
DIRECTORS

PEDIATRICS
Rena Kasick, MD
Mary Kay Kuzma, MD
Alexander T. Rakowsky, MD
Suzanne M. Reed, MD
Claire A. Stewart, MD

INTERNAL MEDICINE/
PEDIATRICS
Lucas McKnight, MD
Allison Rossetti, MD

PEDIATRIC RESIDENTS
CHIEF RESIDENTS
Dr. Monica L. Hoff
Dr. Claudia A. Mosquera Vasquez
Dr. Jacqueline M. Nicodemo
Dr. Kortney J. Pifher
Dr. Nathaniel Sherrer

PL-4
Dr. Bianca Zapanta

PL-3
Dr. Nadine-Stella E. Achenjang
Dr. Molly J. Austen
Dr. Nimisha Bajaj
Dr. Megan N. Barcroft
Dr. Trevor R. Bushong
Dr. Kaitlyn D. Cassady
Dr. Michael T. Clark
Dr. Nicole M. Davidson
Dr. Samantha J. DeMarsh
Dr. Sabine J. Eid
Dr. Marettta H. Fan
Dr. Ryan M. Flaherty
Dr. Gabriella T. Gonzales
Dr. Cory W. Gotowka
Dr. Emily M. Grad
Dr. Elizabeth M. Grogan
Dr. Ezekiel D. Hartman
Dr. Ann M. Kebede
Dr. Rafael Lemus
Dr. Aaron Maki
Dr. Samir Mishra

Dr. Jessica A. Nash
Dr. Britney N. Onuma
Dr. Molly J. Osterhage
Dr. Amudha Pazhanisamy
Dr. Heather Peterson-Schempp
Dr. Melonie A. Phillips
Dr. Rachel E. Pratt
Dr. Joshua J. Prudent
Dr. Matthew T. Smith
Dr. Brandon S. Stone
Dr. Kristin L. Sundy-Boyles
Dr. Kara D. Szlag
Dr. Rachel L. Thompson
Dr. Charles C. Treinen
Dr. Jessica E. Williams
Dr. Mariah L. Wright
Dr. Jarrod J. Wurm
Dr. Guillermo J. Yepes Junquera

PL-2
Dr. Hayat Al Tabosh
Dr. Sarah L. Allen
Dr. Brandon W. Barsky
Dr. Chelsea K. Bitler
Dr. Katelyn Carlson
Dr. April P. Consevage
Dr. Samantha L. Coss
Dr. Sara A. Crowell
Dr. Sean D. DeBoyace
Dr. Sara M. Delap
Dr. Grace C. Eberly
Dr. Meghan J. Fennell
Dr. JessieAnn V. Flowers
Dr. Ritika Gupta
Dr. Lisa H. Hall
Dr. Emily A. Hargrave
Dr. Evan M. Ingram
Dr. Catherine Kapcar
Dr. Alyshah M. Lakhani
Dr. Brittany A. Landry
Dr. Veronica G. Lewalski
Dr. Rachel M. Ludwig
Dr. Julie A. Luna Torres
Dr. Quinton J. Mandle
Dr. Macala Maney
Dr. Kiah L. McArthur
Dr. Alyssa-Claire T. Mendoza
Dr. Emily A. Messick
Dr. Marina C. Metzler
Dr. Lauren M. Misik
Dr. Robert J. Nadler
Dr. Jennifer M. Neumeyer
Dr. Priyanshi Patel
Dr. Adam M. Pearlstein
Dr. Lydia M. Powers

Dr. Sarah C. Rohrman
Dr. Daniel C. Roper
Dr. Katherine T. Shevelson
Dr. Blen T. Weldekidan
Dr. Alexandra J. Wenig
Dr. Matthew B. Wysong
Dr. Jacqueline A. Yurkoski
Dr. Rachel H. Zeno

PL-1
Dr. Vedika S. Agrawal
Dr. Kaleb R. Boggs
Dr. Alison L. Brittain
Dr. Ana Maria Cabal Herrera
Dr. Fiona K. Chambers
Dr. Phillip S. Cheng
Dr. Paul Cho
Dr. Ryan Ciarlo
Dr. John W. Crecelius
Dr. Catherine Y. Davis
Dr. Ahmani K. DoDoo
Dr. Emily M. Engelhardt
Dr. Emily P. Ernest
Dr. Kaitlyn M. Foreman
Dr. Vinchelle D. Hardison
Dr. Taylor M. Hartlaub
Dr. Grace C. Hendrickson
Dr. Hannah R. Hughes
Dr. Audrey E. Hull
Dr. S Basil H. Jafri
Dr. Dena Lowing
Dr. Sarah A. Mangold
Dr. William H. McAllister
Dr. Evan J. Meiman
Dr. Candice M. Melkerson
Dr. Elizabeth T. Murray
Dr. McKenzie L. Nelson
Dr. Michelle V. Pfeffer
Dr. Albert A. Phillips, II
Dr. Julia M. Plourde
Dr. Sebastian T. Powell
Dr. Emily E. Rowland
Dr. Ali M. Sawani
Dr. Na’il O. Scoggins
Dr. Hannah J. Simmons
Dr. Jennifer M. Springer
Dr. Claire L. Tanager
Dr. Vanessa Thiel
Dr. Jonathan A. Wheeler
Dr. Matthew G. Wiet
Dr. Joshua A. Yell
Dr. George Zakhary
Dr. Morgan E. Zlotolow

INTERNAL MEDICINE-
PEDIATRIC RESIDENTS
CHIEF RESIDENTS
Dr. Daniel Schmitz
Dr. Aisha White

PGY-4
Dr. Nabeeha Ahmad
Dr. Kristin Cooper/ Springer
Dr. Rachel D’Amico
Dr. Michael Dienstbach
Dr. Mary Hanks
Dr. Rachael Mangaudis
Dr. Timothy Pian
Dr. Savannah Smith

PGY-3
Dr. Cole Bredehoeft
Dr. Duncan Campbell
Dr. Jennifer DeSalvo
Dr. Dominic Haertling
Dr. Brandi Heinz
Dr. Michael Neiger
Dr. Anthony Sanchez
Dr. Matthew Schreier
Dr. Shilpa Sridhar
Dr. Christopher Woeste

PGY-2
Dr. Suranjana Dey
Dr. Anna Downs
Dr. John Gambрил
Dr. Brandon Liebau
Dr. Mariel McGuiness
Dr. Temitayo Olojo
Dr. Nathan Parisi
Dr. Stephen Ream
Dr. Jeanette Schnierle
Dr. Sarah Sprauer

PGY-1
Dr. Kate Andrews
Dr. Neemash Desai
Dr. Jenna Hatab
Dr. Geoffrey Houtz
Dr. Lauren Ledingham
Dr. Ellen Lubbers
Dr. Megan McCrohan
Dr. John Reynolds
Dr. Andrea Schlosser
Dr. Hanah Smith

Department of Pediatrics

ADOLESCENT MEDICINE

The Section of Adolescent Medicine at Nationwide Children’s Hospital provides general and specialty care for adolescents. The staff includes experts in all aspects of health care for adolescents, with an emphasis on comprehensive primary care, reproductive health care, eating disorders, LGBTQ youth, substance abuse, health for incarcerated youth, and adolescents with complex health problems.

Faculty



Andrea E. Bonny, MD
Chief

- Elise D. Berlan, MD, MPH
- Maria D. Brown, MD
- Ashley M. Ebersole, MD, MS
- Fareeda W. Haamid, DO
- Cynthia M. Holland-Hall, MD, MPH
- Casey C. Levy, MD, MPH
- Erin R. McKnight, MD, MPH
- Heather L. Stewart, MD
- Hunter J. Wernick, DO, MS

2021 – 2022 Fellows

- Lauren E. Matera, DO
- Kristen E. Reilly, MD, MSW
- Hunter J. Wernick, DO, MS

Highlights From the Past Year

The Adolescent Medicine Clinic is located in the Livingston Ambulatory Center on our Columbus campus. Primary care is offered, as are consultative clinics for adolescents with reproductive health needs and those who need treatment for addiction. The Medical Clinic at the Franklin County Juvenile Intervention Center provides health care for detained youth. The Balanced Energy and Nutrition (BEAN) clinic provides medical evaluation and care for patients with disordered eating. The Medication Treatment for Addiction Program has been treating adolescents and young adults with substance use disorders since 2007. The Young Women’s Contraceptive Services Program, also known as BC4Teens, increases accessibility to long- acting reversible contraception. The THRIVE Program provides comprehensive care to transgender and gender- nonconforming youth. Physicians in the Section of Adolescent Medicine provide ongoing and consultative care for adolescents admitted to Nationwide Children’s with diverse medical problems, such as gynecological conditions and complications from eating disorders. An Accreditation Council for Graduate Medical Education Fellowship in Adolescent Medicine has been in place since 2010.

Our faculty members actively participate in research and national leadership. Elise D. Berlan, MD, MPH, is principal investigator on a Merck investigator-initiated grant entitled “Implementation and examination of contraception care for hospitalized adolescents with mental health disorders.” Fareeda W. Haamid, DO, and Andrea E. Bonny, MD, are co-investigators on a National Institutes of Health (NIH) grant exploring hormonal contraceptive use and risk of venous blood clots. Erin R. McKnight, MD, MPH, and Andrea E. Bonny, MD, are co-investigators on a NIH grant developing new statistical approaches for estimating county-level rates of opioid misuse to target areas of highest priority. Cynthia M. Holland-Hall, MD, MPH, serves on the Executive Committee of the American Academy of Pediatrics Section of Adolescent Health, Fareeda W. Haamid, DO, serves on the board of directors for the North American Society for Pediatric and Adolescent Gynecology, and Erin R. McKnight, MD, MPH, was selected by the National Academies of Sciences, Engineering, and Medicine to serve on their planning committee for a workshop on family focused interventions to prevent substance use disorders in adolescents.

Selected Publications

Berlan E, Valenti O, Long W, Abenaim A, Maciejewski H, Gowda C. Practice facilitation improves adolescent reproductive health preventative services in primary care. *Pediatrics*. 2022 Jan;149(1):e2020035774.

Haamid F, Ajayi TL, Williams DR, Walker VP. Can't keep runnin'. *Journal of Adolescent Health*. 2022 Jan; S1054-139X(21)00213-5.

Holland-Hall C, Bonny AE. Testing for sexually transmitted infections: providers cannot opt out of the conversation. *Pediatrics*. 2022 May;149(5):e2021055954.

Holland-Hall C. Sexually transmitted infection treatment guidelines for adolescent health providers: what's new in 2021? *Journal of Pediatric and Adolescent Gynecology*. 2022 Jun;35(3):267-269.

Zhang P, Tossone K, Ashmead R, Bickert T, Bailey E, Doogan NJ, Mack A, Schmidt S, Bonny AE. Examining differences in retention on medication for opioid use disorder: an analysis of Ohio Medicaid data. *Journal of Substance Abuse Treatment*. 2022 May; 136:108686.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

\$672,672

Fast Facts: July 2021 – June 2022

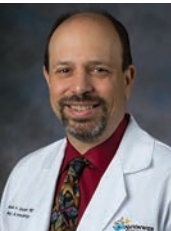
- Adolescent Medicine Clinic Visits: 6,008
- Adolescent Medicine Eating Disorders Visits: 3,057
- Dublin Adolescent Medicine Clinic Visits: 218
- East Broad Adolescent Medicine Clinic Visits: 428
- Total Adolescent Medicine Clinic Visits: 9,711
- Inpatient Consults: 42

Department of Pediatrics

ALLERGY AND IMMUNOLOGY

The Division of Allergy and Immunology at Nationwide Children’s Hospital provides comprehensive services for the diagnosis and treatment of patients with allergic and immunologic diseases from birth through age 21. Clinical activity includes an active outpatient clinic, food allergy treatment center, several multispecialty clinics, an urgent referral clinic and inpatient consultation services. The division is also actively involved in both basic science and clinical research.

Faculty



Mitchell H. Grayson, MD
Division Chief



Rebecca Scherzer, MD
Section Chief

Elizabeth A. Erwin, MD
Irene J. Mikhail, MD
Peter J. Mustillo, MD
Benjamin Prince, MD
Margaret Redmond, MD
Kasey Strothman, MD
David R. Stukus, MD

2021 – 2022 Fellows

Christopher Brooks, MD
Christian Coletta, MD
Kasey Lanier, MD
Kelsey Lecerf, MD

Highlights From the Past Year

The Division of Allergy and Immunology has been busy working to provide the best outcomes for children with allergic and immunologic disorders:

- Our Food Allergy Treatment Center in Lewis Center is a one-of-a-kind center in central Ohio providing comprehensive evaluation, diagnosis and management of food allergies, including high-risk oral food challenges.
- Our division has been named a World Allergy Organization Centers of Excellence in North America.
- We are committed to the care of children with immune system defects, and along with the Nationwide Children’s Hospital Diagnostic Immunology Laboratory, continue to be a Jeffrey Modell Foundation for Primary Immunodeficiencies Diagnostic and Research Center of Excellence.
- One of our faculty serves as Editor-in-Chief for *Annals of Allergy, Asthma & Immunology*, a premiere allergy journal, and the editorial office is now housed in our division.
- Our providers manage all allergic conditions, including asthma, allergic and nonallergic rhinitis, chronic sinusitis, hives, eczema, angioedema, drug and food allergies, latex allergy and stinging insect allergy. We provide allergy skin testing, allergen immunotherapy, asthma education, pulmonary function testing, comprehensive food allergy management (including oral food challenges) and drug allergy testing/oral drug challenges. We evaluate children with recurrent or unusual infections and provide complete evaluation and management for primary immunodeficiencies. Faculty participate in the Complex Asthma and 22q11 clinics and in multidisciplinary clinics with Hematology/Oncology, Otolaryngology (ENT) and Gastroenterology. We provide inpatient consultation and immediate assistance for health care providers through the Physician Direct Connect Line.

- Our faculty perform a wide array of basic and clinical research, as well as quality improvement initiatives, exploring mechanisms driving development of asthma and allergies, clinical studies of eosinophilic esophagitis, food allergy, use of technology to improve patient outcomes, transition of care, primary immunodeficiency, asthma, and allergic and nonallergic rhinitis.
- Allergy and Immunology faculty provide clinical and didactic instruction for the Nationwide Children’s Hospital Allergy and Immunology Fellowship Program and Pediatric Residency Program along with students from The Ohio State University College of Medicine. Faculty and fellows have leadership positions in national allergy and immunology organizations and are invited speakers at local, regional, national and international conferences.

Selected Publications

Erwin E, Jaramillo L, Smith B, Kruszewski P, Kahwash B, Grayson M, Mejias A, Ramilo O. Sex differences in blood transcriptional profiles and clinical phenotypes in pediatric patients with eosinophilic esophagitis. *The Journal of Allergy and Clinical Immunology in Practice*. 2021 Sep;9(9):3350-3358.e8.

Hussain S, Rohlfing M, Resiliac J, Santoro J, Peebles M, Garcin D, Grayson M. Atopic neutrophils prevent postviral airway disease. *Journal of Immunology*. 2021 Nov 15;207(10):2589-2597.

Miller R, Grayson M, Strothman K. Advances in asthma: new understandings of asthma’s natural history, risk factors, underlying mechanisms, and clinical management. *The Journal of Allergy and Clinical Immunology*. 2021 Dec;148(6):1430-1441.

Patrick M, Venkatesh R, Stukus D. Social media and its impact on health care. *Annals of Allergy, Asthma and Immunology*. 2022 Feb;128(2):139-145.

Redmond M, Scherzer R, Prince B. Novel genetic discoveries in primary immunodeficiency disorders. *Clinical Reviews in Allergy and Immunology*. 2022 Jan 12:1-20.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022
\$257,700

Fast Facts: July 2021 – June 2022

Main Campus Allergy Clinic Visits: 3,998
Immunology Clinic Visits: 422
Complex Asthma-Allergy Clinic Visits: 98
Hilliard Allergy Clinic Visits: 630
Lewis Center Food Allergy Treatment Center Visits: 1,786
Westerville Allergy Clinic Visits: 481
Total Clinic Visits: 7,415
Inpatient Consults: 101



“This study highlights the importance of vaccinations before and after heart transplantation.”

– Emily Hayes, MD

The Heart Center

Occurrence and Cost of Infections After Heart Transplant

A study using the Pediatric Health Information System (PHIS) database found one in six pediatric solid organ transplant recipients were hospitalized with respiratory syncytial virus (RSV) or vaccine-preventable illness in the first five years after transplant. Within this study, heart transplant recipients were at increased risk of hospitalization compared to other organ recipients.

In response, researchers from Nationwide Children's Hospital used the PHIS database to determine the risk factors for acquiring these infections and the associated long-term outcomes in pediatric heart transplant recipients. The researchers performed a retrospective cohort study of all pediatric heart transplant recipients with transplant-related hospitalizations available in the PHIS database from September 2003 to December 2018.

“We found hospitalizations for RSV or vaccine-preventable illness occurred frequently following heart transplantation and were associated with significant cost and hospital resource use,” says **Emily Hayes, MD**, attending pediatric cardiologist at Nationwide Children's and one of the study's authors.

Dr. Hayes and her colleagues found that nearly 18% of pediatric heart transplant patients were hospitalized with RSV or vaccine-preventable illness during the study period, with the majority of hospitalizations occurring within the first five years after transplantation. RSV was the most common infection requiring hospitalization, followed by influenza and pneumococcus.

The median length of stay for a hospitalization for RSV or vaccine-preventable illness in these patients was four days, with a median total cost of more than \$11,000.

Surprisingly, the average age of infection for RSV was two years, which is the age at which the American Academy of Pediatrics no longer provides guidance regarding the prophylactic use of palivizumab following heart transplantation.

In addition, induction therapy with two or more immunosuppressants and the need for mechanical circulatory support pre-transplant increased the risk of acquiring RSV or vaccine-preventable illness.

According to Dr. Hayes, who is also an assistant professor of Pediatrics at The Ohio State University College of Medicine, the results show annual vaccinations should be prioritized in this population.

Potential strategies to minimize post-transplant infections include expanding vaccine use through accelerated immunization schedules in younger patients, further studies of the prophylactic use of palivizumab beyond two years of age after transplantation, and routine monitoring of immunogenicity after vaccination with re-immunization based on guidelines.

“This study highlights the importance of vaccinations before and after heart transplantation,” she says. “Primary care physicians, infectious disease consultants, and cardiologists should work together to maximize vaccine opportunities for both patients and their families prior to transplantation.”

REFERENCE:

Hayes EA, Hart SA, Gowda C, Nandi D. Hospitalizations for respiratory syncytial virus and vaccine preventable infections following pediatric heart transplantation. *Journal of Pediatrics*. 2021 Sep;236:101-107.e3.

Department of Pediatrics

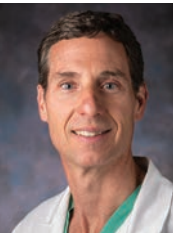
THE HEART CENTER

The Heart Center at Nationwide Children’s Hospital combines all clinical and research disciplines under one umbrella to meet our mission: to improve outcomes by discovering the causes of heart disease and develop novel therapies for our patients, focusing on each as an individual and providing the state-of-the-art care that all patients deserve, regardless of age. We support the mission of Nationwide Children’s to provide our services in a safe environment focused on family-centered care.

Faculty



Catherine D. Krawczeski, MD
Heart Center Co-Director
Cardiology Chief



Mark E. Galantowicz, MD
Heart Center Co-Director
Cardiothoracic Surgery Chief



Vidu Garg, MD
Heart Center Director of
Translational Research
Director, Center for
Cardiovascular Research

Aimee K. Armstrong, MD
Lamya Atweh, MD
Carl H. Backes, MD
Amee Bigelow, MD, MS
Brian A. Boe, MD
Jessica L. Bowman, MD
Sergio A. Carrillo, MD
Steven C. Cassidy, MD

Kristin M. Chenault, MD
Marco Corridore, MD
Tara Cosgrove, MD, MBOE
Linda H. Cripe, MD
Clifford L. Cua, MD
Curt J. Daniels, MD
Richard P. Fernandez, MD
Jill A. Fitch, MD

Robert J. Gajarski, MD, MHSA
Jennifer Gauntt, MD
Stephen A. Hart, MD
Kan N. Hor, MD
Anna N. Kamp, MD, MPH
John Kelly, MD
Naomi J. Kertesz, MD
Omar M. Khalid, MD

Sarah Khan, MD
John P. Kovalchin, MD
Rajesh Krishnamurthy, MD
Rohan Kumthekar, MD
Lauren Lastinger, MD
Anthony Y. Lee, MD
Marc Lee, MD
Simon Lee, MD

Kaitlin E. L’Italien, MD
Eric A. Lloyd, MD
May Ling Mah, MD, MS
Patrick I. McConnell, MD
Christopher T. McKee, DO
Aymen N. Naguib, MD
Deipanjan Nandi, MD, MSc
Kathryn D. Nardell, MD

Julie C. O’Donovan, MD
Christina M. Phelps, MD
Saurabh Rajpal, MD
Kerry L. Rosen, MD, MBA
Daniel G. Rowland, MD
Arash Salavitabar, MD
Brittany Shutes, MD
Toshiharu Shinoka, MD, PhD

Janet M. Simsic, MD
Corey A. Stiver, MD
Karen M. Texter, MD
Andrew Tran, MD, MS
Stephanie Tseng, MD
Jason Williams, MD
Peter D. Winch, MD, MBA
Lydia Wright, MD, MSc

Andrew R. Yates, MD
Cody M. Young, DO

Highlights From the Past Year

NATIONAL AND INTERNATIONAL REPUTATION

- The Heart Center continued delivering outstanding surgical outcomes, significantly better than the national mean with overall surgical mortality around 2% each of the last four years (2018-2021).
- We remained leaders in postoperative outcomes reported to the national PC4 collaborative with one of the shortest lengths of ICU stay and lowest need for postoperative mechanical ventilation in the entire collaborative.
- We sustained an extremely low rate of blood stream infections associated with central intravenous lines in cardiac inpatients (ICU and acute care) at 0.4 infections/1000 line-days in 2021.
- The ACHD CT surgery program is one of the top programs in the U.S. with recent STS data reporting a 0% surgical mortality for the past five years with national benchmark 1.7-2.2%. This service has expanded to include Nationwide Children’s CT surgeons and ACHD team performing surgery at The Ohio State University and the Ross Heart Hospital.
- The ACHD program continues grow with over 4,500 outpatient visits per year (largest in the U.S.), evaluating patients in nine locations in central Ohio and around the state.
- Nationwide Children’s hosted the Central Ohio Maternal Fetal Medicine Conference in April 2022.
- The Imaging Team initiated an innovative method pilot study: Focused Newborn Cardiac Ultrasound by Transport Team Clinicians.
- The imaging team instituted a new imaging protocol for patients with hypertrophic cardiomyopathy.
- Dr. Cliff Cua and his team continued their NIH-RO1 grant study (\$3.2 million), titled “Early Predictors of Spontaneous Patent Ductus Arteriosus (PDA) Closure and PDA-Associated Outcomes,” funded through November 2023.
- Dr. John Kovalchin and his team won the Echo Jeopardy Championship at the American Society of Echocardiography’s Annual 2022 Meeting.
- Dr. Steve Cassidy received the Master Clinician Award for the Department of Pediatrics.
- Multiple device trials were led by the interventional team, including pivotal trials for the two self-expanding transcatheter pulmonary valves.
- Nationwide Children’s was the live case site for PICS 2021 and 2022.
- We participated as a member of the steering committee in the Association for European Pediatric and Congenital Cardiology (AEPC) study on the Effect of Fetal Aortic Valvuloplasty on Outcomes: A prospective observational cohort study with a comparison cohort.
- We established the International SERVE (Self-Expanding RVOT Valve Evidence) Registry with Nationwide Children’s as the coordinating site.
- We had strong representation on writing groups for many national statements/guidelines through SCAI, PICS Society, AAP and the Society of Cardiovascular Computed Tomography.
- We led large animal research studies, including investigation of a new tissue engineered vascular graft, a bioresorbable ASD device, a bioresorbable magnesium drug-eluting stent, interventional cardiac MR guided catheterization with a new low field 0.55T scanner, and a tissue engineered bioresorbable fetal heart valve.
- We held a leadership role and participation in the C3PO Risk Mitigation Project, leading to lower-than-expected level 4/5 serious adverse events for five quarters in a row.
- We performed the first-in-human implant of the Autus size-adjustable valve for surgical pulmonary valve replacement and participation as one of three centers in the early feasibility study.

- We implanted more HeartMate3 VADs in 2021 than any other free-standing pediatric children’s hospital.
- We performed a record 11 transplants from July 2021 through June 2022.
- We continued national leadership in titration of heart failure therapies through ACTION and quality improvement initiatives through the Pediatric Heart Transplant Society.
- Following pandemic-related closures, Nationwide Children’s returned to full outpatient clinical volumes in late 2020 and had record number of referrals beginning in 2021.
- We continued leadless dual-chamber pacemaker implants in children by our electrophysiology team.
- We saw expansion of Project Adam with virtual teaching and remote drills to certify more schools in a larger radius in the placement and use of automatic external defibrillators (AEDs).
- Our ongoing use of biomechanical flow lab in the Pediatric Advanced Imaging Resource (PAIR) continued as a joint venture with the Department of Bioengineering at Georgia Tech, focusing on patient-specific 3D printing and biomechanical flow modeling.
- Active work continued in multiple quality improvement projects including those focused on improving long-term neurodevelopmental outcomes, increasing human milk feeds in critically ill neonates, reducing postoperative length of stay, and reduction in hospital acquired conditions.
- We presented a multidisciplinary proactive risk mitigation Safety II program called PROMISE (PRO-active Mitigation to decrease Serious adverse Events) to improve outcomes in high-risk surgical patients.
- We implemented a post-operative clinical pathway for Fontan patients with successful reduction in our average post-operative length of stay.
- We funded seven intramural projects and obtained \$1.5 million in extramural grant funding from the National Institutes of Health (NIH), the American Heart Association and the Additional Ventures Foundation.
- Ongoing multi-year funding totaled nearly \$2.5 million from the NIH’s National Heart, Lung, and Blood Institute and Additional Ventures to investigate the use of induced pluripotent stem cells to study single ventricle heart disease.
- We continued collaboration with the Center for Regenerative Medicine on the tissue-engineered vascular graft clinical trial in patients with single ventricle heart disease.
- We continued collaboration with the Center for Cardiovascular Research in the genomics of congenital heart disease, modeling of single ventricle heart disease using induced pluripotent stem cells, and the discovery of maternal biomarkers for single ventricle heart disease.

Center for Cardiovascular Research: See page 187 for information about this center in the Abigail Wexner Research Institute at Nationwide Children’s.

Selected Publications

Cosgrove T, Carlozzi L, Dolan K, Gleeson S, Johnson L, Cassidy S, Gajarski R. Standardization of care reduces length of stay for postoperative congenital heart disease patients. *Pediatric Quality Safety.* 2021 Dec 15;6(6):e493.

Daniels C, Rajpal S, Greenshields J, Rosenthal G, Chung E, Terrin M, Jeudy J, Mattson S, Law I, Borchers J, Kovacs R, Kovan J, Rifat S, Albrecht J, Bento A, Albers L, Bernhardt D, Day C, Hecht S, Hipskind A, Mjaanes J, Olson D, Rooks Y, Somers E, Tong M, Wisinski J, Womack J, Esopenko C, Kratochvil C, Rink L; Prevalence of clinical and subclinical myocarditis in competitive athletes with recent SARS-CoV-2 infection: Results from the big 10 COVID-19 cardiac registry. Big ten COVID-19 cardiac registry investigators. *JAMA Cardiology.* 2021 Sep 1;6(9):1078-10872.

Fick T, Cua C, Lee S. Imaging findings in pediatric COVID-19 – A review of current literature. *Cardiology and Therapy.* March 2022;11:185-201.

Groh W, Bhakta D, Tomaselli G, Aleong R, Teixeira R, Amato A, Asirvatham S, Cha Y, Corrado D, Duboc D, Goldberger Z, Horie M, Hornyak J, Jefferies J, Kääh S, Kalman J, Kertesz N, Lakdawala N, Lambiase P, Lubitz S, McMillan H, McNally E, Milone M, Namboodiri N, Nazarian S, Patton K, Russo V, Sacher F, Santangeli P, Shen W, Sobral Filho D, Stambler B, Stöllberger C, Wahbi K, Wehrens X, Weiner M, Wheeler M, Zeppenfeld K. HRS expert consensus statement on evaluation and management of arrhythmic risk in neuromuscular disorders. *Heart Rhythm.* 2022 Apr 29;S1547-5271(22)01946-4.

McDonald C, Marban E, Hendrix S, Hogan N, Ruckdeschel Smith R, Eagle M, Finkel R, Tian C, Janas J, Harmelink M, Varadhachary A, Taylor M, **Hor K,** Mayer O, Henricson E, Furlong P, Ascheim D, Rogy S, Williams P, Marban L, Group H-S. Repeated intravenous cardiosphere-derived cell therapy in late-stage Duchenne muscular dystrophy (HOPE-2): A multicentre, randomised, double-blind, placebo-controlled, phase 2 trial. *Lancet.* 2022 Mar 12;399(10329):1049-1058.

McElhinney D, Zhang Y, Aboulhosn J, Morray B, Biernacka E, Qureshi A, Torres A, Shahanavaz S, Goldstein B, Cabalka A, Bauser-Heaton H, Georgiev S, Berger F, Millan-Ilturbe O, Peng L, **Armstrong A,** Levi D, Fronczak-Jakubczyk A, Sondergaard L, Anderson J, Schranz D, Jones T, Cheatham J, Schubert S, Ewert P. Multicenter study of endocarditis after transcatheter pulmonary valve replacement. *Journal of the American College of Cardiology.* 2021 Aug 10;78(6):575-589.

Schwartz EL, **Kelly J,** Blum K, **Hor K, Yates A,** Zbinden J, Verma A, Lindsey S, Ramachandra A, Szafron J, Humphrey J, Shinoka T, Marsden AL, **Breuer CK.** Development and performance of tissue-engineered vascular grafts in fontan patients. *NPJ Regenerative Medicine.* 2021 Aug 12;6(1):477.

Sutton R, Wolfe H, Reeder R, Ahmed T, Bishop R, Bochkoris M, Burns C, Diddle J, Federman M, Fernandez R, Franzon D, Frazier A, Friess S, Graham K, Hehir D, Horvat C, Huard L, Landis W, Maa T, Manga A, Morgan R, Nadkarni V, Naim M, Palmer C, Schneider C, Sharron M, Siems A, Srivastava N, Tabbutt S, Tilford B, Viteri S, Berg R, Bell M, Carcillo J, Carpenter T, Dean J, Fink E, Hall M, McQuillen P, Meert K, Mourani P, Notterman D, Pollack M, Sapru A, Wessel D, **Yates A,** Zuppa A. Effects of physiologic point-of-care cardiopulmonary resuscitation training on survival with favorable neurologic outcome in cardiac arrest in pediatric ICUs: A randomized clinical trial. *JAMA.* 2022 Mar 8;327(10):934-945.

Zettler E, Rivera B, **Stiver C, Boe B, Cua C,** Ball M, Smith C, Slaughter J, Chen B, Callahan R, **Backes C.** Primary pulmonary vein stenosis among premature infants with single-vessel disease. *Journal of Perinatology.* 2021 Jul;41(7):1621-1626.



Grants Awarded to Heart Center and Cardiovascular Research Faculty

JULY 1, 2021 – JUNE 30, 2022

\$1,752,882

Fast Facts: July 2021 – June 2022

Heart Center Clinics

Main Campus and *Close to Home*SM Center Visits: 18,344

Regional Clinics Visits: 3,081

Heart Center Diagnostics

Cardiac CTs: 249

Cardiac Monitoring: 3,365

Cardiac MRIs: 739

Echocardiograms: 16,238

Electrocardiograms (EKGs): 17,633

Exercise Stress Tests: 747

Heart Center Procedures

Cardiac Catheterizations: 502

Cardiac Surgeries: 450

Electrophysiology Procedures: 184

Heart Transplants: 11

Department of Pediatrics

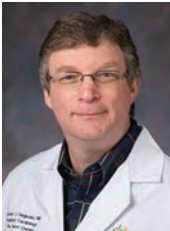
CARDIOLOGY

Cardiology is a section of the Department of Pediatrics and an integral part of The Heart Center at Nationwide Children’s Hospital. See page 43 for complete details.

Faculty



Catherine D. Krawczeski, MD
Division Chief



Robert J. Gajarski, MD, MHSA
Section Chief

Aimee K. Armstrong, MD
Carl H. Backes, MD
Amee Bigelow, MD, MS
Brian A. Boe, MD
Jessica L. Bowman, MD
Steven C. Cassidy, MD
Tara Cosgrove, MD, MBOE
Linda H. Cripe, MD

Clifford L. Cua, MD
Curt J. Daniels, MD
Richard P. Fernandez, MD
Jill A. Fitch, MD
Vidu Garg, MD
Jennifer Gauntt, MD
Stephen A. Hart, MD
Kan N. Hor, MD

Anna N. Kamp, MD, MPH
John Kelly, MD
Naomi J. Kertesz, MD
Omar M. Khalid, MD
John P. Kovalchin, MD
Rohan Kumthekar, MD
Lauren Lasteringer, MD
Anthony Y. Lee, MD

Marc Lee, MD
Simon Lee, MD
Kaitlin E. L’Italien, MD
Eric A. Lloyd, MD
May Ling Mah, MD, MS
Deipanjan Nandi, MD, MSc
Kathryn D. Nardell, MD
Christina M. Phelps, MD

Saurabh Rajpal, MD
Kerry L. Rosen, MD, MBA
Daniel G. Rowland, MD
Arash Salavitarab, MD
Brittany Shutes, MD
Janet M. Simsic, MD
Corey A. Stiver, MD
Karen M. Texter, MD

Andrew Tran, MD, MS
Stephanie Tseng, MD
Jason Williams, MD
Lydia Wright, MD, MSc
Andrew R. Yates, MD

2021 – 2022 Fellows
Adult Congenital Heart Disease

William Marshall, MD
Isla McClelland, MD

Advanced Heart Failure and Transplant

Emily Hayes, MD

Advanced Interventional Cardiology

Rachel Taylor, MD

Advanced Noninvasive Cardiac Imaging

Tyler Fick, MD

Pediatric Cardiology

Julie Aldrich, MD
Zachary Daniels, DO
William Fogarty, DO
Jaclyn Giafaglione, MD
Rachel Harris, DO
Hannah Jacobs, DO
Matthew Laubham, MD
Erin Nealon, MD
Aaron Walsh, MD

Department of Pediatrics

CHILD AND FAMILY ADVOCACY

The Section of Child and Family Advocacy, housed within the Center for Family Safety and Healing at Nationwide Children’s Hospital, is home to a team of board-certified child abuse pediatricians and advanced-practice nurse practitioners who are nationally recognized child maltreatment experts with an emphasis on physical abuse, sexual abuse and medical child abuse. The Center for Family Safety and Healing is dedicated to the well-being of children and families. Together with partners and communities, the center supports victims of family violence and advocates for social change to prevent abuse. As a national leader in this important work, a team of more than 120 professionals representing medicine, behavioral health, social services, law enforcement, prosecution and children services are co-located at the center to address the complex issues of family violence.

Faculty



Megan M. Letson, MD, MEd
Chief

Farah W. Brink, MD
Kristin G. Crichton, DO, MPH
Catherine M. Huber, MD
Jennifer J. Tscholl, MD

2021 – 2022 Fellows
Child Abuse Pediatrics

Nicole Barrett, MD
Nara Cho, MD
Shilpa Hari, MD

Combined Child Abuse
Pediatric and Pediatric
Emergency Medicine Fellow

Michelle Greene, DO

Highlights From the Past Year

- The Section of Child and Family Advocacy provides comprehensive evaluation and management of child maltreatment, offering inpatient and outpatient services. Key services include the Child Assessment Center, Fostering Connections Program, Child Assessment Team Clinic, Non-Accidental Traumatic Brain Injury Clinic and inpatient consultations.
- The Child Assessment Center offers a coordinated response to family violence for families through partnerships with law enforcement, children services and a range of community resources. Through a collaborative effort with the Emergency Department, we also provide suspected child abuse assessments after clinic hours by utilizing on-call forensic interviewers and pediatric sexual assault nurse examiners in the emergency department setting.
- As a clinical partnership with Franklin County Children Services, the Fostering Connections Program is offered at three different locations and serves as a medical home for children in out-of-home placement.
- The Child Assessment Team (CAT) Clinic focuses on the follow-up for children with suspected physical abuse. This is a multidisciplinary clinic with Child Abuse Pediatrics, Trauma Surgery, Psychology, and Social Work.
- The section remains committed to providing quality educational experiences for trainees, including medical student and pediatric resident electives. Under the direction of Dr. Megan Letson, the Child Abuse Pediatrics Fellowship is an Accreditation Council for Graduate Medical Education-accredited program and continues to attract excellent trainees. Additionally, in collaboration with Pediatric Emergency Medicine, we are one of only a few programs nationally to offer a combined four-year Child Abuse Pediatrics and Pediatric Emergency Medicine Fellowship.
- Members of the section continue to be recognized nationally, including representation on the American Board of Pediatrics Sub-board on Child Abuse Pediatrics and on multiple Ray Helper Society committees. Additionally, faculty continue a tradition of national presentations, including the Ray Helper Society annual meeting, and are involved in child maltreatment-related research. We continue to be a site for CAPNET, a child abuse research network.

Selected Publications

Bishop R, Sethia R, Elmaraghy C, Lind M, Tscholl J, Malhotra P. Recognition and management of nonaccidental esophageal perforation. *Pediatrics*. 2022 Jan 1;149(1):e2021052073.

Crichton K, Brink F, Patterson K, Michaels N. Traumatic pediatric firearm injuries during the COVID-19 pandemic. *Journal of Applied Research on Children: Informing Policy for Children at Risk*. 2022q Jun; 12:2, Article 3.

Koti A, Crichton K, Liker K, Hashmi Z, Thackeray J. Occult injury screening among infants with subconjunctival hemorrhage. *Journal of Pediatric Ophthalmology and Strabismus*. 2021 Jul-Aug;58(4):213-217.

Letson M, Brink F, Daniels A, Thompson S, Wolf K, Michaels N. Implementation of SEEK in a Children's Advocacy Center: a process improvement initiative. *Pediatric Quality and Safety*. 2022 Jun;7(4):e573.

Thackeray J, Crichton K, McPherson P, Izsak, E, Vavul-Roediger L, Kim G, Spencer S, Baker C, Eismann E, Shapiro R on behalf of the TRAIN Collaborative. Identification of initial and subsequent injury in young infants: opportunities for quality improvement in the evaluation of child abuse. *Pediatric Emergency Care*. 2022 Jun; 38:6: e1279-e1284.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022
\$4,329,953

Fast Facts: July 2021 – June 2022

- Child Assessment Clinic Visits: 1,390
- Foster Care Clinic Visits: 1,413
- Sharon Woods Foster Care Clinic Visits: 232
- Eastland Foster Care Clinic Visits: 206
- Non-Accidental TBI Clinic Visits: 83
- Child Assessment Team Clinic Visits: 213
- Total Clinic Visits: 3,537
- Inpatient Consults (Child Abuse Team): 546

Department of Pediatrics
CLINICAL INFORMATICS

The Division of Clinical Informatics at Nationwide Children’s Hospital aims to transform health care through design, implementation and optimization of information and communication systems. Our goal is to enhance patient care activities with safe and reliable information systems, improve individual and population health outcomes through the use of technology and digital tools, enable innovation and research across the institution, and empower our patients and families with the tools they need to engage effectively with their health care team and our health care system.

Faculty



Jeffrey M. Hoffman, MD
Chief

- Aarti R. Chandawarkar, MD
- Juan D. Chaparro, MD, MS
- Jennifer A. Lee, MD
- Kathryn E. Nuss, MD
- Shama Y. Patel, MD, MPH
- Laura Rust, MD, MPH
- Alysha Taxter, MD, MSCE

2021 – 2022 Fellows

- Manjot Gill, MD
- Emily Sentman, MD
- Kathryn Tobin, MD
- Shravani Vundavalli, MD

Highlights From the Past Year

The faculty and fellows in the Division of Clinical Informatics work to enhance the effectiveness of our clinical information systems and to provide expert consultation to operational leaders, clinicians and investigators across the institution. We collaborate with other divisions and disciplines to improve tools for clinical documentation, patient management, population health, quality improvement and research.

The past year has seen a number of important contributions from the division in the areas of patient safety, quality improvement, clinical communication and provider efficiency.

- In collaboration with data scientists and clinical informaticists in our Information Services Department, Drs. Laura Rust and Kathryn Nuss completed a full roll-out of our homegrown predictive algorithm to anticipate likely clinical deterioration among hospitalized patients outside of the ICU. On the original pilot units, this new tool has enabled our existing situational awareness program (“Watchstander”) to reduce emergent ICU transfers and code blue events in this population by an impressive 71%.
- Partnering with a group of dedicated physician EHR builders in the Division of Primary Care Pediatrics, Drs. Aarti Chandawarkar and Shravani Vundavalli were able to streamline workflows for depression screening and management, as well as increasing rates of evaluation for children at high risk for autism spectrum disorder using new clinical decision support tools within the EHR.
- One of newest faculty members, Dr. Alysha Taxter has revolutionized how we care for children with rheumatic diseases, such as lupus and arthritis, by capturing and integrating electronic patient-reported data into routine clinical care, quality initiatives, and research. She has also created a point-of-care dashboard which providers, patients, and families can use to inform shared decision-making during clinic visits.

- In 2021, our entire team worked with hospital leadership, legal services, and our compliance office to comply with the new information blocking provisions of the 21st Century Cures Act, which requires healthcare organizations to make most of patient’s chart electronically accessible to families, including clinical notes. In particular, Drs. Laura Rust and Emily Sentman worked with the Division of Emergency Medicine to overhaul their entire documentation workflow in order to create a single shared provider note. Not only did this provide important safeguards to avoid release of sensitive or confidential patient information to parents, but it improved the effectiveness in communicating visit details to the patient’s primary care provider and decreased the overall amount of time required for providers to document these visits, saving an estimated 11 days of documentation time per year.
- This past year, our division began offering physician informatics consultation services to our colleagues in other departments and divisions in an effort to identify opportunities to improve clinical workflow, enhance their experience using the EHR, and improve patient care quality and safety. To date, we have completed over 140 consultations which led to numerous EHR enhancements and educational opportunities.

Nationally, faculty in our division now serve in several high-profile leadership positions in informatics for various organizations. Dr. Jeff Hoffman is the incoming Clinical Informatics Sub-board chair for the American Board of Preventive Medicine; Dr. Aarti Chandawarkar is president-elect of the Academic Forum of the American Medical Informatics Association; Dr. Laura Rust is co-chair of Epic’s Pediatric Emergency Medicine specialty steering board; and Dr. Juan Chaparro now serves on the Clinical Information Technology Executive Committee of the American Academy of Pediatrics.

Selected Publications

Chaparro J, Beus J, Dziorny A, Hagedorn P, Hernandez S, Kandaswamy S, Kirkendall E, McCoy A, Muthu N, Orenstein E. Interruptive alert stewardship: techniques to monitor and improve interruptive clinical decision support. *Applied Clinical Informatics*. 2022 May;13(3): 560-568.

deMayo R, Huang Y, Lin E, **Lee J,** Heggland A, Im J, Grindle C, **Chandawarkar A.** Associations of telehealth care delivery with pediatric health care provider well-being. *Applied Clinical Informatics*. 2022 Jan;13(1):230-241.

Lee J, Yang S, Holland-Hall C, Sezgin E, **Gill M,** Lin S, Huang Y, **Hoffman J.** Prevalence of sensitive terms in clinical notes using natural language processing techniques. *Journal of Medical Internet Research Medical Informatics*. 2022 Jun;10(6):e38482.

Rust L. Notes at your fingertips: Open note considerations regarding pediatric and adolescent care. *Current Problems in Pediatric and Adolescent Health Care*. 2021 Nov;51(11):101102.

Taxter A, Donaldson B, Rigdon J, Harry O. Association between patient-reported outcomes and treatment failure in juvenile idiopathic arthritis. *ACR Open Rheumatology*. 2022 Jun.

Department of Pediatrics
COMMUNITY PEDIATRICS

The Section of Community Pediatrics at Nationwide Children’s Hospital includes community physicians in Pediatrics and Internal Medicine/Pediatrics who are affiliated with Nationwide Children’s. Many of these physicians participate in the Pediatric Education in Community Sites (PECS) program. This provides residents with a very different kind of outpatient experience than that of a traditional hospital-based practice. Beginning in their first or second year, each resident is assigned to a weekly half-day continuity experience in a private practice. This offers thorough exposure to general pediatric practice and reinforces the relationship between Nationwide Children’s and the community physicians.

Faculty



Robert W. Snyder, MD, FAAP
Chief

Wahida B. Abaza, MD	Taylor A. Ballenger, MD	Heather A. Battles, MD
Nikola T. Al-ain, MD	Richard A. Baltisberger, MD	Sarah A. Behrens, MD
Alanna J. Albano, DO	Lauren C. Bar-Lev, MD	Anne M. Bever, MD
Ilona B. Albrecht, DO	Terry P. Barber, MD	Cynthia J. Black, MD
Benjamin P. Almasanu, DO	Carrie J. Barnes-Mullett, MD	Kathleen D. Blake, MD
Lacey J. Althausen, MD	Brent M. Barson, DO	Kimberly K. Blazer, MD
Nardia S. Ataman, MD	Ryan M. Barson, MD	Denise L. Blocker, MD
Jennifer E. Bachman, MD	Courtney R. Bartsch, MD	Eileen C. Bolton, MD

Sandra L. Boyle, MD	Jennifer H. Campbell, MD	Sidney L. Couling, MD	Michael T. DiBartola, MD
Richard J. Breen, MD	Mitchell R. Camp, MD	Elizabeth A. Crickard, DO	Kevin M. Dickerson, MD
Steven Randall Brown, MD	Stephen M. Canowitz, MD	Ann M. Croft, MD	Bradley E. Dickson, MD
Michelle S. Buendia, MD	Ali M. Carine, DO	Camilla Curren, MD	Jonathan A. Digby, DO
Kyle Burghgraef, MD	Jennifer B. Carlos, MD	Omolara Y. Dairo, MD	Dawn C. Dillinger, DO
Jennifer L. Burkam, MD	Aila L. Co, MD	Amy E. Deibel, MD	Kent W. Doherty, DO
Shari L. Burns, MD	Benjamin W. Cole, MD	Traci A. DeVoe, MD	Lorna F. Donovan, MD
Bethany J. Caldwell, MD	Kathleen A. Costlow, MD	Praveena V. Dhawale, MD	Dennis M. Doody, MD

James R. Dorado, MD	Lenora A. Fitton, DO	Monica C. Gilbert, MD	Jacob H. Gregerson, MD
Julie M. Dunlea, MD	David D. Fosselman, MD	Kathryn L. Ginocchi, MD	Judith A. Groner, MD
Nicholas J. Eastman, MD	Patricia A. Francis, MD	Jumana C. Giragos, MD	Patrick J. Gross, DO
Meika K. Eby, MD	Michael R. Franks, MD	Charles M. Goddard, MD	Dana L. Hamilton, DO
Kimberly A. Eilerman, DO	Brad E. Fuller, MD	Erin L. Goist, MD	Maliika Haque, MD
Maureen M. Faust, DO	Kathleen T. Fulop, MD	Michelle C. Golla, MD	Daniel J. Heinmiller, MD
Alicia D. Fenn, MD	Raju R. Gaglani, MD	Anna C. Gray, MD	John S. Heintz, MD
Emily T. Ferguson, MD	Barbara B. Galantowicz, MD	Emily K. Gray, MD	Megan E. Heitzman, MD

Christopher B. Houts, MD	Cheryl K. Kirkby, MD	Lisa A. Krumm, MD	Michael C. Loar, MD
Elizabeth M. Jacob, MD	Adam M. Kirkland, MD	Vijay S. Kumbar, MD	William W. Long, MD
Enaas F. Kasheer, MD	Elizabeth L. Kirkland, MD	Celina M. LaBrec-Salmons, MD	Tricia W. Lucin, MD
Stephen L. Kebe, MD	William E.C. Knobeloch, MD	Robert C. LaMonte, MD	Eileen M. Maher, MD
Lisa A. Kelch, MD	Irene P. Koesters, MD	Kristina M. Lehman, MD	Michele V. Mahoney, MD
Andrew M. Keller, MD	Stephen C. Koesters, MD	Michael J. Leymaster, MD	Jason W. Mailloux, MD
Sara M. Kelly, MD	Andrew S. Korcal, MD	Bradley A. Lisko, MD	Jennifer J. Mastruserio, MD
Richard A. Kern, MD	Justin K. Krueger, MD	Elizabeth A. Little, MD	Derek A. McClellan, MD

Sheilla D. McNeal, MD	Mark A. Muresan, MD	Jennifer Killion Overbey, MD	Domenico Pietropaolo, MD
Meera R. Mehta, MD	Jacqueline M. Nicodemo, MD	Divya S. Parikh, MD	Laura D. Plachta, MD
George M. Messick, MD	Mary-Lynn Niland, MD	Jacqueline S. Pennywitt, MD	Phyllis Jo Polas, DO
Bruce P. Meyer, MD	Autumn M. O'Brien, MD	Jan E. Perry, MD	Danielle S. Pottinger, MD
Cameron K. Miller, MD	Adebomi A. Omikunle, MD	Michael A. Perry, MD	M. Bonnie Pugh, MD
Alana C. Milton, MD	Janet S. Orr, MD	Richard A. Petrella, MD	Blake J. Randolph, MD
Stacy L. Morran, MD	Lilliam I. Ortiz, MD	Brad T. Pfau, MD	Barbara B. Rayo, MD
Matthew J. Morrison, MD	Laura E. Osthaus, MD	Laura D. Phillips-Chou, MD	Teresa R. Recker Gross, DO

Robert D. Reis, MD	Phillip N. Simon, MD	Ellen R. Tamburello, MD	Kristin E. Thompson, MD
Patricia A. Ryan, MD	Rebecca M. Slaunwhite, MD	Katrina S. Tansky, MD	John D. Toth, MD
Purbi S. Sahai, MD	Donna L. Sterling, MD	Amy Rachelle A. Teleron-Khorshad, MD	Bonny M. Tsai, MD
Timothy R. Savage, MD	Nicholas S. Stevens, MD	Timothy A. Teller, MD	Ahmed J. Turjoman, MD
Erin K. Schaffner, MD	Wendy K. Stevens, MD	Mark A. Thoma, MD	H. Scott Tyson, MD
Elizabeth A. Schloss, MD	Kathleen C. Stiles, MD	Olivia W. Thomas, MD	Nicole R. Van Steyn, MD
Dana J. Schultz, MD	Miller J. Sullivan, Jr., MD	Craig R. Thompson, MD	Sean M. Vellucci, MD
Eileen H. Sheets, MD	Nazhat Taj-Schaal, MD		Victoria N. Vinsant, MD

Diana T. Wagner, MD	Michelle E. Yaw, MD
James D. Ward, MD	Becky Zhao, MD
Olivia N. Westhoven, MD	Elizabeth A. Zmuda, DO
Ray S. Wheasler, III, MD	
Matthew M. White, MD	
Melissa D. Winterhalter, MD	
Kathleen M. Wodarczyk, MD	
Lindsay A. Wylie, MD	

Department of Pediatrics

COMPLEX CARE

The Division of Complex Care at Nationwide Children’s Hospital provides comprehensive, coordinated and holistic care to children and adults with neurodevelopmental disabilities. In our Complex Health Care program, we are a primary care medical home for many patients. For those who already have a medical home in the community, we provide expertise in neurodevelopmental care alongside their other specialists. The Cerebral Palsy Program is an interdisciplinary program devoted to providing state of the art care for children, adolescents and adults with cerebral palsy. The Pediatric Feeding and Swallowing Program offers a variety of services, including evaluation and longitudinal management for children with feeding difficulties as well as an intensive feeding program. Our faculty participate in the interdisciplinary Spinal Muscular Atrophy Clinic, the Leukodystrophy Clinic, the Metabolic Bone Clinic, the Sialorrhea Clinic and the Adult Down Syndrome Clinic at the Nisonger Center. We also provide medical care to the residents of the Heinzerling Community. In addition to our outpatient programs, Complex Care has an inpatient service to provide medical care to our patients who require hospitalization.

Faculty



Garey Noritz, MD
Division Chief



Laurie Glader, MD
Section Chief

Rukshana Ahmed, MD

Erica Braswell, MD

Derek Fletcher, MD

Praveen Goday, MD
Director of Nutrition and Feeding Program

Elizabeth Lucas, MD

Tsovinar Sorkin, MD

Katherine Steingass, MD

Joy Walton, MD

Highlights From the Past Year

- Praveen Goday, MD, has joined Nationwide Children’s Hospital as director of the Nutrition and Feeding Program, and director of the Feeding and Swallowing Program. He is an internationally renowned expert in nutrition and feeding disorders in children. The Feeding and Swallowing Program provides evaluation and treatment of complex feeding disorders and is one of only a handful in the country to offer an intensive feeding program. One of the major outcomes is reduction in the need for enteral tube feeding. Other outcomes focus on increased enjoyment in eating, family stress reduction and nutritional optimization. A substantial expansion of services and space is in process.
- The Cerebral Palsy Program at Nationwide Children’s is the lead site for the Cerebral Palsy Research Network. By linking more than 30 centers in the United States and Canada, we are working to improve treatments and outcomes for people with cerebral palsy through high-quality clinical research and quality initiatives. In partnership with the nationally recognized Early Development Clinic, where early diagnosis of cerebral palsy is a priority, we have improved the clinical transition for patients with cerebral palsy from infancy through childhood. We also have one of the few cerebral palsy clinics for adults in the United States.

- Our faculty continue to be a sought-after resource for mentoring and education, with invited lectures locally, nationally and internationally. Our non-physician staff are leaders in training their colleagues in psychology, nursing, nutrition, pharmacy, social work and allied therapies in the provision of family-centered care for children and adults with disabilities.
- Members of our faculty have leadership positions at leading national organizations, including the American Academy of Pediatrics, the Society for Developmental and Behavioral Pediatrics, the Cerebral Palsy Foundation, and the American Academy for Cerebral Palsy and Developmental Medicine.
- We will offer a fellowship in Complex Care Pediatrics beginning July 1, 2023. This 2-3 year fellowship is one of just a few in the country and will train the next generation of academic pediatricians to specialize in the care of children with medical complexity.

Selected Publications

Glader L, Comeau M, Sanders L. Addressing parent employment as an essential issue in child health. *Pediatrics*. 2021 Sept;148(3).

Jersak T, Kim S, Noritz G, Testa M, Humphrey L. Defining persistent total parenteral nutrition use in patients with neurologic impairment. *Journal of Palliative Medicine*. 2022 Apr;25(4):577-583.

Jersak T, Noritz G. Evaluation of pain in adults with childhood-onset disabilities and communication difficulties. *Frontiers in Neurology*. 2021 Oct;12(1763):722971.

Love L, Newmeyer A, Ryan-Wenger N, Noritz G, Skeens M. Lessons learned in the development of a nurse-led family centered approach to developing a holistic comprehensive clinic and integrative holistic care plan for children with cerebral palsy. *Journal for Specialists in Pediatric Nursing*. 2022 Jan;27(1):e12354.

Noritz G, Shah S, Glader L. Estimating fracture risk in children and adults with disabilities: An iniquitous use of race. *Developmental Medicine and Child Neurology*. 2022 Apr;64(4):523.

Fast Facts: July 2021 – June 2022

Inpatient Discharges: 359

Observation and Outpatient-in-a-Bed Discharges: 47

Average Length of Stay*: 6.97

Average Daily Census*: 6.85

Patient Days*: 2,501

**Excludes observation and outpatient-in-a-bed patients*

Inpatient Consults: 25

Complex Health Care Clinic Visits: 7,619

Department of Pediatrics
CRITICAL CARE MEDICINE

The Division of Critical Care Medicine at Nationwide Children’s Hospital provides in-house faculty coverage of the pediatric intensive care units (PICUs) 24 hours a day and is dedicated to the care of children who have, or are at risk for, life-threatening illnesses across the spectrum of pediatric disease. This service also contributes actively to the vital missions of research and advanced training in the field of pediatric critical care medicine. This typically service cares for about 3,000 patients per year, covering up to 54 PICU beds at Nationwide Children’s and contributing to the coverage of the 20-bed cardiothoracic ICU. Therapies such as extracorporeal membrane oxygenation, high frequency oscillatory ventilation, and continuous renal replacement therapies are available at all times. We continue to boast one of the lowest severity-adjusted mortality rates of any PICU in the country. We also staff the Assessment and Consultation Team (a multidisciplinary rapid response team) and the Code Blue team at Nationwide Children’s Hospital.

Faculty



Mark W. Hall, MD, FAAP, FCCM
Division Chief



Nadeem Khan, MD, FAAP
Section Chief

Onsy S. Ayad, MD, FAAP
Amee M. Bigelow, MD
Katherine E. Bline, MD
Richard J. Brilli, MD, FAAP
Margaret A. Chase, MD
Melissa G. Chung, MD
Megan C. Daniel, MD
Maria H. Estrada, DO, FAAP

Richard P. Fernandez, MD
Jill A. Fitch, MD, FAAP
W. Joshua Frazier, MD
Jennifer M. Gauntt, MD
Samantha W. Gee, MD, FAAP
Todd J. Karsies, MD, MPH
Catherine D. Krawczeski, MD
Anthony Y. Lee, MD, FAAP

Ada T. Lin, MD, FAAP
Eric A. Lloyd, MD
Marlina E. Lovett, MD
Jeffrey E. Lutmer, MD
Tensing Maa, MD, FAAP
Jennifer M. MacDonald, MD, PhD
Christopher P. Montgomery, MD
Jennifer A. Muszynski, MD, MPH, FCCM

Nicole F. O'Brien, MD
Danna W. Qunibi, MD, MBOE
Claire A. Stewart, MD, MEd
Tsovinar Sorkin, MD, MS
Markita L. Suttle, MD
Joseph D. Tobias, MD
Andrew R. Yates, MD

2021 – 2022 Fellows
Oluwasoore Akande, DO
Natalie Capretta, DO
Claire Christian, MD
Loren Farley, MD
Hunter Johnson, MD
Jordan Lull, MD
Cynthia Moffitt, MD
Lauren McCluney, MD
Robert Murray, MD

Sara Sanders, MD
Erin Thornley, DO
Laura Wingert, MD

Highlights From the Past Year

The division remains a leader in pediatric critical care research, with robust ongoing leadership and participation in single- and multi-center studies. In 2021, Nationwide Children’s Hospital successfully recompeted to remain in the National Institutes of Health-funded Collaborative Pediatric Critical Care Research Network (CPCCRN). Division Chief Mark W. Hall, MD, is a national leader in the field of immunobiology research and serves as the principal investigator for the CPCCRN network’s groundbreaking multi-center trial of personalized immunomodulation in pediatric sepsis. Other outstanding areas of research focus for the Critical Care Medicine faculty include *Staphylococcus aureus* microbiology (Christopher P. Montgomery, MD), cerebral malaria and global health (Nicole F. O’Brien, MD), transfusion science (Jennifer A. Muszynski, MD, MPH, FCCM), respiratory infections (Todd J. Karsies, MD, MPH), bereavement (Markita L. Suttle, MD), anesthesiology (Joseph D. Tobias, MD), simulation (Tensing Maa, MD, FAAP), resuscitation (Andrew R. Yates, MD), quality and safety (Richard J. Brill, MD, FAAP, MCCM) and others. With this broad scientific portfolio, an *in-situ* research laboratory within the PICU, and five divisional research coordinators, the section remains at the forefront of innovation in the field. Our Accreditation Council for Graduate Medical Education-approved Pediatric Critical Care Medicine Fellowship provides rigorous clinical and academic training for the next generation of ICU faculty, accepting four fellows per class in our three-year program. The Critical Care Medicine faculty participate in instruction for the pediatric and surgical residency programs, as well as multiple other fellowship programs. A PICU elective is also provided for fourth-year medical students.

Selected Publications

Karsies T, Tarquinio K, Shein SL, Beardsley AL, Prentice E, Karam O, Fontela P, Moore-Clingenpeel M, Willson DF; Pediatric Acute Lung Injury and Sepsis Investigator’s (PALISI) Network. Compliance with an antibiotic guideline for suspected ventilator-associated infection: the ventilator-associated infection (VAIN2) Study. *Pediatric Critical Care Medicine*. 2021 Oct 1;22(10):859-869.

Li Z, Beesetty P, Gerges G, Kleinhenz M, Moore-Clingenpeel M, Yang C, Ahmed LB, Hensley J, Steele L, Chong AS, Montgomery CP. Impaired T-lymphocyte responses during childhood *Staphylococcus aureus* Infection. *Journal of Infectious Diseases*. 2022 Jan 5;225(1):177-185.

Muszynski JA, Banks R, Reeder RW, Hall MW, Berg RA, Zuppa A, Shanley TP, Cornell TT, Newth CJL, Pollack MM, Wessel D, Doctor A, Lin JC, Harrison RE, Meert KL, Dean JM, Holubkov R, Carcillo JA for the Eunice Kennedy Shriver National Institute of Child Health and Human Development Collaborative Pediatric Critical Care Research Network (CPCCRN). Outcomes associated with early RBC transfusion in pediatric severe sepsis: A propensity-adjusted multicenter cohort study. *Shock*. 2022 Jan 1;57(1):88-94.

O’Brien NF, Fonseca Y, Johnson HC, Postels D, Birbeck GL, Chimalizeni Y, Seydel KB, Bernard Gushu M, Phiri T, June S, Chetcuti K, Vidal L, Goyal MS, Taylor TE. Mechanisms of transcranial doppler ultrasound phenotypes in paediatric cerebral malaria remain elusive. *Malaria Journal*. 2022 Jun 21;21(1):196.

Suttle M, Hall MW, Pollack MM, Berg RA, McQuillen PS, Mourani PM, Sapru A, Carcillo JA, Startup E, Holubkov R, Notterman DA, Colville G, Meert KL; Eunice Kennedy Shriver National Institute of Child Health and Human Development Collaborative Pediatric Critical Care Research Network (CPCCRN). Post-traumatic growth in parents following their child’s death in a pediatric intensive care unit. *Journal of Palliative Medicine*. 2022 Feb;25(2):265-273.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022
\$2,248,015

Fast Facts: July 2021 – June 2022

PICU Admissions: 3,272
Average Length of Stay*: 4
Average Daily Census*: 35
Total Patient Days*: 12,910
Inpatient Discharges: 3,352
Number of Beds: 54

*Excludes observation and outpatient-in-a-bed patients

Department of Pediatrics

DERMATOLOGY

The Section of Dermatology at Nationwide Children’s Hospital sees outpatients from birth through age 18 for both common and rare disorders of the hair, skin and nails.

Faculty



Patricia M. Witman, MD
Chief

Esteban Fernández Faith, MD
Katya Harfmann, MD
Joy Lynn Mosser-Goldfarb, MD

Highlights From the Past Year

- We welcomed a new nurse practitioner, Kendra Brunner, CPNP-PC, increasing our provider group to four physicians and three nurse practitioners.
- Our Pediatric Dermatology Fellowship program, under the direction of program director Dr. Esteban Fernández Faith, was awarded accreditation by the ACGME in 2022, the first year that ACGME accreditation of pediatric dermatology fellowships was an option.
- Dr. Joy Mosser, as program director of the The Ohio State University Dermatology Residency Program, was successfully approved to add another resident position to the program, bringing the total residency class to 4 per year.
- Dr. Esteban Fernández Faith had the honor of serving as a course director for the 2022 annual Society for Pediatric Dermatology Meeting.
- Brittany Kozy, APN, and Dr. Katya Harfmann planned and organized the inaugural Pediatric Dermatology Symposium, a one-day conference on pediatric dermatology topics to educate providers in the region which occurred for the first time in October 2022.

Selected Publications

Brokamp G, Mori M, Fernández E. Pseudoxanthoma elasticum. *JAMA Dermatology*. 2022 Jan 1;158(1):100.

Brokamp G, Mosser-Goldfarb J. Intralesional sodium thiosulfate treatment of calcinosis cutis in pseudopseudohypoparathyroidism. *Pediatric Dermatology*. 2022 May;39(3):425-428.

Cordisco MR, Fernández FE, Lanoel A, Manunza F, Stefano P, Castro C, Durán-McKinster C, Velasquez F, Henostroza K, Harfmann K, Baselga Torres E. Ulceration in congenital hemangiomas. *Journal of Vascular Anomalies*. 2021 Sep;2(3):e015.

Lee G, Witman P, Mosser J, Fernández E. A case series of giant molluscum contagiosum in an immigrant African pediatric population. *Pediatric Dermatology*. 2021 Nov;38 Suppl 2:113-116.

Matarneh B, Witman P. Life-threatening hypothermia in a child with primary erythromelalgia. *Pediatric Dermatology*. 2022 Jan;39(1):135-136.

Fast Facts: July 2021 – June 2022

Canal Winchester Dermatology Clinic Visits: 477
Dermatology Clinic Visits: 8,276
Dublin Dermatology Clinic Visits: 2,472
Westerville Dermatology Clinic Visits: 599
Total Clinic Visits: 11,824
Inpatient Consults: 166

*Excludes observation and outpatient-in-a-bed patients

Department of Pediatrics

DEVELOPMENTAL AND BEHAVIORAL PEDIATRICS

The mission of the Division of Developmental and Behavioral Pediatrics at Nationwide Children’s Hospital is to achieve best outcomes for children with developmental and behavioral needs through equitable, evidence-based, family-centered care with a focus on interprofessional practice. Outpatient services include comprehensive care delivered by developmental and behavioral pediatricians and advanced nurse practitioners in partnership with pediatric psychology, speech pathology, social work and other health care professionals. Areas of expertise include the evaluation and management of autism spectrum disorders, complex ADHD and developmental delay. Additional focus areas include myelomeningocele, neonatal follow-up, Down syndrome and Williams syndrome. The division often provides care in collaboration with programs through Nationwide Children’s Hospital’s Behavioral Health Services.

Faculty



Amy Newmeyer, MD
Division Chief



Jennifer Walton, MD, MPH
Associate Division Chief

Lindsay Bartram, DO
Daniel L. Coury, MD
Anita R. Narayanan, MD
Patricia L. Nash, MD
Katherine Steingass, MD

2021 – 2022 Fellows

THIRD YEAR

Elizabeth Barnhardt, DO
Rohan Patel, MD

FIRST YEAR

Sushma Kasinathan, MD

Highlights From the Past Year

- The Division of Developmental and Behavioral Pediatrics at Nationwide Children’s is led by Amy Newmeyer, MD. An associate professor of pediatrics at The Ohio State University College of Medicine, Dr. Newmeyer serves on the American Board of Psychiatry and Neurology NDD Committee and as the Nationwide Children’s site medical co-director for the Autism Care Network.
- Jennifer Walton, MD, MPH, is the associate chief of the division and is co-director of the Nationwide Children’s Williams Syndrome Clinic. She holds a variety of roles nationally, including as a member of the Williams Syndrome Association’s Professional Advisory Board and the Society for Developmental Behavioral Pediatrics’ Board of Directors.
- Faculty in the division contribute at the local and national levels to improve clinical outcomes and reduce avoidable harm. Lindsay Bartram, DO, leads a quality improvement (QI) initiative to improve transition to adult care for developmental and behavioral pediatric patients. Daniel L. Coury, MD, holds multiple national administrative and research roles, including medical directorship of the Autism Care Network. Anita R. Narayanan, MD, leads the division’s quality improvement efforts to reduce environmental stressors faced by Developmental and Behavioral Pediatrics patients and reduce missed appointments. Patricia L. Nash, MD, serves as medical director of the Nationwide Children’s Down Syndrome Program. Katherine Steingass, MD, serves as medical director of the Nationwide Children’s Myelomeningocele Clinic and as a principal investigator on the National Spina Bifida Patient Registry.
- In 2021, the division launched an outreach clinic in conjunction with Licking Memorial Hospital to bring high quality, accessible care for children with emotional, behavioral and developmental disorders to the patients in Licking County.
- The division continues to support a robust fellowship program led by Dr. Katherine Steingass. The fellowship is integrated with The Ohio State University’s Leadership Education in Neurodevelopmental Disabilities (LEND) program at the Nisonger Center, with Dr. Walton serving as the LEND program’s co-associate director.

Selected Publications

Barnhardt EW, Steingass K, Levine A, Jurbank M, Piercefield J, Nyp SS. The value of telehealth and a team-based approach in improving developmental and behavioral care during the COVID-19 pandemic. *Journal of Developmental and Behavioral Pediatrics*. 2021 Sep 1;42(7):602-604.

Keim SA, Jude A, Smith K, Khan AQ, Coury DL, Rausch J, Udaipuria S, Norris M, Bartram LR, Narayanan AR, Rogers LK. Randomized controlled trial of omega-3 and -6 fatty acid supplementation to reduce inflammatory markers in children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*. 2022 Jan 11;10.1007/s10803-021-05396-9.

Longo A, Gilmore D, Garvin J, Coury D, Hanks C, Moffatt-Bruce S, Hess A, Hand B. Characteristics associated with healthcare independence among autistic adults. *Research in Autism Spectrum Disorders* 2022 July. Volume 95, 101972.

Love L, Newmeyer A, Ryan-Wenger N, Noritz G, Skeens MA. Lessons learned in the development of a nurse-led family centered approach to developing a holistic comprehensive clinic and integrative holistic care plan for children with cerebral palsy. *Journal for Specialists in Pediatric Nursing*. 2022 Jan;27(1):e12354.

Walton JR, Spinks-Franklin A. Discrimination and the role of the clinician. *Pediatrics*. 2021 Dec 1;148(6):e2021053619.

Walton JR, Martens MA, Moore-Clingenpeel M. Brief report: Evaluating the effectiveness of music to obtain more accurate blood pressure readings in children with Williams syndrome. *Journal of Autism and Developmental Disorders*. 2022 Feb;52(2):871-876.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

\$269,603

Fast Facts: July 2021 – June 2022

Developmental Behavioral Pediatrics Clinic Visits: 4,637

Developmental Disabilities Clinic Visits: 101

Myelomeningocele Clinic Visits: 640

Newark Developmental Behavioral Pediatrics Clinic Visits: 118

Westerville Developmental Behavioral Pediatrics Clinic Visits: 2,730

**Excludes observation and outpatient-in-a-bed patients*

Department of Pediatrics

EMERGENCY MEDICINE

The Emergency Department at Nationwide Children’s Hospital is one of the nation’s highest-ranked and busiest pediatric emergency departments (based on Children’s Hospital Association benchmarking data and *Parents* magazine). Emergency Medicine features a Level I Pediatric Trauma Center and an Emergency Department staffed by board-certified/eligible pediatric emergency medicine subspecialists 24 hours a day.

Faculty



Rachel M. Stanley, MD, MHSA
Division Chief



Michael Stoner, MD
Section Chief

- Adjoa Andoh, MD
Srikanth Aravapalli, MD
Berkeley Bennett, MD
Alan Bleiberg, MD
Bridget Bonaventura, MD
Mary Bowman, MD
Beth Bubolz, MD
Jonathon Chang, MD
Michael Chua, MD
- Cullen Clark, MD
Beth Claxton, MD
Daniel Cohen, MD
Marcie Costello, MD
Courtney Coyle, MD
Carrie DeHoff, MD
Michael Dunn, MD
Meika Eby, MD
Emile Elshammaa, MD

- Joelle Farlow, MD
Aarti Gaglani, MD
Yaffa Gewirtz, MD
Delia Gold, MD
Michelle Greene, DO
Angela Harris, MD
Todd Holman, MD
Maya Iyer, MD
- Yamini Jadcherla, MD
Hazel Jeong, MD
Chris Jones, DO
Chelsea Kadish, MD
Julie Leonard, MD
Julia Lloyd, MD
Jennifer Melvin, MD
Leah Middelberg, MD
- Samir Mishra, MD
Jennifer Mitzman, MD
Jennifer Mrozek, MD
Michael Patrick, MD
Maegan Reynolds, MD
Anne Runkle, MD
Laura Rust, MD
Daniel Scherzer, MD
- Betsy Schmerler, MD
Emily Sentman, MD
Bashar Shihabuddin, MD
Gregory Stewart, MD
Kristin Stukus, MD
Scott Sutton, MD
Tracey Wagner, MD
Jordee Wells, MD

- Jessica Wilson, MD
Morgan Wurtz, MD
Anita Yalamanchi, DO
- 2021 – 2022 Fellows
Sadie Acquah-Asare, MD
Abha Athale, DO
Sarah Chen, MD
Courtney Coyle, MD
Kristol Das, MD
Nathaniel Forman, MD
- Michelle Greene, DO
Nita Gupta, MD
Yamini Jadcherla, MD
Chelsea Kadish, MD
David Kling, DO
Celia Ligorski, DO
Rosalia (Lia) Mahr, MD
- Jennifer Nystrom, MD
Douglas (Alan) Potts, MD
Taylor White, DO
Christopher Wright, MD

Highlights From the Past Year

The Department of Emergency Medicine provides expertise in pediatric advanced life support and resuscitation, as well as evaluation and treatment in every area for acute medical and surgical conditions. Emergency services are provided at our main campus and Lewis Center emergency departments.

The Emergency Department is a hub for medical education in the acute care of children, adolescents and selected adults. Medical students and more than 300 residents from Emergency Medicine, Family Practice, Internal Medicine/Pediatrics and Pediatrics programs are educated in all aspects of pediatric emergencies. In addition, Nationwide Children’s has a large, vibrant Pediatric Emergency Medicine Fellowship program. Members of the Section of Emergency Medicine are active leaders and participants in the residency program at Nationwide Children’s and at The Ohio State University College of Medicine.

In addition to providing clinical, operational and educational excellence, Emergency Medicine has a strong history of clinical research. We lead the federally funded Great Lakes node of the Pediatric Emergency Care Applied Research Network (PECARN), a large 18-hospital research network. We have developed research collaborations with the Columbus Division of Fire and other emergency medical service agencies regionally and nationally. The section is committed to the ongoing improvement of health care delivery in the Emergency Department and in clinical outcomes.

Selected Publications

Andoh AA, Lo CB, Shi J, Bode RS, Gee SW, Leonard JC. Cost analysis of hospitals performing continuous albuterol in non-intensive care settings. *Journal of Asthma*. Mar 14 2022;1-9.

Iyer MS, Way DP, Schumacher DJ, Lo CB, Leslie LK. What procedures are important to general pediatricians and why? *Academic Pediatrics*. Sep-Oct 2021;21(7):1281-1287.

Lloyd J, Depinet H, Zhang Y, Semenova O, Meinzen-Derr J, Babcock L. Comparison of children receiving emergent sepsis care by mode of arrival. *American Journal of Emergency Medicine*. Sep 2021;47:217-222.

Middelberg LK, Leonard JC, Shi J, Aranda A, Brown JC, Cochran CL, Eastep K, Gonzalez R, Haasz M, Herskovitz S, Hoffmann JA, Koral A, Lamoshi A, Levitte S, Lo YHJ, Montminy T, Novak I, Ng K, Novotny NM, Parrado RH, Ruan W, Shapiro J, Sinclair EM, Stewart AM, Talathi S, Tavarez MM, Townsend P, Zaytsev J, Rudolph B. High-powered magnet exposures in children: A multi-center cohort study. *Pediatrics*. 2022 Mar 1;149(3):e2021054543.

Wells JM, Shi J, Bonny AE, Leonard JC. The association of emergency contraception legislation with adolescent births from 2000 to 2014. *Journal of Pediatric and Adolescent Gynecology*. Feb 2022. [Epub ahead of print]



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022
\$5,023,486

Fast Facts: July 2021 – June 2022

Main Campus ED: 71,310
Lewis Center ED: 19,788
Total ED Visits: 91,098



“This highlights the potential role of early urinary biomarkers of kidney damage before the development of microalbuminuria.”

– Leena Mamilly, MD

Endocrinology

Identifying Early Urinary Biomarkers of Kidney Damage in Type 1 Diabetes

Diabetic nephropathy is a common complication of type 1 diabetes. Traditionally, measurement of microalbuminuria is used to screen children with diabetes for diabetic nephropathy. However, evidence suggests that damage to the kidneys may begin before microalbuminuria can be detected.

In a new study, researchers from Nationwide Children’s investigated urinary biomarkers of kidney damage and oxidative stress that may signal the early stages of diabetic nephropathy in pediatric diabetes patients. They also explored how these biomarkers are associated with blood pressure patterns and glycemic variability.

The researchers enrolled participants between 10 and 21 years old with type 1 diabetes and performed continuous glucose monitoring and ambulatory blood pressure monitoring on each participant. They analyzed participants’ urine samples for urinary neutrophil gelatinase-associated lipocalin (uNGAL), a marker of renal tubule health, and pentosidine, a marker of oxidative stress in the kidneys.

“We found that while the traditional marker of diabetic nephropathy, microalbuminuria, was negative in all but one of our patients, levels of uNGAL and pentosidine were significantly elevated in type 1 diabetes patients compared to controls,” says **Leena Mamilly, MD**, an endocrinologist at Nationwide Children’s and lead author of the study. “This highlights the potential role of early urinary biomarkers of kidney damage before the development of microalbuminuria.”

The study also showed a high prevalence of abnormal blood pressure dipping in patients with type 1 diabetes. Abnormal blood pressure patterns are a predictor for complications in individuals with diabetes, and this study suggests they may be present before the development of microalbuminuria.

Lastly, the results raise the question of whether glycemic variability, rather than mean blood glucose (HbA1c), has a stronger impact on the development of diabetic nephropathy and call for further studies.

According to Nationwide Children’s nephrologist Mahmoud Kallash, MD, another of the study’s authors, the key finding is that diabetes begins to affect the kidneys soon after diagnosis. Early detection of kidney damage can lead to early intervention and prevention of further kidney disease.

“We found that uNGAL and pentosidine can be early markers of renal injury and may be used prevent irreversible damage to the kidneys,” he says. “We plan to use these data to build a long-term prospective study to confirm these findings and investigate whether treating patients early might prevent or slow the progression of their kidney disease.”

REFERENCE:

Mamilly L, Mastrandrea LD, Mosquera Vasquez C, Klammer B, Kallash M, Aldughiem A. Evidence of early diabetic nephropathy in pediatric type 1 diabetes. *Frontiers in Endocrinology*. 2021 Apr 28; 12:669954.

Department of Pediatrics

ENDOCRINOLOGY

The Section of Endocrinology at Nationwide Children’s Hospital provides comprehensive primary and consultative services for the diagnosis and treatment of endocrine/hormone disorders and diabetes mellitus in children and adolescents. We offer multidisciplinary care for complex chronic medical conditions that impact the endocrine systems. The section has a strong national presence in the realm of quality improvement for diabetes.

Faculty



Manmohan K. Kamboj, MD
Chief

Sasigarn A. Bowden, MD
Monika Chaudhari, MD
Kajal Gandhi, DO
Rohan K. Henry, MD, MS
Robert P. Hoffman, MD
Justin A. Indyk, MD, PhD
Leena Mamilly, MD
Leena Nahata, MD
Kathryn Obrynba, MD
Aurelia C.H. Wood, MD

2021 – 2022 Fellows

Reham Alzahrani, MD
Esther Bell, MD
Ayse Bulan, MD
Cecilia Damilano, MD
Hiba Salhah, MD

Highlights From the Past Year

The Section of Endocrinology currently has 11 active pediatric endocrinologists, nine advanced practitioners and five pediatric endocrinology fellows. The section presently conducts 15,000 outpatient appointments per year. In 2021, there were over 370 patients diagnosed with new-onset diabetes, and there are over 2,200 patients with diabetes mellitus being followed at Nationwide Children’s on a regular basis.

The section collaborates closely with other disciplines to offer endocrine expertise in the multidisciplinary clinic format to facilitate patient care. At present, these comprehensive programs include the following areas of focus: type 1 and type 2 diabetes mellitus, cystic fibrosis-related diabetes, Prader-Willi syndrome, bone-marrow transplant long-term follow-up, metabolic bone disease, muscular dystrophy, thyroid nodule/cancer, reproductive health and fertility, sickle-cell, young adult diabetes transition, disorders of sexual development and gender (THRIVE program), PCOS, neuro-oncology, William’s syndrome, and chromosome 22q11 deletion.

The section maintains a robust quality improvement portfolio that includes over 15 active projects designed to achieve best safety and quality outcomes for patients with diabetes mellitus and endocrine disorders. As a member of the National T1D Exchange Quality Improvement Collaborative, the section participates in initiatives to further expand the reach of quality improvement best practices nationally. The Section of Endocrinology is a major referral center for children and adolescents in and beyond central Ohio and is a national and international destination for various specialty endocrine programs. The section also is a consultative resource for the Ohio Department of Health Newborn Screening Program for congenital hypothyroidism and congenital adrenal hyperplasia.

Selected Publications

Ebekozien O, Mungmode A, Odugbesan O, Majidi S, Prahalad P, Noor N, Riales N, Agarwal S, Weinstock R, Rapaport R, **Kamboj M**; T1DX-QI Collaborative. Addressing type 1 diabetes health inequities in the United States: Approaches from the T1D Exchange QI Collaborative. *Journal of Diabetes*. 2022 Jan;14(1):79-82.

Hong K, Glick B, **Kamboj M**, **Hoffman R**. Glycemic control, depression, diabetes distress among adolescents with type 1 diabetes: effects of sex, race, insurance, and obesity. *Acta Diabetologica*. 2021 Dec;58(12):1627-1635.

Mamilly L, Pyle-Eilola A, **Chaudhari M**, **Henry R**. The utility of a random growth hormone level in determining neonatal growth hormone sufficiency. *Clinical Endocrinology (Oxf)*. 2021;94(3):392-398.

Nahata L, Olsavsky A, Dattilo T, Lipak K, Whiteside S, Yeager N, Audino A, Rausch J, Klosky J, O'Brien S, Quinn G, Gerhardt C. Parent-Adolescent Concordance Regarding Fertility Perspectives and Sperm Banking Attempts in Adolescent Males With Cancer. *Journal of Pediatric Psychology*. 2021 Oct 18;46(10):1149-1158.

Obrynba K, Anglin K, Moffett A, Steinke T, **Kamboj M**. A Quality Improvement Project to Implement Choking Prevention and First Aid Education in Prader-Willi Syndrome Caregivers. *Journal of Clinical Medicine*. 2021 Oct 27;10(21):4993.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

\$358,223

Fast Facts: July 2021 – June 2022

Inpatient Discharges: 436
Observation and Outpatient-in-a-Bed Discharges: 272
Total Discharges: 708
Average Length of Stay*: 2.5
Average Daily Census*: 2.9
Patient Days*: 1,076
**Excludes observation and outpatient-in-a-bed patients*

Inpatient Consults: 611
Canal Winchester Endocrinology Clinic Visits: 317
Dublin Endocrinology Clinic Visits: 1,721
East Broad Endocrinology Clinic Visits: 573
Endocrinology Clinic Visits: 9,543
Westerville Endocrinology Clinic Visits: 2,136
Lima Endocrinology Clinic Visits: 61
Prader-Willi Clinic Visits: 108



Gastroenterology, Hepatology and Nutrition

Stress Increases Systemic Inflammation and Anxiety in Mouse Model of IBD

In a new study, researchers at Nationwide Children’s Hospital and the Abigail Wexner Research Institute tested whether exposure to stress would lead to flares of intestinal inflammation in a mouse model of inflammatory bowel disease (IBD). They found stress did not exacerbate colitis in the mice, though it did increase anxiety-like behavior.

The new study had two goals: testing whether stressor exposure could induce a relapse in inflammation and determining the impact of stress on anxiety-like behavior. The researchers used mouse models with chemically induced IBD and exposed the mice to a social disruption stressor while they were recovering from colitis.

Ross Maltz, MD, a pediatric gastroenterologist at Nationwide Children’s and the study’s lead author, says the team next examined different tissues for levels of cytokines, such as interleukin 17A (IL-17A).

“We clearly showed that stressor exposure increases IL-17A in the brain, as well as in the blood and in the lymph nodes,” he says.

According to Michael Bailey, PhD, a principal investigator at the Abigail Wexner Research Institute at Nationwide Children’s and senior author of the study, the data suggest there is an immune dysregulation in the intestine, but it’s not necessarily increased inflammation.

“There may actually be some components of protective immunity that are decreased,” he says. “Overall, it looks like exposure to stress causes a dysregulation in the immune response in the intestine, which is related to increased inflammation in the intestinal lymph nodes and blood. These inflammatory responses are in turn related to inflammation in the brain and anxiety-like behavior.”

In addition to doing similar studies in other mouse models of IBD, the researchers hope to work out some of the mechanisms involved in the inflammatory response to stress.

“Our next step will be to determine whether that decrease in protective immunity in the intestine allows some intestinal bacteria to cross the intestinal barrier,” says Dr. Bailey. “Based on studies in animals without IBD, we believe that bacteria crossing the intestinal barrier leads to inflammation inside the body, including the brain, that then contributes to anxiety. Identifying these mechanisms would allow us to begin developing therapies to target intestinal bacteria to treat anxiety and depression in individuals with chronic diseases.”

REFERENCE:
Maltz RM, Marte-Ortiz P, Rajasekera TA, Loman BR, Gur TL, Bailey MT. Stressor-induced increases in circulating, but not colonic, cytokines are related to anxiety-like behavior and hippocampal inflammation in a murine colitis model. *International Journal of Molecular Sciences*. 2022;23(4):2000.



“We clearly showed that stressor exposure increases IL-17A in the brain, as well as in the blood and in the lymph nodes.”
– Ross Maltz, MD

Department of Pediatrics

GASTROENTEROLOGY, HEPATOLOGY AND NUTRITION

Consistently ranked as a top digestive disorders program by U.S. News & World Report, the Division of Gastroenterology, Hepatology and Nutrition at Nationwide Children’s Hospital provides comprehensive care for a broad range of gastrointestinal, liver, pancreatic and nutritional problems. The division strives for excellence in research, teaching and clinical care, and maintains a team of physician-scientists committed to the creation of new knowledge in the discipline. Our physicians work with pediatric nurse practitioners to diagnose and treat gastrointestinal, pancreatic and liver disorders while collaborating with other specialists, such as dietitians, behavioral and developmental psychologists, and surgeons to provide comprehensive, coordinated care for each child.

Faculty



Carlo Di Lorenzo, MD
Division Chief



Brendan M. Boyle, MD, MPH
Section Chief



Cheryl E. Gariepy, MD
Associate Division Chief for Research

Brandon Arnold, DO
Neetu Puri Bali, MD, MPH
Steve L. Ciciora, MD
Molly C. Dienhart, MD
Jennifer L. Dotson, MD, MPH
Tracy R. Ediger, MD, PhD
Steven H. Erdman, MD
Colleen Flahive, MD
A. Jay Freeman, MD
Jonathan M. Gisser, MD

Monique Goldschmidt, MD
Praveen Goday, MD
Muhammad Khan, MD
Jennifer Lee, MD
Peter Lu, MD
Ross Maltz, MD
Ethan Mezoff, MD
Hilary Michel, MD
Carol J. Potter, MD

John M. Russo, MD
Ala K. Shaikhkhalil, MD
Karla K. Vaz, MD
Rajitha Venkatesh, MD
Alex Weymann, MD
Kent C. Williams, MD
Frederick W. Woodley, PhD
Desale Yacob, MD

2021 – 2022 Fellows
Pediatric Gastronenterology
Madelyn Cohen, DO
Peter Farmer, MD
Matt Grisham, MD
Kathryn Hawa, DO
Janice Khoo, MD
Samantha Paglinco, DO

Patrick Rowland, MD
Raul Sanchez, MD
Garrett Sprague, MD

GI Motility
Shivani Gupta, DO

Highlights From the Past Year

The Division of Gastroenterology, Hepatology and Nutrition at Nationwide Children’s Hospital is consistently ranked among the top programs in the country by U.S. News & World Report. The division provides comprehensive care through multidisciplinary clinics and services for children from all over the world, and is nationally recognized for expertise in multiple specialized programs:

- Motility Center: A national leader in caring for children with neuro-gastrointestinal and functional disorders. Team members include Carlo Di Lorenzo, MD, division chief of Gastroenterology; Desale Yacob, MD, medical director; and Karla Vaz, MD, Neetu Puri Bali, MD, Peter Lu, MD, and Ashley Kroon Van Diest, PhD.
- Center for Colorectal and Pelvic Reconstruction: This renowned center works in partnership with the Motility Center to provide advanced comprehensive medical and surgical services for children with complex motility disorders.
- Inflammatory Bowel Disease Center: A national leader in providing state-of-the-art care for children with Crohn’s disease and ulcerative colitis. Co-directors of the inflammatory bowel disease (IBD) service are Brendan Boyle, MD, and Jennifer Dotson, MD, working together with Ross Maltz, MD, and Hilary Michel, MD. The IBD Center has one of the highest steroid-free remission rates in the country and works closely with the pediatric surgeons to provide comprehensive care for children with severe IBD.
- Intestinal Rehabilitation Service: Under the leadership of Molly Dienhart, MD, and Ethan Mezoff, MD, the team follows a large cohort of children with intestinal failure and has some of the best outcomes in the country for care of children with short bowel syndrome.
- Celiac Disease Center: Under the leadership of Tracy Ediger, MD, PhD, medical director, the center is nationally recognized for promotion of more standardized care for children with celiac disease to improve long-term outcomes.
- Intestinal Polyposis Service: Led by Steven Erdman, MD and Colleen Flahive, MD the service works closely with geneticists to provide comprehensive care and counseling for children and families with polyposis syndromes.
- Eosinophilic Esophagitis Clinic: Team members include John Russo, MD, Rajitha Venkatesh, MD, and Elizabeth Erwin, MD. The service provides both gastrointestinal and allergy expertise in the long-term management of children with eosinophilic esophagitis.
- Pancreas and Liver Care Center: Under the medical leadership of hepatologists Alex Weymann, MD, and Monique Goldschmidt, MD, and pancreatologists A. Jay Freeman, MD, and Cheryl Gariepy, MD, and the surgical leadership of Jaimie D. Nathan, MD, the center provides comprehensive multidisciplinary care to children with routine and complex liver and pancreas conditions. The center offers leading-edge liver transplant capabilities, including all technical variant grafts, as well as advanced portal hypertension operations. Designated by the National Pancreas Foundation as an Academic and Clinical Center of Excellence, the center is one of the few pediatric programs in the nation that offers total pancreatectomy with islet autotransplantation (TPIAT). Additionally, Balamurugan N. Appakalai, PhD, an international pioneer in pancreatic islet cell processing and transplantation, joined the team in 2021 and directs the Islet Cell Isolation Program.
- Interventional and Diagnostic Endoscopy: In 2022, the GI Division welcomed Muhammad A. Khan, MD, MPH, FASGE, a pediatric interventional endoscopist with special focus in endoscopic retrograde cholangiopancreatography (ERCP) and endoscopic ultrasound (EUS) in the diagnostic evaluation and therapeutic management of chronic pancreatitis, peri-pancreatic fluid collections and other hepatopancreatobiliary disorders.
- Gastrointestinal Autism Clinic: Led by Kent Williams, MD, a nationally renowned expert on children with autism and gastrointestinal problems, this clinic provides comprehensive care for diagnosis and management of GI disorders in this specialized group of children.
- NICU cholestasis service: Under the leadership of Carol Potter, MD, this unique service provides specialized, individualized, long-term care to hospitalized infants with liver disease.
- Multidisciplinary clinics: Members of the GI Division work closely with other medical and surgical subspecialists to provide comprehensive care in dedicated clinics for children with complex medical problems including aerodigestive disorders (Karla

Vaz, MD), cystic fibrosis, congenital heart disease and bone disease (Ala Shaikhkhalil, MD, who has specialized expertise in both GI and nutrition), muscular dystrophy (Kent Williams, MD), feeding disorders and the complex care clinic (Neetu Puri Bali, MD, MPH).

- Outreach clinics: In addition to seeing children with GI disorders at Nationwide Children’s, our faculty see patients at satellite clinics locally (in Dublin and Westerville) and at regional outreach sites in Mansfield (Jonathan Gisser, MD, and Brandon Arnold, DO), Lima (Steve Ciciora, MD, and Tracy Ediger, MD, PhD) and Chillicothe (Carlo Di Lorenzo, MD, Desale Yacob, MD, Peter Lu, MD, and Ross Maltz, MD).

Selected Publications

Baaleman D, Vriesman M, Koppen I, Osborne K, Benninga M, Saps M, Yacob D, Lu P, Woodley F, Di Lorenzo C. Hypnosis to reduce distress in children undergoing anorectal manometry: A randomized controlled pilot trial. *Journal of Neurogastroenterology and Motility.* 2022 Apr;28:312-319.

Flahive C, Onwuka A, Bass L, MacFarland S, Minneci P, Erdman S. Characterizing pediatric familial adenomatous polyposis patients undergoing colectomy in the United States. *The Journal of Pediatrics.* 2022 Jun;245:117-122.

Gariepy C, Ooi C, Maqbool A, Ellery K. Demographics and risk factors for pediatric recurrent acute pancreatitis. *Current Opinion in Gastroenterology.* 2021 Sep;37(5):491-497.

Lee J, Di Tosto G, McAlearney F, Miller S, Mezoﬀ E, Venkatesh R, Huang J, Lightdale J, Volney J, McAlearney A. Physician perspectives about telemedicine: considering the usability of telemedicine in response to coronavirus disease 2019. *Journal of Pediatric Gastroenterology and Nutrition.* 2021 Jul;73 (1): 42-47.

Maltz R, Marte-Ortiz P, Rajasekera T, Loman B, Gur T, Bailey M. Stressor-induced increases in circulating, but no colonic, cytokines are related to anxiety-like behavior and hippocampal inflammation in a murine colitis model. *International Journal of Molecular Sciences.* 2022 Feb; 23(4):2000.

Mezoﬀ E, Roberts E, Ernst D, Gniadek M, Beauseau W, Balint J, Ardura M, Dienhart M. Elimination of hospital-acquired central line-associated bloodstream infection on a mixed-service unit. *Journal of Parenteral and Enteral Nutrition.* 2022 Mar;46(3):608-617.

Morris G, McNicol M, Boyle B, Donegan A, Dotson J, Michel H, Maltz R. Increasing biosimilar utilization at a pediatric inflammatory bowel disease center and associated cost savings: Show me the money. *Inflammatory Bowel Diseases.* 2022 Mar;28(4):531-538.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

\$203,,685

Fast Facts: July 2021 – June 2022

Inpatient Discharges: 731

Observation and Outpatient-in-a-Bed Discharges: 344

Total Discharges: 1,075

Average Length of Stay*: 6.0

Average Daily Census*: 12.1

Patient Days*: 4,417

Total Surgical Procedures 3,142

*Excludes observation and outpatient-in-a-bed patients

Gastroenterology Clinic Visits (Main Campus): 15,755

Chillicothe Gastroenterology Clinic Visits: 361

Dublin Gastroenterology Clinic Visits: 1,479

Lima Gastroenterology Clinic Visits: 425

Mansfield Gastroenterology Clinic Visits: 559

Westerville Gastroenterology Clinic Visits: 1,623

GI Allergy Clinic Visits: 185

Total GI Clinic Visits: 20,387



Department of Pediatrics

GENETIC AND GENOMIC MEDICINE

The mission of the Division of Genetic and Genomic Medicine at Nationwide Children’s Hospital is to deliver compassionate, family-centered care via genetic/genomic diagnostic and therapeutic services while providing counseling, education, research and advocacy to improve the lives of individuals with genetic conditions. We treat inborn errors of metabolism and genetic conditions across the ages, from preconception and prenatal through childhood and well into adulthood. Clinical services are supported partly by the Ohio Department of Health as a Regional Genetics Center of the state of Ohio, Region IV. Research partners include the Steve and Cindy Rasmussen Institute for Genomic Medicine, and the Center for Gene Therapy and Center for Cardiovascular Research in the Abigail Wexner Research Institute at Nationwide Children’s Hospital.

Faculty



Kim L. McBride, MD, MS
Division Chief



Kandamurugu (Murugu)
Manickam, MD, MPH
Section Chief

Dennis W. Bartholomew, MD
Bimal Chaudhari, MD, MPH
Scott E. Hickey, MD
Stephen G. Kaler, MD
Mari Mori, MD
Britton D. Rink, MD
Kristin Truxal, MD

2021 – 2022 Fellows & Residents

Medical Genetics Residents

Hannah Hughes, MD PGY2
Daniel Nolan, MD, PhD PGY4
Brandon Stone, MD PGY3
Jacqueline Yurkoski, MD PGY3
Bianca Zapanata, DO PGY4

Medical Biochemical Fellows

William Burns, MD PGY5

We continue to offer high quality education in genetics and genomics. There was a record high five genetic residents and one fellow in our training program. This 2021-2022 academic year we trained our first fellow in Medical Biochemical Genetics. There is a critical need for specialists in this area of genetics in the United States, and we are proud of this new program under the direction of Dr. Mari Mori. Our division was also the sponsor of two students through the Healthy Neighborhoods Healthy Families program.

Our division is active in several research projects. We participate in the Institute of Genomic Medicine Rare Disease Program to identify causes of rare disorders in patients from Nationwide Children’s, ending their diagnostic odyssey. We have active protocols in several clinical trials, including the investigator-led gene transfers for Sanfilippo disease type A and B (principal investigator: Kevin Flanigan, MD) and industry-sponsored programs for phenylketonuria. Three trials are due to launch: enzyme replacement therapy for generalized arterial calcification in infancy (as the national site), enzyme substitution therapy for phenylketonuria and a small molecular study for methylmalonic and propionic acidemias. The division also has several active early access programs for Menkes disease, Barth syndrome, Friedreich ataxia and others. Our group also participates in a number of natural history studies of lysosomal disorders.

Selected Publications

Caceres V, Murray T, Myers C, Parbhoo K. Prenatal genetic testing and screening: A focused review. *Seminars in Pediatric Neurology*. 2022 Apr;42:100976.

Lecerf K, Koboldt D, Kuehn H, Jayaraman V, Lee K, Mihalic Mosher T, Yonkof J, Mori M, Hickey S, Franklin S, Drew J, Akoghlianian S, Sivaraman V, Rosenzweig S, Wilson R, Abraham R. Case report and review of the literature: Immune dysregulation in a large familial cohort due to a novel pathogenic RELA variant. *Rheumatology (Oxford)*. 2022 Apr 12:keac227.

Manickam K, McClain M, Demmer L, Biswas S, Kearney H, Malinowski J, Massingham L, Miller D, Yu T, Hisama F Exome and genome sequencing for pediatric patients with congenital anomalies or intellectual disability: an evidence-based clinical guideline of the American College of Medical Genetics and Genomics (ACMG). *Genetic in Medicine*. 2021 Nov;23(11):2029-2037.

Nolan D, Chaudhari B, Franklin S, Wijeratne S, Pfau R, Mihalic Mosher T, Crist E, McBride K, White P, Wilson R, Hickey S, Koboldt D. Hypomorphic alleles pose challenges in rare disease genomic variant interpretation. *Clinical Genetics*. 2021 Sep;100(6):775-776.



Grants Awarded to Clinical and Research Faculty

JULY 1, 2021 – JUNE 30, 2022
\$1,727,129

Highlights From the Past Year

This last year our division has been recognized for our excellence in the care of individuals and families with genetic disorders. We were named as a coordinated clinic for the care of individuals with Marfan syndrome and other aortopathies by the Marfan Foundation. Our biggest acknowledgement was received from the National Organization of Rare Disorders, which granted us recognition as a Center of Excellence.

Rare disorders remain a focus overall for the division. We continue to participate in the Institute of Genomic Medicine Rare Disease Program to identify causes of rare disorders in patients from Nationwide Children’s Hospital, ending their diagnostic odyssey. We were pleased to participate again in the Rare Disease Day organized by the Division of Rheumatology (February 22, 2022) and are planning to greatly expand the event for 2023. Our interest also reaches nationally with our faculty participating in setting standards and guidelines in the evaluation of individuals with these conditions, including an important statement on the use of exome and genome sequencing (publication highlighted below). We have successfully started a new clinic for therapeutics of genetic disorders including enzyme replacement therapies for a variety of lysosomal storage disorders. Our goal for the coming year is to establish a Rare Disease Clinic to better serve our patients and become a nationally recognized destination for those with a rare disorder.

Fast Facts: July 2021 – June 2022

Inpatient Discharges: 47
Observation and Outpatient-in-a-Bed Discharges: 15
Total Nationwide Children’s Discharges: 62
Average Length of Stay*: 4.1
Average Daily Census*: 0.5
Patient Days*: 192
Inpatient Consults: 281

*Excludes observation and outpatient-in-a-bed patients

Outpatient Visits

Athens Genetics Clinic Visits: 16
Cardiogenetics Clinic Visits: 269
Dublin Genetics Clinic Visits: 224
Genetics (Main Campus) Clinic Visits: 2,578
Lima Genetics Clinic Visits: 37
Marietta Genetics Clinic Visits: 15
Westerville Genetics Clinic Visits: 130
Zanesville Genetics Clinic Visits: 56



Hematology, Oncology & Blood and Marrow Transplant

A Single-Dose Cancer Immunotherapy via Gene Transfer

T cells redirected to cancer cells either via a chimeric antigen receptor (CAR-T) or a bispecific molecule have been game-changers in treating certain leukemias and lymphomas. Even so, there are challenges associated with these treatments; CAR-T cells are expensive and cumbersome to manufacture, while bispecifics require long infusions.

Timothy Cripe, MD, PhD, chief of the Division of Hematology and Oncology at Nationwide Children’s and lead author of the new study, says his group was inspired by the successes the Nationwide Children’s neuromuscular group has had using systemic adeno-associated virus (AAV) gene therapy.

“We thought we could use this technology to express a therapeutic product — not just replace a gene but instruct cells to make a whole new gene,” says Dr. Cripe.

The team designed recombinant AAV vectors to express a therapeutic protein into the bloodstream following a single intravenous injection. They tested the gene therapy in mice expressing human immune cells, finding it could attack malignant B cells in several ways.

In addition to requiring only one dose, this therapy also enables sustained pressure on the target cancer cells, resulting in therapeutic expression for more than one year. Indeed, Dr. Cripe points out that in the mice, tumors shrank slowly, generally over weeks to months.

“This finding illustrates the necessity of consistent, long-term expression of cancer therapy in order to chip away at the tumor and continue to put pressure on the tumor cells and not let it grow back,” he says.

After confirming that the gene therapy did not cause adverse effects in the mice, Dr. Cripe and his colleagues devised a switch that would turn the therapy on or off on-demand. Dr. Cripe says this kind of technology might be more appropriate for relapsing diseases, such as rheumatological disorders, where short-term or intermittent therapy is preferable.

Dr. Cripe, who is also a professor of pediatrics at The Ohio State University College of Medicine, says his team is currently exploring their gene therapy approach in a wider range of cancers.

“We are starting to work on developing a whole pipeline of parallel kinds of gene therapies that will produce other therapeutics that would go after different kinds of cancers,” he says.

With help from Vironexis, a company that Dr. Cripe cofounded, the researchers are hoping to launch a clinical trial of the gene therapy by the end of next year.

REFERENCE:

Cripe TP, Hutzen B, Currier MA, Chen CY, Glaspell AM, Sullivan GC, Hurley JM, Deighen MR, Venkataramany AS, Mo X, Stanek JR, Miller AR, Wijeratne S, Magrini VJ, Mardis ER, Mendell JR, Chandler DS, Wang PY. Leveraging gene therapy to achieve long-term continuous or controllable expression of biotherapeutics. *Science Advances*. 2022 Jul 15;8(28):eabm1890.



“We are starting to work on developing a whole pipeline of parallel kinds of gene therapies that would go after different kinds of cancers.”

– Timothy Cripe, MD, PhD

Department of Pediatrics

HEMATOLOGY, ONCOLOGY & BLOOD AND MARROW TRANSPLANT

The Division of Hematology, Oncology & Blood and Marrow Transplant at Nationwide Children’s Hospital treats patients with any one of a full array of blood diseases, cancers, immunodeficiency disorders, bone marrow failure syndromes and inherited metabolic storage diseases. Our clinical team oversees the comprehensive evaluation, multidisciplinary diagnosis, treatment and long-term management of children, adolescents and young adults with blood diseases and cancer, as well as other diseases treated by cellular therapies or apheresis.

In addition to clinical care, through our integrated programs within the Abigail Wexner Research Institute’s Center for Childhood Cancer Research, the Steve and Cindy Rasmussen Institute for Genomic Medicine, the Blood Diseases Research Affinity Group and the Biopathology Center, we seek to transform the way patients with cancer and blood diseases are cared for by fully integrating research, cutting-edge therapies and multidisciplinary teams.

Faculty



Timothy P. Cripe, MD, PhD, FAAP
Division Chief



Randal S. Olshefski, MD
Section Chief

Rolla F. Abu-Arja, MD

Anthony N. Audino, MD

Jeffery J. Auletta, MD

Rajinder P. Bajwa, MD, MBBS

Nabanita Bhunia, MD

Susan I. Colace, MD

Susan E. Creary, MD

Amy L. Dunn, MD

Maryam Fouladi, MD, MSc, FRCP

Molly Gardner, PhD

Cynthia A. Gerhardt, PhD

Terri L. Guinipero, MD

Jennifer Hansen-Moore, PhD

Amanda Jacobson-Kelly, MD

Bryce A. Kerlin, MD

Margot Lazow, MD

Dean Lee, MD, PhD	Suzanne M. Reed, MD	Keri A. Streby, MD	2021 – 2022 Fellows FIRST YEAR Amanda Campbell, MD Megan Scruggs, MD
Kathleen L. Lemanek, PhD	Ryan D. Roberts, MD, PhD	Kathryn Vannatta, PhD	
Steve Lessnick, MD, PhD	Melissa J. Rose, DO	Anthony D. Villella, MD	
Erin Meyer, DO, MPH	Claire Russell, PhD	Andrea Wojtowicz, PhD	
Sarah H. O’Brien, MD, MS	Ralph Salloum, MD	Nicholas D. Yeager, MD	
Veronika Polishchuk, MD	Amanda Sankar, MD	Tammi K. Young-Saleme, PhD	
Mark A. Ranalli, MD	Bhuvana A. Setty, MD		
Hemalatha G. Rangarajan, MD	Nilay D. Shah, MD		

SECOND YEAR	THIRD YEAR	FOURTH YEAR (BMT)	FOURTH YEAR (SARCOMA)
Natasha Bala, MD	Eman Abdelghani, MD	Ashleigh Kussman, MD	Mallery Olsen, MD
Andrew Picca, DO	Nicole Kendel, MD	FOURTH YEAR (NEURO-ONCOLOGY)	
James Reinecke, MD, PhD	Laura Tyrrell, MD	Rebecca Ronsley, MD	

Highlights From the Past Year

Through research, patient care and psychosocial support, the Division of Hematology, Oncology & Blood and Marrow Transplant provides the best possible outcomes for our patients, families and care teams. We’ve consistently been ranked in the top programs in the country by U.S. News & World Report. Our discoveries, clinical trials and new treatments offer new solutions for patients and families, not only at Nationwide Children’s Hospital but around the world.

In April 2022, the division launched a national effort in collaboration with the National Cancer Institute (NCI) and Cancer Oncology Group (COG) aimed to improve diagnosis and treatment of children with solid tumors using molecular analysis. The Molecular Characterization Initiative collects, analyzes, and reports clinical molecular data to support COG-affiliated clinicians to choose the best treatment for each child, regardless of where they are geographically.

Nationwide Children’s Hospital provides two critical aspects of the NCI’s Childhood Cancer Data Initiative (CCDI) Molecular Characterization Initiative: the Biopathology Center, which oversees the COG Biobank and receives, stores and processes samples, and the Steve and Cindy Rasmussen Institute for Genomic Medicine (IGM), which performs the clinical molecular characterization assays. The results, returned to referring physicans, help refine the initial diagnosis, guide treatment decisions and provide rationale for targeted clinical trials for children across the country, and drastically improve both the speed of decision-making for primary providers and future discoveries to treat pediatric solid tumors.

Research and Innovation Accomplishments:

- Launch of Cabo-Main study as part of Nationwide Children’s NEXT Consortium, treating patients with high-risk pediatric solid tumors
- Early Phase Trial Enrollments
 - Launch of Gene Therapy treatment for patients with sickle cell disease
 - Launch of Blood Disease Research Affinity Group
 - Cell Therapy (KarMMa)
- Expanded production of NK cells, offering first in world type of treatment to pediatric patients

Partnership and Growth:

- Molecular characterization initiative partnership with COG and NCI
- Expansion to provide care to the newly opened Nationwide Children’s-Toledo campus: Expanding close to home for patients in Northwest Ohio and Southern Michigan.
- Proton therapy technology: Installation of the world’s most advanced cyclotron into the Proton Therapy Center, built in partnership with The Ohio State Comprehensive Cancer Center – James Cancer Hospital.
- Expanded research: With the launch for Nationwide Children’s fourth building dedicated solely to pediatric research and innovation, Hematology, Oncology, and Blood and Marrow Transplant will have expanded laboratory space and an additional good manufacturing practices (GMP) facility.

Through our clinical and research work, driven by the best and brightest physicians and staff, we vow to remain on the cutting edge of solutions for our patients worldwide.

Center for Childhood Cancer Research: See page 191 for information about the Center for Childhood Cancer in the Abigail Wexner Research Institute at Nationwide Children’s Hospital.

Selected Publications

Lazow MA, Nievelstein MT, Lane A, Bandopadhyay P, DeWire-Schottmiller M, **Fouladi M**, Glod JW, Greiner RJ, Hoffman LM, Hummel TR, Kilburn L, Leary S Minturn JE, Packer R, Ziegler DS, Chaney B, Black K, de Blank P, Leach JL. Volumetric endpoints in diffuse intrinsic pontine glioma: Comparison to cross-sectional measures and outcome correlations in the International DIPG/DMG Registry. *Neuro-Oncology*. 2022 Feb 11;noac037.

Leary SES, Packer RJ, li Y, Billups CA, Smith KS, Jaju A, Heier L, Burger P, Walsh K, Han Y, Embry L, Hadley J, Kumar R, Michalski J, Hwang E, Gajjar, A, Pollack IF, **Fouladi M**, Northcott PA, Olson JM. Efficacy of carboplatin and isotretinoin in children with high-risk medulloblastoma: A randomized clinical trial from the Children’s Oncology Group. *JAMA Oncology*. 2021 Sep 1;7(9):1313-1321.

O’Brien SH, Stanek JR, Witmer, CM, Raffini L. The continued rise of venous thromboembolism across U.S. children’s hospitals. *Pediatrics*. 2022 Mar 1;149(3):e2021054649.

Ozelo MC, Mahlangu J, Pasi KJ, Giermasz A, Leavitt AD, Laffan M, Symington E, Quon DV, Wang JD, Peerlinck K, Pipe SW, Madan B, Key NS, Pierce GF, O’Mahony B, Kaczmarek R, Henshaw J, Lawal A, Jayaram K, Huang M, Yang X, Wong WY, Kim B, GENE8-1 Trial Group (**Dunn A, collaborator**) Valoctocogene roxaparvovec gene therapy for hemophilia A. *New England Journal of Medicine*. 2022 Mar 17 386(11):1013-1025.

Rangarajan HG, Pereira MSF, Brazauskas R, St Martin A, **Kussman A**, Elmas E, Verneris MR, Gadalla SM, Marsh SGE, Paczesny S, Spellman SR, Lee SJ, **Lee DA**. Donor Killer Immunoglobulin Receptor Gene Content and Ligand Matching and Outcomes of Pediatric Patients with Juvenile Myelomonocytic Leukemia Following Unrelated Donor Transplantation. *Transplantation and Cellular Therapy*. 2021 Nov;27(11):926.e1-926.e10.

Rodriguez V, Stanek JR, Kerlin BA, Dunn AL. Andexanet alfa versus prothrombin complex concentrates/blood products as apixaban/rivaroxaban reversal agents: a survey among pediatric hematologists. *Clinical and Applied Thrombosis-Hemostasis*. 2022 Jan-Dec;28: 1076029622107884.

Skeens M, Guttoo P, **Stanek JR, Taylor K, Stratz E,** Ardura M, **Rangarajan HG.** An exploration of COVID-19 impact and vaccine hesitancy in parents of pediatric hematopoietic stem cell transplant (HCT) recipients. *Bone Marrow Transplantation*. 2022 Apr;57(4):547-553.



Grants Awarded to Center and Division
Clinical and Research Faculty

JULY 1, 2021 – JUNE 30, 2022

\$14,012,416

Fast Facts: July 2021 – June 2022

Inpatient Discharges: 1,343

Observation and Outpatient-in-a-Bed Discharges: 268

Total Discharges: 1,611

Patient Days*: 10,051

Average Length of Stay*: 7.5

Average Daily Census*: 27.5

Inpatient Consults: 628

Total Surgical Procedures: 787

BMT Transplants: 67

Apheresis and Photopheresis Procedures: 930

*Excludes observation and outpatient-in-a-bed patients

Anticoagulation Clinic Visits: 146

BMT Clinic Visits: 4,883

Chillicothe Hematology/Oncology Clinic Visits: 34

Dublin Hematology Clinic Visits: 114

East Broad Sickle Cell Clinic Visits: 125

Main Campus Hematology/Oncology Clinic Visits: 9,132

Mansfield Hematology/Oncology Clinic Visits: 14

Portsmouth Hematology/Oncology Clinic Visits: 13

Surgical Oncology Clinic Visits: 115

Zanesville Hematology/Oncology Clinic Visits: 20

Department of Pediatrics

HOSPITAL PEDIATRICS AND ADULT HOSPITAL MEDICINE

The Section of Hospital Pediatrics at Nationwide Children’s Hospital, which also includes newborn and adult hospital medicine, is home to a talented group of physicians who specialize in the care of hospitalized newborns, children, adolescents and adults. The section supports Nationwide Children’s commitment to providing the highest-quality care to all children and their families regardless of ability to pay, and specifically aims to set the standard in the provision of high-value, quality inpatient care, the intentional and thoughtful education of future generations of doctors, and the production of useful and influential clinical, educational and quality-improvement research.

Faculty



Ryan S. Bode, MD, MBOE
Chief

Seth Agyeman-Berko, PA

Sean Ankrom, MD

Kristin Balmert, PA

Joshua D. Black, MD

Jessica Bockenstedt, MD

Carrie Cacioppo, MD

Sharon Clark, MD

Megan Coe, MD

Sofia Davila, MD

Ana Delerme, MD

Vignesh Doraiswamy, MD

Samuel W. Dudley, MD

Christian Earl, MD

Matthew Emery, MD

Lauren Finnegan, NP

Emily Graham, MD

Kelly Grannan, MD

Rakhi Gupta-Basuray, MD

Cara Harasaki, MD

Allison C. Heacock, MD

Samantha Herrmann, PA-S, MS

Kelsey Jackson, MD

Shawn Jacquemin, MD

Rena Kasick, MD

Jillian S. Kunar, DO

Kristina Lehman, MD

Kristen S. Lewis, MD

Nancy N. Liao, MD

Beth W. Liston, MD, PhD

Jamie R. Macklin, MD

Sarah Marzec, MD, MA

Daniel J. McFarlane, MD

Gerd B. McGwire, MD, PhD

Lucas V. McKnight, MD

Christy Mulligan, MD

Kendall Murphy, NP

Mohammed Najjar, MD

Alana Painter, MD

Michael Perry, MD

Laura Plachta, MD

Charles R. Redman, MD

Allison Rossetti, MD

Christine A. Schmerge, MD

Shauna Schord, MD

Eric R. Schumacher, DO, MBA

Claire Sevov, MD

Catherine C. Sinclair, MD

Melissa L. Skaug, MD

Whitney Smith, NP

Isaac Spears, MD

Anuja Sriparameswaran, MD

Mary Stone, MD

Matthew Suer, MD

Devon Swick, DO

Kimberly M. Tartaglia, MD

Keith Torrey, MD

Melissa Tullock, DO

Maria Widmann, MD

2021 – 2022 Fellows

Karen Allen, MD

Ashleigh Slemmer, DO

Kathryn Westphal, MD

Highlights From the Past Year

The Section of Hospital Pediatrics and Adult Hospital Medicine provides inpatient care across the continuum to patients and families at Nationwide Children’s. Newborn hospitalists manage full-term and late preterm newborns and the associated common conditions, including hyperbilirubinemia, feeding and nutrition, infections, neonatal abstinence syndrome, and newborn screening and anticipatory guidance. Pediatric hospitalists provide inpatient care for common pediatric illnesses such as bronchiolitis, asthma and failure to thrive, as well as undifferentiated and/or multisystem diseases, coordinating and facilitating care, and ensuring a safe transition back to primary care providers. In addition, in conjunction with the Section of Child Psychiatry, hospitalists work collaboratively in the Big Lots Behavioral Health Pavilion to provide holistic medical care for children and adolescents facing acute mental health crises. Internal medicine-trained adult hospitalists serve as consultants for adult patients with congenital and childhood-onset chronic illnesses admitted to Nationwide Children’s.

After COVID-19 pandemic related inpatient volume decreases in 2020, hospital volumes and our Hospital Pediatric patient days and discharges returned to similar numbers as 2019. Like other industries and divisions, we have been challenged with maintaining consistent staffing with impacts of the virus on our faculty. Our team has continued to show incredible teamwork, flexibility and resilience as we ensure safe and consistent staffing across our multiple service lines. Despite these ongoing challenges, our team has continued to thrive in our educational, safety, quality improvement (QI) and research programs. We continued to provide top-quality education, with largely a return to in person educational sessions but also augmented by virtual teaching as we adopted during the pandemic. Our Pediatric Hospital Medicine Fellowship Program graduated our third fellow in June, and we successfully expanded to two fellows per year after matching our top highly talented candidates. We were also able to retain our most recent fellowship graduate as our newest faculty member. Our important QI and research work continued to expand including multiple multi-institutional grant funded research projects. Publications and national presentations again increased compared to the prior year.

The section is involved in a multitude of patient safety, quality improvement and research initiatives with demonstrated outcomes that include:

- Patient Centered Outcomes Research Institute (PCORI) funded grant investigating the safety and efficiency of hospital direct admissions versus emergency department admissions
- Diversity, equity and inclusion focused projects including contraceptive counseling and intervention to at-risk hospitalized adolescents and ensuring hospital orientation in a family’s primary language
- Clinical pathway development and implementation using evidence-based practice leading to standardized care and improved patient outcomes
- Enhanced patient safety, including 24/7 in-house attending coverage and the innovative Safety Officer and Watchstander Program, which has led to a significant decrease in unrecognized clinical deterioration on the floor, ICU transfers and patient mortality

We are dedicated and committed to the education of future pediatricians with an emphasis on excellence in clinical teaching for both medical students and family practice and pediatric residents. Faculty serve as important mentors for these learners in their educational, clinical, research and professional development. Our faculty continue to be recognized on an annual basis with prestigious teaching awards, consistently evaluated and ranked as one of the top two inpatient rotations by the pediatric residents.

Selected Publications

Hoff M, Liao N, Mosquera C, Saucedo A, Wallihan R, Walton J, Scherzer R, Bonachea E, Wise L, Thomas O, Mahan J, Barnard J, Bignall R. An initiative to increase residency program diversity. *Pediatrics*. 2022 Jan; 149 (1): e2021050964. 10.1542/peds.2021-050964.

Leyenaar J, Freyleue S, Bordogna A, Wong C, Penwill N, Bode R. Frequency and duration of boarding for pediatric mental health conditions at acute care hospitals in the US. *Journal of the American Medical Association*. 2021 Dec;326(22):2326–2328.

Marsh M, Reed S, Mahan J, Schneider L, Fernandes A, Liao N, Spears I, Lauden S. Advanced multimodal communication curriculum for pediatric residents. *Journal of Medical Education and Curricular Development*. 2021 Oct 4;8:23821205211035239.

Westphal K, Gupta Basuray G, Keesari R, Jackson K, Reber K, Cacioppo C, Splinter A, Bode R. Neonatal utilization of acute care services during the COVID-19 pandemic. *Hospital Pediatrics*. 2022 May 4:e2021006397.

Yun K, Wallihan R, Desai A, Alter S, Ambroggio L, Cohen D, El-Assal O, Marzec S, Florin T, Keaton M, Shah S, Ruddy R, Sharpe S, Leber A, Everhart K, Mejias A, Ramilo O; Children’s hospitals initiative for research in pneumonia. Clinical characteristics and etiology of community-acquired pneumonia in US Children, 2015-2018. *Pediatric Infectious Disease Journal*. 2022 May 1;41(5):381-387.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022
\$717,152

Fast Facts: July 2021 – June 2022

- Inpatient Discharges: 4,247
 - Observation Discharges: 2,830
 - Total Discharges: 7,077
 - Average Length of Stay*: 2.8
 - Average Daily Census*: 33.0
 - Patient Days*: 12,059
 - Complex Healthcare Clinic Visits: 3,978
- *Excludes observation and outpatient-in-a-bed patients*



Infectious Diseases

Risk for Serious Complications From Vaccine-Preventable Infections After Hematopoietic Cell Transplant

When a hematopoietic cell transplant (HCT) recipient at Nationwide Children's Hospital was diagnosed with a vaccine-preventable infection (VPI), treating clinicians decided to evaluate the burden of VPI in HCT patients at Nationwide Children's and elsewhere. The team collected post-HCT VPI data on more than 9,500 children across the United States.

Their study, published in *Bone Marrow Transplantation*, revealed that 7.1% of children who underwent HCT were hospitalized for a VPI in the five years following their transplant, most frequently in the first six to 12 months after transplant.

The most common infections were influenza, varicella and invasive pneumococcal infections. Younger patients and those with primary immune deficiency or graft-vs-host disease were at greater risk. Children with VPI also had longer hospital stays, a higher rate of intensive care unit admission and higher mortality in the early post-HCT period compared to children post-HCT without VPIs.

There are many reasons for VPI in this population. Some children may not have been vaccinated pre-HCT, while those who have been vaccinated can face a loss of vaccine-induced immunity or ongoing immunosuppression after transplant.

"If a VPI leads you to be hospitalized, that's a big deal," says **Monica Ardura, DO, MSCS**, an infectious disease specialist and medical director of the Host Defense Program at Nationwide Children's. "These data provide objective evidence that VPIs do indeed happen and can be associated with adverse outcomes in this population. The next question is, what can we do better to protect our patients?"

Dr. Ardura and her colleagues have begun examining immune responses to inactivated vaccines in HCT patients to find the ideal timing for post-transplant vaccination, enable individualized recommendations and help clinicians safely recommend each vaccine for their patients.

Because of the heightened risk for VPIs in the first six to 12 months, the team at Nationwide Children's created a quality improvement initiative to provide inactivated vaccines beginning at four to six months post-HCT in eligible patients and optimize timely completion of age-appropriate vaccines. Depending on patient health and medications received, live-attenuated viral vaccines can be provided at two years post-transplant.

"These patients have gone through a lot. They have a complicated medical history, and after transplant there can be a lot of different complications — we don't want VPIs to be one of them," says Dr. Ardura. "Sometimes vaccines are an afterthought. We want to bring them more to the forefront as something clinicians should think about in every medical encounter."

REFERENCE:

Danino D, Stanek JR, Rangarajan H, Ardura MI. Hospitalizations for vaccine-preventable infections among pediatric hematopoietic cell transplantation recipients in the first 5 years after transplantation. *Bone Marrow Transplantation*. 2021 Nov;56(11):2656-2663.



"If a vaccine-preventable infection leads you to be hospitalized, that's a big deal."

– Monica Ardura, DO, MSCS

Department of Pediatrics

INFECTIOUS DISEASES

The specialists in the Division of Infectious Diseases at Nationwide Children’s Hospital provide expertise in the diagnosis and management of children with all types of acute and chronic infections in both immune-competent and immune compromised children. Our physicians provide direct care for patients admitted to the Nationwide Children’s Infectious Diseases Unit and clinical consultation for patients with complicated infectious diseases throughout the hospital, in close partnership with their primary care teams. We have developed close clinical and research collaborations with physicians in Hematology, Oncology & Blood and Marrow Transplant; Pediatric Critical Care; Cardiology, Lung, Heart and Liver Transplantation; Neonatology and the various surgical departments in order to optimize the infectious diseases-related care of patients. Patients are also evaluated in the ambulatory setting following referral to the Infectious Diseases, Tuberculosis, Neonatal Infectious Disease, Host Defense, Kawasaki Disease, Travel Medicine, Hepatitis C, and the Family AIDS Clinic Education Services (FACES) clinics located on the Nationwide Children’s main campus. Additionally, our division offers consultation to external providers and their patients through the Nationwide Children’s Hospital Physician Consult and Transfer Center. Research is conducted through the division and in collaboration with our colleagues from the Clinical Microbiology Laboratory, the Center for Microbial Pathogenesis, the Center for Vaccines and Immunity and other centers in the Abigail Wexner Research Institute at Nationwide Children’s, as well as national and international collaborators.

Faculty



Octavio Ramilo, MD
Division Chief



William J. Barson, MD, MS
Section Chief

Monica Ardura, DO, MSCS
Jeffrey Auletta, MD
Megan Brundrett, MD
Kevin Cassady, MD
Juan Chaparro, MD
Guliz Erdem, MD
Charitha Gowda, MD, MPH
Katia Halabi, MD

Jonathan R. Honegger, MD
W. Garrett Hunt, MD, MPH, DTM&H
Su Jin Joo, MD
Rachel Martin-Blais, MD, DTM&H
Maria Asuncion Mejias, MD, PhD, MSCS

Christopher Ouellette, MD
Pablo J. Sánchez, MD
Masako Shimamura, MD
Eunkyung Song, MD
Jeanette Taveras, DO
Sanya Thomas, MD
Cristina Tomatis, MD
Rebecca Wallihan, MD
Matthew Washam, MD, MPH
Joshua Watson, MD

Clinical Microbiology
Amy Leber, PhD
Director
Sophonie Jean, PhD
Assistant Director
Huanyu Wang, PhD
Assistant Director

2021 – 2022 Fellows
Kali Broussard, MD
Diego Cruz, MD
Raquel Giacomelli Cao, MD, PhD
Alex Medoro, MD, MS, FAAP
Ana Quintero, MD
Rouba Sayegh, MD

Highlights From the Past Year

The Division of Infectious Diseases continues to offer clinical expertise to patients with complex infections in different settings across the hospital, including the specialized Infectious Diseases inpatient unit, the Infectious Diseases consult services (General ID and Host Defense), and in a number of specialized outpatient clinics (General ID, Host Defense, HIV, Hepatitis C, Neonatal Infectious Disease, Tuberculosis, Travel Medicine, and Kawasaki Disease).

Nationwide Children’s Hospital’s population of immunocompromised children continues to grow both in numbers and complexity. In order to optimize the care of these children, we divided and expanded the consult service into two different services: General ID Consult Service and ID Host Defense Service. The latter is under the direction of Dr. Monica Ardura and her colleagues Drs. Eunkyung Song, Sanya Thomas, Christopher Ouellette and Jeff Auletta who have interest and expertise in this area.

The COVID-19 pandemic brought challenges to our program in 2020-2021. However, these challenges presented opportunities to improve patient care. We developed outpatient COVID-19 and multisystem inflammatory syndrome in children (MIS-C) clinics so that these patients could be followed in an outpatient setting that facilitated their follow-up care and participation in research. This effort has proven to be a very successful model that will assist the growth of our infectious diseases clinical research operation.

We maintain our strong research collaborations with colleagues in the Center for Microbial Pathogenesis and the Center for Vaccines and Immunity in the Abigail Wexner Research Institute at Nationwide Children’s, as well as the Clinical Microbiology Laboratory.

We continue clinical translational research programs dealing with: hepatitis (Jonathan Honegger, MD; Chris Walker, PhD; Charitha Gowda, MD), adenovirus (Amy Leber, PhD; Eunkyung Song, MD), cytomegalovirus (Pablo Sánchez, MD; Asuncion Mejias, MD; Masako Shimamura, MD), pneumococcus (William Barson, MD; Guliz Erdem, MD), tuberculosis and Global Health (W. Garrett Hunt, MD), respiratory syncytial virus (RSV) vaccine development and SARS CoV-2 infection (Asuncion Mejias, MD; Octavio Ramilo, MD; Mark Peeples, PhD), pediatric pneumonia (Rebecca Wallihan, MD; Octavio Ramilo, MD), and translational and diagnostic/ therapeutic clinical trials aimed to optimize clinical outcomes in immunocompromised hosts (Monica Ardura, MD; Jeffrey Auletta, MD; Christopher Ouellette, MD; Masako Shimamura, MD; Eunkyung Song, MD; and Sanya Thomas, MD).

Research: See page 199 for information about the Center for Microbial Pathogenesis and page 205 for the Center for Vaccines and Immunity in the Abigail Wexner Research Institute at Nationwide Children’s Hospital.

Selected Publications

Boutzoukas A, Freedman D, Koterba C, **Ouellette C**, et al. La crosse virus neuroinvasive disease in children: a contemporary analysis of clinical/neurobehavioral outcomes and predictors of disease severity. *Clinical Infectious Diseases*. 2022 May 24;ciac403.

Brundrett M. Human immunodeficiency virus preexposure prophylaxis in adolescents and young adults. *Pediatrics in Review*. 2022 Jan 1;43(1):28-36.

Danino D, Stanek J, Rangarajan H, **Ardura M**. Hospitalizations for vaccine-preventable infections among pediatric hematopoietic cell transplantation recipients in the first 5 years after transplantation. *Bone Marrow Transplantation*. 2021 Nov;56(11):2656-2663.

Diaz-Diaz A, Bunsow E, Garcia-Maurino C, Moore-Clingenpeel M, Naples J, Juergensen A, Mertz S, **Wang H, Leber A**, Gern J, Hall M, Cohen D, **Ramilo O, Mejias A**. Nasopharyngeal codetection of *Haemophilus influenzae* and *Streptococcus pneumoniae* shapes respiratory syncytial virus disease outcomes in children. *The Journal of Infectious Diseases*. 2022 Mar 2;225(5):912-923.

Ghonime M, Saini U, Kelly M, Roth J, Wang P, Chen C, Miller K, Hernandez-Aguirre I, Kim Y, Mo X, Stanek J, Cripe T, Mardis E, **Cassady K**. Eliciting an immune-mediated antitumor response through oncolytic herpes simplex virus-based shared antigen expression in tumors resistant to viroimmunotherapy. *Journal for ImmunoTherapy of Cancer*. 2021 Oct;9(10):e002939.

Lanata M, Diaz A, Hecht S, Katragkou A, Gallup N, Buckingham D, Tansmore J, Sargel C, **Watson J**, Karsies T. Empiric vancomycin reduction in a pediatric intensive care unit. *Pediatrics*. 2021 Sep;148(3): e2020009142.

Sarmiento Clemente A, Kaplan S, Barson W, Lin P, Romero J, Bradley J, Tan T, Pannaraj P, Givner L, Hultén K. Decrease in pediatric invasive pneumococcal disease during the COVID-19 pandemic. *Journal of the Pediatric Infectious Diseases Society*. 2022 Jun 22:piac056.

Tomatis Souverbielle C, Wang H, Feister J, Campbell J, Ramilo O, Pietropaolo D, Salamon D, Leber A, Erdem G. Year-round, routine testing of multiple body site specimens for human parechovirus in young febrile infants. *The Journal of Pediatrics* 2021 Feb;229:216-222.e2.



**Grants Awarded to All Infectious Diseases
Clinical and Research Faculty**

JULY 1, 2021 – JUNE 30, 2022
\$5,795,647

Fast Facts: July 2021 – June 2022

- Inpatient Discharges: 2,574
- Observation and Outpatient-in-a-Bed Discharges: 922
- Total Discharges: 3,496
- Average Length of Stay*: 2.6
- Average Daily Census*: 19
- Patient Days*: 6,760
- Inpatient Consults: 833
- Immunodeficient Clinic Visits: 1,883
- Infectious Disease Clinic Visits: 1,743
- Tuberculosis Clinic Visits: 572

**Excludes observation and outpatient-in-a-bed patients*





"We wanted to help people understand that even when babies are extremely ill... there is a good possibility they can survive."

– Edward Shepherd, MD

Neonatology

Specialized Treatment for Severe Bronchopulmonary Dysplasia Increases Survival

In a new study, researchers analyzed in-hospital outcomes for preterm infants referred to Nationwide Children's Comprehensive Center with established bronchopulmonary dysplasia (BPD). Despite the severity of illness in these patients, nearly all of them survived to hospital discharge with improvement in comorbidities.

Extremely preterm infants with severe forms of BPD may require ongoing intensive care, including protracted invasive mechanical ventilation. Approximately 10-20 percent of these patients will die before discharge, and those that survive often experience significant neurodevelopmental delays.

The BPD Center at Nationwide Children's is a unique, interdisciplinary program working to reduce complications and mortality from BPD and improve long-term neurodevelopmental outcomes.

Patients referred to the center usually arrive severely ill, and typically well after the diagnosis of BPD is established at 36 weeks corrected gestation.

"Many of these kids come to us after the places that sent them determined nothing more could be done," says **Edward Shepherd, MD**, section chief of Neonatology at Nationwide Children's and one of the study's authors. "The transfer is a last-ditch effort to help kids that they think would not make it otherwise."

This study aimed to determine the baseline illness severity and in-hospital outcomes of infants with established BPD referred to Nationwide Children's BPD program.

Dr. Shepherd and his colleagues report that of the 71 patients in the study, 65 (92%) survived to hospital discharge, despite presenting late and being severely ill on admission. What's more, most survivors were discharged home without the need for positive pressure respiratory support or pulmonary vasodilators.

The researchers attribute the improvements they saw in pulmonary function, pulmonary vascular disease, and growth to targeted respiratory support strategies developed for patients with severe BPD.

"With this study, we wanted to help people understand that even when babies are extremely ill, if you use a thoughtful model of care, there is a good possibility they can survive," says Dr. Shepherd, who is also a professor of clinical pediatrics at The Ohio State University College of Medicine.

"It's not ideal to transport these babies across the country and treat them here for months," he says. "We would love for our center to inspire other places to invest in their ability to care for these babies. I hope this is the beginning of a refinement in how these patients are cared for across the country."

REFERENCE:

Kielt MJ, Logan JW, Backes CH, Reber KM, Nelin LD, Shepherd EG. In-hospital outcomes of late referrals for established bronchopulmonary dysplasia. *Journal of Perinatology*. 2021;41:1972-1982.

Department of Pediatrics

NEONATOLOGY

Nationwide Children’s Hospital is home to one of the largest networks of clinical neonatal care in the United States. The Section of Neonatology at Nationwide Children’s is an integral component of the neonatal program, which includes a full range of family-centered newborn care and innovative clinical and translational research programs, conducted through the Division of Neonatology and in collaboration with the Center for Perinatal Research in the Abigail Wexner Research Institute at Nationwide Children’s.

Faculty



Leif D. Nelin, MD
Division Chief



Sudarshan Jadcherla, MD
Associate Division Chief for
Academics



Edward G. Shepherd, MD
Section Chief



Amy Schlegel, MD
Associate Division Chief



Valencia P. Walker, MD, MPH
Associate Division Chief for
Health Equity and Inclusion



Carl H. Backes, MD
Associate Division Chief for
Clinical Research

Full-Time Nationwide
Children's Faculty

Molly K. Ball, MD
Roopali V. Bapat, MD
Thomas Bartman, MD, PhD
Kristen L. Benninger, MD
Elizabeth M. Bonachea, MD
Bimal Chaudhari, MD
Bernadette Chen, MD
George El-Ferzli, MD
Jana Erner, MD

Omid Fathi, MD
Jennifer Haase, MD
Cecilie Halling, MD
Maria Jebbia, MD
Jason Jackson, DO
Matthew Kielt, MD
Jason Kovalcik, MD
Craig A. Nankervis, MD
Ahmed Osman, MD
Leeann Pavlek, MD
Pablo J. Sánchez, MD

Amy L. Schlegel, MD
Ruth B. Seabrook, MD
Vanessa L. Shanks, MD
Jonathan L. Slaughter, MD, MPH
Michael R. Stenger, MD
Christopher J. Timan, MD
Jennifer K. Trittmann, MD, MPH
Sheria D. Wilson, MD
Community-Based Faculty
Craig W. Anderson, MD
Gary Bixler, MD

Sarah J. Corriveau, MD
Ene Fairchild, MD
Angela Firestine, MD
Joshua H. Goldberg, MD
Barry Halpern, MD
Nancy B. Hansen, MD
Juli Kern, MD
Jeffrey S. Keyes, MD
Michelle Lash, MD
Corin Cozzi Linsey, MD
Wendy A. Luce, MD

Maclain Magee, MD
Benjamin A. McDonald, MD
Randy R. Miller, MD
Avante Milton, MD
Richard Moraille, MD

Apurwa S. Naik, MD
Mitali Pakvasa, MD
Brooke Redmond, MD
Christopher Regan, DO
John H. Seguin, MD

Teresa L. Seto, MD
Michael Shoemaker, MD
Gary E. Snyder, MD
Anthony R. Theile, DO
Youness Tolaymat, MD

Peri Ulema, DO
Allison Vasileff, MD
Natalie O. White, DO
Jonathan R. Wispe, MD

Neonatology Administration

Marissa E. Larouere, MBA, BSN, RN
Vice President Neonatal Services
Lawrence Baylis, MHA
Service Line Administrator
Heather Larson
Business Manager

Neonatal Network Directors

Melissa Hamms, MBA, BSN, RN
Jennifer Thompson, MBA, BSN, RN
Jodi Smathers, RN, MSN
**Director of Neonatal
Advanced Practitioners**
Erin Keels, DNP, APRN, NNP-BC

2021 – 2022 Fellows

Mary Crume, MD
Michael Ratti, MD
Allison Lure, MD
Ashley Wethall, MD
Yvette Chop, MD
Rachel Han, MD

Paulina Krause, MD
Clifford Mueller, MD
Timothy Rogers, MD
Olivia Ruth, MD
Zubin Shah, MD
George Ziegler, MD

Highlights From the Past Year

The Section of Neonatology is dedicated to providing integrated perinatal care and research throughout the patient life cycle to reduce infant mortality and morbidities so that children are able to reach their full potential. To achieve this, the section not only provides outstanding Level III and IV neonatal care, but has also implemented a variety of innovative, unique programs that bring together multidisciplinary groups to provide advanced clinical care and research targeting the most common and most debilitating causes of mortality and morbidity in these babies.

- Comprehensive Center for Bronchopulmonary Dysplasia
 - The only dedicated inpatient unit for the care of infants with bronchopulmonary dysplasia (BPD)
 - Published our outcomes for those patients referred late and found that despite presenting with a high degree of illness severity, nearly all patients survived with improvements in comorbidities by the time of discharge
 - Found that during the COVID-19 pandemic that no in-patient with BPD developed COVID-19 and that other viral infections were dramatically decreased by the infection prevention measures used during the pandemic
- Small Baby Program
 - Dedicated unit for the care of infants born at <27 weeks gestation
 - Disseminated our approach to the small baby, including publications on the development and implementation of the small baby unit demonstrating improved survival, decreased short-term morbidities, and improved long-term neurodevelopmental outcomes
- Infant Feeding Disorders Program
 - Unique program providing physiology-based advanced care and treatment to optimize outcomes for infants with feeding disorders
 - Published findings demonstrating that a comprehensive evaluation and individualized management strategy, including parental engagement in feeding practices resulted in greater feeding success than did provider prescribed feeding modifications based on videofluoroscopic swallow studies alone.
- Congenital Infections Program
 - Unique multidisciplinary inpatient/outpatient program to identify, treat and follow infants born with congenital viral infections

- Published that nafcillin used for empiric treatment of late-onset sepsis in patients without a history of methicillin-resistant *S. aureus* infection or colonization reduced overall vancomycin utilization by 67% without changing the duration of culture positivity, recurrence of same infection within 14 days after discontinuation of antibiotic therapy or mortality
- Fetal Center
 - Neonatologists with expertise in fetal medicine and complex neonatal care provide counseling to families facing a spectrum of fetal diagnoses and collaborate with maternal fetal medicine and pediatric specialists to ensure best outcomes
 - Growth of Nationwide Children’s fetal medicine program with creation of the Fetal Center and the foundational role that neonatologists play within this unique care setting is leading to increased patient visits, improved collaborative care and expanded care options
- Innovative Advanced Fellowships
 - Unique advanced fellowships in infant feeding disorders and in BPD medicine
 - Curriculum includes advanced diagnostics and management of focused problems related to infant feeding disorders and BPD
- Diversity, Equity and Inclusion
 - Procuring and analyzing baseline racial/ethnic disparity data trends for staff and patients
 - Launching clinical initiatives including tobacco exposure mitigation, improving breastfeeding/human milk feeding and increasing family engagement
 - Developing programs to improve effectiveness in recruiting and retaining a diverse and inclusive cadre of trainees, staff, and faculty
 - Identifying bias and disparities in periviable counseling and care
 - Developed a workshop to interrupt microaggressions in the academic health center environment

Perinatal Research: See page 201 for information about the Center for Perinatal Research in the Abigail Wexner Research Institute at Nationwide Children’s.

Selected Publications

Fathi O, Nelin L, Shepherd E, Reber K. Development of a small baby unit to improve outcomes for the extremely premature infant. *Journal of Perinatology*. 2022 Feb;42(2):157-164.

Jadcherla S, Hasenstab K, Osborn E, Levy D, Ipek H, Helmick R, Sultana Z, Logue N, Yildiz V, Blosser H, Shah S, Wei L. Mechanisms and management considerations of parent-chosen feeding approaches to infants with swallowing difficulties: an observational study. *Scientific Reports*. 2021 Oct 7;11(1):19934.

Kielt M, Logan J, Backes C, Reber K, Nelin L, Shepherd E. In-hospital outcomes of late referrals for established bronchopulmonary dysplasia. *Journal of Perinatology*. 2021 Aug;41(8):1972-1982.

Kielt M, Murphy A, Smathers J, Bates M, Nelin L, Shepherd E. In-hospital respiratory viral infections for patients with established BPD in the SARS-CoV-2 era. *Pediatric Pulmonology*. 2022 Jan;57(1):200-208.

Magers J, Prusakov P, Speaks S, Conroy S, Sánchez P. Safety and efficacy of nafcillin for empiric therapy of late-onset sepsis in the NICU. *Pediatrics*. 2022 May 1;149(5):e20210523602.

Pavlek L, Mueller C, Jebbia M, Kielt M, Nelin L, Shepherd E, Reber K, Fathi O. Perspectives on developing and sustaining a small baby program. *Seminars in Perinatology*. 2022 Mar;46(2):151548.

Tucker Edmonds B, Schmidt A, Walker V. Addressing bias and disparities in periviable counseling and care. *Seminars in Perinatology*. 2022 Apr;46(3):151524.

Walker V, Hodges L, Perkins M, Sim M, Harris C. Taking the VITALS to interrupt microaggressions. *MedEdPORTAL*. 2022 Jan 19;18:11202.



Grants Awarded to Neonatology Clinical and Research Faculty

JULY 1, 2021 – JUNE 30, 2022
\$7,255,092

Fast Facts: July 2021 – June 2022

Main Campus

Inpatient Discharges: 1,165
Observation and Outpatient-in-a-Bed Discharges: 6
Total Discharges: 1,171
Average Length of Stay*: 32.8
Average Daily Census*: 104.6
Patient Days*: 38,170
Fetal Medicine Collaborative Clinic Visits: 1,073
Neonatology Clinic Visits: 2,951
Neonatology BPD Clinic Visits: 918

Newborn Intensive Care Unit at Riverside Methodist Hospital

Inpatient Discharges: 618
Observation and Outpatient-in-a-Bed Discharges: 4
Total Discharges: 622
Average Length of Stay*: 23.7
Average Daily Census*: 40.2
Patient Days*: 14,655

Newborn Intensive Care Unit at Grant Medical Center

Inpatient Discharges: 259
Observation and Outpatient-in-a-Bed Discharges: 9
Total Discharges: 268
Average Length of Stay*: 19.0
Average Daily Census*: 13.5
Patient Days*: 4,921

Newborn Intensive Care Unit at Doctor's Hospital West

Inpatient Discharges: 100
Observation and Outpatient-in-a-Bed Discharges: 4
Total Discharges: 104
Average Length of Stay*: 19.0
Average Daily Census*: 5.2
Patient Days*: 1,900

Newborn Special Care Nursery at Dublin Methodist Hospital

Inpatient Discharges: 166
Observation and Outpatient-in-a-Bed Discharges: 0
Total Discharges: 166
Average Length of Stay*: 9.0
Average Daily Census*: 4.1
Patient Days*: 1,489

Newborn Intensive Care Unit at St. Ann’s Hospital

Inpatient Discharges: 271
Observation and Outpatient-in-a-Bed Discharges: 1
Total Discharges: 272
Average Length of Stay*: 19.0
Average Daily Census*: 14.1
Patient Days*: 5,157

Newborn Intensive Care Unit at The Ohio State University Wexner Medical Center

Inpatient Discharges: 661
Observation and Outpatient-in-a-Bed Discharges: 65
Total Discharges: 726
Average Length of Stay*: 17.2
Average Daily Census*: 31.2
Patient Days*: 11,372



“There’s a disconnect between guidelines and what nephrologists think a patient’s care should be.”

– Mahmoud Kallash, MD

Nephrology and Hypertension

What’s the Scope of Nephritis in Pediatric Patients With IgA Vasculitis?

IgA vasculitis (IgAV) is the most common vasculitis in children, usually presenting with typical purpuric rash, abdominal pain and arthritis. Up to half of children have kidney involvement. IgAVN has a heterogeneous presentation among children, and there’s a lack of consensus on how to manage it.

“Like many other kidney diseases, IgAVN has many variables,” says Mahmoud Kallash, MD, a nephrologist in the Section of Nephrology and Hypertension at Nationwide Children’s Hospital. “Current guidelines recommend supportive therapy before initiation of IS agents, while our study showed IS agents are used more commonly. There’s a disconnect between guidelines and what nephrologists think a patient’s care should be.”

To gain a better understanding of how patient presentation and treatment relates with 12-month outcomes, Dr. Kallash and colleagues reviewed records of 128 patients aged <21 years with IgAVN.

IgAVN presentation was variable. Most patients presented with hematuria and proteinuria (64%) with a urine protein/creatinine (UPC) ratio between 0.01-36.4 mg/mg and estimated glomerular filtration rate (eGFR) between 22-181 mL/min/1.73 m². Acute kidney injury (AKI) was observed among 15%, and 6% had nephrotic syndrome.

Treatment for IgAN also varied between steroids, IS agents plus steroid therapy, or angiotensin-converting enzyme inhibitors (ACEi). Anti-metabolite agents were the most common IS agents. Patients receiving supportive care had significantly lower UPC at baseline.

At 12 months, 82 patients had normal UPC with no proteinuria and 102 patients had normal kidney function based on eGFR. Overall, there was no significant difference between treatment groups for proteinuria or kidney function.

“In our study, patients receiving IS agents had more significant disease than patients who got supportive care. It is difficult to draw conclusions about these patterns without a randomized or controlled study,” says Dr. Kallash.

Kidney biopsy was performed on 69 patients, with no consensus on a threshold to perform kidney biopsy. More biopsies were performed among older patients and those with higher UPC at presentation. Crescents were observed in just over half of biopsies and were more common in older patients. The severity of IgAVN on kidney pathology did not correlate with the baseline degree of proteinuria or kidney function.

“Going forward, we need a systemic and evidence-based approach for treating this common disease” says Dr. Kallash. “We need to evaluate different treatment strategies among patients with a similar degree of injury to truly identify the best treatment option.”

REFERENCE:

Kallash M, Vogt BA, Zeid A, Khin E, Najjar M, Aldughiem A, Benoit E, Stotter B, Rheault M, Warejko JK, Daga A. The scope of treatment of pediatric IgA vasculitis nephritis and its outcome: a Pediatric Nephrology Research Consortium study. *Pediatric Nephrology*. 2022 Nov;37(11):2687-2697.

Department of Pediatrics

NEPHROLOGY AND HYPERTENSION

The Division of Nephrology and Hypertension at Nationwide Children’s Hospital provides specialized primary and consultative care for children with kidney and urinary tract problems through age 21. Disorders treated include acute kidney injury, chronic kidney disease, congenital anomalies of the kidneys and urinary tract, glomerular disorders, tubular disorders, urinary tract infection, kidney stones, electrolyte disorders, hypertension and metabolic bone disease. A full range of renal replacement therapy services are available, including hemodialysis, peritoneal dialysis, continuous renal replacement therapy, aquapheresis and kidney transplantation.

Faculty



John David Spencer, MD
Division Chief



Hiren P. Patel, MD
Section Chief

Brian Becknell, MD, PhD
Ray Bignall II, MD
Mahmoud Kallash, MD
John D. Mahan, MD
Tahagod Mohamed, MD
Stephanie Peters, APN
William E. Smoyer, MD
Beth A. Vogt, MD
Amy Wright, NP
Diana Zepeda-Orozco, MD, MS

Research Faculty

Ashley Jackson, PhD
Juan de dios Ruiz Rosado, PhD

2021 – 2022 Fellows

Jessamyn Carter, MD
(Medicine/Pediatrics)
Emily Stonebrook, MD
(Pediatrics)
Laura Walawender, MD
(Pediatrics)
Ahmed Zeid, MD
(Pediatrics)

In addition to patient care, The Division of Nephrology and Hypertension maintains an active and highly funded research program in the Abigail Wexner Research Institute at Nationwide Children’s Hospital. Five of our physician-scientists maintain actively funded National Institutes of Health (NIH) research programs, including Brian Becknell, MD, PhD; William E. Smoyer, MD; and John David Spencer, MD; Emily Stonebrook, MD; and Diana Zepeda-Orozco, MD. In addition to these physician-scientists, Ashley Jackson, PhD, and Juan de Dios Ruiz Rosado, PhD, are basic scientists who are supported by the NIH and investigating mechanisms of kidney disease. Together, our team investigates mechanisms and outcomes of urinary tract infection, obstructive uropathy, chronic kidney disease, bacterial peritonitis, renal transplantation, glomerular diseases, metabolic bone disorders and medical education. Nephrology faculty had over 50 unique, peer-reviewed publications, some of which are highlighted here.

Research: See page 193 for information about the Center for Clinical and Translational Research in the Abigail Wexner Research Institute at Nationwide Children’s.

Selected Publications

Cara-Fuentes G, **Smoyer W**. Biomarkers in pediatric glomerulonephritis and nephrotic syndrome. *Pediatric Nephrology (Berlin)*. 2021 Sep;36(9):2659-2673. .

Dawson A, LaMotte J, **Bignall R II**. Acknowledging socioecological systems to address the systemic racial disparities in children with kidney disease. *Journal of the American Society of Nephrology*. 2022 Jun 29.

Jackson A, Narla S, Bates C, **Becknell B**. Urothelial progenitors in development and repair. *Pediatric Nephrology (Berlin)*. 2022 Aug;37(8):1721-1731.

Kallash M, **Vogt B**, **Zeid A**, Khin E, Najjar M, Aldughiem A, Benoit E, Stotter B, Rheault M, Warejko J, Daga A. The scope of treatment of pediatric IgA vasculitis nephritis and its outcome: a pediatric nephrology research consortium study. *Pediatric Nephrology (Berlin)*. 2022 Mar 2.

Kumar R, Reed S, Stanek J, **Mahan J**. Defining kidney outcomes in children with acute lymphoblastic leukemia in the modern era. *Pediatric Nephrology (Berlin)*. 2022 Sep;37(9):2119-2126.

Pierce K, Eichler T, Mosquera Vasquez C, Schwaderer A, Simoni A, Creacy S, Hains D, **Spencer J**. Ribonuclease 7 polymorphism rs1263872 reduces antimicrobial activity and associates with pediatric urinary tract infections. *The Journal of Clinical Investigation*. 2021 Nov 15;131(22):e149807.

Highlights From the Past Year

In January 2022, the Kidney and Urinary Tract Center opened at Nationwide Children’s. This center, created in collaboration with the Department of Urology, offers patients access to expert surgical and medical treatment of urologic, genital, and kidney issues. The center is a collaborative, integrated process designed to combine patient care, advocacy, research and training to develop the next generation of nephrology and urology treatment for children. Expanded or new programs in the Kidney and Urinary Tract Center include:

- Development of an aquapheresis program to dialyze small infants
- Establishment of an acute kidney injury program that is supported by research efforts and quality improvement projects that aim to minimize kidney damage
- Expanded services including Neonatal Nephrology, Glomerular Disease, and a new pediatric Hypertension clinic
- Patient advocacy and community engagement through the Kidney Health Advocacy and Community Engagement Program (KHACE)



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022
\$4,826,019

Fast Facts: July 2021 – June 2022

Inpatient Discharges: 203
Observation and Outpatient-in-a-Bed Discharges: 103
Total Discharges: 306
Average Length of Stay*: 4.8
Average Daily Census*: 2.7
Patient Days*: 980
Nephrology Clinic Visits: 4,894
Dublin Nephrology Clinic Visits: 262
Kidney Transplants: 11

*Excludes observation and outpatient-in-a-bed patients



“This is a great example of building to a preclinical model with systemic gene delivery that is clinically relevant.”
– Zarife Sahenk, MD, PhD

Neurology

Gene Therapy Rescues Phenotype in Preclinical Model for Limb Girdle Muscular Dystrophy 2A/R1

LGMDs are a rare form of muscular dystrophy with no treatment. As a heterogenous group caused by many mutations, classification complexity makes the disease difficult to understand. Additionally, the prevalence is varied among its varied forms. The National Organization for Rare Disorders (NORD) estimates the prevalence for LGMD ranging from 1 in 14,500 to 1 in 123,000.

Limb girdle muscular dystrophy (LGMD) 2A/R1 is caused by mutations in the CAPN3 gene that result in a loss of CAPN3 protein function.

Researchers from the Center for Gene Therapy in the Abigail Wexner Research Institute at Nationwide Children’s Hospital highlighted a stepwise gene therapy process that will enable clinical testing. The approach uses the AAV mediated vector AAVrh74.tMCK.hCAPN3.

“We first showed efficacy by injecting the gene directly into the muscle of our model,” says **Zarife Sahenk, MD, PhD**, lead author of the study, neurologist and principal investigator in the Center for Gene Therapy. “Four weeks after delivery we saw that the CAPN3 protein was present and muscle size was increased, indicating successful delivery and translation of the injected gene.”

The direct to muscle injection showed no toxicity, laying the groundwork for systemic vascular delivery. Dr. Sahenk and her team used two doses in the systemic experiments: 3×10^{12} vg (low) and 6×10^{12} vg (high). The two doses were tested in two age groups with both male and female models.



Jerry Mendell, MD

“In both low and high titer doses, and in both age groups and sexes, we did not see any evidence of toxicity,” says **Jerry Mendell, MD**, senior author of the study and principal investigator in the Center for Gene Therapy. “Some investigators in the field have been particularly concerned about cardiac complications, but our experiments showed no sign of that.”

Twenty weeks later, efficacy was tested using functional (treadmill), physiological (*in vivo* muscle contractility assay) and histopathological outcomes. The gene therapy resulted in significant, robust improvements at both low and high doses and in both age groups.

“We are very proud of this work, and this publication,” says Dr. Sahenk. “This is a great example of taking an ideal animal model, and exploratory experimental trial by intramuscular delivery, and building to a preclinical model with systemic gene delivery that is clinically relevant. This is what we teach our students, fellows and colleagues as the template for translational clinical science.”

REFERENCE:

Sahenk Z, Ozes B, Murrey D, Myers M, Moss K, Yalvac ME, Ridgley A, Chen L, Mendell JR. Systemic delivery of AAVrh74.tMCK.hCAPN3 rescues the phenotype in a mouse model for LGMD2A/R1. *Molecular Therapy – Methods and Clinical Development*. 2021 Jun 24;22:401-414.

Department of Pediatrics

NEUROLOGY

Providers in the Division of Neurology at Nationwide Children’s Hospital deliver comprehensive care for children with a wide variety of disorders. These children include those with simple and complex epilepsy, primary and secondary headache and migraine, tics and movement disorders, neuroinflammatory conditions, muscular dystrophy, spinal muscular atrophy and neuropathy (acquired and genetic). In order to correctly identify and safely treat these children, state-of-the-art neurophysiological diagnostic testing and intraoperative monitoring is used. Our mission is to achieve the best outcomes for all children and adolescents with neurological illness.

Faculty



Anne M. Connolly, MD
Division Chief



Jaime-Dawn Twanow, MD
Section Chief

Stephanie Ahrens, MD
Dara Albert, DO
William D. Arnold, MD
Kristen Arredondo, MD
Sylvia Awadalla, MD
Shawn Aylward, MD
Christopher Beatty, MD
Melissa Chung, MD
Emily De Los Reyes, MD

John L. Eickholt III, MD
Kevin Flanigan, MD
Mariam L. Freimer, MD
Darrah Haffner, MD
Melissa Hutchinson, MD
Monica P. Islam, MD
Latif Khuhro, MD
Neil Kulkarni, MD
Warren D. Lo, MD

Setty Magaña, MD, PhD
Jennifer McKinney, MD
Jerry Mendell, MD
John Mytinger, MD
Adam Ostendorf, MD
Ann Pakalnis, MD
Anup Patel, MD
Toni S. Pearson, MD

Margie Ream, MD, PhD
Sean Rose, MD
Zarife Sahenk, MD, PhD
Laurel Slaughter, MD
Chang-Yong Tsao, MD
Jorge Vidaurre, MD
Megan Waldrop, MD
Pedro Weisleder, MD, PhD

2021 – 2022 Residency and Fellowship Programs
Child Neurology Residents
Ahmed Awad, MD
Brianna Brun, MD
Daniel Clark, MD, PhD
Megan Fredwall, MD
Rae Gumayan, MD
Muhammed Talha Gunduz, MD

Laura (Kate) Lamberta, DO
Corinne McCabe, MD
Thomas Murray, DO
Stephanie Rinne, DO
Alexandra Sankovic, MD
Ezgi Saylam, MD
Alex Sunshine, MD, PhD – Research Track

Stroke Fellow

Lisa Pabst, MD

Headache Fellows

Ana Coronado, MD
Ana Verdecia, MD

Highlights From the Past Year

In the last year, we welcomed Stephanie Ahrens, DO, who joined in July 2021 after completing pediatric and neurology residencies followed by two years of neurophysiology and surgical epilepsy fellowship. She brings additional expertise in treatment of children who require surgical approaches for treatment of epilepsy.

Active gene transfer for children with spinal muscular atrophy (SMA) continues. With active newborn screening in Ohio, nine children were safely treated in 2021. Basic and translational research to develop gene therapy for children with Batten disease, muscular dystrophy (Duchenne and limb girdle) and Charcot-Marie-Tooth (CMT) continue. We continue to expand quality improvement initiatives, leading to improvement in care of infants and children with epilepsy, status epilepticus, complex epilepsy and neuromuscular disorders.

The Division of Neurology includes 33 physicians and 15 advanced health care providers who oversee comprehensive programs for children with epilepsy, headache, movement disorders, neurodegenerative disorders and neuromuscular diseases. Children with complex disorders benefit from our multidisciplinary clinical approach. Additional ongoing multidisciplinary programs include centers of clinical excellence for children with Batten disease, leukodystrophy and muscular dystrophy. Eleven additional neurology multidisciplinary clinics include those for children with brain tumors, CMT, concussion, epilepsy, need for epilepsy transition, intracranial hypertension (pseudotumor cerebri), spinal muscular atrophy, neuroimmunologic disorders, stroke, tics, Tourette disorder and tuberous sclerosis.

The division offers outstanding residency and fellowship programs. The Child Neurology Residency program (certified by Accreditation Council for Graduate Medical Education and ranked seventh in the country) includes five residents per year with options for clinical- or research-focused educational tracks. Neurology also offers pediatric fellowship training in clinical neurophysiology, epilepsy surgery, gene therapy, headache, neuromuscular disease, neuromuscular pathology and stroke. Faculty members conduct quality improvement, basic and clinical research and published numerous journal articles and book chapters in 2020.

Research: See page 195 for information about the Center for Gene Therapy in the Abigail Wexner Research Institute at Nationwide Children’s.

Neurosurgery: See page 153 to learn about the Department of Neurosurgery at Nationwide Children’s.

Selected Publications

Boutzoukas A, Freedman D, Koterba C, Hunt W, Mack K, Cass J, Yildiz V, de los Reyes E, Twanow J, Chung M, Ouellette C. La crosse virus neuroinvasive disease in children: a contemporary analysis of clinical/neurobehavioral outcomes and predictors of disease severity. *Clinical Infectious Disease*. 2022 May;ciac403.

Mendell J, Al-Zaidy S, Lehman K, McColly M, Lowes L, Alfano L, Reash N, Iammarino M, Church K, Kleyn A, Meriggioli M, Shell R. Five-year extension results of the phase 1 start trial of onasemnogene abeparvovec in spinal muscular atrophy. *JAMA Neurology*. 2021 Jul;78(7):834-841.

Ostendorf A, Ahrens S, Lado F, Arnold S, Bai S, Owen M, Chapman K, Clarke D, Eisner M, Fountain N, Gray J, Hopp J. United states epilepsy center characteristics a data analysis from the national association of epilepsy centers. *Neurology*. 2022 Feb;98(5):E449-E458.

Ramey S, DeLuca S, Stevenson R, Conaway M, Darragh A, Lo W. Constraint-induced movement therapy for cerebral palsy: A randomized trial. *Pediatrics*. 2021 Nov;148(5):e2020033878.

Rose S, Yeates K, Nguyen J, Ercole P, Pizzimenti N, McCarthy M. Subconcussive head impacts and neurocognitive function over 3 seasons of youth football. *Journal of Child Neurology*. 2021 Aug;36(9):768-775.

Sahenk Z, Ozes B, Murrey D, Myers M, Moss K, Yalvac M, Ridgley A, Chen L, Mendell J. Systemic delivery of AAVrh74.tMCK.hCAPN3 rescues the phenotype in a mouse model for LGMD2A/R1. *Molecular Therapy – Methods and Clinical Development*. 2021 Sept;22:401-414.

Vidaurre J, Albert D, Parker W, Naprawa J, Mittlesteadt J, Idris A, Patel A. Improving time for administration of second-line antiseizure medications for children with generalized convulsive status epilepticus using quality improvement methodology. *Epilepsia*. 2021 Oct;62(10):2496-2504.

Waldrop M, Moore S, Mathews K, Darbro B, Medne L, Finkel R, Connolly A, Crawford T, Drachman D, Wein N, Habib A, Krzesniak-Swinarska M, Zaidman C, Collins J, Jokela M, Udd B, Day J, Ortiz-Guerrero G, Statland J, Butterfield R, Dunn D, Weiss R, Flanigan K. Intron mutations and early transcription termination in Duchenne and Becker muscular dystrophy. *Human Mutation*. 2022 Apr;43(4):511-528.



**GRANTS AWARDED TO CENTER FOR GENE THERAPY
AND NEUROLOGY CLINICAL AND RESEARCH FACULTY**

JULY 1, 2021 – JUNE 30, 2022

\$8,328,612

Fast Facts: July 2021 – June 2022

Inpatient Epilepsy Monitoring Unit

Total Epilepsy Monitoring Unit Discharges: 845
Average Daily Census (8 bed Epilepsy Monitoring Unit): 7.4
Patient Days: 1,262
Epilepsy Pre-surgical Evaluations: 131
Inpatient Neurology Consults: 6,249

Neurology Outpatient

Main Campus Neurology Clinic Visits: 11,211
Dublin Neurology Clinic Visits: 3,615
East Broad Neurology Clinic Visits: 1,015
Findlay Neurology Clinic Visits: 53
Heinzerling Neurology Clinic Visits: 55
Mansfield Neurology Clinic Visits: 119
Westerville Neurology Clinic Visits: 1,817
Complex Concussion Clinic Visits: 440
Stroke Clinic Visits: 235
Total Neurology Clinic Visits: 18,560

Neuromuscular Disorders Outpatient

MDA Clinic Visits: 648
Neuromuscular Disorders Clinic Visits: 939
Spinal Muscular Atrophy Clinic Visits: 183
Total Neuromuscular Clinic Visits: 1,770



Department of Pediatrics

PEDIATRIC PSYCHOLOGY AND NEUROPSYCHOLOGY

The Section of Pediatric Psychology and Neuropsychology in the Department of Pediatrics at Nationwide Children’s Hospital concentrates clinical services in four primary areas: Pediatric Psychology provides specialized assessment and intervention services that focus on the relationship between cognitive, social and emotional functioning and physical health, typically for children with cooccurring medical conditions (e.g., cancer, diabetes, sickle cell disease). Pediatric Neuropsychology performs specialized evaluations for children and adolescents with a range of medical and neurological disorders that impact thinking or behavior (e.g., brain tumors, epilepsy, seizure disorders, traumatic brain injury). Pediatric Psychiatric Acute Care Psychology provides services to support the acute care continuum in the Big Lots Behavioral Health Pavilion. In addition, Intellectual and Developmental Disability/Autism Spectrum Disorder Psychology provides specialized assessment and intervention services for children and adolescents impacted by various genetic and neurodevelopmental disabilities, including autism spectrum disorders. See page 133 for details and for information about all Behavioral Health services.

Faculty



Eric M. Butter, PhD
Chief

Charles Albright, PhD	Catherine Butz, PhD	Canice Crerand, PhD
Jacqueline Aldrich, PhD	Abbey Caserta, PhD	Jennifer David, PhD
Jessica Bailey, PhD	Jennifer E. Cass, PhD	Anne Dawson, PhD
Amy E. Baughcum, PhD	Eileen Chaves, PhD	Ashley Debeljak, PhD
Tara Benninger, PhD	Sarah Connolly, PhD	Nicole Dempster, PhD
Doug Bodin, PhD	Andrea Coppens, PhD	Robert M. Dempster, PhD
Shalonda Brooks, PhD	Alison Hatley Cotter, PhD	Jackie Doxie-King, PhD

Christine Eichelberger, PhD	Shannon Gillespie, PhD	Caroline Hodgson, PhD	Cara Inglis, PsyD
Anya Froelich, PsyD	Alana Goldstein-Leever, PhD	Jessica Hoehn, PhD	Jamie Jackson, PhD
Lauren Garbacz, PhD	Amy Hahn, PhD	Ariana Hoet, PhD	Osigwe Ijeoma, PhD
Molly Gardner, PhD	Jane Hamel-Lambert, PhD	Kristen E. Hoskinson, PhD	Katie Johannning-Gray, PhD
Ellen Geib, PsyD	Jennifer Hansen, PhD	Cody Hostutler, PhD	Oula Khoury, PhD
Cynthia A. Gerhardt, PhD	Rebecca Hellenthal, PhD	Jennifer Hughes, PhD	Chrissie Koterba, PhD

Ashley Kroon Van Diest, PhD	Laura M. Mackner, PhD	Margaret Mehling, PhD	Caroline Murphy, PhD
Elizabeth Kryszak, PhD	Marilee Martens, PhD	David Michalec, PhD	Emily Newton, PhD
Kathleen L. Lemanek, PhD	Wayne Mason, PhD	Kara Monnin, PhD	Megan Norris, PhD
Ann Levine, PhD	Hannah McKillop, PhD	Elisabeth Moore, PhD	Jill O’Neil, PhD
Barbara Mackinaw-Koons, PhD	Kelly A. McNally, PhD	Alana Moses, PhD	Jessica Palilla, PhD
	Erin McTiernan, PhD	James A. Mulick, PhD	Ari Rabkin, PhD

Natalie Raff, PhD	Jessica Scherr, PhD	Tyanna Snider, PsyD	H. Gerry Taylor, PhD
Whitney Raglin-Bignall, PhD	Rose Schroedl, PhD	Janet Souder, PsyD	Sean Tams, PhD
Heather Richard, PsyD	Kelsey Shively, PhD	Kevin Stephenson, PhD	Kristen Trott, PhD
Courtney Rice, PsyD	Ashley Showalter, PhD	Jack H. Stevens, PhD	Natalie Truba, PhD
Claire Russell, PhD	Adina Seidenfeld, PhD	Moneika Sutton, PhD	Kathryn A. Vannatta, PhD
Megan Schaeffer, PhD	Micheline Silva, PhD	Karen Tabern, PhD	Lindsey Vater, PhD

Sarah N. VerLee, PhD	Jacqueline Wynn, PhD
Bethany Walker, PhD	Heather L. Yardley, PhD
Jonathan Wilkins, PhD	Tammi K. Young-Saleme, PhD
Camille Wilson, PhD	
Mary Wojnaroski, PhD	
Andrea Wojtowicz, PhD	
Noelle Wolf, PhD	

Selected Publications

Christofferson ES, Ruzicka EB, Bolt M, Lyons E, Wachs M, Buchanan CL, Schmiede SJ, **Monnin K**. Understanding disparities and barriers associated with pediatric transplant evaluation and time to listing: Moving toward a more comprehensive picture. *Pediatric Transplantation*. 2022 Mar;26(2):e14182.

David JG, Chute D, Reed B, Saeed S, DeMatteo D, Atay O, Maddux M, Daly B. Assessing the prevalence of and risk factors for disordered eating attitudes and behaviors in adolescents with inflammatory bowel disease. *Inflammatory Bowel Diseases*. 2022 Jan 5;28(1):143-145.

Dawson AE, LaMotte JE, Bignall 2nd ONR. Acknowledging socio-ecological systems to address the systemic racial disparities in children with kidney disease. *Journal of the American Society of Nephrology*. 2022 Jun 29;33(10):1820-1822.

Hostutler CA, Snider T, Wolf N, Grant R. ACEs screening in adolescent primary care: Psychological flexibility as a moderator. *Families, Systems Health*. 2022 Jun 9. [Epub ahead of print]

Kryszak EM, Albright CM, Fell LA, **Butter EM**, Kuhlthau KA. Clinician perspectives on telehealth assessment of autism spectrum disorder during the COVID-19 pandemic. *Journal of Autism and Developmental Disorders*. 2022 Feb 1;1-16. [Epub ahead of print]

Schaefer MR, Aguilera V, Parris K, Long A, Triplett B, Phipps S. Giving the gift of life twice: Understanding the lived experiences of parent donors and nondonors in pediatric haploidentical hematopoietic cell transplantation. *Pediatric Blood & Cancer*. 2022 Feb;69(2):e29480.

Watson WD, Lahey S, Baum KT, Hamner T, **Koterba CH**, Alvarez G, Chan JB, Davis KC, DiVirgilio EK, Howarth RA, Jones K, Kramer M, Tlustos SJ, Zafiris CM, Slomine BS. The role of the neuropsychologist across the stages of recovery from acquired brain injury: a summary from the pediatric rehabilitation neuropsychology collaborative. *Child Neuropsychology*. 2022 Jun 21;1-22.

Wesley KL, **Hoehn J, Butz C**, Aylward, SC. Experiences of pain and quality of life in pediatric intracranial hypertension. *Journal of Pediatric Psychology*. 2022 Apr 8;47(4):412-419.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

\$2,622,297

Fast Facts: July 2021 – June 2022

Inpatient Consultations: 5,580

Psychology Clinic Visits: 15,355

Psychology Medical Clinic / Outpatient Consultation Visits: 20,875

Department of Pediatrics

PRIMARY CARE PEDIATRICS

Pediatricians in the Division of Primary Care Pediatrics at Nationwide Children’s Hospital staff the 13 Nationwide Children’s Hospital Primary Care Centers located throughout the Columbus area. A multidisciplinary staff provides comprehensive primary care services for a diverse and underserved population of patients.

Faculty



Alex R. Kemper, MD, MPH, MS
Division Chief



Dane A. Snyder, MD
Section Chief

Mary Ann Abrams, MD
Akua A. Amponsah, MD
Kristen Beck, MD
Stefanie R. Bester, MD
Stephanie Bland, MD
Sara Bode, MD
Courtney Brown, MD
Megan Brundrett, MD

Milagro P. Castaneda-Vidaurre, MD
Aarti Chandawarkar, MD
Linda E. Chun, MD
Katharine Coffman, MD
Duane R. Copenheaver, DO
Emily A. Decker, MD
Tanya Dedyo, MD

Gracia De Jong, MD
Sarah Denny, MD
Meghan Dishong, MD
Ihuoma U. Eneli, MD
Maretta Fan, DO
Ashley Fernandes, MD

Susan Friedman, MD
Patricia Gabbe, MD
Jessica Gefvert, MD
Sean P. Gleeson, MD
Elizabeth Grogan, MD
Judith A. Groner, MD

Malika Haque, MD
Laura Hart, MD
Stephen J. Hersey, MD
Lisa Humphrey, MD
Aurelia J. Jackson, MD
Sinimol James, MD

Angela V. Jones, MD
Shelby Jordan, MD
Ranee Jostpille, MD
Skyler Kalady, MD
Tatyana Karakay, MD
Amrik Singh Khalsa, MD

Megan King, MD
Lindsay Kneen, MD
Jack A. Kopechek, MD
Alicia Kuper, DO
Mary Kay Kuzma, MD
Lauren Lange Smith, MD
Benjamin Levinson, MD

Gilbert Liu, MD
Jonathan T. Lucas, MD
Shengyi Mao, MD
Laura Martin, MD
Rose Martoma, MD
Lucas McKnight, MD
Douglas J. McLaughlin, MD

Melissa A. Meyer, MD
Christopher Miller, MD
Belinda M. Mills, MD
Alana Milton, MD
Asma Mobin-Uddin, MD
Mary A. Nelin, MD
Barbara Oettgen, MD

Michele Oyortey, MD
Melonie Phillips, MD
Aubrey Pizza, MD
Stephanie Quach, MD
Alexander T. Rakowsky, MD
Jessica Retzke, MD
Jennifer Ricciardo, MD

Nathan Richards, MD
Richard E. Rodenberg Jr., MD
Allison Rossetti, MD
Andrea Sattler, MD
Sara Schroder, MD
Andrew Searcy, MD

Amina Smajlovic, MD
Brandi Spitler, DO
Kimberly Stettler, MD
Lisa Stone, DO
Melissa Swanson, MD
Olivia W. Thomas, MD

Gina R. Thompson, DO
Jagadisharaje K. Urs, MD
Jose Vargas, MD
Suzanne Voorhees, MD
Shravani Vundavalli, MD
Caroline Weingart, MD

Mark Wells, MD
Marion Were, MD
Dominique Williams, MD
Mark Winerman, MD
Rachael Zanotti-Morocco, DO

Highlights From the Past Year

The Primary Care Centers provide comprehensive care primarily for children from birth to 21 years of age. Available services include preventive care, chronic disease management and acute care, with both scheduled and same-day, walk-in access. In addition to pediatricians and pediatric nurse practitioners, the clinics include a wide array of other individuals to support the needs of patients and their families, including care coordinators, certified lactation consultants, disease managers, pharmacists, psychologists and social workers. Combined adult and pediatric adult health services are available at one clinic site. The division also houses the Center for Healthy Weight and Nutrition, a national model for multidisciplinary, comprehensive care for children and adolescents with obesity.

The division’s quality improvement initiatives continue to focus on improving care for patients with a broad array of conditions, including anemia, asthma, attention deficit-hyperactivity disorder, depression and obesity. The division also focuses on ensuring all children and adolescents receive timely preventive services, including well-child visits and immunizations. A central goal of our work is to assure the delivery of high-quality preventive care to minimize secondary effects of the COVID-19 pandemic.

The Division of Primary Care Pediatrics provides training and education for The Ohio State University College of Medicine students, as well as residents in Pediatrics, Family Medicine and combined Internal Medicine-Pediatrics. Research focuses on a broad range of preventive services, smoking cessation, obesity prevention and treatment, health literacy, and transition from pediatric to adult health care services.

Selected Publications

Beck K, Snyder D, Toth C, Hostutler C, Tinto J, Letostak T, Chandawarkar A, Kemper A. Improving primary care adolescent depression screening and initial management: a quality improvement study. *Pediatric Quality Safety*. 2022 Mar;7:e549.

Kemper A, Newman T, Slaughter J, et al. Clinical practice guideline revision: Management of hyperbilirubinemia in the newborn infant 35 or more weeks of gestation. *Pediatrics*. 2022 Aug 5;e2022058859

McLaughlin D, Grayson M, Toth C. Quality improvement to engage general pediatricians in reducing inaccurate penicillin allergy labels. *Academic Pediatrics*. 2022 May 27;S1876-2859(22)00256-X.

Snyder D, Schuller J, Ameen Z, Toth C, Kemper A. Improving patient-provider continuity in a large urban academic primary care network. *Academic Pediatrics*. 2022 Mar; 22(2):305-312.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

\$2,634,213

Fast Facts: July 2021 – June 2022

Primary Care Network Visits: 223,549

Unique Patients Treated in Entire Primary Care Network: 104,939

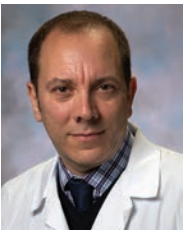
HEALTHY WEIGHT AND NUTRITION

The Center for Healthy Weight and Nutrition at Nationwide Children’s Hospital offers a comprehensive approach to weight management with medical and bariatric surgery programs for the prevention and treatment of children and young adults, ages 2 to 21 years, with obesity. The center’s mission is to empower children and families to establish a foundation for healthy lifestyles through clinical care, education, research, community engagement and advocacy.

Faculty



Ihuoma U. Eneli, MD, MS, FAAP
Director



Marc P. Michalsky, MD, MBA, FACS, FAAP
Surgical Director

Dominique Williams, MD, MPH, FAAP, Dipl ABOM

Nicole Greenwood, MD

Eileen Chaves, PhD

Jinyu Xu RD, MPH, PhD
Research Scientist

Keeley Pratt, PhD
Affiliate Faculty, OSU

Highlights From the Past Year

The Center for Healthy Weight and Nutrition offers assessment clinics for evaluation of children and young adults with obesity, and a variety of interdisciplinary programs for intensive weight management. The center’s adolescent bariatric surgery program is accredited by the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program. The center leads the Primary Care Obesity Network (PCON), a program that supports primary care practices with training and resources. In 2021, CareSource, a nationally recognized nonprofit health plan, funded a partnership with the center to expand the center’s PCON program and introduce the Project ECHO (Extension for Community Care Outcomes) framework. Since the inception of ECHO Obesity and despite the pandemic, in 2021 the center was able to train and/or support more than 245 health care professionals. In addition, the center anchors the obesity program in the hospital’s signature population health initiative, Pediatric Vital Signs (PVS), which involves several community partnerships.

The center remains dedicated to providing educational opportunities with a fourth-year medical student elective, a residency elective rotation, a childhood obesity and adolescent bariatric surgery fellowship, in addition to serving as an expert to obesity programs around the United States and internationally. The center participates in three National Institutes of Health (NIH) multicenter studies on the long-term outcomes of adolescent bariatric surgery, modeling obesity program attrition and the use of family behavioral therapy to address childhood obesity in the primary care setting. The center faculty provides leadership for several leading national organizations in the field including the Obesity Medicine Association (OMA), American Society for Metabolic and Bariatric Surgery (ASMBS), American Academy of Pediatrics Institute for Healthy Childhood Weight (AAP-IHCW) and the National Academy of Medicine (NAM) Roundtable on Obesity Solutions. In 2021, the center received the Academic Pediatric Association (APA) Health Care Delivery Award. The award recognizes innovative, effective programs that support health care in a teaching setting.

Selected Publications

Chaves E, Reddy S, Cadieux A, Tomasula J, Reynolds K. The continued impact of the COVID-19 pandemic on pediatric obesity: A commentary on the return to a healthy new normal. *International Journal of Environmental Research and Public Health*. 2022 May 5;19(9):5597.

El Haija M, Browne N, Griggs C, Herdes R, Michalsky MP, Ogle S, Zitsman J, Pratt J; Pediatric committee of the ASMBS. Considerations on the role of esophagogastroduodenoscopy in the pediatric metabolic and bariatric surgery patient. *Surgery for Obesity and Related Diseases*. 2021 Nov;17(11):1834-1839.

Eneli I, Xu J, Pratt K. Change in weight category among youth early in the COVID-19 pandemic. *Clinical Obesity*. 2022 Jun;12(3):e12522.

Haamid F, Ajayi T, Williams D, Walker V. Can’t keep runnin’. *Journal of Adolescent Health*. 2022 Jan 20:S1054-139X(21)00213-5.

Pronk N, Eneli I, Economos C, Bradley D, Fassbender J, Calancie L, Patawaran W, Hovmand. Using systems science for strategic planning of obesity prevention and treatment: The roundtable on obesity solutions experience. *Current Problems in Cardiology*. 2022 May 2:101240.



Grants Awarded

JULY 1, 2021– JUNE 30, 2022
\$307,683

Fast Facts: July 2021 – June 2022

- Bariatric Clinic Visits: 851
- Healthy Weight and Nutrition Clinic Visits: 2,725
- Hilliard Healthy Weight Clinic Visits: 843
- Westerville Healthy Weight Clinic Visits: 962

Katelyn Krivchenia, MD



Sabrina K. Palacios, MD



Pulmonary Medicine
Long-Term Pulmonary Symptoms Follow COVID-19 Infection in Children

Fatigue and shortness of breath may persist, even in the absence of abnormal test results.

So-called “long COVID” can result in lasting pulmonary sequelae in adults, but little is known about long-term outcomes in children and adolescents post-COVID-19. In February 2021, Nationwide Children’s Hospital initiated a multidisciplinary Pediatric Pulmonary Post-COVID Clinic for children experiencing prolonged pulmonary symptoms after COVID-19 infection.

In the largest U.S. study to date of pediatric patients with long-term pulmonary sequelae following COVID-19, researchers conducted a retrospective analysis of all patients seen in clinic between February 2021 and December 2021. They evaluated measures of lung function, including lung volumes, diffusion capacity, pre- and post-bronchodilator spirometry, and performance on a six-minute walk test, and analyzed changes in pulmonary findings over time.

Despite a mostly mild, outpatient acute infection, virtually all patients presenting to the clinic experienced notable fatigue and shortness of breath, says **Katelyn Krivchenia, MD**, pediatric pulmonologist at Nationwide Children’s and co-lead author of the study published in *Pediatric Pulmonology*.

“Regardless of their prior physical function, most felt tired and short of breath,” she says. “We saw kids who used to run a six-minute mile getting short of breath after walking up the stairs.”

The majority had no significant abnormalities on chest imaging, lung function testing or physical exam. However, most patients consistently demonstrated tachycardia and heart rate variability during the six-minute walk test, potentially suggesting autonomic dysfunction, as well as completing a lower-than-expected distance in the allotted time. At follow-up visits, six-minute walking distance and tachycardia tended to improve, while heart rate variability, fatigue and shortness of breath persisted.

The researchers identified three clinical phenotypes in their cohort of patients. About one-third responded positively to bronchodilator therapy, even if their initial spirometry testing was negative. Children in this group generally had a family or personal history of asthma. Another group, about 12% of the cohort, had paroxysmal vocal cord movement disorder. A final group exhibited symptoms even though no abnormalities could be found.

“We show that in this population, virtually everybody has normal testing results, in contrast to what we see in adults with long COVID,” says **Sabrina K. Palacios, MD**, pediatric pulmonologist and co-lead author. This suggests the full panel of lung tests may not be necessary for pediatric patients.

The researchers also conclude that bronchodilator therapy may be worth starting sooner with pediatric patients, and clinicians should be aware of vocal cord dysfunction as a potential contributor to shortness of breath and fatigue in children with long COVID.

Dr. Krivchenia notes that more than 75% of the children seen in the clinic were not vaccinated against COVID-19, and some of them suffered re-infections.

“We found that long COVID is debilitating for some of these kids,” she says. “People think this disease is mild in pediatric populations, but we see kids who can’t go back to school, don’t graduate on time and can’t play their sport anymore.”

REFERENCE:
Palacios S, Krivchenia K, Eisner M, Young B, Ramilo O, Mejias A, Lee S, Kopp BT. Long-term pulmonary sequelae in adolescents post-SARS-CoV-2 infection. *Pediatric Pulmonology*. 2022 Oct;57(10):2455-2463. [Epub 2022 Jul 8]



Largest U.S. study to date of pediatric patients with long-term pulmonary sequelae following COVID-19 infection to help guide further diagnosis and treatment.

Department of Pediatrics

PULMONARY MEDICINE

The Division of Pulmonary and Sleep Medicine at Nationwide Children’s Hospital provides the highest quality clinical care for children and adults with congenital respiratory disorders including asthma, cystic fibrosis, primary ciliary dyskinesia, interstitial lung diseases, disorders of breathing control, sleep-related breathing disorders, hemoglobinopathies and neuromuscular diseases. Additionally, our providers care for those approaching and following lung and heart-lung transplant, advanced lung disease management, and for management of those requiring long-term mechanical ventilation. Given the many challenges these children and their families face, it is important that the care we deliver is multidisciplinary and often multi-specialty in nature. Another extremely important part of our mission is to provide medical education to prepare the next generation of clinicians, scientists and educators.

Multi-Specialty Collaborators: Endocrinology; Gastroenterology, Hepatology and Nutrition; Neurology/ Neuromuscular; Otolaryngology; Psychiatry; Psychology

Multidisciplinary Staff: respiratory therapists, registered dietitians, social workers (LISW and LISW-S), research coordinators, clinical nursing (RN, APN), clinical staff (RN, LPN, MA); Pulmonary Research Core

Faculty



Karen S. McCoy, MD
Division Chief



Richard D. Shell, MD
Section Chief

Debra Boyer, MD	Kavitha Kotha, MD	Grace Paul, MD	Brooke Gustafson, MD
Courtney Gushue, DO	Robert Kowatch, MD	Swaroop Pinto, MD	Swati Jayaram, DO
John Heintz, MD	Katelyn Krivchenia, MD	Shahid Sheikh, MD	Rachel Ronau, DO
Melissa Holtzlander, MD	Anne May, MD	Lisa Ulrich, MD	Terace Thomas, MD
Maninder Kalra, MD	Eric Mull, DO	2021 – 2022 Fellows	Bailey Young, DO
Stephen Kirkby, MD	Sabrina Palacios, MD	Sarah Cohen, MD	
Benjamin Kopp, MD	Alpa Patel, MD	Michelle Gillespie, MD	

Highlights From the Past Year

We were successful in gaining new accreditation for our Primary Ciliary Dyskinesia Program and our Interstitial Lung Disease Program. Our 19 physicians are seeing patients on our Columbus campus, as well as local and regional Ohio clinics in Westerville, Dublin, Lima, and one of our former fellows has joined as faculty at Nationwide Children’s-Toledo. More than 11,000 patients were seen in 2021. The center is rated in the U.S. News & World Report top 10 Children’s Hospitals. The

Pulmonary Division excels in patient care, training of residents and fellows, and participates in training of multidisciplinary students. In addition to a large, highly regarded center for cystic fibrosis care, the group is recognized and awarded Therapeutic Development Network status and is designated a CFF Research and Development Program “C3 RDP, Cure Cystic Fibrosis Columbus.” Numerous investigators and laboratories, both at Nationwide Children’s and The Ohio State University, participate in bench-to-bedside research related to cystic fibrosis, focused on immune dysfunction and the consequent infections in this disease. Members of the division participate significantly in clinical trials, basic science and quality improvement.

Selected Publications

Cruz-Vidal D, Mull E, Taveras J, Shell R, Hunt G, Fowler B, Wallihan R, Erdem G. EVALI versus MIS-C, one more overlapping diagnosis to consider. *Pediatric Pulmonology*. 2021 Sep;56(9):2918-2924.

Paul G, Bai S, Jackson K, McCoy K. Aquagenic wrinkling in children under two years of age: Could this be a potential clinical referral tool for cystic fibrosis among non-screened populations? *Journal of cystic fibrosis: official journal of the European Cystic Fibrosis Society*. 2021 Sep;20(5):e77-e83.

Sheikh S, Ryan-Wenger N, Pitts J, Britt Jr R, Paul G, Ulrich L. Impact of guideline adherence and race on asthma control in children. *World Journal of Pediatrics*. 2021 Oct;17(5):500-507.

Ulrich L, Macias C, George A, Bai S, Allen E. Unexpected decline in pediatric asthma morbidity during the coronavirus pandemic. *Pediatric Pulmonology*. 2021 Jul;56(7):1951-1956.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

\$3,086,513

Fast Facts: July 2021 – June 2022

Inpatient Discharges: 881

Observation and Outpatient-in-a-Bed Discharges*: 1,978

Total Discharges: 2,859

Average Length of Stay†: 5.9

Average Daily Census†: 14.2

Patient Days†: 5,176

Inpatient Consults: 374

Cystic Fibrosis Patients: 566

*Excludes sleep studies

†Excludes observation and outpatient-in-a-bed patients

Pulmonary Clinic Visits

Dublin Pulmonary Clinic Visits: 683

Lima Pulmonary Clinic Visits: 209

Lung Transplant Clinic Visits: 30

Main Campus Pulmonary Clinic Visits: 6,910

Pulmonary Rehab Clinic Visits: 757

Westerville Pulmonary Clinic Visits: 2,145

Total Pulmonary Clinic Visits: 10,734

Pulmonary Diagnostics Clinic Visits

Dublin Pulmonary Diagnostics Clinic Visits: 20

Main Campus Pulmonary Diagnostics Clinic Visits: 257

Westerville Pulmonary Diagnostics Clinic Visits: 26

Total Pulmonary Diagnostics Clinic Visits: 303

Sleep Disorders Center

Main Campus Sleep Clinic Visits: 518

Dublin Sleep Clinic Visits: 620

Westerville Sleep Clinic Visits: 505

Total Sleep Clinic Visits: 1,643

SLEEP DISORDERS CENTER

Faculty



Maninder S. Kalra, MD, PhD
Sleep Lab Medical Director

- A. Latif Khuhro, MD
- Robert Kowatch, MD, PhD
- Anne May, MD
- Brandon Morgan, MSW, LISW
- Alpa Patel, MD
- Grace Paul, MD
- Swaroop Pinto, MD
- Jack Stevens, PhD

Highlights From the Past Year

Accredited by the American Academy of Sleep Medicine, the Sleep Disorders Center at Nationwide Children’s Hospital provides inpatient and outpatient consultations and treatment for children with a wide variety of sleep disorders. Common indications for evaluation include breathing abnormalities during sleep, insomnia, unusual/excessive movements at night and excessive daytime sleepiness. As part of the Sleep Medicine Fellowship Program at The Ohio State University College of Medicine, the center provides two months of clinical training to sleep medicine fellows each year, which includes didactic lectures, supervised clinical experience and interpretation of infant and child polysomnographic studies. The Sleep Disorders Center participates in the training of medical students, residents in Pediatrics, Neurology, Otolaryngology, Physical Medicine and Rehabilitation, and Radiology, as well as pediatricians, psychiatrists, and graduate students at The Ohio State University. Over the past 14 years, 52 sleep medicine and pediatric subspecialty fellows have completed required rotations in pediatric sleep medicine at the center. Center physicians lecture widely throughout The Ohio State University on a variety of topics and present their research at national meetings.

Selected Publications

Penfold R, Thompson E, Hilt R, Schwartz N, Robb A, Correll C, Newton D, Rogalski K, Earls M, **Kowatch R**, Beck A, Yarborough B, Crystal S, Vitiello B, Kelleher K, Simon G. Development of a symptom-focused model to guide the prescribing of antipsychotics in children and adolescents: results of the first phase of the safer use of antipsychotics in youth (suay) clinical trial. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2022 Jan;61(1):93-102.

Cristea A, Ren C, Amin R, Eldredge L, Levin J, Majmudar P, **May A**, Rose R, Tracy M, Watters K, Allen J, Austin E, Cataletto M, Collaco J, Fleck R, Gelfand A, Hayes D Jr, Jones M, Kun S, Mandell E, McGrath-Morrow S, Panitch H, Popatia R, Rhein L, Teper A, Woods J, Iyer N, Baker C. Outpatient respiratory management of infants, children, and adolescents with post-prematurity respiratory disease: An official American Thoracic Society clinical practice guideline. *American Journal of Respiratory and Critical Care Medicine*. 2021 Dec 15;204(12):e115-e133.

Tanner K, Dempster R, Castillo, Burdo-Hartman W, Halpin E, Rausch J, **Stevens J**. Randomized trial of a self-administered parenting intervention for selected eating in young children. *Eating Behaviors*. 2022 Jun 20;46:101646.

Ruch D, Heck K, Sheftall A, Fontanella C, **Stevens J**, Zhu M, Horowitz L, Campo J, Bridge J. Characteristics and precipitating circumstances of suicide among children ages 5 to 11 years in the United States, 2013-2017. *JAMA Network Open*. 2021 Jul 1;4(7):e2115683.

Department of Pediatrics

RHEUMATOLOGY

Our mission is to improve the lives of children with rheumatic disease through high-quality and innovative care, education and research. The Division of Rheumatology at Nationwide Children’s Hospital provides comprehensive, compassionate, evidence-based clinical care to children with musculoskeletal and rheumatic diseases, conducts research on these diseases, and educates students, residents, fellows and pediatricians. The division is involved in several quality improvement projects to improve outcomes for children with rheumatic disease, and partners with patients and families in these efforts.

Faculty



Stacy Payne Ardoin, MD, MS
Chief

- Shoghik Akoghlianian, MD

Melissa Argraves, MD, MEd

Kyla Driest, MD, MEd

Ysabella Esteban, MD

Gloria C. Higgins, PhD, MD (Emeritus)

Edward Oberle, MD

Vidya Sivaraman, MD

Alysha Taxter, MD, MSCE
- 2021 – 2022 Fellows

Christine Bacha, MD

Samuel Gagne, MD

Lauren Harper, MD

Highlights From the Past Year

The Rheumatology Clinic at Nationwide Children’s serves children with diseases including juvenile idiopathic arthritis, systemic lupus erythematosus, juvenile dermatomyositis, spondyloarthropathy, vasculitis, scleroderma, autoinflammatory conditions and painful musculoskeletal problems. The clinic conducts more than 5,000 outpatient visits annually at locations on main campus and in Dublin, Ohio. Our fellowship includes three categorical pediatric fellows and will increase to four categorical pediatric fellows in the next academic year.

- To meet the needs of patients and families with complex immunologic disease, we offer several multidisciplinary clinics.
- The Lupus, Vasculitis and Glomerulonephritis Clinic incorporates expertise from rheumatologists, nephrologists, pulmonologists, psychologists, pharmacists and social workers to provide evidence-based, personalized treatment plans for children and adolescents with lupus and vasculitis.
 - The Neuro-Immunology Clinic includes representatives from Rheumatology, Psychiatry, Psychology and Neuropsychology, and focuses on care of children with autoimmune encephalitis and other neuro-immunologic disorders.
 - Our Hypermobility Clinic engages providers from Rheumatology, Physical Therapy, Occupational Therapy, Psychology and Social Work, and provides comprehensive support to children with symptomatic hypermobility.
 - Edward Oberle, MD, directs our Musculoskeletal Ultrasound Clinic.
 - Kyla Driest, MD, MEd, participates in a collaborative clinic with Hematology, Immunology and Genetics focused on care of patients with persistent cytopenias and combined immunologic and hematologic dysfunction.

This year we welcomed to our team Dr. Alysha Taxter who is board-certified in Clinical Informatics, Rheumatology and Sports Medicine. She has dual appointments in Clinical Informatics and Rheumatology. Our close association with adult rheumatology at The Ohio State University and with multiple pediatric subspecialists at Nationwide Children’s promotes collaborative educational opportunities, clinical care and research. Rheumatology is engaged in clinical and basic science research projects and participates in several national and international collaborative studies of childhood rheumatic diseases. Basic scientist Chack-Yung Yu, DPhil, has an appointment in Rheumatology focusing on the relationship between complement genetics and rheumatic diseases. Our team participates in the Childhood Arthritis and Rheumatology Research Alliance and Pediatric Rheumatology Collaborative Study Group clinical research networks. We also participate in the quality improvement initiative Pediatric Rheumatology Care and Outcomes Improvement Network.

Selected Publications

Lecerf K, Koboldt D, Kuehn H, Jayaraman V, Lee K, Mihalic Mosher T, Yonkof J, Mori M, Hickey S, Franklin S, Drew J, Akoghlanian S, Sivaraman V, Rosenzweig S, Wilson R, Abraham R. Case report and review of the literature: Immune dysregulation in a large familial cohort due to a novel pathogenic RELA variant. *Rheumatology (Oxford)*. 2022 Apr 12. [Epub ahead of print]

Mulvihill E, Furru R, Goldstein-Leever A, Driest K, Lemle S, MacDonald D, Frost E, Sivaraman V. Targeted provider education and pre-visit planning increase rates of formal depression screening in childhood-onset SLE. *Pediatric Rheumatology Online Journal*. 2021 Aug 3;19(1):116.

Zhou D, Rudnicki M, Chua G, Lawrance S, Zhou B, Drew J, Barbar-Smiley F, Armstrong T, Hilt M, Birmingham D, Passler W, Auletta J, Bowden S, Hoffman R, Wu Y, Jarjour W, Mok C, Ardoin S, Lau Y, Yu C. Human complement C4B allotypes and deficiencies in selected cases with autoimmune diseases. *Frontiers in Immunology*. 2021 Oct 26;12:739430.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022
\$1,719,236

Fast Facts: July 2021 – June 2022

- Inpatient Discharges: 30
- Observation and Outpatient-in-a-Bed Discharges: 30
- Total Discharges: 60
- Average Length of Stay*: 4.2
- Average Daily Census*: 0.3
- Patient Days*: 126
- Inpatient Consults: 208
- Main Campus Rheumatology Clinic Visits: 4,481
- Dublin Rheumatology Clinic Visits: 696
- Total Clinic Visits: 5,177

*Excludes observation and outpatient-in-a-bed patients

Department of Pediatrics
SPORTS MEDICINE

The Division of Sports Medicine at Nationwide Children’s Hospital includes a team of experts who specialize in the treatment and prevention of sports-related injuries in the pediatric and adolescent athlete. The focus of the department is prevention, diagnosis and treatment of youth and adolescent sports injuries, including concussions and other specialties.

Faculty



Thomas L. Pommering, DO
Chief

- Steven C. Cuff, MD

Drew Duerson, MD

Anastasia N. Fischer, MD

James P. MacDonald, MD

Jonathan Napolitano, MD

Reno Ravindran, MD
- Richard E. Rodenberg, MD

Amy E. Valasek, MD

2021 – 2022 Fellows

Daniel Chen, MD

Alvin Chi, MD

Highlights From the Past Year

- Faculty in Sports Medicine continue to publish cutting-edge research in the areas of concussion, spondylolysis, exercise in youth and female athletic triad. We provide team-centered sports medicine care. Our clinical staff works with the athlete’s team, which includes the patient, family, athletic trainer, school nurse, coach and primary care physician, to assist in the recovery of the injury, development of a treatment plan and recommendations for successful participation in future sports activities. Our department also helps patients navigate their care through our partners in other departments within Nationwide Children’s, including Radiology, Orthopaedics, Physical Therapy, Cardiology, Healthy Weight and Nutrition, Pulmonary Medicine, Neuropsychology/Psychology, Emergency Medicine, Primary Care, and Sports Nutrition.
- Faculty named over 55 times in publications, abstracts and national podium and poster presentations
 - Trained over 300 learners who rotated through the Sports Medicine service in the past year
 - Continue to collaborate with local school districts, the Ohio High School Athletic Association and other Nationwide Children’s departments on COVID-19 safety protocols, return to sport and related medical care
 - Hosted two conferences including our Annual Sports Medicine & Orthopedics Conference last fall and our first Adaptive Sports Medicine Conference this spring
 - Developed a Golf Medicine Program with Titleist Performance Institute (TPI) certified providers
 - Served as team physicians for Ohio Dominican University and several central Ohio high schools and middle schools

Services available at Nationwide Children’s Sports Medicine include:

- Diagnosis and treatment of all sports-related injuries
- Comprehensive point-of-care ultrasound (POCUS) for diagnosis and interventional treatment of musculoskeletal injuries
- Sports Concussion Clinic
- Adaptive Sports Medicine Clinic

- Performing Arts Medicine
- Golf Medicine
- Limb Deformity Clinic in collaboration with the Department of Orthopaedics
- Specialized rehabilitation and injury prevention programs for swimmers, throwers, dancers, runners and athletes in other sports
- Sports Nutrition Counseling
- Sports Performance Training
- Play Strong Program (supervised rehab and exercise program for children with medical conditions such as cancer, obesity, diabetes, certain heart diseases, autism, etc.)
- Pediatric Sports Medicine Fellowship Training Program
- Central Ohio EMS Community Outreach and Education for Care of Athletes Injured on the Field of Play
- Partnerships with multiple youth and club sport organizations and schools
- Robust website with educational resources for patients/families, physicians, athletic trainers, school nurses and coaches

Selected Publications

Coleman N, Beasley M, Briskin S, Chapman M, Cuff S, Demorest RA, Halstead M, Hornbeck K, Kinsella SB, Logan K, Liu R, Mooney C, Myers RA, Ruparell S, Santana J, Walter KD, Waterbrook AL, Wolf SF. Musculoskeletal and sports medicine curriculum guidelines for pediatric residents. *Current Sports Medicine Reports*. 2021 Apr 1;20(4):218-22.

Daniel K, Fischer A, Welty M, Valasek AE. Improving the diagnosis of menstrual dysfunction through quality improvement. *Pediatric Quality and Safety*. 2022 Jan 21;7(1):e505.

Miller KE, MacDonald JP, Sullivan L, Venkata LPR, Shi J, Yeates KO, Chen S, Alshaikh E, Taylor HG, Hautmann A, Asa N, Cohen DM, Pommering TL, Mardis ER, Yang J. Salivary miRNA expression in children with persistent post-concussive symptoms. *Frontiers in Public Health*. 2022 May 30;10:890420.

Selhorst M, MacDonald J, Martin L, Rodenberg R, Krishnamurthy R, Ravindran R, Fischer A. Immediate functional progression program in adolescent athletes with a spondylolysis. *Physical Therapy in Sport*. 2021 Nov;52:140-146.

Young JA, Hand BN, Onate JA, Valasek AE. Clinical utility and validity of exercise vital sign in children. *Current Sports Medicine Reports*. 2022 Jan 1;21(1):28-33.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022
\$22,175

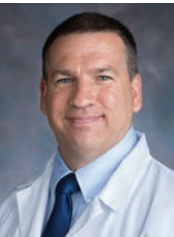
Fast Facts: July 2021 – June 2022

- Canal Winchester Sports Medicine Clinic Visits: 1,616
- Dublin Sports Medicine Clinic Visits: 3,767
- East Broad Sports Medicine Clinic Visits: 799
- Hilliard Sports Medicine Clinic Visits: 1,487
- Main Campus Sports Medicine Clinic Visits: 1,633
- Marysville Sports Medicine Clinic Visits: 668
- New Albany Sports Medicine Clinic Visits: 1,710
- Reynoldsburg School-Based Sports Medicine Clinic Visits: 53
- Westerville Sports Medicine Clinic Visits: 4,710
- Total Sports Medicine Clinic Visits: 16,443

Department of Pediatrics
TOXICOLOGY

The Section of Toxicology at Nationwide Children’s Hospital provides teaching, patient care and research to improve the outcome for poisoned patients. We provide medical supervision for the Central Ohio Poison Center (COPC) and the toxicology consult service in the treatment of poisoned patients and management of adverse drug reactions. Our research investigates drug and toxicant effects, as well as poison prevention and population-based poison control. We provide important consultation resources to hospital-based and community physicians across Ohio, supporting them as they continue to treat poisoned patients in their own communities.

Faculty



Marcel J. Casavant, MD
Chief

- Alexandra R. Funk, PharmD, DABAT
- Hannah L. Hays, MD, FACEP, FAACT
- Natalie I. Rine, PharmD, BCPS, BCCCP
- Jason Russell, DO
- Henry Spiller, MS, DABAT

Highlights From the Past Year

Medical and pharmacy students, and physicians from emergency medicine, pediatrics, internal medicine, pediatric emergency medicine and child abuse training programs, benefit from rotations with the Section of Toxicology and the COPC. We teach the public through frequent media interviews and programs. We also help local, county and state agencies prepare effective responses to mass-casualty events and to terrorism involving biological, chemical and radiological hazards. The section is an important resource for Ohio’s childhood lead poisoning prevention program. The COPC serves the citizens of 64 Ohio counties. The 18 specially-trained, nationally-certified nurses and pharmacists handle poison exposure cases from the public, health care professionals, health departments and emergency medical services. Certified by the American Association of Poison Control Centers, the COPC has been improving the care of poisoned patients for 64 years.

With our nationally-recognized Be Poison Smart!® public education program, the COPC works to reduce the incidence of childhood poisonings throughout Ohio. Our Be Poison Wise!SM program helps older adults prevent poison exposures and medication mistakes. The COPC plays an important role in toxic surveillance, communications and emergency professional education in preparation for and during a community disaster. Research to describe important poisoning hazards and to reduce the incidence of poisoning is conducted with the Center for Injury Research and Policy in the Abigail Wexner Research Institute at Nationwide Children’s Hospital.

Selected Publications

Francis M, Spiller HA, Badeti J, Funk AR, Casavant MJ, Michaels NL, Zhu M, Smith GA. Suspected suicides and nonfatal suicide attempts involving antidepressants reported to United States poison control centers, 2000-2020. *Clinical Toxicology*. 2022;60(7):818-826.

Gable CJ, Spencer SP, Middelberg LK, Scherzer D, Suer M, Casavant MJ. Pediatric exploratory ingestions involving novel pill pack packaging. *The American Journal of Emergency Medicine*. 2022 Mar;(53):282.

Leubitz A, Spiller HA, Joliff H, Casavant MJ. Prevalence and clinical characteristics of unintentional ingestion of marijuana in children younger than 6 years in states with and without legalized marijuana laws. *Pediatric Emergency Care*. 2021 Dec 1;37(12):969-9731.

Mezoff EA, Hays H, Shaikhkhalil A. Should clinicians prescribe non-FDA regulated dietary supplements when caring for children with hypovitaminosis D? *AMA Journal of Ethics*. 2022;24(5):353-360.

Michaels NL, Spiller HA, Badeti J, Sheftall AH, Funk AR, Smith GA. Benzodiazepine exposures among women of reproductive age in the United States, 2004-2018. *Human & Experimental Toxicology*. 2021;(40):1807-1816.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

\$396,473

Fast Facts: July 2021 – June 2022

Peer Consults: 3,507

Toxicology Poison Center Consults: 5,028

Poison Control Exposure Cases: 37,588

Department of Pediatrics

URGENT CARE

The Division of Urgent Care at Nationwide Children’s Hospital operates seven urgent care centers throughout the central Ohio area. Staffed by physicians, nurses, clinicians and technologists who specialize in the treatment of pediatric urgent care needs, our centers had more than 150,000 visits last year. Our centers offer a full complement of urgent care services including radiology, laboratory, suturing and splinting to meet the unique needs of pediatric patients in convenient locations — when and where they are needed most.

Faculty



Cynthia S. Zimm, MD, MBA, FAAP
Chief

Iham M. Alqudah, MD	Daniela A. Humphrey, DO	Jonathan J. Price, MD
Edward D. Alten, MD	Iram Jafri, MD	Joshua J. Prudent, MD
Robert R. Baun, MD	John F. Jennings, MD	Sheela R. Rao, MD
Luciana E. Berg, MD	Simmi Dogra Kulkarni, MD	John P. Sotos, MD
Deborah L. Blackwell, DO	Catherine A. Lambert, MD	Jerry M. Stultz, MD
Traci A. Bouchard, MD	Marc S. Leder, MD	Kathleen L. Sugrue, MD
Brian K. Bowden, MD	Rachael E. Levine, MD	Bethany D. Uhl, MD
Michael S. Chua, MD	Aaron J. Maki, MD	Rishi R. Verma, MD
Lori R. Deschene, MD	Timothy S. McClung, MD	Jennifer L. Wyse, MD
Rachel M. Feldkamp, MD	Kathryn E. Nuss, MD	
Karla R. Hauersperger, MD	Jan E. Perry, MD	

Highlights From the Past Year

Formerly associated with Emergency Medicine, the Division of Urgent Care became recognized as a distinct division and section under the Department of Pediatrics at Nationwide Children’s Hospital in 2022. This development coincided with the recruitment of Cynthia S. Zimm, MD, MBA, FAAP, the new Urgent Care chief. A pediatrician with more than 20 years of experience in general, emergency and urgent care pediatrics, Dr. Zimm earned her medical degree and completed her residency in Pediatrics at the Albert Einstein College of Medicine/ Jacobi Medical Center in New York. She also earned her Master of Business Administration from Indiana University. A fellow of the American Academy of Pediatrics, Dr. Zimm is passionate about education, high quality efficient care, education and evidence-based medicine.

Selected Publications

Berkowitz D, Cohen J, Shaukat H, Willner E, Herold S, Coco T, Pattishall A, Bhandari N, Ramsook C, Vinograd A, Yen T, Guins T, Berg L, Koutroulis I. Development of academic pediatric urgent care fellowships. *Journal of Pediatrics*. 2021 Jan;228:4-7.e2.

Carlson KM, Berman SK, Price J, Committee on Child Health Financing. Guiding principles for managed care arrangements for the health of newborns, infants, children, adolescents and young adults. *Pediatrics*. 2022;150(2):e2022058396.

Patel A, Cohen J, Pattishall A, Berkowitz D, Coco T, Herold S, Pierce M, Ramsook C, Vinograd A, Yen T, Berg L, Koutroulis I. The emergence of academic pediatric urgent care fellowships. *Pediatric Emergency Care*. 2021 Dec 1;37(12):e899-e900.

Uhl BD, Boutzoukas A, Gallup N, Patrick M, Stultz J, Porter C, Watson JR. Increasing adherence to acute otitis media treatment duration guidelines using a quality improvement approach. *Pediatric Quality & Safety*. 2021 Nov-Dec; 6: e501

Fast Facts: July 2021 – June 2022

Main Campus Urgent Care Visits: 44,091

Canal Winchester Urgent Care Visits: 16,244

Dublin Urgent Care Visits: 10,751

East Broad (Columbus) Urgent Care Visits: 21,575

Hilliard Urgent Care Visits: 18,288

Marysville Urgent Care Visits: 11,302

Westerville Urgent Care Visits: 27,695

Urgent Care Telehealth Visits: 195

Total Visits: 150,141

Department Reports

ANESTHESIOLOGY AND PAIN MEDICINE

The Department of Anesthesiology and Pain Medicine at Nationwide Children’s Hospital consists of fellowship-trained, board-certified pediatric anesthesiologists. The department provides anesthesiology and pain-management services for pediatric patients of all ages, from neonates through adolescents, requiring all types of surgical procedures, procedural sedation outside the operating room, acute and chronic pain management, and palliative care.

Faculty



Joseph D. Tobias, MD
Chief

Graciela Argote-Romero, MD	Kristin Chenault, MD	Seth Hayes, MD
Rita Banoub, MD	Kate Cicozi, MD	Renee Heng, MD
Ralph Beltran, MD	Marco Corridore, MD	Grant Heydinger, MD
Jason Bryant, MD	Olamide Dairo, MD	Lisa Humphrey, MD
Candice Burrier, MD	Ajay D’Mello, MD	Natalie Jacobowski, MD
Gregory Cambier, MD	Nicole Elsey, MD	Sarah Khan, MD
Richard Cartabuke, MD	Allison Greening, MD	Senthil G. Krishna, MD

Katherine Manupipatpong, MD	Aymen Naguib, MD	Lance Relland, MD	Ahsan Syed, MD
David Martin, MD	Vanessa Ng, MD	Devin Sanders, MD	Arlyne Thung, MD
Gregory Maves, MD	Rachel Ochotny, MD	Brian Schloss, MD	Joshua Uffman, MD
Christopher McKee, DO	Vanessa Olbrecht, MD	Erica Sivak, MD	Giorgio Veneziano, MD
Renata Miketic, MD	Ekua Owusu-Bediako, MD	Ashley Smith, MD	Brittany Willer, MD
Alok Moharir, MD	Priyal Patel, DO	Steven Smith, MD	Peter Winch, MD
Olubukola Nafiu, MD	Leila Reduque, MD	Timothy Smith, MD	

2021 – 2022 Fellows

Deanna Couser, MD	Andrea Martinez Velez, MD
Anuranjan Ghimire, MD	Amrish Patel, MD
Jay Holladay, DO	Laura Puertas-Ocio, MD
Birva Khara, MD	

Highlights From the Past Year

- Anesthesiology and Pain Medicine provided care at 43 different sites each day. The department includes 43 pediatric anesthesiologists, six palliative care physicians, and 55 certified registered nurse anesthetists. An attending pediatric anesthesiologist is present in the hospital at all times for emergency cases, consultations and airway management.
- During the 2021-2022 academic year, the department provided anesthetic care and procedural sedation services for more than 35,000 procedures.

- Members of the faculty are fellowship-trained in pediatric anesthesiology and board certified in Anesthesiology and Pediatric Anesthesiology by the American Board of Anesthesiology. Additional board certification is held in Pediatric Critical Care Medicine (three faculty), Pain Medicine (eight faculty), and General Pediatrics (four faculty). The Division of Pediatric Cardiac Anesthesiology includes six pediatric anesthesiologists with added expertise in the perioperative care of patients with acquired and congenital heart disease.
- The Acute Pain Service provides pain management services, including patient-controlled analgesia and regional anesthesia for hospital and home-based care.
- The department provides palliative care and hospice services with six full-time palliative care physicians, three of whom are boarded and trained in additional specialties including psychiatry, hematology and oncology, and cardiology.
- The fellowship program provides subspecialty training in pediatric anesthesiology for fellows in an ACGME-accredited program and international fellows from all over the world. Advanced subspecialty training is offered in pediatric cardiac anesthesia, pediatric regional anesthesia, quality improvement and safety, acute pain management, chronic pain management and palliative care.
- Departmental research initiatives are led by a Vice-Chair for academic affairs and supported by two postdoctoral research scientists, two clinical research nurses and four research associates. There are numerous ongoing prospective investigations in various areas of pediatric anesthesiology and acute care medicine. The department published more than 50 manuscripts in peer-reviewed journals and presented more than 55 abstracts at national meetings during the last academic year.
- Clinical research involves novel approaches to airway management, innovations in regional anesthesia and pain management techniques for acute post-surgical pain, the perioperative implications of comorbid conditions, including obstructive sleep apnea and COVID-19, use of novel pharmacologic agents in the pediatric population, and several quality improvement and safety initiatives. Additionally, the department is continuing their focused research on the impact of ethnicity and socioeconomic factors on perioperative care and surgical outcomes.
- During the upcoming year, we anticipate continued expansion of clinical services with coverage of additional operating room sites, expanded coverage in GI suites, and the initiation of procedural sedation services on H11. We also anticipate increases in the solid organ transplantation program and the fetal surgery program. There will be continued growth of chronic pain initiatives, including expansion of palliative care services, growth of the inpatient rehabilitation program for patients with complex pain issues, and continued care in the chronic pain clinic.

Selected Publications

Khawaja A, Tumin D, Beltran R, Tobias J, Uffman J. Incidence and causes of adverse events in diagnostic radiological studies requiring anesthesia in the Wake-Up Safe registry. *Journal of Patient Safety*. 2021 Dec 1;17(8):e1261-e1266.

Mpody V, Willer B, Owusu-Bediako E, Kemper A, Tobias J, Nafiu O. Economic trends of racial disparities in pediatric post-appendectomy complications. *Pediatrics*. 2021 Oct;148:e2021051328.

Munlemvo D, Tobias J, Chenault K, Naguib N. Prothrombin complex concentrate to treat coagulation disturbances: An overview with a focus on use in infants and children. *Cardiology Research*. 2022 Feb;13:18-26.

Wani T, John J, Rehman S, Bhaskar P, Sahabudheen A, Mahfoud Z, Tobias J. Point-of-care ultrasound to confirm endotracheal tube cuff position in relationship to the cricoid in the pediatric population. *Paediatric Anaesthesia*. 2021 Oct;31:1310-1315.

Willer B, Mpody C, Tobias J, Nafiu O. Association of race and family socioeconomic status with pediatric postoperative mortality. *JAMA Network Open*. 2022 Mar;5(3):e222989.

Department Reports

PATHOLOGY AND LABORATORY MEDICINE

The Department of Pathology and Laboratory Medicine at Nationwide Children’s Hospital provides a wide range of pediatric diagnostic services for hospitalized and ambulatory infants, children and adolescent patients. Laboratory services are provided through the main campus anatomic and clinical pathology laboratories, as well as multiple outpatient/reference laboratory testing facilities, Nationwide Children’s *Close To Home*SM and Urgent Care centers, and our freestanding Emergency Department.

Faculty



Shamlal Mangray, MB, BS
Chief, Pathology and Laboratory Medicine
Section Chief, Anatomic Pathology



Kathleen K. Nicol, MD
Medical Director,
Section Chief, Clinical Pathology



Vinay Prasad, MD
Section Chief,
Anatomic Pathology

Roshini Abraham, PhD
Peter B. Baker III, MD
Laura Biederman, MD
Daniel R. Boue, MD, PhD
Kristina Brannock, MD
Dustin Bunch, PhD
Srinivasa Chekuri, MB, BS
Sonja Chen, MB, BS
Catherine Chung, MD

Miriam R. Conces, MD
Bonita R. Fung, MD
Sophonie Jean, PhD
Samir Kahwash, MD
Amy L. Leber, PhD
Huifei Liu, MD, PhD
Erin K. Meyer, DO, MPH
Jeffrey Papiernik, MD
Christopher R. Pierson, MD, PhD
Amy L. Pyle-Eilola, PhD

Nilsa Del Carmen Ramirez-Milan, MD
Archana Shenoy, MD
Diana Thomas, MD
Huanyu Wang, PhD

Affiliated Faculty

Biochemical Genetics

Dennis W. Bartholomew, MD
Kim L. McBride, MD, MS

Steve and Cindy Rasmussen Institute for Genomic Medicine Clinical Laboratory

Melanie Babcock, PhD
Catherine Cottrell, PhD
Jesse Hunter, PhD
Kristy Lee, PhD
Marco Leung, PhD
Mariam Mathew, PhD
Ruthann B. Pfau, PhD

Shalini C. Reshmi, PhD
Matthew Schultz, PhD
Kathleen Schieffer

Neuromuscular Pathology

Zarife Sahenk, MD, PhD

2021 – 2022 Fellows

Michelle Smith, MD

Highlights From the Past Year

The Department of Pathology and Laboratory Medicine includes more than 26 pathologists and doctoral scientists with subspecialty expertise in pediatric pathology and laboratory medicine. This professional staff is supported by more than 400 technical staff who provide 24/7 coverage in critical patient care areas. As an integral part of Nationwide Children’s operations, our team provides specimen collection and diagnostic services in multiple service centers across Ohio. The department is planning to make a substantial investment in new technology to launch an ambitious digital pathology program in collaboration with the Biopathology Center.

The department practiced and built upon our One Team Values and behaviors to achieve best outcomes for our patients and each other by developing a departmental Diversity, Equity and Inclusion team. We established best practices for pediatric transfusions to optimize transfusion therapy by increasing the percentage of red blood cell transfusions meeting primary lab hemoglobin thresholds from 62.5% to 75% by July 2021 and sustaining through end of 2021. We continued to optimize the laboratory footprint through renovation projects to modernize lab bench spaces. As Nationwide Children’s transitioned in its COVID-19 response, Pathology and Laboratory Medicine provided support for the outpatient and employee collection and testing operations. This was accomplished through the implementation of multiple platforms for testing in the main laboratory, off-site labs and point-of-care testing, as well as support for primary care offices. In addition, the department remained committed to operational excellence by completing 248 lab testing/IT projects via the department project management pipeline. This included new assays, modification of existing assays, and validating updated laboratory analyzers to improve laboratory efficiency, quality and throughput. Laboratory and Courier Services was also awarded the 2021 Hank Birtcher Employee Safety Award.

As part of our core mission, we were actively involved in undergraduate and graduate medical education, and our faculty served in multiple leadership roles locally and nationally. Faculty highlights include:

- Vinay Prasad, MD, was appointed section chief, Anatomic Pathology and was promoted to professor within The Ohio State University Department of Pathology.
- Miriam Conces, MD, was promoted to associate professor within The Ohio State University Department of Pathology.
- Amy Pyle, PhD, was promoted to associate professor within The Ohio State University Department of Pathology.
- Sophonie Jean, PhD, was appointed director, Antimicrobial Susceptibility Testing and Immunoserology.
- Huanyu Wang, PhD, was appointed director, Molecular Microbiology.
- Archana Shenoy, MD, was appointed fellowship director for Pediatric Anatomic Pathology, and director of Pathology and Laboratory Medicine Outreach.
- Sonja Chen, MB, BS, was appointed director of Autopsy Service.
- Laura Biederman, MD, was appointed director of Electron Microscopy and Immunofluorescence.
- Srinivasa Chekuri, MB, BS, was appointed co-director of Pathology Informatics.
- Dustin Bunch, PhD, was appointed co-director of Pathology Informatics.
- Three anatomic/clinical pathologists were recruited in the last year, and we will recruit and develop faculty in the areas of cytopathology, hematopathology, hemostasis, transfusion medicine and flow cytometry.
- Roshini Abraham, PhD, was recognized by the Clinical Immunology Society (CIS) as the inaugural fellow (FCIS) for distinguished service, and honored by ClinGen with a Significant Contributor Excellence Award.
- Christopher R. Pierson, MD, PhD, received Honorable Mention for The Ohio State University Portfolio Coach of the Year.

Selected Publications

Kraft M, Pyle R, Dong X, Hagan J, Varga E, van Hee M, Boyce T, Pozos T, Yilmaz-Demirdag Y, Bahna S, **Abraham R**. Identification of 22 novel BTK gene variants in B cell deficiency with hypogammaglobulinemia. *Clinical Immunology*. 2021 Aug;229:108788.

Logan S, **Schieffer K**, **Conces M**, Stonerock E, Miller A, Fitch J, LaHaye S, Voytovich K, McGrath S, Magrini V, White P, Wilson R, Mardis E, **Cottrell C**, Koo S. Novel morphologic findings in PLAG1-rearranged soft tissue tumors. *Genes Chromosomes & Cancer*. 2021 Aug;60(8):577-585.

Wang H, **Jean S**, Wilson S, Lucyshyn J, McGrath S, Wilson R, Magrini V, **Leber A**. A deletion in the N gene of SARS-CoV-2 may reduce test sensitivity for detection of SARS-CoV-2. *Diagnostic Microbiology and Infectious Disease*. 2022 Apr;102(4):115631.

Ziegler G, Slaughter J, Chaudhari M, Singh H, Sánchez P, **Bunch D**. Preterm to term infant postmenstrual age reference intervals for thyroid-stimulating hormone and free thyroxine. *Pediatric Research*. 2022 Apr;91(5):1130-1135.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

\$21,786,339

Department Reports

PHYSICAL MEDICINE AND REHABILITATION

The Section of Physical Medicine and Rehabilitation at Nationwide Children’s Hospital specializes in the diagnosis and management of children with physically disabling conditions. Our physicians are board-certified specialists in Physical Medicine and Rehabilitation with additional certification in pediatric rehabilitation medicine and are members of the departments of Pediatrics, and Physical Medicine and Rehabilitation at The Ohio State University College of Medicine. In addition, Carl D. Gelfius, MD, is board certified in electrodiagnostic medicine. Carl D. Gelfius, MD, Karl Klamar, MD, and Reginald D. Talley, MD, are board certified in brain injury medicine.

Faculty



Michelle A. Miller, MD
Chief

- Carl D. Gelfius, MD
- Amy D. Hiller, DO
- Karl W. Klamar, MD
- Wilawan Nopkhun, MD
- Nathan S. Rosenberg, MD
- Reginald D. Talley, MD

2021 – 2022 Fellows

- Dana Miller, MD
- Noel Pristas, MD

Highlights From the Past Year

Physical Medicine and Rehabilitation was actively involved in the teaching of medical students, medical residents and fellows over the past year. We offer a pediatric rehabilitation rotation to the Physical Medicine and Rehabilitation residents from Larkin Community Hospital and the Palm Spring Branch of Larkin. Presentations on pediatric rehabilitation, concussion, neuromuscular disorders, musculoskeletal disorders, spasticity management and pediatric traumatic brain injury were made at local, regional, national and international levels.

Clinically, we provide services to the multidisciplinary brachial plexus team, the wheelchair seating and equipment clinic, and the EMG laboratory. We also continue services to our CARF (Commission on Accreditation of Rehabilitation Facilities)-accredited inpatient rehabilitation unit, the inpatient consult service and the following outpatient clinics: General Rehabilitation, Myelomeningocele, Botulinum Toxin, Concussion, Gait Lab, Neuro-oncology and Non-Accidental Traumatic Brain Injury.

Selected Publications

Kalbus, J., Hiller, A., Nopkhun, W. (November 2021) Recurrent acute necrotizing encephalopathy following viral infections in a child with a ranbp2 mutation: A case report. AAPMR Annual Meeting 2021, virtual meeting.

Miller, M, Meilahn, JR. “Adaptive Sports and Recreation.” In *Pediatric Rehabilitation: Principles and Practice*, 6th ed. Edited by Murphy K, McMahon M, and Houtrow A. (New York, Springer Publishing, 2021), chapter 13.

Pristas N, Klamar K, Napolitano J, Rosenberg N. Acute on chronic cervical myelopathy causing cervical segmental myoclonus in a high-level wheelchair athlete: a case report. *Spinal Cord Series and Cases*. 2021 Sep 29;7(1):90.

Pristas N, Rosenberg N, Pindrik J, Ostendorf A, Lundine J. An Observational report of swallowing outcomes following corpus callosotomy. *Epilepsy & Behavior*. 2021 Oct;123:108271.

Rosenberg, N. Predicting and enhancing outcomes in traumatic brain injury. Pediatric Trauma Society 2021 Annual Meeting, November 2021, Baltimore, MD.

Rosenberg, N. Rehabilitation options in multiple phases of recovery. Rare Neuroimmune Disease Symposium 2021, October 2021, virtual meeting.

Fast Facts: July 2021 – June 2022

- Inpatient Discharges: 85
- Observation and Outpatient-in-a-Bed Discharges: 2
- Total Discharges: 87
- Average Length of Stay*: 23.5
- Average Daily Census*: 5.5
- Patient Days*: 1,996

- Inpatient Consults: 445
- Number of Beds: 12
- Physical Medicine Clinic Visits: 5,798
- Myelomeningocele (Spina Bifida) Clinic Visits: 692
- School-Based Seating Clinic Visits: 12
- *Excludes observation and outpatient-in-a-bed patients



“Everyone needs to see suicide prevention as part of their role.”
– Meredith Chapman, MD

Behavioral Health

Zero Suicide: A Comprehensive Framework for Pediatric Hospitals

Suicide is the second leading cause of death among 10- to 24-year-olds, and the number of youths presenting to pediatric hospitals for suicide-related concerns has doubled in recent years.

Suicide is more than just a mental health problem, it’s a social justice and public health issue, says **Meredith Chapman, MD**, medical director of the Center for Suicide Prevention and Research at Nationwide Children’s. Dr. Chapman presented on Nationwide Children’s implementation and expansion of Zero Suicide at the annual American Academy of Child and Adolescent Psychiatry meeting.

Zero Suicide is a comprehensive approach to suicide prevention and intervention with a central idea: suicide prevention is an organizational responsibility, not just for individual providers or the behavioral health department.

“It takes leadership and vision,” says Dr. Chapman, who is also an associate professor of Psychiatry at The Ohio State University College of Medicine. “Everyone needs to see suicide prevention as part of their role and part of the mission of their organization. It requires that everyone buy in and appreciate that this is an issue that affects us all.”

Zero Suicide uses standardized, evidence-based tools to identify and assess suicide risk and intervene. It also trains health care professionals to be competent and confident in implementing these tools.

In addition, Dr. Chapman says that the program’s emphasis on tracking and using data to continuously improve efforts fit well into Nationwide Children’s existing culture of quality and safety.

Next year, Nationwide Children’s will expand their Zero Suicide work to other pediatric practices around Ohio.

“We will work with other children’s hospitals in Ohio to better track real-time data related to suicide attempts and deaths from suicide across the state,” says Dr. Chapman. “We are also working at a national level with other pediatric hospitals around the country to define the gold standard of care for suicidal youth.”

Through Nationwide Children’s implementation of the Zero Suicide framework, Dr. Chapman highlighted how pediatric health care systems can drive change and innovation in suicide prevention and intervention.

“We know that a lot of people who die by suicide, youths included, have contact with a health care provider before their deaths,” says Dr. Chapman. “And mostly, it’s not mental health care providers, it’s primary care doctors or emergency department visits.

“As health care providers, we all have the opportunity to ask directly about suicide, show people we care and intervene meaningfully.”

REFERENCE:

Chapman, MR. 2021. Journey to best outcomes: Zero suicide implementation and expansion at Nationwide Children’s Hospital. *Journal of the American Academy of Child and Adolescent Psychiatry*. 60 (10): S31. Doi: 10.1016/j.jaac.2021.07.138.

Department Reports

BIG LOTS BEHAVIORAL HEALTH SERVICES

Faculty



David A. Axelson, MD

Medical Director of Behavioral Health Services and Chief of Psychiatry and Behavioral Health, Nationwide Children's Hospital

Chief, Division of Child and Family, Department of Psychiatry and Behavioral Health, The Ohio State University

Highlights From the Past Year

Big Lots Behavioral Health Services at Nationwide Children’s Hospital is a comprehensive service line dedicated to children and adolescents affected by mental illness and problems of emotion, behavior, development, thought and adaptation to life challenges, including those associated with physical illness and trauma. We are committed to partnering with patients, families and referring primary care clinicians and specialists to deliver services of public health relevance and to achieve the best possible clinical outcomes. Because no single discipline or professional can adequately address the needs of every child, our approach is deliberately multidisciplinary and collaborative.

Care is typically delivered by a team composed of a combination of child and adolescent psychiatrists, developmental and behavioral pediatricians, psychologists and neuropsychologists, advanced practice providers, nurses, social workers, family therapists and counselors. By working together, we aim to deliver team-based care that transcends the work of individual professionals, incorporating evidence-based practices into active clinical settings and establishing high standards of quality, safety and customer satisfaction. Faculty from the Department of Pediatrics and the Child and Adolescent Division of the Department of Psychiatry and Behavioral Health provide clinical care for the service line.

In March 2020, Nationwide Children’s opened the Big Lots Behavioral Health Pavilion. As the most comprehensive pediatric facility of its kind nationally, the Pavilion houses integrated behavioral health services, including inpatient psychiatric beds, a psychiatric crisis evaluation center with observation beds, a crisis stabilization unit, a partial hospital program, intensive outpatient program and outpatient clinics. Over the past year, we saw significant growth in the volume of patients served by programs in the Pavilion. The Behavioral Health Pavilion serves as a place to conduct trainings for the wide range of disciplines in pediatric mental and behavioral health, as well as foster collaboration with Nationwide Children’s research teams and community partner agencies. The service line has hosted representatives from many pediatric hospitals and behavioral health organizations that have asked to visit and learn about the design and service delivery at the Big Lots Behavioral Health Pavilion.

In addition to being one of the largest outpatient service lines at Nationwide Children’s, we are also the largest pediatric behavioral health network of any children’s hospital in the country, with about 250,000 outpatient visits completed in the last year. Clinical services within behavioral health serve as a setting for training a wide range of disciplines. Associated training programs include pre-professional internships in psychology, social work and clinical counseling; fellowships in child and adolescent psychiatry and in developmental behavioral pediatrics; postdoctoral psychology fellowships in pediatric psychology, neuropsychology, child clinical, intellectual and developmental disabilities and autism treatment; a postgraduate fellowship program in child and adolescent mental health for advanced practice nurses; and externships for psychiatric and mental health advanced practice nurses, clinical counselors, social workers, family therapists and psychologists. In addition, medical students, residents in psychiatry, pediatric and family practice, and nursing students all have training experiences and rotations within the service line. The service line supports a diverse portfolio of clinical research studies, many of which are led by investigators from the Center for Biobehavioral Health, the Center for Suicide Research and Prevention, and the Child Development Center Research Program, as well as collaborations with the Steve and Cindy Rasmussen Institute for Genomic Medicine. By integrating clinical, educational, research and advocacy efforts, we strive to improve the lives of children and families in central Ohio and beyond. The programs within Behavioral Health Services are described below.

The Child Development Center and Center for Autism Spectrum Disorders provide services to individuals with intellectual and developmental disabilities, including those with autism spectrum disorders. The Child Development Center offers a range of services to address the developmental and behavioral needs of children, adolescents and families of those with autism spectrum disorders and other developmental disabilities. These services include interdisciplinary assessment and treatment, psychological evaluation and treatment, family interventions, advocacy support and care coordination with medical, speech and additional services. The Child Development Center provides integrated care in more than a dozen pediatric subspecialty clinics. It also serves as a site for Autism Speaks’ Autism Care Network, which has more than 25 sites across the United States and Canada. The center’s psychologists are also involved in several other national research networks including the Simons Foundation SPARK Autism Network, the largest genetic research registry for individuals with autism spectrum disorder.

The Center for Autism Spectrum Disorders provides comprehensive, multidisciplinary care focusing on evidence-based treatment, education, research and advocacy for children diagnosed with autism spectrum disorder. Services include intensive behavioral intervention and consultation, school support and educational consultation, Asperger syndrome counseling, social skills groups, parent teaching, advocacy and community education.

Pediatric Psychology and Neuropsychology has clinical services in two primary areas: Pediatric Psychology provides specialized assessment and intervention services that focus on the relationship between cognitive, social and emotional functioning and physical health, typically for children with co-occurring medical conditions (e.g., cancer, diabetes, sickle cell disease); Pediatric Neuropsychology performs specialized evaluations for children and adolescents with a range of medical and neurological disorders that impact thinking or behavior (e.g., brain tumors, epilepsy, seizure disorders, traumatic brain injury). The section provides care throughout the hospital, including inpatient medical units, medical specialty outpatient clinics and the Psychology Clinic at Nationwide Children’s.

Psychologists act as liaisons to divisions within the departments of Pediatrics and Psychiatry to provide expertise in clinical care and to assist in development of research and quality initiatives around the psychosocial care for patients and families. In 2021, Pediatric Psychology continued to provide inpatient consultation and liaison, and outpatient services. One area of continued expansion has been integrating pediatric psychologists into our Primary Care Centers as well as supporting collaborations for behavioral health integration programs in initiatives designed by Partners For Kids. Also, Pediatric Psychology expanded already established integrated care programs within Gastroenterology, the Pediatric Feeding and Swallowing Program, and acute psychiatry settings within the Big Lots Behavioral Health Pavilion. Additionally, there is a history of psychologists providing leadership in several programs within the Department of Pediatrics at Nationwide Children’s, with roles such as director of Psychosocial Services for the Division of Hematology, Oncology & Blood and Marrow Transplant, psychosocial leadership in areas of gastrointestinal care and the Newborn Intensive Care Unit, program leadership in the interdisciplinary feeding program for children with feeding problems, and the comprehensive interdisciplinary pain program. Pediatric Psychology continued to

provide leadership for the Nationwide Children’s Intensive Pain Rehabilitation and Education Program in its first year of operation and continued to provide clinical leadership in the *On Our Sleeves*® movement for children’s mental health. See page 107 for a list of faculty, selected publications and grants awarded.

Psychiatry and Community Behavioral Health is the largest and most clinically diverse section of Behavioral Health Services. This integrated program of care for pediatric mental disorders spans a comprehensive spectrum, from prevention services to inpatient psychiatric units. Services currently available include pediatric crisis assessment and treatment within an expanded Youth Crisis Stabilization Unit, consultation-liaison services for youth who are hospitalized at Nationwide Children’s, psychiatric inpatient beds at Nationwide Children’s, Partial Hospital Program, multiple levels of care for eating disorders in collaboration with Adolescent Medicine, intensive outpatient services within the Mood and Anxiety Program, intermediate levels of behavioral health care in the community, including in the courts and schools, specialized services for early child mental health, outpatient treatment clinics and a novel program to integrate mental health service delivery in primary care settings. Over the past year, we continue to focus on refining and expanding services at the new Big Lots Behavioral Health Pavilion. In 2022, the Early Child Mental Health program moved into a new, expanded facility which includes a Therapeutic Interagency Preschool program. This program provides comprehensive, multidisciplinary behavioral health care and education to preschoolers who can benefit from intensive services. See page 138 for a list of faculty, selected publications and grants awarded.

Center for Biobehavioral Health: See page 185 for information about the Center for Biobehavioral Health in the Abigail Wexner Research Institute at Nationwide Children’s Hospital.



Grants Awarded to Clinical and Research Faculty

JULY 1, 2021 – JUNE 30, 2022
\$10,651,962

Fast Facts: July 2021 – June 2022

- Outpatient Visits/Consults: 262,651
- Inpatient Consults: 5,293
- Inpatient Discharges: 2,198
- Inpatient Days: 13,466
- Child Development Center Visits: 12,073
- Child Development Center Medical Clinic/Outpatient Consultation Visits: 1,555
- Center for Autism Spectrum Disorders Visits: 33,790

Department Reports
PSYCHIATRY AND COMMUNITY BEHAVIORAL HEALTH

Psychiatry and Community Behavioral Health at Nationwide Children’s Hospital is the largest and most clinically diverse section of the Big Lots Behavioral Health Service Line. This integrated program of care for pediatric mental health conditions spans a comprehensive spectrum of care from prevention services to inpatient psychiatric units. The Child and Family Division in The Ohio State University Department of Psychiatry and Behavioral Health has faculty at Nationwide Children’s. See page 133 for details and for information about all Behavioral Health services.

Faculty



David A. Axelson, MD
Chief

- | | | |
|------------------------|-------------------------|-------------------------------|
| John Ackerman, PhD | Meredith Chapman, MD | Richard H. Gilchrist, MD |
| Kento Akasaka, DO | Joyce Chen, MD | Charles J. Glawe, MD |
| Benjamin Albrecht, DO | Allison Collier, MD | Adam Goldberg, MD |
| Jaclyn Aldrich, PhD | Nancy Cunningham, PsyD | Jocelyn Hart, MD |
| Samanta Boddapati, PhD | Benjamin Fields, PhD | Karah Harvey-Nuckles, MD, MPH |
| Jeffrey A. Bridge, PhD | Michael Flores, PhD | Caroline Hodgson, PhD |
| Katie Burkhouse, PhD | Cynthia Fontanella, PhD | Ariana Hoet, PhD |
| Eric Butter, PhD | Mary Fristad, PhD | Amy Hoisington-Stabile, MD |
| Catherine Butz, PhD | Bela M. Gandhi, MD | Jennifer Hughes, PhD |

- | | | | |
|------------------------------|--------------------------|-----------------------|------------------------|
| Geeta Ilipilla, MD | Molly Meers, PhD | Stephen Scott, DO | Pankhuree Vandana, MD |
| Natalie Jacobowski, MD | Elizabeth Moore, PhD | Arielle Sheftall, PhD | Elizabeth Vickery, PhD |
| Kristina R. Jiner, MD | Christine Oh, MD | Allison Sirocky, PhD | Kelly Wesolowski, PsyD |
| Anna Kerlek, MD | Ijeoma Osigwe, PhD | Lisa Sperle, PhD | Kristopher West, PhD |
| Oula Khoury, PhD | Jessica Palilla, PhD | Maria Stamatakos, MD | Nicole White, MD |
| Robert A. Kowatch, MD, PhD | Jennifer Reese, PsyD | Griffin A. Stout, MD | Heather Yardley, PhD |
| Rajeev Krishna, MD, PhD, MBA | Margaret Rosencrans, PhD | Shanna Swearingen, MD | Musa Yilanli, MD |
| Scott Leibowitz, MD | Eileen Ryan, DO | Glenn Thomas, PhD | |
| Gina McDowell, LPCC-S | Nadine Schwartz, MD | Raymond Troy, MD | |

Selected Publications

Birmaher B, Hafeman D, Merranko J, Zwicker A, Goldstein B, Goldstein T, Axelson D, Uher R. Role of polygenic risk score in the familial transmission of bipolar disorder in youth. *JAMA Psychiatry*. 2022 Feb 1;79(2):160-168.

Brickman HM, Fristad MA. Psychosocial treatments for bipolar disorder in children and adolescents. *Annual Review of Clinical Psychology*. 2022 May 9;18:291-327.

Hughes JL, Asarnow JR. Implementing and adapting the SAFETY treatment for suicidal youth: The incubator model, telehealth, and the COVID-19 pandemic. *Cognitive and Behavioral Practice*. 2022 Feb;29(1), 198-213.

Penfold RB, Thompson EE, Hilt RJ, Schwartz N, Robb AS, Correll CU, Simon GE. Development of a symptom-focused model to guide the prescribing of antipsychotics in children and adolescents: Results of the first phase of the safer use of antipsychotics in youth (SUAY) clinical trial. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2022 Jan;61(1):93-102.

Reese JB, Ramtekkar U. Telebehavioral health: Workforce, access, and future implications. *Psychiatric Clinics of North America*. 2022 Jun;45(2):313-319.

Ruch DA, Heck KM, Sheftall AH, Fontanella CA, Stevens J, Zhu M, Bridge JA. Characteristics and precipitating circumstances of suicide among children aged 5 to 11 years in the United States, 2013-2017. *JAMA Network Open*. 2021 Jul 1;4(7):e2115683.

Sheftall AH, Vakil F, Ruch DA, Boyd RC, Lindsey MA, Bridge JA. Black youth suicide: Investigation of current trends and precipitating circumstances. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2022 May;61(5):662-675.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022
\$1,387,331

Fast Facts: July 2021 – June 2022

- Community-Based Therapy Visits: 37,672
- Office-Based Therapy Visits: 97,960
- Partial Hospital/Intensive Outpatient Program Visits: 6,063
- Psychiatric Crisis Department: 8,475
- Psychiatry Clinic Visits: 28,833
- Psychiatry Inpatient Consultations: 1,596
- Psychiatry Inpatient Unit Discharges: 991
- Youth Crisis Stabilization Unit Discharges: 1,238

Department Reports
RADIOLOGY

The Department of Pediatric Radiology at Nationwide Children’s Hospital is one of the nation’s premier imaging programs for children, with subspecialty expertise in abdominal, cardiac, chest, fetal/neonatal, interventional, musculoskeletal, neuroimaging and nuclear imaging. We provide expert care in image-guided diagnosis and therapy.

Our mission is to improve children’s lives through innovative imaging. The major philosophical consideration that drives our mission is that children are not small adults. Technology must be adapted to meet the needs of pediatric patients to create imaging biomarkers specific for pediatric disease. We approach imaging with the following goals in mind:

- Develop and validate imaging biomarkers specific to pediatric disease
- Determine quality, safety and cost-effectiveness of validated imaging biomarkers for discrete patient care pathways
- Integrate imaging biomarkers across the research and clinical spectrums
- Utilize Pediatric Advanced Imaging Resource (PAIR) analysts to provide advanced analysis of images

Faculty



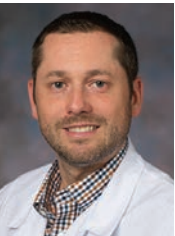
Ellen Chung, MD
Interim Chief



Jeremy Jones, MD
Vice Chief, Pediatric Radiology



Brent Adler, MD
Section Chief, Body Imaging



Adam Bobbey, MD
Section Chief, Nuclear Medicine and Molecular Imaging



Leah Braswell, MD
Section Chief, Interventional Imaging

- Lamya Atweh, MD
- David Gregory Bates, MD
- Nathan Fagan, MD
- Mai-Lan Ho, MD
- Mark Hogan, MD
- Rajesh Krishnamurthy, MD
- Anna Lillis, MD, PhD
- Lisa Martin, MD
- Aaron McAllister, MD
- Kathryn Milks, MD
- James Murakami, MD

- Becky Murray, MD
- Julie O’Donovan, MD
- Andrew Rabe, DO
- Mitch Rees, MD
- Diana Rodriguez, MD
- Lynne Ruess, MD
- Jerome Rusin, MD
- Jeremy Sabado, MD
- Summit Shah, MD
- Sally Smith, DO
- Benjamin Thompson, DO

- Patrick Warren, MD
- Cody Young, DO
- Nicholas Zumberge, MD

2021 – 2022 Pediatric Diagnostic Fellows

- Sanket Patel, MBBS
- Jasmeet Singh, MBBS

Highlights From the Past Year

Radiology has had several clinical advancements over the past year. A few notable accomplishments:

- Cardiac Imaging: Pursuing efficiencies in workflow to reduce turnaround time of cardiac imaging studies, including rapid myocardial characterization using 3T, abbreviated and unsedated 4D flow studies with free breathing in congenital heart disease, and streamlined processing and reporting workflow.
- Body Imaging: Continued growth in fetal imaging services; hepatic imaging continues to grow in sophistication and scope; more extensive vascular imaging is being routinely done on transplant and liver resection patients cared for by hepatology and surgery.
- Oncologic Imaging: Continued growth and utilization of tumor metrics to track lesions in patients enrolled in clinical trials; implementing Lutathera radiotherapy for patients with somatostatin receptor avid brain tumors.
- Neuroimaging: Continued expansion of study specific MRI protocols and metrics with neuro-oncology; exploration of utility of low field strength MRI in setting of hydrocephalus, in conjunction with neurosurgery; establishment and support of monthly multidisciplinary skull base conference.
- Interventional Radiology: Building relationships with new and growing hospital programs such as hepatology, transplant surgery, and intestinal rehabilitation; providing targeted gene therapy to support research efforts; continuing to expand vascular anomaly and lymphatic flow disorders practice; presenting scientific work and publications in rare diseases, including aneurysmal bone cysts.
- Our cardiac research team has had several key publications regarding the use of biomechanical flow modeling using patient-specific 3D printed models and computational modeling of risk of sudden cardiac death in children. They have begun the first study of 4D flow in sheep fetuses using blood pool contrast agent for hemodynamic monitoring of fetal interventions as part of a collaborative effort with the tissue engineering group.
- Additionally, our imaging faculty lead and promote multi-institutional data sharing through large patient registries, including the Imaging Registry for Orphan and Rare Disease (IROAR) at the American College of Radiology and its association with PEDSnet, the Fontan Outcome Registry Using Cardiac Magnetic Resonance Imaging Examinations (FORCE), and Longitudinal study of aortic disease in children (CLARITY).

Selected Publications

Bambach S, Smith M, Morris PP, Campeau NG, Ho ML. Arterial spin labeling applications in pediatric and adult neurologic disorders. *Journal of Magnetic Resonance Imaging*. 2022 Mar;55(3):698-719.

Blum KM, Zbinden JC, Ramachandra AB, Lindsey SE, Szafron JM, Reinhardt JW, Heitkemper M, Best CA, Mirhaidari GJM, Chang YC, Ulziibayar A, Kelly J, Shah KV, Drews JD, Zakko J, Miyamoto S, Matsuzaki Y, Iwaki R, Ahmad H, Daulton R, Musgrave D, Wiet MG, Heuer E, Lawson E, Schwarz E, McDermott MR, Krishnamurthy R, Krishnamurthy R, Hor K, Armstrong AK, Boe BA, Berman DP, Trask AJ, Humphrey JD, Marsden AL, Shinoka T, Breuer CK. Tissue engineered vascular grafts transform into autologous neovessels capable of native function and growth. *Communications Medicine*. 2022 Jan 10;2:3.

Chaudhari B, Ho ML. Congenital brain malformations: an integrated diagnostic approach. *Seminars in Pediatric Neurology*. 2022 Apr 22;100973. [Epub ahead of print]

Krishnamurthy R, Masand PM, Jadhav SP, Molossi S, Zhang W, Agrawal HM, Mery CM. Accuracy of computed tomography angiography and structured reporting of high-risk morphology in anomalous aortic origin of coronary artery: comparison with surgery. *Pediatric Radiology*. 2021 Jul;51(8):1299-1310.

Wiesinger F, Ho ML. Zero-TE MRI: principles and applications in the head and neck. *British Journal of Radiology*. 2022 Jun 10:20220059. [Epub ahead of print]

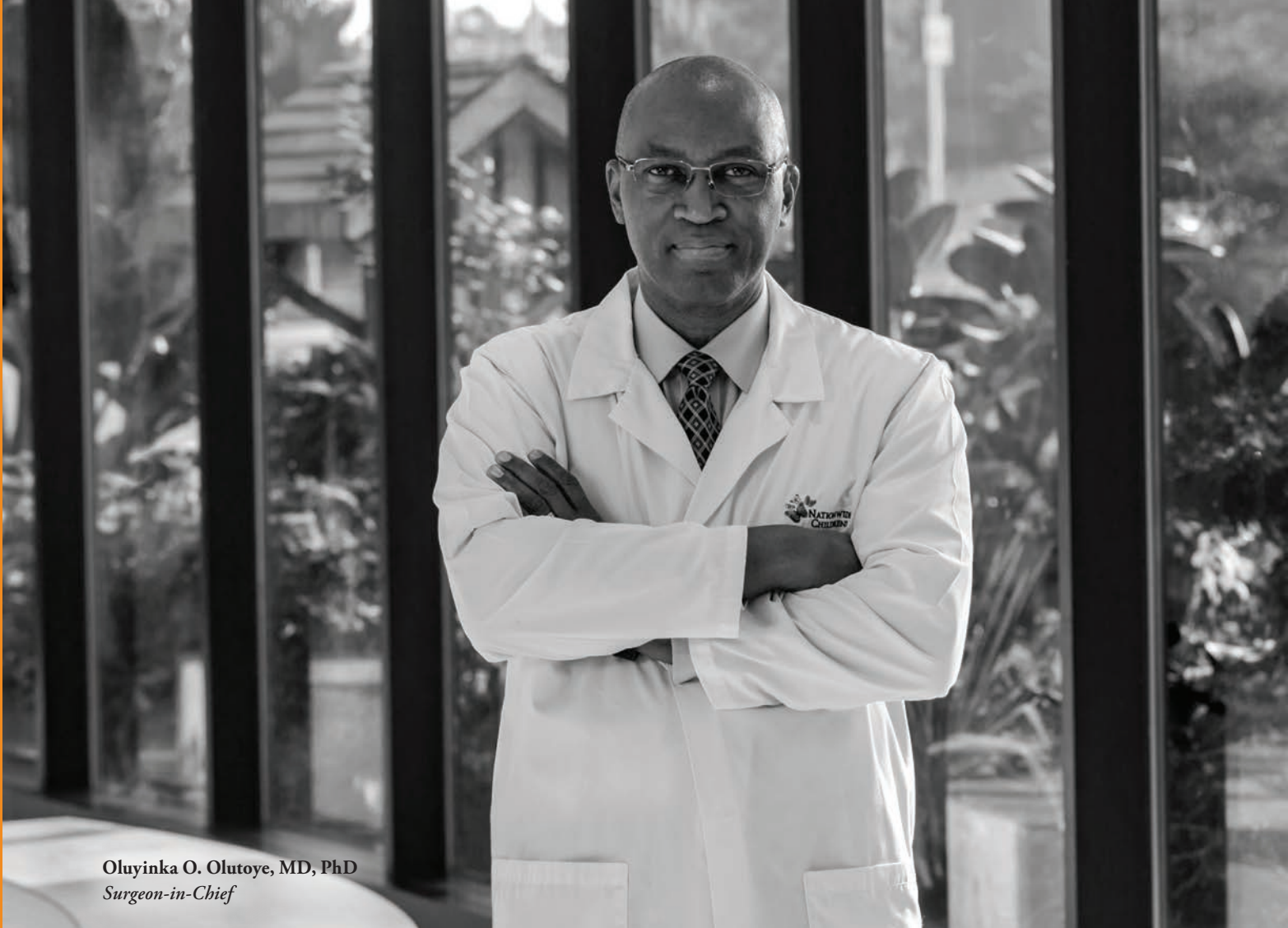


Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

\$163,639





Oluyinka O. Olutoye, MD, PhD
Surgeon-in-Chief

SURGICAL SERVICES

Nationwide Children’s Hospital’s surgical departments have come together with a single, clear focus — to provide optimal outcomes for every child — inside and outside the walls of the operating room. This work is predicated on three core pillars — providing advanced clinical care, performing ground-breaking research and offering industry-leading training programs — that combine to provide the best care for every child.

Our faculty are helping to improve the care provided to children around the world by training the next generation of surgeons. Our departments offer the most surgical residency and fellowship programs of any free-standing pediatric hospital in the United States. Training programs are also offered to other surgeons, providing opportunities for them to advance their skills in more advanced techniques such as minimally invasive surgery, robotic assisted surgery and complex colorectal surgery.

SURGICAL SUBSPECIALTIES

- Abdominal Transplant and Hepatopancreatobiliary Surgery
 - Cardiothoracic Surgery
 - Colorectal and Pelvic Reconstruction
 - Dentistry
- Neurosurgery
 - Ophthalmology
 - Orthopaedics
 - Otolaryngology
 - Pediatric and Adolescent Gynecology
- Pediatric Surgery
 - Plastic and Reconstructive Surgery
 - Trauma
 - Urology

Surgical Services
ABDOMINAL TRANSPLANT AND HEPATOPANCREATOBILIARY SURGERY

The Department of Abdominal Transplant and Hepatopancreatobiliary Surgery at Nationwide Children’s is leading the way in providing liver and kidney transplantation as well as surgical treatment of children with pancreatic and hepatobiliary conditions. A national and international destination, the department serves as the principal surgical component for several advanced multidisciplinary programs, including the Pancreas and Liver Care Center and Kidney Transplant. Surgical capabilities include many advanced procedures available at only a handful of children’s hospitals in the United States. Program highlights include:

- Total pancreatectomy with islet autotransplantation (TPIAT) for children with debilitating pain and impaired quality of life from acute recurrent or chronic pancreatitis
- The only pediatric hospital in the United States with a dedicated on-site islet isolation facility
- Advanced liver surgery options and all technical variant transplant grafts, including reduced-size grafts, split liver grafts and living donor transplantation
- Liver transplants in very young patients (<12 months)
- Highly specialized hepatobiliary surgery team with extensive experience in hepatoportoenterostomy (Kasai) for biliary atresia, choledochal cyst resection and complex resections of tumors and masses
- Expertise in portal hypertension operations, including meso-Rex shunts for extrahepatic portal vein thrombosis, distal splenorenal shunts and mesocaval shunts
- Autologous intestinal reconstruction surgery, including the Bianchi procedure and the serial transverse enteroplasty procedure (STEP), for children with short bowel syndrome

Faculty



Jaimie D. Nathan, MD
Chief, Abdominal Transplant and Hepatopancreatobiliary Surgery

KIDNEY TRANSPLANT
PEDIATRIC SURGERY AND
KIDNEY TRANSPLANT

- Jaimie D. Nathan, MD
- Amer Rajab, MD, PhD
- Sara Rasmussen, MD, PhD
- Christie Heinzman, DNP, APRN

NEPHROLOGY

- Brian Becknell, MD, PhD
- O. N. Ray Bignall II, MD
- Mahmoud Kallash, MD
- John D. Mahan, MD
- Tahagod Mohamed, MD

- Hiren P. Patel, MD
- William E. Smoyer, MD
- John David Spencer, MD
- Emily J. Stonebrook, MD
- Beth A. Vogt, MD
- Diana Zepeda-Orozco, MD

UROLOGY

- Christina B. Ching, MD
- Rama Jayanthi, MD
- Daryl J. McLeod, MD

PANCREAS AND LIVER
CARE CENTER
HEPATOPANCREATOBILIARY
SURGERY AND LIVER
TRANSPLANT

- Jaimie D. Nathan, MD
- Ashley Limkemann, MD
- Sara Rasmussen, MD, PhD
- Christie Heinzman, DNP, APRN

GASTROENTEROLOGY,
HEPATOLOGY AND NUTRITION

- A. Jay Freeman, MD, MSc
Medical Director, Pancreas Care
- Cheryl E. Gariepy, MD

Monique L. Goldschmidt, MD <i>Medical Co-Director, Liver Care</i>	Alexander Weymann, MD <i>Medical Director, Liver Care</i>	Ajay D’Mello, MD	ENDOCRINOLOGY
Muhammad A. Khan, MD, MPH <i>Director, Interventional and Diagnostic Endoscopy</i>	ANESTHESIOLOGY AND PAIN MEDICINE	Greg Maves, MD	Kajal K. Gandhi, DO, MPH
Carol J. Potter, MD	Graciela Argote-Romero, MD	Renata Miketic, MD	Robert Hoffman, MD
Ala K. Shaikhkhalil, MD	Candice Burrier, MD	Timothy Smith, MD	Jennifer Ladd, MD
	Linda Chun, MD	Ahsan S. Syed, MD	HEMATOLOGY/ONCOLOGY
		Brittany Willer, MD	Mark A. Ranalli, MD

INFECTIOUS DISEASE	ISLET CELL TRANSPLANTATION AND BETA CELL BIOLOGY	Siddharth Narayanan, PhD <i>Research Scientist</i>	PEDIATRIC PSYCHOLOGY
Monica I. Ardura, DO, MSCS	Balamurugan N. Appakalai, PhD <i>Director</i>	Krishna Kumar Samaga, MS <i>Chief Research Associate</i>	Allison M. Hatley-Cotter, PhD
Christopher P. Ouellette, MD	Ahad Ahmed Kodipad, PhD <i>Research Scientist</i>		RADIOLOGY
Eunkyung Song, MD			Mitchell A. Rees, MD
Sanya J. Thomas, MD			Patrick Warren, MD

Highlights From the Past Year

- Performed Nationwide Children’s first total pancreatectomy with islet autotransplantation (TPIAT) operation in 2022
- Performed Nationwide Children’s first meso-Rex shunt operation for extrahepatic portal vein thrombosis
- Performed 11 kidney and four liver transplants, including the first liver transplant in an acute liver failure patient
- Multiple new recruits have expanded our expertise in liver and kidney transplantation and hepatopancreatobiliary care. New recruits include:
 - Sara Rasmussen, MD, PhD, joined the department as surgical director of kidney transplant. Dr. Rasmussen has significant interest and experience in transplant quality and in DEI and has research interests in the role of human endogenous retroviruses in tumors and in ischemia-reperfusion injury.
 - Muhammad A. Khan, MD, MPH, was named director of Interventional and Diagnostic Endoscopy at Nationwide Children’s. Dr. Khan has a special focus in endoscopic retrograde cholangiopancreatography (ERCP) and endoscopic ultrasound (EUS) in the diagnostic evaluation and therapeutic management of chronic pancreatitis, peri-pancreatic fluid collections, and other hepatopancreatobiliary disorders.
 - A. Jay Freeman, MD, MSc, was named medical director of Pancreas Care. Dr. Freeman is a leader in the care of children with pancreatic disorders as well as the GI and liver complications of cystic fibrosis. His research is funded by the NIH and Cystic Fibrosis Foundation.
- Opened the Abdominal Transplant and Hepatopancreatobiliary Surgery Clinic, a multidisciplinary clinic that takes a collaborative approach to caring for patients and families
- Opened the first on-site Good Manufacturing Practices (GMP) pancreatic islet isolation laboratory in a children’s hospital in the United States

Selected Publications

Goddard GR, Wagner ML, Jenkins TM, Abu-El-Haija M, Lin TK, Goldstein SL, **Nathan JD**. Effect of intraoperative fluid type on postoperative systemic inflammatory response and end-organ dysfunction following total pancreatectomy with islet autotransplantation in children. *Journal of Pediatric Surgery*. 2022;(57):1649-1653. [Epub ahead of print]

Nathan JD, Ellery K, Balakrishnan K, Bhatt H, Ganoza A, Husain SZ, Kumar R, Morinville VD, Quiros JA, Schwarzenberg SJ, Sellers ZM, Uc A, Abu-El-Haija M. The role of surgical management in chronic pancreatitis in children: a position paper from the NASPGHAN Pancreas Committee. *Journal of Pediatric Gastroenterology and Nutrition*. 2022 May 1;74(5):706-719.

Nathan JD, Yang Y, Eaton A, Witkowski P, Wijkstrom M, Walsh M, Trikudanathan G, Singh VK, Schwarzenberg SJ, Pruett TL, Posselt A, Naziruddin B, Mokshagundam SP, Morgan K, Lara LF, Kirchner V, He J, Gardner TB, Freeman ML, Ellery K, Conwell DL, Chinnakotla S, Beilman GJ, Ahmad S, Abu-El-Haija M, Hodges JS, Bellin MD. Surgical approach and short-term outcomes in adults and children undergoing total pancreatectomy with islet autotransplantation: A report from the Prospective Observational Study of TPIAT. *Pancreatology* 2022 Jan;22(1):1-8.

Rasmussen SK. An overview of pediatric peritoneal dialysis and renal replacement therapy in infants: A review for the general Pediatric surgeon. *Seminars in Pediatric Surgery* 2022 Jun;(31): 151193.

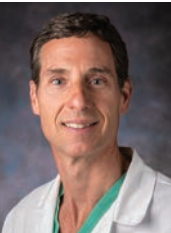
Vittorio J, Kosmach-Park B, King LY, Fisher R, Fredericks EM, Ng VL, Narang A, **Rasmussen SK**, Bucuvalas J. Health care transition for adolescents and young adults with pediatric-onset liver disease and transplantation: A position paper by the North American Society of Pediatric Gastroenterology, Hepatology, and Nutrition. *Journal of Pediatric Gastroenterology and Nutrition*. 2022 July 13. [Epub ahead of print]

Surgical Services

THE HEART CENTER/CARDIOTHORACIC SURGERY

The Cardiothoracic Surgery Program at Nationwide Children’s Hospital is dedicated to the treatment of all patients, from fetus to adulthood, with congenital heart defects ranging from the most straightforward to the extremely complex. As part of The Heart Center, we offer a comprehensive approach to heart care that is based on a multidisciplinary team model, which enables our team to constantly monitor quality of care and patient safety pre- and post-surgery to assure the best possible outcomes. See page 43 for details about The Heart Center.

Faculty



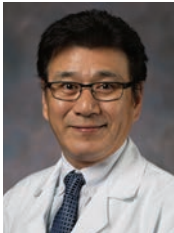
Mark E. Galantowicz, MD
Chief, Cardiothoracic Surgery Co-Director, The Heart Center



Sergio A. Carrillo Melendez, MD
Pediatric Cardiothoracic Surgeon



Patrick I. McConnell, MD
Director, Cardiopulmonary Mechanical Assist Program



Toshiharu Shinoka, MD, PhD
Director, Cardiovascular Tissue Engineering Program

Selected Publications

Carrillo S. Commentary: Is it time to rethink surgical management of juxtaductal pulmonary stenosis? Less is more in the neonatal period. *Seminar Thoracic Cardiovascular Surgery*. 2021 Winter;33(4):1103-1104.

Conway J, Ravekes W, **McConnell P**, Cantor R, Koehl D, Sun B, Daly R, Hsu D. Early improvement in clinical status following ventricular assist device implantation in children: A marker for survival. *American Society for Artificial Internal Organs Journal*. 2022 Jan 1;68(1):87-95.

Gilmore A, Davis J, Low S, Chisolm J, Kelly J, Hone E, Bai S, **McConnell P**, **Galantowicz M**, Cua C. Incidence of and risk factors for aortic arch interventions after the comprehensive stage II procedure for Hypoplastic Left Heart syndrome. *Pediatric Cardiology*. 2022 Feb;43(2): 426 – 434.

Matsuzaki Y, **Shinoka T**. “Bioabsorbable materials for the future treatment of congenital heart disease.” In *Current Practice in Medical Science Vol. 2*. Edited by John Yahya I. Elshimali. (BP International, June 2022), 160-178.

McConnell P. Aortic sinus morphology in mitral stenosis variants is a risk for native aortic thrombosis. *The Annals of Thoracic Surgery*. 2022 April: 113:4.



Grants Awarded to Heart Center and Cardiovascular Research Faculty

JULY 1, 2021 – JUNE 30, 2022

\$1,752,882

Surgical Services

COLORECTAL AND PELVIC RECONSTRUCTION

The Center for Colorectal and Pelvic Reconstruction at Nationwide Children’s Hospital is leading the way in providing high-quality care for children diagnosed with colorectal and pelvic conditions. There is a direct correlation between the number of patients a clinical program sees and the high-quality outcomes they can deliver to their patients. Colorectal and Pelvic Reconstruction is the busiest program of its kind anywhere in the world, having performed more than 764 operations last year. Every child diagnosed with a colorectal or pelvic condition is handled with an individualized treatment plan. Because of the complexity of many conditions, most children require care throughout their life. Our team is committed to providing optimal outcomes and quality of life for patients ranging from newborns, through toilet training, puberty and adulthood, including bowel, urinary, sexual function and childbearing.

Faculty



Richard J. Wood, MD
Chief

Colorectal and Pelvis Reconstructive Surgery

Karen A. Diefenbach, MD

Alessandra Gasior, DO
Transitional Care Director

Ihab Halaweish, MD

Christopher J. Westgarth-Taylor, MD
Colorectal Director, Colorectal and Pelvic Reconstruction

Gastroenterology, Hepatology and Nutrition

Neetu B. Puri, MD

Carlo Di Lorenzo, MD

Peter Lu, MD

Karla Vaz, MD

Kent C. Williams, MD

Desale Yacob, MD
Motility Director, Colorectal and Pelvic Reconstruction

Diagnostic Radiology

Brent H. Adler, MD

David Gregory Bates, MD

Benjamin P. Thompson, DO

Neurosurgery

Jeffrey R. Leonard, MD

Pediatric and Adolescent Gynecology

Geri D. Hewitt, MD

Gynecology Director, Colorectal and Pelvic Reconstruction

Chelsea A. Kebodeaux, MD

Katherine A. McCracken, MD

Urology

Daniel G. DaJusta, MD

Urology Director, Colorectal and Pelvic Reconstruction

Molly Fuchs, MD

V. Rama Jayanthi, MD

Service Line Administrator

Vannessa Moses

Program Manager

Stephanie Vyrostek, MHA, BSN, RN

Clinical Leaders

Kristina Booth, MSN, CFNP

Natalie Rose, BSN, RN

Business Office Coordinator

Kelly Gibson, MHA

2021 – 2022 Fellows Pediatric Colorectal Research

Maria E. Knaus, MD

Pediatric Colorectal Surgery

Ahmad Oudeh, MD

International Pelvic Reconstruction

Naeem Liaqat, MB, BS
(Medicare Hospital, Rawalpindi, Pakistan)

Highlights From the Past Year

The Center for Colorectal and Pelvic Reconstruction complex reconstruction program, working closely with urologists, gynecologists and gastroenterologists, continues to help children from around the world, providing guidance and surgery for children from all 50 states and 73 countries. The use of minimally invasive surgery has expanded, offering both robot-assisted and pure laparoscopic surgical treatment of complex conditions, including bladder neck reconstruction, and appendicovesicostomy and/or Malone procedures for severe incontinence, both urinary and fecal, and offering unique opportunities to share tissues such as a shared appendix used for both procedures. The Colorectal and Pelvic Reconstruction team travels to provide surgical education across the globe. Surgeons train fellow surgeons and nurses train fellow nurses.

The Center for Colorectal and Pelvic Reconstruction has a growing transition of care program for children as they become young adults and move into adulthood. With the expertise of Alessandra Gasior, DO, the first surgeon in the world trained in both pediatric and adult colorectal surgery, this unique program will collaborate with The Ohio State University Wexner Medical Center. The center has changed the lives of many adult patients through our collaborative approach to care and bowel management program.

Selected Publications

Ahmad H, Levitt M, **Yacob D**, Halleran D, **Gasior A**, **Di Lorenzo C**, **Wood R**, Langer J. Evaluation and management of persistent problems after surgery for Hirschsprung disease in a child. *Current Gastroenterology Reports*. 2021 Oct;23:18.

Ahmad H, Rentea R, **Knaus M**, Wilbur J, **Halaweish I**, Langer J, Levitt M, **Wood R**. Routine botulinum toxin injection one month after a Swenson pull-through does not change the incidence of Hirschsprung associated enterocolitis. *Journal of Pediatric Surgery*. 2021 Dec;9:S0022-3468(21)00830-7.

Ahmad H, Skerritt C, Halleran D, Rentea R, Reck-Burneo C, Vilanova-Sanchez A, Weaver L, Langer J, **Diefenbach K**, **Gasior A**, Levitt M, **Wood R**. Are routine postoperative dilations necessary after primary posterior sagittal anorectoplasty? A randomized controlled trial. *Journal of Pediatric Surgery*. 2021 Aug;56: 1449-1453.

Fuchs M, Halleran D, Bourgeois T, Sebastiao Y, Weaver L, Farrel N, Vilanova-Sanchez A, **Gasior A**, **Halaweish I**, **Jayanthi V**, **Wood R**, **Dajusta D**. Correlation of anorectal malformation complexity and associated urologic abnormalities. *Journal of Pediatric Surgery*. 2021 Nov;56(11):1988-1992.

Knaus M, Ahmad H, Metzger G, Beyene T, Thomas J, Weaver L, **Gasior A**, **Wood R**, **Halaweish I**. Outcomes of a telemedicine bowel management program during COVID-19. *Journal of Pediatric Surgery*. 2021 Sep;S0022-3468(21)00636-9.

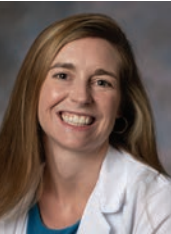
Skerritt C, **Wood R**, **Jayanthi V**, Levitt M, Ching C, **DaJusta D**, **Fuchs M**. Does a standardized operative approach in cloacal reconstruction allow for preservation of a patent urethra? *Journal of Pediatric Surgery*. 2021 Dec;56(12):2295-2298.

Wood R, Vilanova-Sanchez A, El-Gohary Y, Ahmad H, Halleran D, Reck-Burneo C, Rentea R, Sebastiao Y, Nash O, **Booth K**, Trimble C, Zahora P, Baxter C, Driesbach S, **Halaweish I**, **Gasior A**, Levitt M. One-year impact of a bowel management. program in treating fecal incontinence in patients with anorectal malformations. *Journal of Pediatric Surgery*. 2021 Oct;56(10):1589-1693.

Surgical Services
DENTISTRY

The Department of Dentistry at Nationwide Children’s Hospital is comprised of dedicated professionals in the fields of pediatric dentistry, orthodontics, oral surgery, endodontics, periodontics, general dentistry, dental hygiene and dental assisting who provide comprehensive preventive, therapeutic, urgent and emergency oral health care services for infants, children and adolescents, including those with special health care needs. Our mission is to optimize oral health for the children who need us most through a balanced program dedicated to providing quality clinical care and specialty services while advancing knowledge through research, advocacy and community partnerships within a premier educational environment. Scientific discoveries focus on caries prevention, behavior management, oral microbiome and dental trauma outcomes.

Faculty



Janice A. Townsend, DDS, MS
Chief

Full-Time Nationwide
Children’s Faculty

Homa Amini, DDS, MS, MPH

Ehsan Azadani, DDS, MS

Paul S. Casamassimo, DDS, MS

Daniel B. Claman, DDS
Associate Program Director

Kimberly Hammersmith, DDS,
MPH, MS
Program Director

Ashok Kumar, BDS, MS
Director of Clinical Operations
and General Anesthesia

Rosa Ortega, DDS, MS

Chelsea Shellhart, DDS

OSU-Affiliate Faculty

Hany A. Emam, BDS, MS

Henry W. Fields, DDS, MS, MSD
Section Chief, Orthodontics

Ann L. Griffen, DDS, MS

Erin L. Gross, DDS, PhD, MS

Courtney A. Jatana, DDS, MS,
FACS

Kelly S. Kennedy, DDS, MS

Peter E. Larsen, DDS
Section Chief, Oral and
Maxillofacial Surgery

Dennis J. McTigue, DDS, MS

Beau Meyer, DDS, MPH

Diego A. Solis, DDS

Orthodontists (Primary
Appointment in Plastics)

Kaitrin Kramer, DDS, MS, PhD

Ana M. Mercado, DMD, MS, PhD

Kara Morris, DDS, MS

Community-Based
Dentists

Ashley E. Anderson, DDS

Amy Augustine, DDS

Richa Banthia, DDS

Carolyn A. Barber, DDS

Kyle Beulke, DDS

Janet J. Brown, DDS

Jennifer Bryk-Hechko, DDS, MS

Emily R. Burns, DDS, MS

Andrew Carranco, DDS, MS

George Chen, DMD, MS

Darya Dabiri, DMD, MS

Joseph DePalo, DMD, MS

Johnathan W. Draney, DDS, MS

Kylene H. Fernandez, DDS, MS

Timothy J. Frey, DDS

Lucia C. Gerstmann, DDS, MS

Kimberly M. Gill, DDS, MS

Jillian N. Gray, DDS

Marcus Heffner, DDS

Mitzi L. Hines, DDS

Nicole Johnson, DDS

Gary M. Judis, DDS

Patrick M. Kennedy, DDS

Nicholas M. Kerns, DDS, MS

Benjamin Kwok, DDS, MS

Joshua M. Leavitt, DMD, MS

Jeffrey S. Lee, DDS

Eileen M. Martinez, DDS

Monte E. Masonbrink, DDS, MS

Yoon-Mi L. Matracia, DMD, MS

Jeffrey T. Milton, DDS, MS

Cecilia A. Moy, DDS, MS

Andrea M. Myers, DDS

Gregory M. Ness, DDS

Scott W. Nieman, DDS

Colleen C. Orellana, DDS, MS

Andree-Anne Page, DMD

Sachin S. Parulkar, DDS

Monica R. Patel, DMD, MS

Nira S. Patel, DDS

Matthew L. Pingel, DMD

Jessica Pizano, DMD

Mitchell Poole, DDS, MS

Mindy A. Price, DDS, MS

Sidney D. Price, DDS, MS

Joel J. Richards, DDS

Adam Richardson, DDS, MS

Shaun A. Rotenberg, DMD, MS

Avneet K. Sandhu, DDS

Marlina M. Shah, DDS, MS

David S. Silverglade, DDS, MS

David A. Smeltzer, DDS

Eric Soller, DDS

Kumar Subramanian, DDS, MS

CaAdrian N. Taylor, DDS

Claire E. Towning, DDS

Eric C. Van Gilder, DDS

Andrew Vo, DDS, MS	Erin Bibber, DMD	Kyulim Lee, DMD	Casey White, DMD
Kevin T. Weitzel, DMD, MS	Natalie Bussard, DDS	Ira Mulo, DDS	Sheaffer Yinger, DDS
Stephen Wilson, DMD, PhD	David Danesh, DMD	Lana Richardson, DDS	
Chloe Wong, DDS, MS	Michael Davis, DDS	Alison Riley, DDS	
2021 – 2022 Residents	Marlee Hansen, DDS	Brittany Schweiger, DDS	
Philip Barras, DMD	Kayla Kopczynski, DDS	Warren Spencer, DDS	
Bradley Bennett, DMD	Jennifer Lee, DMD	Kristen Sweeney, DMD	

Highlights From the Past Year

In the past year, the department has continued our long tradition of care for children with an emphasis on children with special health care needs and patients with barriers accessing care. The department has maintained excellence in joint specialty care with our Periodontics Clinic and Trauma Clinic. Dental care was disrupted due to COVID-19 for many families, so we have been treating children with more complex dental needs. To reduce barriers to accessing dental care, the department has launched a school-based dentistry program in the Columbus area in collaboration with School Based Health and Care Connection. To continue to improve clinical access to care, Chelsea Shellhart, DDS, has been recruited.

National and local faculty and resident recognitions:

- Ehsan Azadani, DDS, MS, was awarded the Larry J. Peterson Young Educators Award, which honors a faculty member who has taught for one to three years and has shown “exceptional enthusiasm for teaching.”
- Beau Meyer, DDS, MPH, was elected Chair, American Academy of Pediatric Dentistry, Council on Pre-doctoral Education Council Liaison (Pre-doctoral Education), American Academy of Pediatric Dentistry, Affiliate Advisory Committee.
- Erin Gross, DDS, PhD, MS, served as a Member-at-Large position on the Council of Faculties Administrative Board for the American Dental Education Association.
- Homa Amini, DDS, MPH, MS, and Janice Townsend, DDS, MS, were on the interdisciplinary team awarded the Gartner Eye on Innovation Awards Healthcare and Life Sciences for their innovative use of technology to drive best-in-class initiatives.
- Beau Meyer, DDS, MPH, was awarded The Ohio State College of Dentistry, Stazen Junior Faculty Award, for demonstrating exceptional promise in the research field.
- Dr. Amini, DDS, MPH, MS, received the 2021 American Dental Education Association (ADEA) Leadership Institute Alumni Association (LIAA) award to Honor Jack Bresch for her demonstration of advocacy for oral health care and dental education.
- Beau Meyer, DDS, MPH, received courtesy faculty appointment, College of Public Health, Division of Health Services Management and Policy.
- Daniel Claman, DDS and Kim Hammersmith DDS, MPH, MS were promoted to Associate Professor-Clinical and Janice Townsend, DDS, MS was promoted to Professor.

Research (funded) highlights:

- Homa Amini: Bridging the Gap in the Community through Partnership to Prevent ECC; Alliance for a Cavity-Free Future Canada-United States grant: \$3,800
- Homa Amini: Integration of Oral Health into Prenatal Care; Ohio Department of Health: \$75,000
- Kim Hammersmith: Genetic and Dental Analysis of a Novel Form of Dentinogenesis Imperfecta: The Ohio State University College of Dentistry Clinical Scholars Research Pilot Program, \$10,245.

- Kim Hammersmith: From Classroom to Clinic: Enhanced Public Health Dental Training and a School-Based Pediatric Dentistry Model; US Department of Health and Human Services, Health Resources and Services Administration: \$504,490
- Beau Meyer: Interactive game-based clinical training for vulnerable and underserved populations; Ohio Medicaid Technical Assistance and Policy Program (MEDTAPP), Ohio Department of Medicaid; \$1,365,202 total (\$667,525 funded plus \$697,678 in cost-share

Selected Publications

Azadani E, Casamassimo P, Peng J, Griffen A, Amini H, Kumar A. Primary second molar treatment as a predictor of repeat general anesthesia. *Pediatric Dentistry*. 2021 Sept;43(5):380-386.

Boynton J, Amini H, Claman D, Hammersmith, K, Peng, J, McDaniel, J, Casamassimo, P. Safety training in U.S. pediatric dentistry advanced education programs: A survey of program directors. *Pediatric Dentistry*. 2022 May;44(3):198-206.

Bui S, Meyer B. Caries and oral health behaviors among children with and without intellectual and developmental disabilities. *JAMA Pediatrics*. 2022 July;176(7):722-724.

Sulyanto, R, Beall, C, Berger, M, Goodell, C, Koo, S, Candamo, F, Dickson, J, Kang, M, Ho, S, Wai Ng, M, Hashmi, S, Leys, E, Griffen, A. Silver diamine fluoride alters microbial communities in subsurface dentin. *JADA Foundational Science*, 2022;1(2022) 100004.

Thayer, S, Townsend, J, Peters, M, Yu, Q, Odom, M, Sabey, K; Kovanaze intranasal spray vs traditional injected anesthetics: A study of pulpal blood flow utilizing laser doppler flowmetry. *Anesthesia Progress*. 2022 Apr;69(1):31–38.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022
\$725,627

Fast Facts: July 2021 – June 2022

- Inpatient Discharges: 5
- Observation and Outpatient-in-a-Bed Discharges: 14
- Total Discharges: 19
- Average Length of Stay*: 1.4
- Patient Days*: 7
- Dental Clinic Visits: 29,703
- Dental Clinic and Sedation: 330
- Total Surgical Procedures: 3,779

*Excludes observation and outpatient-in-a-bed patients

Surgical Services

NEUROSURGERY

Ranked ninth in the country by U.S. News & World Report, the Department of Neurosurgery at Nationwide Children’s Hospital provides evaluation and treatment for problems of the central nervous system in patients from birth through 21 years of age and in selected adults with congenital neurological disorders. The staff works closely with members of the departments of Anesthesia, Hematology, Oncology & Blood and Marrow Transplant, Neurology, Physical Medicine & Rehabilitation, Pediatric Surgery, Plastic and Reconstructive Surgery, Colorectal and Pelvic Reconstruction, Fetal Medicine and many other pediatric disciplines as well as the adult neurosurgical program.

Faculty



Jeffrey R. Leonard, MD
Chief

Full-Time Nationwide
Children’s Faculty

- Jonathan A. Pindrik, MD
- Ammar Shaikhouni, MD, PhD
- Eric A. Sribnick, MD, PhD

OSU-Affiliate Faculty

- Andrew J. Grossbach, MD
- John M. McGregor, MD
- Ehud U. Mendel, MD
- Shahid Nimjee, MD
- Ciaran J. Powers, MD, PhD
- Daniel Prevedello, MD
- Patrick Youssef, MD

2021 – 2022 Fellow
Pediatric Neurosurgery

- Ali Amine, MD

Highlights From the Past Year

- The Department of Neurosurgery has continued with significant growth with 850 surgical cases and more than 6,000 clinic visits performed annually.
- Outreach efforts have been successful, as the team has provided care to patients from all around the world, including 42 states and nine countries.
- The Epilepsy Surgery Program is steadily expanding and is on pace to perform over 70 epilepsy cases this year.
- The Selective Dorsal Rhizotomy Program continues to provide comprehensive care for patients with spastic cerebral palsy, including care provided by colleagues in Physical Medicine and Rehabilitation, as well as in Therapy Services. Our program is one of very few in the country that performs this procedure with great success. Our out-of-state referrals have grown significantly, as demonstrated by increases in new patient clinic visits, inpatient hospital days and case volume.
- Jonathan Pindrik, MD, and Eric Sribnick, MD, PhD, were promoted to Associate Professors at The Ohio State University College of Medicine.

Research (Funded) Highlights

National Institutes of Health Awards to faculty in Neurosurgery in 2021-2022:

- Jeffrey R. Leonard, MD, site principal investigator, received more than \$1 million in 2021 for R01 entitled, “A Safety and Efficacy Study of AAV2-hAADC for AADC Deficiency,” a multi-site study and collaboration with The Ohio State University.

- Eric Sribnick, MD, PhD, principal investigator, received a K08 award from the National Institute of Neurological Disorders and Stroke for his project, “Reversal of Immunoparalysis Following Traumatic Brain Injury and Systemic Hemorrhage in Juvenile Rat Model.”
- Ammar Shaikhouni, MD, PhD, principal investigator, received an R21 from the National Institute of Mental Health for his project, “Using Intracranial Recording, Stimulation and Computational Modeling to Map Role of the Subthalamic Nucleus in Human Decision Making.”

Selected Publications

Akbari SHA, Yahanda AT, Ackerman LL, Adelson PD, Ahmed R, Albert GW, Aldana PR, Alden TD, Anderson RCE, Bauer DF, Bethel-Anderson T, Bierbrauer K, Brockmeyer DL, Chern JJ, Couture DE, Daniels DJ, Dlouhy BJ, Durham SR, Ellenbogen RG, Eskandari R, Fuchs HE, Grant GA, Graupman PC, Greene S, Greenfield JP, Gross NL, Guillaume DJ, Hankinson TC, Heuer GG, Iantosca M, Iskandar BJ, Jackson EM, Jallo GI, Johnston JM, Kaufman BA, Keating RF, Khan NR, Krieger MD, **Leonard JR**, Maher CO, Mangano FT, McComb JG, McEvoy SD, Meehan T, Menezes AH, Muhlbauer MS, O'Neill BR, Olavarria G, Ragheb J, Selden NR, Shah MN, Shannon CN, Shimony JS, Smyth MD, Stone SSD, Strahle JM, Tamber MS, Torner JC, Tuite GF, Tyler-Kabara EC, Wait SD, Wellons JC, Whitehead WE, Park TS, Limbrick DD. Complications and outcomes of posterior fossa decompression with duraplasty versus without duraplasty for pediatric patients with Chiari malformation type I and syringomyelia: a study from the Park-Reeves Syringomyelia Research Consortium. *Journal of Neurosurgery. Pediatrics*. 2022 Apr 15:1-13. [Epub ahead of print]

Bedrosian TA, Miller KE, Grischow OE, Schieffer KM, LaHaye S, Yoon H, Miller AR, Navarro J, Westfall J, Leraas K, Choi S, Williamson R, Fitch J, Kelly BJ, White P, Lee K, McGrath S, Cottrell CE, Magrini V, **Leonard J**, **Pindrik J**, **Shaikhouni A**, Boué DR, Thomas DL, Pierson CR, Wilson RK, Ostendorf AP, Mardis ER, Koboldt DC. Detection of brain somatic variation in epilepsy-associated developmental lesions. *Epilepsia*. 2022 Aug;63(8):1981-1997. [Epub 2022 Jun 23]

Drapeau AI, Onwuka A, Koppera S, **Leonard JR**. Hospital case-volume and patient outcomes following pediatric brain tumor surgery in the pediatric health information system. *Pediatric Neurology*. 2022 Aug;133:48-54. [Epub 2022 Jun 11]

Makoshi ZA, **Leonard JR**. Editorial. The ongoing dilemma of incidentalomas. *Journal of Neurosurgery. Pediatrics*. 2021 Oct 29;1-2.

Merola A, Singh J, Reeves K, Changizi B, Goetz S, Rossi L, Pallavaram S, Carcieri S, Harel N, **Shaikhouni A**, Sammartino F, Krishna V, Verhagen L, Dalm B. New frontiers for deep brain stimulation: Directionality, sensing technologies, remote programming, robotic stereotactic assistance, asleep procedures, and connectomics. *Frontiers in Neurology*, 2021 Jul 22;12:694747.

Pearson TS, Gupta N, San Sebastian W, Imamura-Ching J, Viehoveer A, Grijalvo-Perez A, Fay AJ, Seth N, Lundy SM, Seo Y, Pampaloni M, Hyland K, Smith E, de Oliveira Barbosa G, Heathcock JC, Minnema A, Lonser R, Elder JB, **Leonard J**, Larson P, Bankiewicz KS. Gene therapy for aromatic L-amino acid decarboxylase deficiency by MR-guided direct delivery of AAV2-AADC to midbrain dopaminergic neurons. *Nature Communications*. 2021 Jul 12;12(1):4251.

Sribnick EA, Popovich PG, Hall MW. Central nervous system injury-induced immune suppression. *Neurosurgical Focus*. 2022 Feb;52(2):E10.

Sribnick EA, Warner T, Hall MW. Traumatic brain injury and hemorrhage in a juvenile rat model of polytrauma leads to immunosuppression and splenic alterations. *Journal of Neuroimmunology*. 2021 Dec 15;361:577723.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

\$609,266

Fast Facts: July 2021 – June 2022

- Inpatient Discharges: 537
- Observation and Outpatient-in-a-Bed Discharges: 218
- Total Discharges: 755
- Average Length of Stay*: 5.5
- Average Daily Census*: 8
- Patient Days*: 2,952
- Total Surgical Procedures: 749
- Neurosurgery Main Campus Clinic Visits: 6,352

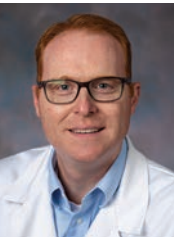
*Excludes observation and outpatient-in-a-bed patients

Surgical Services

OPHTHALMOLOGY

The Department of Ophthalmology at Nationwide Children’s Hospital is dedicated to providing ongoing comprehensive eye care for children and adults. The Department of Ophthalmology includes the Eye Clinic and the Electrophysiology Testing Laboratory. Our department provides comprehensive eye care in both the hospital inpatient setting as well as to families in the community. Our clinics also provide special testing on pediatric patients referred by community-based providers. The clinic staff includes pediatric ophthalmologists, optometrists, a pediatric ophthalmology fellow and ophthalmology residents from The Ohio State University College of Medicine, as well as low vision and rehabilitation specialists. We are pleased to have recently been approved and accredited as an Orthoptic Fellowship Program by the American Orthoptic Council. We will begin training our first student this fall. In addition, the Eye Clinic offers subspecialty clinics staffed by ophthalmologists for patients with issues related to glaucoma, retina, oculoplastics, cornea and external disease, intracranial hypertension, and low vision.

Faculty



David L. Rogers, MD
Chief

Full-Time Nationwide
Children's Faculty

- Don L. Bremer, MD
- Cybil B. Cassady, MD
- Richard P. Golden, MD
- Hilliary E. Inger, MD
- Catherine Olson Jordan, MD
- Julie M. Lange, MD
- Mary Lou McGregor, MD
- Gary L. Rogers, MD
- Hersh Varma, MD
- Amanda L. Way, MD

OSU-Affiliate Faculty

- Sayoko Moroi, MD, PhD
Chair, Ophthalmology and Visual Sciences, The Ohio State University
- N. Douglas Baker, MD
- Dominic M. Buzzacco, MD
- Kenneth V. Cahill, MD
- Colleen M. Cebulla, MD
- Megan M. Chambers, MD
- Raymond I. Cho, MD
- Frederick H. Davidorf, MD
- Jill A Foster, MD
- Allen Gu, MD
- Andrew J. Hendershot, MD
- Charles J. Hickey, MD
- Steven E. Katz, MD
- Curtin G. Kelley, MD
- Johnstone M. Kim, MD
- Dino D. Klisovic, MD
- Rebecca A. Kuennen, MD
- Carrie A. Lembach, MD
- Christina Martinez, MD
- Thomas A. Mendel, MD
- Zachary J. Mikolaj, MD
- Andrew J. Mueller, MD
- Cameron B. Nabavi, MD
- Matthew P. Ohr, MD
- Tyler Oostra, MD
- Daniel G. Straka, MD
- Ana M. Suelves Cogollos, MD
- Michael B. Wells, MD

Highlights From the Past Year

The Department of Ophthalmology supports research and teaching programs that ensure delivery of the highest quality pediatric care for our patients, now and in the future. We are participating in multiple research projects including those involving amblyopia, cataract, myopia, and retinopathy of prematurity (ROP) studies sponsored by the Pediatric Eye Disease Investigator Group. We are actively engaged in studies focused on preserving vision in children with Batten disease. We continue to do research on projects concerning infantile cataracts, intracranial hypertension, secondary intraocular lens placement, pediatric drusen and children with cystic fibrosis. We are also one of the only sites in the country currently participating in the multicenter Artisan Aphakia Lens Study. The Artisan Aphakia lens is unique because it is fixed to the iris and therefore allows for lens implantation in patients who do not have the support structure for a traditional implant. Without an implant lens, these children must wear extremely strong and cosmetically unappealing glasses or highly customized, and often poorly tolerated, hard contact lenses. These patients now have an option to enjoy life with a more normal visual function. These lenses are not FDA approved, and we expect this study will help gain future FDA approval.

The Visual Electrophysiology Clinic at Nationwide Children’s is led by Julie Racine, PhD. This clinic performs electroretinograms, multifocal electroretinograms, electrooculograms and visual evoked potential on patients of all ages, including adults, to assess retinal and retina-cortical function. Our department also manages and acts as the physical location for the office of the Ohio Amblyope Registry program (funded by the Ohio Department of Health’s Save Our Sight fund), the first and only statewide program in the United States designed to serve the needs of children with amblyopia. It is a voluntary registration program to increase knowledge about amblyopia, its causes, prevention, and treatment options. It also provides free eye patches and other important services to help families of children with amblyopia.

The department is equipped with state-of-the-art technology for utilization in standard dilated eye exams and for specialty testing, including ultrasound (A/B scans), retinal photography, visual field, optical coherence tomography (OCT) performed in the office an intraoperatively, intravenous and oral fluorescein angiography, autorefraction, tonometry, color vision and contrast sensitivity testing. We are proud to serve patients from across the country and the world.

Selected Publications

Akhter A, Schulz L, Inger H, McGregor M. Current indications for management options in pseudotumor cerebri. *Neurology and Clinical Neuroscience*. 2022 May; 40(2):391-404.

Alex A, Jordan C, Benedict J, Aylward S, Rogers D, Inger H. Intracranial hypertension recurrence risk after wean of intracranial pressure-lowering medication. *Pediatric Neurology*. 2021 Aug; 121:40-44.

Freedman S, Hercinovic A, Wallace D, Kraker R, Li Z, Bhatt A, Boente C, Crouch E, Hubbard G, Rogers D, VanderVeen D, Yang M, Chueng N, Cotter S, Holmes J. Low- and very low-dose bevacizumab for retinopathy of prematurity: reactivation, additional treatments, and 12-month outcomes. *Ophthalmology*. 2022 Jun; S0161-6420(22)00408-0.

Jordan C, Mungan N, Weaver D, Wagner R. Management of inferior rectus muscle trauma. *Journal of Pediatric Ophthalmology & Strabismus*. 2021 Jul; 58(4):210-212.

Ploof J, Aylward S, Jordan C, Drapeau A. Case series of rapid surgical interventions in fulminant intracranial hypertension. *Journal of Child Neurology*. 2021 Oct;36(11):1047-1053.

Racine J, Golden R. A patient diagnosed with Galloway-Mowat syndrome presenting with a rod-cone functional anomaly with electronegative dark-adapted. *Documenta Ophthalmologica*. 2022 Jun;10.1007/s10633-022-09882-y.



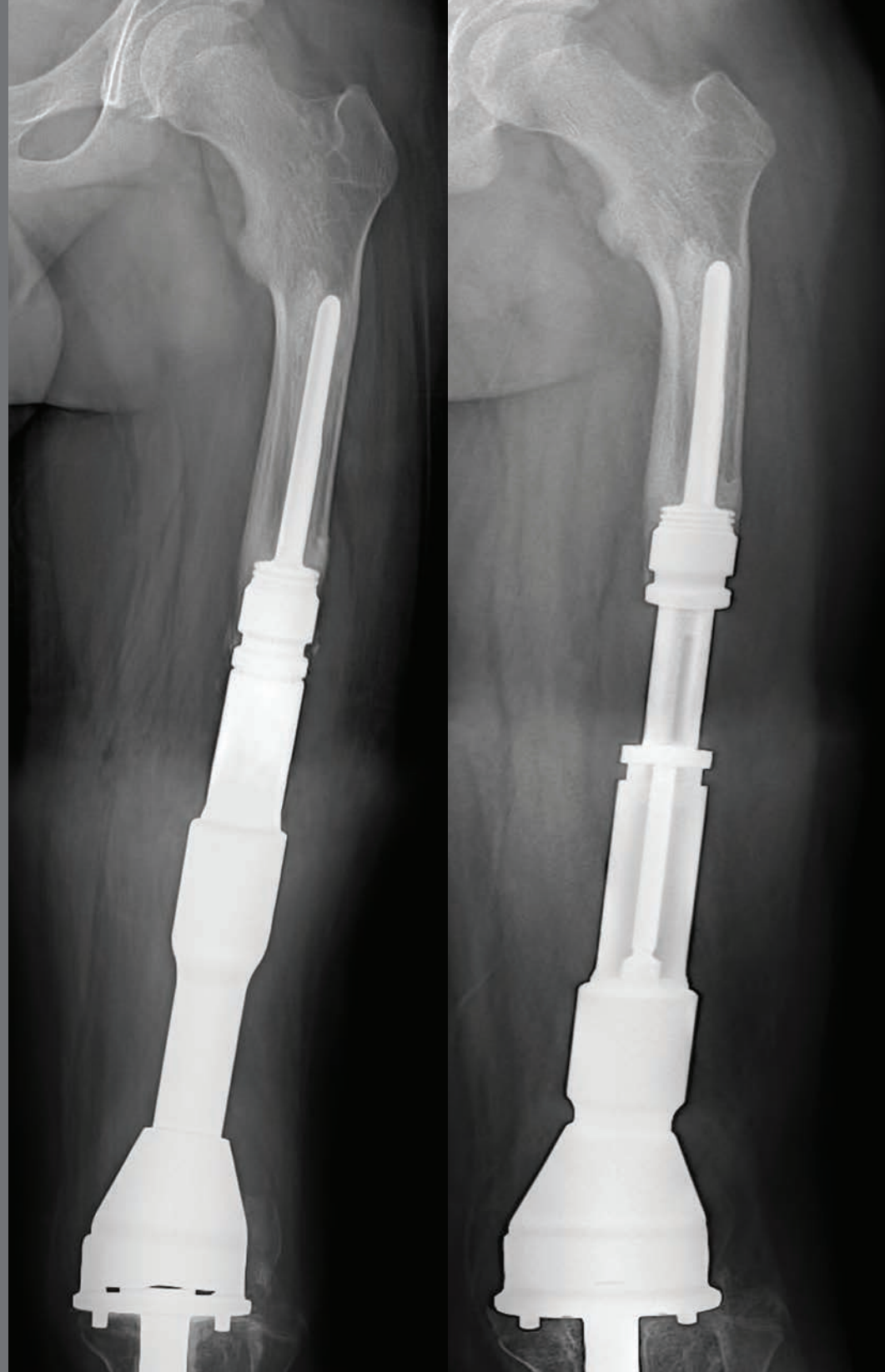
Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

\$1,905,204

Fast Facts: July 2021 – June 2022

- Total Surgical Procedures: 1,554
- Inpatient Consults: 1,790
- Teaching Eye Clinic and Low Vision Eye Clinic Visits: 9,239
- Outpatient Clinic Visits: 33,296



Anterior radiograph of the femur before (left image) and after (right image) serial lengthening.



“Our experience with these noninvasive implants shows that they can reliably achieve desirable outcomes.”

– Thomas Scharschmidt, MD

Orthopaedics

New Guidelines Offer a Clear Path for Expandable Endoprosthesis Use in Post-Sarcoma Limb Reconstruction

Limb salvage operation is the standard of care for pediatric extremity bone sarcomas. These tumors often occur during the second decade of life, when children are growing rapidly. Reconstructive surgeries must account for anticipated remaining growth and the potential for resulting limb inequity.

Osteosarcoma and Ewing sarcoma are the most common primary malignant bone tumors, occurring primarily in the metaphyseal region above the knee. A newer approach to limb salvage operations in this area of the limb is the noninvasive expandable endoprosthesis.

This approach offers a theoretical advantage of immediate weight bearing, predictable function and reliable maintenance of leg length equality. These internal devices can be lengthened with magnets as the child grows to reduce the number of surgical procedures needed. In the past, multiple open procedures were required to achieve leg length equality.

The noninvasive expandable endoprosthesis is typically constructed of a cemented femoral stem or lateral plate, a magnet and gearbox, an extra small tibial implant and uncemented passive tibial stem. The specifics vary by manufacturer.

“Our experience with these noninvasive implants shows that they can reliably achieve desirable outcomes,” says **Thomas Scharschmidt, MD**, orthopedic surgeon at Nationwide Children’s Hospital. “We achieve reliable leg-length equality, have longer failure-free survival and decreased complications.”

To date, no standardized techniques exist for managing patients with noninvasive expandable implants from the time of limb reconstruction to skeletal maturity. To address this gap, orthopedic surgeons and oncologists have collaborated to publish their surgical techniques and guidelines in the *Journal of the American Academy of Orthopaedic Surgeons*.

The publication outlines contraindications, preoperative planning, and surgical techniques for placement, as well as postoperative care and management.

“Successful utilization of noninvasive expandable endoprostheses depends on a clear lengthening schedule and patient family commitment,” says Dr. Scharschmidt, who was an author of the publication. “Ongoing physical therapy, adherence to the schedule and close follow up are crucial to reaping the benefits and preventing arthrofibrosis, pain and neuritis.”

Depending on how old the child was at time of diagnosis and endoprosthesis implantation, there is a chance that they could outgrow the lengthening capabilities of the device.

“As the patient approaches the maximum extension for their implant, we need to have conversations with the family regarding options. We can wait and see, or we can go ahead with another surgery to implant a longer implant and new gearbox,” says Dr. Scharschmidt. “If the child is expected to grow another 2 centimeters or more, we typically recommend replacing the device.”

REFERENCE:

Voskuil RT, Miles DT, Scharschmidt TJ, Alexander JH. Noninvasive expandable endoprostheses from reconstruction to skeletal maturity: A surgical technique and lengthening guide. *Journal of the American Academy of Orthopaedic Surgeons*. 2021 Dec;29(23):998-1007.

Surgical Services

ORTHOPAEDICS

The Department of Orthopaedics at Nationwide Children’s Hospital provides diagnosis, evaluation and treatment for all orthopedic conditions and disorders in infants, children and adolescents. Inpatient, outpatient and emergency services are provided to patients with a wide range of developmental, congenital, neuromuscular and posttraumatic problems of the musculoskeletal system, trauma and fractures, scoliosis, and other spinal abnormalities. Faculty members participate in the education of health care professionals at several levels. Residents, medical students and nurses from The Ohio State University Wexner Medical Center, OhioHealth and Mount Carmel Health System receive all their pediatric orthopedic experience at Nationwide Children’s. The Accreditation Council for Graduate Medical Education-accredited fellowship program rounds out the extensive educational program.

Faculty



Kevin E. Klingele, MD
Chief

Full-Time Nationwide Children’s Faculty

- Allan C. Beebe, MD
- Matthew C. Beran, MD
- Reid C. Chambers, DO
- Christopher A. Iobst, MD
- Allen Kadado, MD
- Jan E. Klamar, MD
- Julie Balch Samora, MD, PhD, MPH
- Walter P. Samora III, MD
- Craig A. Smith, MD

OSU-Affiliate Faculty

- John Alexander, MD
- Hisham M. Awan, MD
- Joel L. Mayerson, MD
- Thomas J. Scharschmidt, MD

Community-Based Faculty

- Brent A. Bickel, MD
- Craig N. Dimitris, MD
- James E. Popp, MD
- Corey L. Van Hoff, MD
- Raymond K. Wurapa, MD

2021 – 2022 Fellow

- Christopher Jackson, MD

Allen Kadado, MD, joined the faculty in 2021. He received his medical degree from Wayne State University School of Medicine, completed his residency at Henry Ford Health System in Detroit and completed a pediatric orthopaedics surgery fellowship at Texas Scottish Rite Hospital for Children. His primary clinical interests include, but are not limited to, conditions of the spine, scoliosis, spinal deformity, pediatric trauma, back pain, clubfoot and general orthopaedics. Dr. Kadado is part of the Center for Comprehensive Spine Care and will be leading the formation of a new Center for Surgical Innovation.

Kirsten Tulchin-Francis, PhD, joined the team in 2022 as director of Orthopedic Research and director of the Honda Center for Gait Analysis and Mobility Enhancement. She has over 25 years of experience in clinical gait analysis and pediatric orthopedic research. Her current research focuses on understanding, modeling and improving mechanics and motor control of children with orthopedic and neurological disorders.

We now begin a new five-year strategic plan focusing on the integration of clinical care and research. New destination clinical programs are being formed along with an expanded research program focusing on clinical outcomes and surgical innovation.

Selected Publications

DiBartola A, Thakur N, Singh S, Quinion C, Samora J. Do obese children have poor patient-reported outcomes after closed reduction and percutaneous pin fixation of supracondylar humerus fractures? *Journal of Pediatric Orthopedics*. 2022 July;42(6): e701.

Fisher M, Singh S, Samora W, Beran M, Klingele K. Outcomes of MPFL reconstruction utilizing a quadriceps turndown technique in the adolescent/pediatric population. *Journal of Pediatric Orthopedics*. 2021 Aug;41(7): e494-e498.

Iobst C, Bafor A. Retrograde extramedullary lengthening of the femur using the PRECICE nail: techniques and results. *Journal of Pediatric Orthopedics*. 2021 Jul 1;41(6):356-361.

Iobst C, Frost FW, Rolfing JD, Rahbek O, Bafor A, Duncan M, Kold S. Radiographs of 366 removed limb lengthening nails reveal differences in bone abnormalities between different nail types. *Bone & Joint Journal*. 2021 Nov;103-B(11):1731-1735.

Randall R, Singh S, Klingele K. Wagner technique of transphyseal proximal femoral fixation. *Techniques in Orthopaedics*. 2021 Dec;36(4):400-404.

Voskuil R, Miles D, Scharschmidt T, Alexander J. Noninvasive expandable endoprotheses from reconstruction to skeletal maturity: A surgical technique and lengthening guide. *Journal American Academy Orthopaedic Surgery*. 2021 Dec 1;29(23):998-1007.

Highlights From the Past Year

The Department of Orthopaedics maintained its stature as a top-tier, nationally ranked pediatric orthopedic provider. Upon completion of a recent five-year strategic plan, the department grew to 13 physician and surgeon providers and 14 physician extenders (APP/PA), averaging over 45,000 outpatient clinic visits and performing over 3,000 surgeries per year. During this time, many novel programs were formed including the Center for Comprehensive Spine Care, Center for Limb Lengthening and Reconstruction, Center for Hip Preservation, Limb Deficiency Clinic, and the Honda Center for Gait Analysis and Mobility Enhancement. Such models of care partner with existing programs including Sports Medicine, Neuromuscular Orthopedics, Oncology and Hand/Upper Extremity to provide comprehensive care for all patients. Additional integration includes dedicated psychology, social work, athletic training and an expansive research team. Patients from 42 states and over 20 international locations received care from our team over the past several years.

Education remains an important foundational piece of the department’s mission. Walter Samora, MD, is residency director, overseeing more than 60 residents per year from The Ohio State University Wexner Medical Center, OhioHealth and Mount Carmel systems. A robust educational program and surgical experiences has led to five residents entering the field over the past five years. Allan Beebe, MD, was honored as Teacher of the Year by The Ohio State University Wexner Medical Center department of Orthopedics. Over 85 residents, medical students and rotators learn from our team each year, including dedicated fellows in pediatric orthopedics as well as limb lengthening and reconstruction. In addition, a unique and inaugural summer scholars program provided a summer internship experience to eight Columbus high school students.

Fast Facts: July 2021 – June 2022

- Inpatient Discharges: 475
- Observation and Outpatient-in-a-Bed Discharges: 612
- Total Discharges: 1,087
- Average Length of Stay*: 3.0
- Average Daily Census*: 3.9
- Patient Days*: 1,429
- *Excludes observation and outpatient-in-a-bed patients
- Total Surgical Cases: 2,977
- Inpatient Consults: 241

- Main Campus Orthopaedic Clinic Visits: 17,266
- Canal Winchester Orthopaedic Clinic Visits: 266
- Dublin Orthopaedic Clinic Visits: 10,942
- East Broad Orthopaedic Clinic Visits: 266
- Hilliard Orthopaedic Clinic Visits: 394
- Mansfield Orthopaedic Clinic Visits: 294
- New Albany Orthopaedic Clinic Visits: 2,405
- Westerville Orthopaedic Clinic Visits: 9,120
- Orthopaedic-Oncology Clinic Visits: 955
- Total Orthopaedic Clinic Visits: 41,868

Surgical Services

OTOLARYNGOLOGY

The Department of Pediatric Otolaryngology, Head and Neck Surgery at Nationwide Children’s Hospital provides comprehensive diagnosis and treatment for children who have diseases of the ears, nose and throat. These problems include congenital and acquired diseases of the head and neck, hearing loss, ear infections, tonsillitis, sinusitis, acute and chronic nasal problems, airway disorders, voice disorders, sleep apnea, skull base tumors, salivary gland problems and many other related diseases.

Faculty



Charles A. Elmaraghy, MD, FAAP, FACS
Chief

Full-Time Nationwide Children’s Faculty

Ethan Bassett, MD
Tendy Chiang, MD
Jonathan M. Grischan, MD, FAAP, FACS
Kris R. Jatana, MD, FAAP, FACS
Spencer Lindsey, MD
Prashant S. Malhotra, MD, FAAP, FACS

Amy Manning, MD
Meredith Merz-Lind, MD, FAAP, FACS
Prasanth Pattisapu MD
James M. Ruda, MD
Patrick C. Walz, MD
Gregory J. Wiet, MD, FAAP, FACS

OSU-Affiliate Faculty

Oliver F. Adunka, MD, FACS
Eugene Ge-Hink Chio, MD
Brad W. deSilva, MD
Edward E. Dodson, MD
Brandon Kim, MD
Leslie R. Kim, MD, MPH
Bradley A. Otto, MD
Minka L. Schofield, MD

Community-Based Faculty

Patrick L. Bockenstedt, MD
Jacob P. Burkhart, DO
Roberto J. Castellon, MD
Daniel W. Chase, MD
Timothy P. Drankwalter, DO
Alfred J. Fleming Jr., MD
Akash Gupta, MD

Joseph E. Hall, MD
Jeffrey B. Hiltbrand, MD
Steven M. Hirsch, MD
Richard T. Irene, MD
Scott T. Kramer, MD
Michael J. Loochtan, MD
James D. Lowery, MD
Michael D. Martyn, MD
Timothy J. Nash, DO

Stephen J. Nogan, MD
Blaize A. O’Brien, MD
David M. Powell, MD
Cherie Ryoo, MD
John M. Ryzenman, MD
Ashish Shah, MD
Thomas M. Shirck, DO
Stephen P. Smith Jr., MD
Adam C. Spiess, MD

Evan J. Tobin, MD
Andrew Tompkins, MD
Darryl N. Willett, MD

2021 – 2022 Fellow

Abdulrahman Althubaiti, MD

Highlights From the Past Year

The Department of Pediatric Otolaryngology accounts for 30-35% of the total surgical volume at Nationwide Children’s and continues to pursue the best outcomes for pediatric ears, nose and throat patients. Several faculty have attained key leadership positions within the hospital with Dr. Meredith Lind being named Surgical Director of Ambulatory Surgery and Dr. Kris Jatana being named Director of Clinical Outcomes for Surgical Services. The department, led by Dr. Amy Manning, has initiated a multi-disciplinary effort to improve the care provided to pediatric tracheostomy patients. This has resulted in the creation of a tracheostomy focused clinic with both in person and telehealth options. We continue to provide outstanding care with some of the best outcomes and lowest readmissions nationally.

Selected Publications

Bishop R, Sethia R, Elmaraghy C, Lind M, Tscholl J, Malhotra P. Recognition and management of nonaccidental esophageal perforation. *Pediatrics*. 2022 Jan 1;149(1):e2021052073.

Jacobs I, Jatana K. Current management of aerodigestive foreign bodies in children. *Seminars in Pediatric Surgery*. 2021 Jun;30(3):151064.

Koenigs M, Young C, Lillis A, Morrison J, Kelly N, Elmaraghy C, Krishnamurthy R, Chiang T. Dynamic volumetric computed tomography angiography is an effective method to evaluate tracheomalacia in children. *Laryngoscope*. 2022 Apr 12.

Liu L, Dharmadhikari S, Spector B, Tan Z, Van Curen C, Agarwal R, Nyirjesy S, Shontz K, Sperber S, Breuer C, Zhao K, Reynolds S, Manning A, VanKoeveering K, Chiang T. Tissue-engineered composite tracheal grafts create mechanically stable and biocompatible airway replacements. *Journal of Tissue Engineering*. 2022 Jun 26;13:20417314221108791.

Malhotra P, Densky J, Melachuri M, Melachuri S, Onwuka A, Winner K, Lucius S, Findlen U. The impact of cochlear implantation on speech and language outcomes in children with asymmetric sensorineural hearing loss. *International Journal of Pediatric Otorhinolaryngology*. 2022 Jan;152:110979.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

\$906,507

Fast Facts: July 2021 – June 2022

Inpatient Discharges: 54
Observation and Outpatient-in-a-Bed-Discharges: 1,460
Total Discharges: 1,514
Average Length of Stay*: 4.1
Average Daily Census*: 0.6
Patient Days*: 224
Total Surgical Cases: 7,553
Inpatient Consults: 821

*Excludes observation and outpatient-in-a-bed patients

ENT (Main Campus) Clinic Visits: 14,822
Dublin ENT Clinic Visits: 6,850
Lewis Center ENT Clinic Visits: 969
Lima ENT Clinic Visits: 87
Mansfield ENT Clinic Visits: 410
Marysville ENT Clinic Visits: 581
Springfield ENT Clinic Visits: 199
Westerville ENT Clinic Visits: 7,486
Pediatric Aerodigestive Disorders Clinic Visits: 83
Rhinology Clinic Visits: 38
Total ENT Clinic Visits: 31,525

Surgical Services

PEDIATRIC AND ADOLESCENT GYNECOLOGY

The Department of Pediatric and Adolescent Gynecology at Nationwide Children’s Hospital provides comprehensive reproductive health services for patients and their families from birth through early adulthood. These services are provided within a wide array of clinical services including:

- Pediatric and Adolescent Gynecology
- Center for Colorectal and Pelvic Reconstruction
- Family AIDS Clinic and Education Services (FACES)
- Fertility and Reproductive Health Program
- Teen and Pregnant Program
- THRIVE Program (differences of sexual development and complex urological and gender concerns)

Faculty



Geri D. Hewitt, MD
Chief

Pediatric and Adolescent Gynecology

Frances Fei, MD
Geri D. Hewitt, MD
Chelsea Kebodeaux, MD
Dana Lenobel, APN
Kate A. McCracken, MD

OSU-Affiliate Faculty
Melissa M. Goist, MD
Maggie Rosen, MD
Rebecca H. Rudesill, MD
Andrea N. Snyder, MD

Teen and Pregnant Program

Natasha Reno, WHNP
Megan Wacker, WHNP

Family Aids Clinic and Education Services

Maggie Rosen, MD

Fetal Medicine

Michael Cackovic, MD
Maged M. Costantine, MD
Adolfo Etchegaray, MD
Heather A. Frey, MD

Oluseyi K. Ogunleye, MD
Philip Samuels, MD
Patrick D. Schneider, MD
Cynthia S. Shellhaas, MD
Stephen F. Thung, MD
Kartik K. Venkatesh, MD, PhD
Courtney Abshier Ware, MD

Gynecology continues to work collaboratively within the Center for Colorectal and Pelvic Reconstruction (CCPR) to address the reproductive health needs of patients born with anorectal malformations across their lifespan. This work encompasses direct surgical and medical patient care, research projects, patient advocacy and educational initiatives. We also work collaboratively with the Anorectal Malformation (ARM) transitional program at The Ohio State University Wexner Medical Center.

The Fertility and Reproductive Health Program provides clinical services and best practices for patients at risk of diminished fertility. Nationwide Children’s is part of the international Oncofertility Consortium, and we continue to offer ovarian tissue cryopreservation and cancer survivorship care.

The Teen and Pregnant Program clinic continues to serve pregnant patients in central Ohio, offering multidisciplinary care in both traditional and centering obstetrical care models.

Selected Publications

Fei Y, Smith Y, Wam J, Dendrinios M, Winfrey O, Quint E. Should we screen for mullerian anomalies following diagnosis of a congenital renal anomaly? *Journal of Pediatric Urology*. 2022 April;(22):00164-4.

Fei Y, Earnst S, Dendrinios M, Quint E. Preparing for puberty in girls with special needs: a cohort study of caregiver concerns and patient outcomes. *Journal of Pediatric and Adolescent Gynecology*. 2021 Aug;34(4):471-476.

Kebodeaux C, Appleton J, Dietrich J. Robotic-assisted laparoscopic approach to removal of mullerian remnants. *Journal of Pediatric and Adolescent Gynecology*. 2022 Feb;35(1):98-100.

Knaus M, Lawrence A, Onwuka A, Abouelseound N, Breech L, Brita K, Dekonenko C, Hertweck S, Hong H, Menon S, Merritt D, Schikler A, Senapati N, Smith Y, Strickland J, Truehart A, Minneci P, Hewitt G. Recommendations for postoperative surveillance of pediatric benign ovarian neoplasms. *Journal of Pediatric and Adolescent Gynecology*. 2021 Oct;34(5):666-672.

Krishnan V, Belle P, Gonzalez D, Hewitt G, McCracken K. Fetus-in-Fetu: A case of ovarian involvement and residual regrowth in a teenager. *Journal of Pediatric Adolescent Gynecology*. 2021 Dec;34(6):882-884.

Loftus C, Ahn J, Rice-Townsend S, Avansino J, Schmidt J, Hagedorn J, Wood R, Shnorhavorian M, Fuchs M, McCracken K, Hewitt G, Amies-Oelschlager A, Meguerian P, Smith C. Experiences and attitudes of young adults with congenital bowel and bladder conditions. *Journal of Pediatric Urology*. 2021 Oct;17(5):701.e1-701.e8.

Theodorou C, Trappey A, Chen S, McCracken K, Saadai P. Surgical management of an obstructive mullerian anomaly in a patient with anorectal malformation. *Journal of Pediatric Surgery Case Reports*. 2021 Aug;71:101908.

Fast Facts: July 2021 – June 2022

- Downtown Teen and Pregnant Clinic Visits: 1,656
- Canal Winchester Clinic Visits: 306
- Dublin Clinic Visits: 857
- East Columbus Clinic Visits: 232
- Main Campus Clinic Visits: 3,051
- Westerville Clinic Visits: 785
- Total Clinic Visits: 6,887
- Total Surgical Procedures: 331

Highlights From the Past Year

Pediatric and Adolescent Gynecology (PAG) at Nationwide Children’s continues to grow in all aspects of medical services provided: in person and telehealth visits, inpatient consultations and surgical procedures performed. This past year we welcomed two new fellowship trained pediatric and adolescent gynecologists, Drs. Frances Fei and Chelsea Kebodeaux. With the addition of these new faculty members, we have also grown our ambulatory clinical sites and the geographic region we serve.

Our educational mission also continues to grow. We have successfully established a pediatric and gynecology fellowship which will be led by Dr. Kate McCracken and have a committed fellow to begin in July, 2023. We remain committed to resident education as well and now have both PGY-1 and PGY-3 OSU OB/GYN rotators as well as external residents spending time with us to learn more PAG.



Pediatric Surgery

Predicting Risk of Nosocomial Infection in Pediatric Burn Patients: Can Measures of Adaptive Immune Function Help?



Rajan K. Thakkar, MD



Renata B. Fabia, MD, PhD



Jonathan I. Groner, MD

Pediatric burn injuries affect 1 million children each year in the United States. While burn care improvements have decreased mortality, infection-related complications remain a significant problem. According to the National Burn Repository, four of the top five complications of pediatric burns are infection related. Plus, infection-related complications occur in up to 60% of patients with large burn injury.

“Understanding the immune response following thermal injury is vital as the skin – the primary defense against pathogens – is compromised,” says Rajan Thakkar, MD, Trauma Medical Director and Co-Director of the Burn Center at Nationwide Children’s Hospital.

Burns prompt changes in inflammatory and innate immune responses of children. Plasma cytokines, cellular profiles and reduction in innate immune function after burn injury have been correlated to adverse outcomes including mortality and infections. However, changes in adaptive immune function following burn injury are not well characterized.

In a recent publication in *Journal of Burn Care & Research*, Dr. Thakkar and colleagues present a prospective, longitudinal immune function surveillance study from a single American Burn Association (ABA)-verified Pediatric Burn Center.

Eighty burn patients were enrolled, and 20 developed nosocomial infections. Whole blood samples from pediatric burn patients were collected within 72 hours of the injury and between days 4 and 7 to analyze adaptive immune function.

Those burn patients whom went on to develop a nosocomial infection, had lower adaptive immune function markers as measured by absolute CD4+ lymphocyte counts and whole blood *ex vivo* phytohemagglutinin-induced interferon gamma and interleukin-10 production capacity as compared to those patients who did not develop an infection.

Further statistical analysis showed these markers of adaptive immune function appear to be predictive of nosocomial infection development. Thus this study demonstrates that these immune function assays can be used in burn patients to determine those patients at highest risk before they actually develop an infection.

“Our findings represent an opportunity to apply immunomodulatory therapy before the onset of infection to improve outcomes in children with burn injuries,” says Dr. Thakkar. “However, additional work is needed to confirm these findings in a larger cohort of burn patients.”

REFERENCE:
Thakkar RK, Penatzer J, Simon S, Steele L, Fabia R, Groner JI, Keesari R, Hall M. Measures of adaptive immune function predict the risk of nosocomial infection in pediatric burn patients. *Journal of Burn Care & Research*. 18 Apr 2022;irac050.



“Understanding the immune response following thermal injury is vital...”
– Rajan Thakkar, MD

Surgical Services

PEDIATRIC SURGERY

The mission of the Department of Pediatric Surgery at Nationwide Children’s Hospital is to provide collaborative, comprehensive, state-of-the-art, multidisciplinary care for infants, children and adolescents with surgical disorders. The members of the department are all full-time faculty of the Department of Surgery at The Ohio State University College of Medicine and are committed to excellence in clinical care, surgical education, research and quality improvement.

Faculty



Gail E. Besner, MD
Chief

Full-Time Nationwide Children’s Faculty

Jennifer H. Aldrink, MD
Christopher K. Breuer, MD
David R. Brigstock, PhD
Katherine J. Deans, MD, MHSc

Karen A. Diefenbach, MD
Renata B. Fabia, MD, PhD
Jonathan I. Groner, MD
Ihab Halaweish, MD
Brian D. Kenney, MD, MPH
Marc P. Michalsky, MD, MBA
Peter C. Minneci, MD, MHSc
Jaimie D. Nathan, MD
Benedict C. Nwomeh, MD, MPH
Oluyinka O. Olutoye, MD, PhD
Surgeon-in-Chief
Dana Schwartz, MD
Rajan K. Thakkar, MD
Christopher J. Westgarth-Taylor, MD
Richard J. Wood, MD

OSU-Affiliate Faculty

Robert Beaulieu, MD
Nicole Bernal, MD
Mounir J. Haurani, MD
Bradley J. Needleman, MD
Kristine Orion, MD
Xin Peng, MD
Amer Rajab, MD, PhD
Timur Sarac, MD
Jean E. Starr, MD
Bryan Tillman, MD
William K. Washburn, MD

2021 – 2022 Fellows

Pediatric Surgery
Joseph Drews, MD
Jamie Golden, MD

Pediatric Minimally Invasive Surgery

Wendy Svetanoff, MD

Surgical Critical Care

Stephanie Cruz, MD

- Karen Diefenbach, MD, received the Golden Apple Teaching Award.
- Rajan Thakkar, MD, received the Denis R. King Teacher of the Year Award.
- Benedict C. Nwomeh, MD, was selected to serve a six-year term on the American Board of Surgery Council. He also became a member of the American College of Surgeons Master Surgeon Educators.
- Jennifer Aldrink, MD, was listed in Castle Connolly 2021 Top Doctors, increasing the number of faculty members chosen to 10. She also received the 2021 Bruce Meyer Art of Medicine Award.
- Katherine J. Deans, MD, MHSc, completed the national Executive Leadership in Academic Medicine (ELAM) Program for Women.
- Renata Fabia, MD, completed her presidency of the North American Burn Society, running a highly successful annual meeting. She also directed, along with Rajan Thakkar, MD, successful re-verification of the Burn Center by the ABA.
- Marc Michalsky, MD, led the Nationwide Children’s Robotic Surgery Program through its 1,000th case. The program was successfully re-verified by the MBSAQIP.
- Peter Minneci, MD, became president of the Midwest Pediatric Surgical Research Consortium.

One of the most important goals of our department is to train the next generation of pediatric surgeons. The research conducted in the department is broad, and includes basic, clinical, translational, outcomes, and QI research projects. The department continues as a leader in the nation in presentations at national academic meetings. For the 11th year in a row, our research trainees have received prestigious awards for their high-quality research, bringing our total number of research awards to an unprecedented 57 in the past 11 years. Several of our pediatric surgery trainees won highly competitive awards this year:

- Nitin Sajankila, MD (mentor: Gail Besner, MD), received an Association of Academic Surgery (AAS) Basic Science Research Grant for his project titled “Protective Effects of Tryptophan Catabolites Produced by *Lactobacillus reuteri* on the Neonatal Immune System and Intestine in Experimental Necrotizing Enterocolitis.”
- Dr. Kristine Griffin (mentor: Brian Kenney, MD) was awarded an ACGME Back to Bedside grant for her project titled “Decreasing Complications for Complex Appendicitis and Fostering Trainee-Patient Relationships: The Appy Buddy Quality Improvement Initiative.”
- Kelli Patterson, MD, (mentor: Rajan Thakkar, MD) received the 2022 American Burn Association/Shriner Best Pediatric Burn Paper Award for “Length of Stay per Total Body Surface Area Burn Relative to Burn Mechanism: A Pediatric Injury Quality Improvement Collaborative (PIQIC) Study.”

Highlights From the Past Year

The Department of Pediatric Surgery is one of the largest and most diverse departments in the country. The department maintains active clinical programs focused on general pediatric surgery, trauma, burns, minimally invasive surgery, robotic surgery, surgical oncology, surgical endocrinology, chest wall deformities, bariatric surgery, inflammatory bowel disease, hepatobiliary surgery, neuromodulation, ECMO, intestinal failure, pigmented lesions, fetal surgery and colorectal surgery. The Trauma Program has been verified by the American College of Surgeons (ACS) as a Level 1 Trauma Program since 1991, the Burn Program has been an American Burn Association (ABA) verified Burn Center since 2003, and the Bariatric Surgery Program has been verified by the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) since 2015.

Each of the 19 faculty members in the department bring individual strengths and talents to the department, and are recognized for their expertise in clinical care, research and education. Faculty members received awards this year for their excellent clinical care, research, and educational expertise including:

- Gail Besner, MD, received the 2021 American College of Surgeons Sheen Award.
- Christopher Breuer, MD, received the 2022 Allen Distinguished Scholar in Pediatric Research Award.
- Jaimie Nathan, MD, was bestowed the Nationwide Foundation Endowed Chair in Pediatric Transplantation.

Selected Publications

Faculty members in the department are highly prolific, publishing as many as 200 papers a year. Examples from the past year include:

Blum K, Zbinden J, Ramachandra A, Lindsey S, Szafron J, Reinhardt J, Heitkemper M, Best C, Mirhaidari G, Chang Y, Ulziibayar A, Kelly J, Shah K, Drews J, Zakko J, Miyamoto S, Matsuzaki Y, Iwaki R, Ahmad H, Daulton R, Musgrave D, Wiet M, Heuer E, Lawson E, Schwarz E, McDermott M, Krishnamurthy R, Krishnamurthy R, Hor K, Armstrong A, Boe B, Berman D, Trask A, Humphrey J, Marsden A, Shinoka T, **Breuer C**. Tissue engineered vascular grafts transform into autologous neovessels capable of native function and growth. *Community Medicine* (London). 2022 Jan 10;2:3.

Brigstock N, **Besner G**. Development of an academic RVU (aRVU) system to promote pediatric surgical academic productivity. *Journal of Pediatric Surgery*. 2022 Jan;57(1):93-99.

Knaus M, Onwuka A, Afrazi A, Breech L, Corkum K, Dillon P, Ehrlich P, Fallat M, Fraser J, Gadepalli S, Grabowski J, Hertweck S, Kabre R, Lal D, Landman M, Lawrence A, Leys C, Mak G, Markel T, Merchan N, Overman R, Rademacher B, Raiji M, Rymeski B, Sato T, Scannel M, Schikler A, Sujka J, Wright T, Aldrink J, Hewitt G, **Minnecci P**, **Deans K**. Multi-institutional review of the preoperative diagnostic accuracy for pediatric ovarian mature cystic teratomas. Midwest Pediatric Surgery Consortium. *Journal of Pediatric Adolescent Gynecology*. 2022 Feb 4:S1083-3188(22). [Epub ahead of print]

Mora M, **Diefenbach K**, **Michalsky M**. Robotic assisted vertical sleeve gastrectomy in adolescents: Dp BMI limits apply? *Journal of Pediatric Surgery*. 2022 Jun;57(6):1158-1161.

Patterson K, Nordin A, Beyene T, Onwuka A, Bergus K, Horvath K, Sribnick E, **Thakkar R**. Implementation of a level 1 neuro trauma activation at a tertiary pediatric trauma center. *Journal of Surgical Research*. 2022 Jul;275:308-317.

Ray W, **Rajab A**, Alexander H, Chmil B, Rumpf R, **Thakkar R**, Viswanathan M, **Fabia R**. A 1% TBSA chart reduces math errors while retaining acceptable first-estimate accuracy. *Journal of Burn Care and Research*. 2022 May 17;43(3):665-678.

Thakkar R, Penatzer J, Simon S, Steele L, **Fabia R**, Groner J, Keesari R, Hall M. Measures of adaptive immune function predict the risk of nosocomial infection in pediatric burn patients. *Journal of Burn Care and Research*. 2022 Apr 18. [Epub ahead of print]



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022
\$7,834,358

Fast Facts: July 2021 – June 2022

Inpatient Discharges: 1,028
Observation and Outpatient-in-a-Bed Discharges: 1,211
Total Discharges: 2,239
Average Length of Stay*: 5.3
Average Daily Census*: 14.8
Patient Days*: 5,420

*Excludes observation and outpatient-in-a-bed patients

Total Surgical Procedures: 3,718
Inpatient Consults: 913
Colorectal Clinic Visits: 2,202
Dublin Surgery Clinic Visits: 107
Surgery/Burn Clinic Visits: 6,177
Westerville Surgery Clinic Visits: 361
Total Surgery Clinic Visits: 8,847

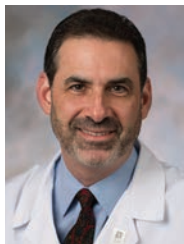


Surgical Services

PLASTIC AND RECONSTRUCTIVE SURGERY

The Department of Plastic and Reconstructive Surgery at Nationwide Children’s Hospital provides comprehensive, interdisciplinary management of cleft lip and palate, congenital and traumatic craniofacial anomalies, 22q deletion syndrome, velopharyngeal dysfunction, hemangiomas and vascular anomalies, pigmented birthmarks, burn injuries, microtia and other ear anomalies, breast abnormalities, congenital and traumatic hand and upper extremity anomalies, and peripheral nerve disorders.

Faculty



Richard E. Kirschner, MD, FAAP, FACS
Chief

Full-Time Nationwide Children’s Faculty

- Adriane Baylis, PhD, CCC-SLP
- Kim Bjorklund, MD
- Ibrahim Khansa, MD
- Kaitrin Kramer, DDS, MS, PhD
- Lauren Madhoun, PhD
- Ana Mercado, DMD, PhD
- Kara Morris, DDS, MS
- Gregory D. Pearson, MD

OSU-Affiliate Faculty

- Albert Chao, MD
- Matthew Chetta, MD
- Min-Jeong Cho, MD
- Clara N. Lee, MD
- Amy Moore, MD
- Ryan Schmucker, MD

2021 – 2022 Fellows

Pediatric Plastic and Craniofacial Surgery

- Hannah Bergman, MD

Craniofacial Speech

- John Munday, MS

- Ongoing development of the Peripheral Nerve Program included the use of novel techniques for lower extremity nerve transfers. This past year, our multidisciplinary team served not only local but also several patients from across the US. In 2021, Kim Bjorklund, MD, director of the program, served as Upper Extremity vice chair for the Resident Education Committee of the American Society of Plastic Surgeons.
- The article, “Alveolar Backing in 3-Year-Old Children with and without Repaired Cleft Palate: Preliminary Findings Related to Cleft Type and History of Otitis Media,” co-authored by Dr. Adriane Baylis, received the 2021 American Speech Language Hearing Association Editor’s Award.
- A \$3.8 million National Institutes of Health – National Institute of Dental and Craniofacial Research grant was awarded for “Health and Psychosocial Outcomes in Children with Cleft Palate.” Principal investigator is Canice Crerand, PhD. Co-investigators are Adriane Baylis, PhD, and Richard Kirschner, MD. This multisite study will evaluate demographic, medical, and contextual factors associated with psychosocial and health outcomes over time in a large, diverse sample of young children born with cleft palate who are enrolled in the Cleft Palate Registry/Research Outcomes Network study, with the goal of advancing clinical care and improving outcomes for this at-risk population.
- A National Institutes of Health – National Institute of Dental and Craniofacial Research grant was awarded for “Shared Reading Intervention for Children with Oral Clefts.” Principal investigator is Brent Collett, PhD, of the University of Washington. Adriane Baylis, PhD, is co-investigator. This multisite study will test a novel, caregiver-focused, remotely delivered intervention to promote language and literacy for young children with oral clefts.
- Dr. Ibrahim Khansa was awarded an intramural research grant (\$40,374) for “Prospective Study of Neurocognitive and Language Outcomes in Children with Craniosynostosis.”
- Dr. Lauren Madhoun was awarded an intramural research grant for “Longitudinal Assessment of Oral Feeding Skills and Caregiver Feeding Stress for Infants with Cleft Palate With and Without Cleft Lip” as co-PI with Dr. Canice Crerand.
- Dr. Gregory Pearson was awarded the 2021 Nationwide Children’s Golden Stethoscope Award.

Highlights From the Past Year

- The department completed its new strategic plan for 2022-2026. The plan includes a comprehensive people strategy as well as ambitious goals and objectives for advancement in clinical services, quality, research, and education.
- The Cleft Lip and Palate Center and the Center for Complex Craniofacial Disorders have received national recognition as leading American Cleft Palate- Craniofacial Association (ACPA)-approved programs. The programs attracted patients from across the US in 2021-2. Kaitrin Kramer, DDS, MS, PhD, joined the team in 2021 as the team’s third craniofacial orthodontist. Members of the Nationwide Children’s team have historically served in national leadership roles. In keeping with this tradition, Adriane Baylis, PhD, CCC-SLP, was elected vice president of the ACPA in 2021 and served as Program Chair for the 2022 ACPA Annual Meeting. Dr. Gregory Pearson was selected as chair of the ACPA Nominating Committee.
- The 22q Center at Nationwide Children’s provides children and families from across the United States and around the globe with access to a multidisciplinary team of expert specialists who understand their special needs. The 22q Center team provided comprehensive, individualized diagnostic and management services to children from across the US, serving as an international leader in the diagnosis and surgical management of velopharyngeal dysfunction in children with 22q11.2 deletion syndrome. In 2021 the team published Understanding 22q, a book written for parents of children with 22qDS.
- 2021-22 witnessed extraordinary growth in the Hemangioma and Vascular Malformations Clinic, including the launch of a multidisciplinary clinic and care conferences. The program brings together a highly skilled, interdisciplinary team of pediatric specialists to provide coordinated and comprehensive care to patients with vascular anomalies, from the simplest to the most complicated. Our team of specialists from plastic surgery, dermatology, interventional radiology, hematology/oncology, and genetics/genomics offers state-of-the-art therapeutic approaches to care for patients with vascular anomalies and hemangiomas.

Selected Publications

Bjorklund K, West J, Nopkhun W, Moore A. Surgical innovations to restore function in pediatric peripheral nerve conditions. *Pediatrics*. 2021 Dec; 148(6).

Crerand C, O'Brien M., Kapa H, Rabkin A, Smith A, Kirschner R, Pearson G, Valleru J, Baylis A. Improving psychosocial risk assessment and service provision for craniofacial team patients: a quality improvement project. *Cleft Palate-Craniofacial Journal*. 2022 Apr; 59(4):S18-S27.

de Blacam, C, Baylis A, Kirschner R, Smith S, Sell D, Sie K, Harris H, Orr D. Core outcome set for reporting outcomes of interventions for velopharyngeal dysfunction: Final results of the COS-VPD initiative. *Cleft Palate-Craniofacial Journal*. 2022 Apr; 59(4):S84-S96.

Halsey J, Asti L, Kirschner R. The impact of race and ethnicity on surgical risk and outcomes following palatoplasty: An analysis of the NSQIP pediatric database. *Cleft Palate-Craniofacial Journal*. 2022 Feb 9;10556656221078154.

Khansa I, Aldabbeh S, Pearson G, Baylis A, Madhoun L, Schoenbrunner A, Splaingard M, Kirschner R. Airway and feeding outcomes in pierre robin sequence: A comparison of three management strategies. *Cleft Palate-Craniofacial Journal*. 2022 Jan 31;10556656221076345.

Kollara L, Perry J, Kirschner R, Fang X, Baylis A. Assessment of the velopharyngeal mechanism at rest and during speech in children with 22q11.2ds: a cross-sectional study. *Cleft Palate-Craniofacial Journal*. 2022 May 15;10556656221100674.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022
\$267,595

Fast Facts: July 2021 – June 2022

Inpatient Discharges: 48
Observation and Outpatient-in-Bed Discharges: 276
Total Discharges: 324
Average Length of Stay*: 3.7
Average Daily Census*: 0.5
Patient Days*: 177

**Excludes observation and outpatient-in-a-bed patients*

Total Surgical Procedures: 1,365
Inpatient Consults: 34
Ortho Center Plastic Surgery Clinic Visits: 57
Orthodontics Treatment Program Visits: 2,830
Cleft Lip/Craniofacial Clinic Visits: 2,413
Hilliard Plastic Surgery Clinic Visits: 493
Plastic Surgery Clinic Visits: 4,272
Westerville Plastic Surgery Clinic Visits: 459
Total Plastic Surgery Clinic Visits: 10,524

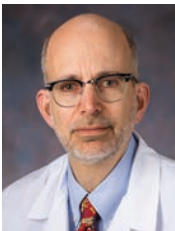
Surgical Services
TRAUMA

Nationwide Children’s Hospital is one of the only freestanding pediatric hospitals in the nation with a Level 1 Pediatric Trauma Center verified by the American College of Surgeons (ACS), a Burn Center verified by the American Burn Association (ABA) and a rehabilitation center accredited by the Commission on Accreditation of Rehabilitation Facilities (CARF). The Trauma and Burn Centers provide clinical care for injured children, a robust performance improvement program to ensure that the highest quality of care is provided, a passenger safety program and research to improve outcomes. The Trauma and Burn Centers went through the reverification process with their respective certifying agencies in 2022. Many strengths were identified throughout all aspects of the patient’s care from pre-hospital, emergency department, critical care, inpatient, operative management and rehabilitation, validating our multidisciplinary, collaborative approach allows us to provide patients with exceptional care. The Trauma and Burn Centers serve our community and beyond in our commitment to best outcomes and health equity for injured children everywhere.

Faculty



Rajan Thakkar, MD
Medical Director, Trauma, and Co-director, Burn Center



Jonathan I. Groner, MD
Quality Medical Director, Trauma



Dana Schwartz, MD
Associate Medical Director, Trauma



Renata Fabia, MD, PhD
Co-director, Burn Center

Trauma Surgeons

Jennifer H. Aldrink, MD
Gail E. Besner, MD
Cory Criss, MD
Karen A. Diefenbach, MD
Ihab Halaweish, MD
Brian D. Kenney, MD, MPH
Sara Mansfield, MD
Marc P. Michalsky, MD
Peter C. Minneci, MD
Jaimie D. Nathan, MD
Benedict C. Nwomeh, MD

Oluyinka Olutoye, MD
Sara K. Rasmussen, MD, PhD
Christopher Westgarth-Taylor, MD
Richard Wood, MD
Physician Trauma/Burn Liasons
Graciela Argote-Romero, MD (Anesthesia)
Allan Beebe, MD (Orthopedics)
Cullen Clark, MD (Emergency Medicine)
Maria Estrada, DO (Critical Care)

Jeff Lutmer, MD (Critical Care)
Jennifer MacDonald, MD (Critical Care)
David Martin, MD (Anesthesia)
Andrew Rabe, MD (Radiology)
Summit Shah, MD (Radiology)
Eric Sribnick, MD (Neurosurgery)
Morgan Wurtz, MD (Emergency Medicine)

Trauma Program Manager

LeeAnn Wurster, MS, RN, TCRN, CPNP-PC

Center for Pediatric Trauma Research Faculty



Jonathan I. Groner, MD
Director



Henry Xiang, MD, MPH, PhD
Associate Director



Julie Leonard, MD, MPH
Associate Director

Jennifer Cooper, PhD
Renata Fabia, MD, PhD
Brian Kenney, MD, MPH
Jeffrey Leonard, MD
Eric Sribnick, MD, PhD
Rachel Stanley, MD
Gerry Taylor, PhD
Rajan Thakkar, MD
Ginger Yang, PhD, MPH

Affiliate Faculty
Allan C. Beebe, MD
Mark Hall, MD, FAAP, FCCM
Bo Lu, PhD (The Ohio State University)
Jennifer Lundine, PhD, CCC-SLP, BC-ANCDs
Ai Ni, PhD (The Ohio State University)
Keith Yeates, PhD
Ping Zhang, PhD, FAMIA (The Ohio State University)

Nurse Researchers
Sheila Giles, BSN, RN
Dana Noffsinger, CPNP-AC
LeeAnn Wurster, MS, RN, TCRN, CPNP-PC

Senior Research Associate
Megan Armstrong, MPH

Highlights From the Past Year

- The Burn Center was successfully reverified as a Pediatric Burn Center by the American Burn Association.
- Dana Schwartz, MD, was appointed associate medical director of Trauma.
- Abby Frooman, MS, RN, CPNP-AC, was hired as a Trauma/Burn advanced practice provider.
- Maria Penrose, CAISS, CSTR, was elected to the Education Committee for the Trauma Center Association of America.
- Lee Ann Wurster, MS, RN, TCRN, CPNP-PC, was elected treasurer for the Trauma Advisory Board of COTS.
- Eric Sribnick, MD, was elected to the Pediatric Trauma Society (PTS) Board as member-at-large.
- Eric Sribnick, MD, was the annual recipient of the PTS Research grant for his work on “Immunoparalysis After Hemorrhage and Traumatic Brain Injury: Mechanism and Therapy.”
- Eric Sribnick, MD, received a K08 grant from the NIH for his work on the “Reversal of Immunoparalysis Following Traumatic Brain Injury and Systemic Hemorrhage in a Juvenile Rat Model.”

Center for Pediatric Trauma Research Achievements

- Henry Xiang, MD, MPH, PhD, MBA, assumed his role as president of the Society for Advancement of Violence and Injury Research (SAVIR).
- Ginger Yang, PhD, MPH, received two research grants from The Ohio State University Discovery Theme Initiative-Chronic Brain Injury to study cognitive activity and readiness for physical activities among children and adolescents with concussion.
- Bo Lu, PhD, and collaborators received two new R01 grants from the National Institutes of Health.
- Julie Leonard, MD, MPH, and collaborators received a U01 grant from the National Institutes of Health/ NINDS to assess the impact of standardized EMS midazolam dosing on timeliness of seizure cessation and safety.

Selected Publications

Cardosi J, Shen H, Groner J, Armstrong M, Xiang H. Machine learning for outcome predictions of patients with trauma during emergency department care. *BMJ Health & Care Informatics*. 2021 Oct;28(1):e100407.

Feiss R, Corrigan J, Ding K, Beaulieu C, Bogner J, Yang J. Behavioral outcomes among adults with lifetime history of traumatic brain injury: differences between rural and urban. *International Journal of Environmental Research and Public Health*. 2022 Feb;19(3):1678.

Lewit R, Kotagal M, Duron V, Falcone R, Fortenberry L, Greene H, Leonard J, Makoroff K, Midura D, Moody S, Ramaiah V, Gosain A, Slidell M. Association of economic recession and social distancing with pediatric non-accidental trauma during COVID-19. *Journal of Surgical Research*. 2022 Feb 24;276:110-119.

Sribnick E, Warner T, Hall M. Traumatic brain injury and hemorrhage in a juvenile rat model of polytrauma leads to immunosuppression and splenic alterations. *Journal of Neuroimmunology*. 2021 Dec 15;361:5777238.

Thakkar R, Penatzer J, Simon S, Steele L, Fabia R, Groner J, Keesari R, Hall M. Measures of adaptive immune function predict the risk of nosocomial infection in pediatric burn patients. *Journal of Burn Care and Research*. 2022 Apr 18;irac050.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022
\$1,561,685

Trauma-related research funding spans multiple centers which include Emergency Medicine, Center for Biobehavioral Health, Pediatric Psychology and Neuropsychology, Center for Injury Research and Policy, and Center for Innovation in Pediatric Practices.

Fast Facts: July 2021 – June 2022

Admissions: 1,446
Average Length of Stay*: 3.0
Blunt Injury Admissions: 1,130
Penetrating Injury Admissions: 119
Burn Injury Admissions: 166

Asphyxial Injury Admissions: 31
Orthopedic Trauma Admissions: 509
Neurosurgery Trauma Admissions: 163
Pediatric Surgery Trauma Admissions: 649
Other Service Trauma Admissions: 125
**Excludes observation and outpatient-in-a-bed patients*



Urology

Which Surgical Approach for Catheterizable Channels in Bowel and Bladder Management Is Best?

Many patients with neurologic disorders experience urinary and fecal incontinence. The appendix or the transverse ileal tube can be repurposed as a catheterizable channel for more independent and effective bladder or colon emptying.

“The problem is that most of the kids that require the channel for the bladder need the same channel for the colon. So, how do we provide patients with both channels? The appendix is a nice, long structure that is perfect for splitting and using to drain the bladder and flush the colon,” says Daniel DaJusta, MD, from the Section of Urology at Nationwide Children’s Hospital and clinical assistant professor of Urology at The Ohio State University College of Medicine.

There are currently no clinical guidelines to guide physicians between using the transverse ileal tube (Monti technique) or intact or split appendix (Mitrofanoff technique) for the catheterizable channel. Dr. DaJusta and colleagues sought to evaluate the clinical outcomes of these surgical procedures, as real-world outcomes may help guide clinical decisions in the future.

Between 2014 and 2018, 25 pediatric patients underwent Monti, 46 intact appendix Mitrofanoff and 36 split appendix Mitrofanoff catheterization procedures at Nationwide Children’s.

The overall complication rate without need for surgical revision was 36.0% for Monti, 21.7% for intact appendix Mitrofanoff and 47.2% for split appendix Mitrofanoff. Among all patients, most complications were due to stenosis (55.6%) and most complications were at the skin level (58.3%).

Patients who underwent split appendix Mitrofanoff procedures were at increased risk for complications (adjusted hazard ratio [aHR], 2.32; 95% CI, 1.04-5.19; P =.04).

“It’s not that split appendix necessarily has a worse complication, but, that our intact Mitrofanoff complication rate was much lower than what’s previously been reported,” says Dr. DaJusta.

Altogether, these data indicate that intact and split appendix Mitrofanoff procedures should not be considered as equivalent. Certain characteristics, such as appendiceal blood supply, appendix length, and abdominal wall thickness may be important features to consider when making decisions about which technique to use.

“We looked at our results and decided that we need to prospectively collect additional information, especially appendix size and patient abdominal wall thickness, in order to better understand overall success of the operation. Our ultimate goal is to use this information to help us lower the split appendix complication rate,” concludes Dr. DaJusta.

REFERENCES:
Zann A, Sebastiao Y, Ching CC, Fuchs M, Jayanthi VR, Wood RJ, Levitt MA, DaJusta D. Split appendix Mitrofanoffs have higher risk of complication than intact appendix or mont channels. *Journal of Pediatric Urology*. 2021;17:700.e1-700.e8.



“Our ultimate goal is to use this information to help us lower the split appendix complication rate.”
– Daniel DaJusta, MD

Surgical Services

UROLOGY

The Department of Urology at Nationwide Children’s Hospital provides comprehensive diagnostic and therapeutic services for a wide range of urological disorders in children of all ages, including teenagers and young adults. Advanced services include reconstructive surgery of the urinary tract, genitalia and urinary sphincter, as well as consultations for urinary tract abnormalities detected in utero. The department participates in several multispecialty clinics, including THRIVE (a program specializing in care for differences of sexual development, complex urological problems and gender concerns), the Center for Colorectal and Pelvic Reconstruction (CCPR), the Urology/Nephrology Combined Clinic, the Stone Clinic and the Myelomeningocele Program.

The mission of the department is to provide the highest quality pediatric urological care in the safest and most child-friendly environment. The department includes members who are full-time pediatric urologists, hold faculty appointments in the Department of Urology at The Ohio State University College of Medicine and are committed to cutting-edge medical research and surgical education.

Faculty



V. Rama Jayanthi, MD
Chief

Full-Time Nationwide
Children’s Faculty

- Seth A. Alpert, MD
- Christopher T. Brown, MD
- Christina B. Ching, MD
- Daniel G. DaJusta, MD
- Molly E. Fuchs, MD
- Daryl J. McLeod, MD
- Donald H. Nguyen, MD

Community-Based Faculty

- Nima Baradaran, MD
- Roy R. Brown Jr., MD
- George T. Ho, MD
- Adam C. Weiser, MD

2021 – 2022 Fellows

- Michael Ernst, MD
- Hamzeh Farraj, MD

Highlights From the Past Year

The Department of Urology has a long tradition of traveling to long-distance clinics to offer high-level specialty care close to our patients’ homes. Historically we have traveled to Lima, Mansfield and Portsmouth (Wheelersburg).

Nationwide Children’s Hospital staff offer full-time pediatric urological services at Dayton Children’s Hospital to serve that region. Nationwide Children’s staff are also now the primary pediatric urology caregivers in northwest Ohio, as we work to develop Nationwide Children’s Hospital-Toledo.

The Robot-Assisted Laparoscopic Surgery Program is robust, performing a wide range of surgical procedures, from routine kidney-level operations such as pyeloplasties and nephrectomies, to more complex procedures such as bladder neck reconstructions and appendicovesicostomy. Only a handful of centers around the country are performing the latter, but at Nationwide Children’s this procedure has become commonplace. Our six robotically trained pediatric urologists are among the most active in the country with regard to surgical volumes.

Selected Publications

Carsel A, DaJusta D, Ching C, McLeod D, Smith J, Fuchs M, Reh fuss A. Robotic upper tract surgery in infants 6 months or less: is there enough space? *Journal of Robotic Surgery*. 2022 Feb;16(1):193-197.

Ebert K, Terry H, Ching C, Dajusta D, Fuchs M, Jayanthi V, McLeod D, Alpert S. Effectiveness of a practical, at-home regimen of parasacral transcutaneous electrical nerve stimulation in pediatric overactive bladder. *Urology*. 2022 Jul;165:294-298.

Fuchs M, Halleran D, Bourgeois T, Sebastião Y, Weaver L, Farrell N, Vilanova-Sánchez A, Gasior A, Halaweish I, Jayanthi V, Wood R, Dajusta D. Correlation of anorectal malformation complexity and associated urologic abnormalities. *Journal of Pediatric Surgery*. 2021 Nov;56(11):1988-1992.

Nicassio L, Klamer B, Fuchs M, McLeod D, Alpert S, Jayanthi R, DaJusta D, Ching C. Broadening candidate office circumcision patients: A comparison of outcome in children based on age and weight. *Journal of Pediatric Urology*. 2022 Feb;18(1):91.e1-91.e6.

Peard L, Gargollo P, Grant C, Strine A, De Loof M, Sinatti C, Spinoit A, Hoebeke P, Cost N, Reh fuss A, Alpert S, Cranford W, Dugan A, Saltzman A. Validation of the modified Bosniak classification system to risk stratify pediatric cystic renal masses: An international, multi-site study from the pediatric urologic oncology working group of the societies for pediatric urology. *Journal of Pediatric Urology*. 2022 Apr;18(2):180.e1-180.e7.

Skerritt C, Wood R, Jayanthi V, Levitt M, Ching C, DaJusta D, Fuchs M. Does a standardized operative approach in cloacal reconstruction allow for preservation of a patent urethra? *Journal of Pediatric Surgery*. 2021 Dec;56(12):2295-2298.

Zann A, Sebastiao Y, Ching C, Fuchs M, Jayanthi V, Wood R, Levitt M, DaJusta D. Split appendix Mitrofanoffs have higher risk of complication than intact appendix or monti channels. *Journal of Pediatric Urology*. 2021 Oct;17(5):700.e1-700.e6.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

\$2,278,335

Fast Facts: July 2021 – June 2022

- Inpatient Discharges: 131
- Observation and Outpatient-in-a-Bed Discharges: 147
- Total Discharges: 278
- Average Length of Stay*: 2.4
- Average Daily Census*: 0.9
- Patient Days*: 319
- Inpatient Consults: 260
- *Excludes observation and outpatient-in-a-bed patients
- Total Surgical Procedures: 1,751
- Urodynamics: 716
- Canal Winchester Urology Clinic Visits: 256
- Dayton Children’s Clinic Visits: 633

- Dublin Urology Clinic Visits: 640
- East Broad Urology Clinic Visits: 368
- Hilliard Urology Clinic Visits: 325
- Lewis Center Urology Clinic Visits: 137
- Lima Urology Clinic Visits: 275
- Mansfield Urology Clinic Visits: 196
- Portsmouth Urology Clinic Visits: 145
- Urology (Main Campus) Clinic Visits: 6,650
- Urology/Nephrology (Main Campus) Clinic Visits: 346
- Westerville Urology Clinic Visits: 1,149
- Total Urology Clinic Visits: 11,120



Dennis R. Durbin, MD, MSCE
President, Abigail Wexner Research Institute

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.

The AWRI occupies more than 500,000 square feet of dedicated research space on the Nationwide Children’s campus. An additional facility, the new Research Building IV, is currently under construction. It is planned to open in 2023 with expanded wet bench and dry lab space.

ABIGAIL WEXNER RESEARCH INSTITUTE LEADERSHIP



Lauren O. Bakaletz, PhD
*Vice President,
Basic Sciences Research*



Deena J. Chisolm, PhD
*Vice President,
Health Services Research*



Dennis R. Durbin, MD, MSCE
President



William E. Smoyer, MD
Vice President, Clinical Research

INSTITUTES AND CENTERS OF EMPHASIS

- Biopathology Center
- Center for Biobehavioral Health
- Center for Cardiovascular Research
- Center for Child Health Equity and Outcomes Research
- Center for Childhood Cancer
- Center for Clinical and Translational Research
- Center for Gene Therapy
- Center for Injury Research and Policy
- Center for Microbial Pathogenesis
- Center for Perinatal Research
- Center for Regenerative Medicine
- Center for Vaccines and Immunity
- Kidney and Urinary Tract Center
- Steve and Cindy Rasmussen Institute for Genomic Medicine

Research Institute Reports

BIOPATHOLOGY CENTER

The Biopathology Center provides a full range of services related to biospecimen procurement, banking, processing, testing and distribution. The Biopathology Center is accredited by the College of American Pathologists Biorepository Accreditation Program (CAP BAP) and the Laboratory Accreditation Program (CAP LAP) for histopathology and molecular processing procedures. The team of 170 staff members manages over 4 million biospecimens from numerous biospecimen collection efforts, including the National Cancer Institute (NCI)-funded biorepositories of the Children’s Oncology Group (COG) and SWOG. Also part of the Biopathology Center are the NCI-funded Pediatric Division of the Cooperative Human Tissue Network and the Biospecimen Processing Center of the NCI’s Center for Cancer Genomics Biospecimen Core Resource (BCR), as well as numerous biospecimen collections from other sponsors (e.g., Nationwide Children’s-funded investigators, the SARC Foundation).

Faculty



Nilsa Del Carmen Ramirez-Milan, MD, FCAP
Medical Director and Principal Investigator



Diana Thomas, MD, PhD, FCAP
Pathology Operations Director and Principal



Jay Bowen, MS
Principal Investigator



Kathleen Nicol, MD, FCAP
Principal Investigator

Highlights From the Past Year

The Biopathology Center continues to grow and expand its services. In order to accommodate these efforts:

- Dr. Diana Thomas was named the Pathology Operations Director of the Biopathology Center in July 2021. She continues to serve as associate director of Neuropathology in the Department of Pathology and Laboratory Medicine at Nationwide Children’s. Dr. Thomas has oversight of the Biopathology Center’s Histopathology and Digital Pathology teams and took direct oversight of the Morphology Core of the Abigail Wexner Research Institute in April 2022.
- A 50,000-square-foot offsite facility will be renovated to consolidate and support current operations and provide options to expand with anticipated future growth. The Biopathology Center plans to move into the new facility in early 2024.
- Concurrently, Nationwide Children’s signed an agreement with LabVantage for an enterprise Laboratory Information Management System with the Biopathology Center as the first and largest user of this system. When completed, the Biopathology Center will be able to realize efficiencies and open up the possibility to take on new large-scale projects to expand the Biopathology Center’s mission of providing support to biomedical research in the pediatric and adult realm.

- The Molecular Characterization Initiative (MCI) is a project that aims to collect, analyze and report clinical molecular data to support COG-affiliated clinicians in choosing the best treatment for each patient. This program is part of the NCI Childhood Cancer Data Initiative (CCDI). Nationwide Children’s supports critical aspects of the NCI CCDI MCI through the Biopathology Center, which oversees the COG Biospecimen Bank, and the Steve and Cindy Rasmussen Institute for Genomic Medicine, which performs the clinical molecular characterization assays. At this time, the MCI is open to children with newly diagnosed brain or spinal cord tumors and soft tissue sarcomas. It will expand to include a variety of rare pediatric cancers. As many as 3,000 participants are expected each year.

Selected Publications

Eckstein O, Allen C, Williams P, Roy-Chowdhuri S, Patton D, Coffey B, Reid J, Piao J, Saguilig L, Alonzo T, Berg S, **Ramirez N**, Jaju A, Mhlanga J, Fox E, Hawkins D, Mooney M, Takebe N, Tricoli J, Janeway K, Seibel N, Parsons D. Phase II study of selumetinib in children and young adults with tumors harboring activating mitogen-activated protein kinase pathway genetic alterations: arm E of the NCI-COG pediatric MATCH trial. *Journal of Clinical Oncology*. 2022 Jul 10;40(20):2235-2245.

Grushko T, Filiaci V, Montag A, Apushkin M, Gomez M, Monovich L, **Ramirez N**, Schwab C, Kesterson J, Seward S, Method M, Olopade O, Fleming G, Birrer M. Effects of slide storage on detection of molecular markers by IHC and FISH in Endometrial Cancer Tissues from a clinical trial: an NRG Oncology/GOG pilot study. *Applied Immunohistochemistry & Molecular Morphology*. 2022 Jan 1;30(1):27-35.

Irwin M, Naranjo A, Zhang F, Cohn S, London W, Gastier-Foster J, **Ramirez N**, Pfau R, Reshmi S, Wagner E, Nuchtern J, Asgharzadeh S, Shimada H, Maris J, Bagatell R, Park J, Hogarty M. Revised neuroblastoma risk classification system: a report from the children’s oncology group. *Journal of Clinical Oncology*. 2021 Oct 10;39(29):3229-3241.

Parsons D, Janeway K, Patton D, Winter C, Coffey B, Williams P, Roy-Chowdhuri S, Tsongalis G, Routbort M, **Ramirez N**, Saguilig L, Piao J, Alonzo T, Berg S, Fox E, Hawkins D, Abrams J, Money M, Takebe N, Tricoli J, Seibel N. Actionable tumor alterations and treatment protocol enrollment of pediatric and young adult patients with refractory cancers in the national cancer institute-children’s oncology group pediatric MATCH trial. *Journal of Clinical Oncology*. 2022 Mar 30. [Epub ahead of print]

Perisa M, Stanek J, Setty B, **Nicol K**, Yeager N. Evaluating age-related disparity of outcomes in ewing sarcoma patients treated at a pediatric academic medical center. *Journal of Pediatric Hematology/Oncology*. 2021 Jul; 43(5): e702-e706.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022
\$21,299,840

Research Institute Reports

CENTER FOR BIOBEHAVIORAL HEALTH

The mission of the Center for Biobehavioral Health in the Abigail Wexner Research Institute at Nationwide Children’s Hospital is to improve 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.

Faculty



Cynthia A. Gerhardt, PhD
Director

Full-Time Nationwide Children’s Faculty

- Canice E. Crerand, PhD
- Kristen E. Hoskinson, PhD
- Jamie L. Jackson, PhD
- Sarah A. Keim, PhD
- Laura Mackner, PhD
- Paola Malerba, PhD
- Leena Nahata, MD

- Eric E. Nelson, PhD
- Joseph R. Rausch, PhD
- Emre Sezgin, PhD
- Micah A. Skeens, PhD, APRN, CPNP
- Jack H. Stevens, PhD
- H. Gerry Taylor, PhD
- Kathryn A. Vannatta, PhD

Affiliate Faculty

- Amy Baughcum, PhD
- Christine A. Fortney, PhD, RN
- Tondi Harrison, PhD, RN
- Kathy Lemanek, PhD
- Kelly McNally, PhD

Highlights From the Past Year

Our vision is to achieve the best possible outcomes for children and families by creating, disseminating and applying new knowledge related to the reciprocal influences of behavior and health. We are also committed to training the next generation of leaders in biobehavioral research.

Developmental, behavioral, and social risk factors contribute to significant morbidity and mortality among youth. Childhood health conditions affect not only the psychosocial well-being of youth but also that of families. Through our research, the center is transforming the health care and well-being of children and families in our community and worldwide.

The center welcomed new faculty members and received several major grants in the past year. Paola Malerba, PhD, is an applied mathematician, whose research aims to understand how neural networks produce brain rhythms and their role in brain function. She is particularly interested in how sleep oscillations affect memory consolidation in healthy children and those with brain injury. Micah Skeens, PhD, APRN, CPNP, is a nurse scientist interested in symptom management and improving adherence to medications among children receiving stem cell transplant. She currently has a new R00 from the National Institute of Nursing Research to develop and evaluate a mobile app for caregivers to improve medication adherence in children following discharge from the hospital.

Post-baccalaureate trainees, Dana Garcia and Valdeoso Patterson, both received research supplements from the National Cancer Institute to promote diversity in health-related research. These awards provide mentorship and training to support individuals underrepresented in science. Ms. Garcia is interested in the role of siblings in buffering the impact of learning difficulties among survivors of childhood cancer, and Mr. Patterson will identify social determinants of quality of life in survivors of childhood cancer.

Canice Crerand, PhD, was awarded a five-year, \$3.5 million U01 from the National Institute of Dental and Craniofacial Research to conduct research with the Cleft Outcomes Research Network/Registry. The goal of this project is to identify factors associated with psychosocial and health outcomes among children born with cleft lip and palate.

Eric Nelson, PhD, received a five-year, \$3.75 million R01 from the National Institute of Mental Health to support his neuroimaging research with transgender youth. This multi-site study will assess the effects of pharmacological suppression of puberty on the mental health and development of brain, emotion and cognitive function in transgender adolescents.

Behavioral Health: See page 133 for information about Behavioral Health services at Nationwide Children’s Hospital.

Selected Publications

Beauchamp M, Peterson R, Ris M, Taylor H, Yeates K. *Developmental Neuropsychology: Research, Theory, and Practice* (3rd Ed.). (New York, NY: Guilford, 2022).

Boone K, Pattison K, Pelak G, Sheppard K, Rausch J, Yeates K, Nelin M, Klebanoff M, Turner A, Rogers L, Keim S. Docosahexaenoic and arachidonic acid supplementation at 1 year has mixed effects on development and behaviour at age 2 for preterm children. *Acta Paediatrica* 2021 Jul;110(7):2082.

Skeens M, Guttoo P, Stanek J, Taylor K, Stratz E, Ardura M, Rangarajan H. An exploration of COVID-19 impact and vaccine hesitancy in parents of pediatric hematopoietic stem cell transplant (HCT) recipients. *Bone Marrow Transplantation*. 2022 Apr;57(4):547-53.

Tanner K, Dempster R, Castillo A, Burdo-Hartman W, Halpin E, Rausch J, Stevens J. Randomized trial of a self-administered parenting intervention for selective eating in young children. *Eating Behaviors*. 2022 Aug 1;46:101646.

Theroux C, Marousis N, Crerand C, Gerhardt C, Nahata L. Implementation of a post-baccalaureate program at a pediatric academic medical center: A pathway to graduate school. *Journal of Clinical Psychology in Medical Settings*. 2022 Apr;29:1-8.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

\$6,642,334

Research Institute Reports

CENTER FOR CARDIOVASCULAR RESEARCH

The mission of the Center for Cardiovascular Research in the Abigail Wexner Research Institute at Nationwide Children’s Hospital is to conduct innovative, mechanism-based research leading to improved therapies and outcomes for pediatric cardiovascular disease and to foster preventive strategies that promote cardiovascular health in adults.

Faculty



Brenda Lilly, PhD
Kim L. McBride, MD, MS
Patrick I. McConnell, MD
Aaron J. Trask, PhD
Mingtao Zhao, DVM, PhD

Vidu Garg, PhD
Director

Highlights From the Past Year

Our cardiovascular studies span the spectrum from basic research, which occurs in the Center for Cardiovascular Research, to translational and clinical research performed in collaboration with clinicians in The Heart Center at Nationwide Children’s. Areas of focus include investigation into the genes and gene-environment interactions that contribute to congenital heart defects, as well as the molecular and signaling pathways regulating normal heart and blood vessel development and how they are disrupted during disease development and progression. Center faculty receive funding from the National Institutes of Health (NIH), the American Heart Association (AHA), Additional Ventures, and Diabetes Research Connection to support their cutting-edge research.

The genomics program has continued to expand with growth of the induced pluripotent stem cell core facility which houses cell lines from patients with congenital heart diseases and Dr. Garg was awarded a new R21 grant from the National Heart, Lung, and Blood Institute (NHLBI) of the NIH, in collaboration with Peter White, PhD, in the Steve and Cindy Rasmussen Institute for Genomic Medicine, to apply computational approaches to congenital heart disease gene discovery.

The past year has been highly productive with over 35 publications, some of which are highlighted here. Cardiovascular research education also continues to be a priority within the center as we continue to train high school, college, medical, graduate, and postdoctoral students, many of whom published first-authored manuscripts or received independent funding in the past year. Our educational mission was bolstered by a new three-year grant from the American Heart Association to provide summer research opportunities for undergraduate students.

The Heart Center: See page 43 for information about services within The Heart Center at Nationwide Children’s Hospital.

Selected Publications

Bennett J, Gordon D, Majumdar U, Lawrence P, Matos-Nieves A, Myers K, Kamp A, Leonard J, **McBride K**, White P, **Garg V**. Use of machine learning to classify high-risk variants of uncertain significance in lamin A/C cardiac disease. *Heart Rhythm*. 2022 Apr;19(4):676-685.

Bossenbroek J, Ueyama Y, McCallinhart P, Bartlett C, Ray W, **Trask A**. Improvement of automated analysis of coronary Doppler echocardiograms. *Scientific Reports*. 2022 May 6;12(1):74908.

Ernzen K, **Trask A**, Peebles M, **Garg V**, **Zhao M**. Human stem cell models of SARS-COV-2 infection in the cardiovascular system. *Stem Cell Reviews and Reports*. 2021 Dec;17(6):2107-2119.

Gordon D, Cunningham D, Zender G, Lawrence P, Penaloza J, Lin H, Fitzgerald-Butt S, Myers K, Duong T, Corsmeier D, Gaither J, Kuck H, Wijeratne S, Moreland B, Kelly B, Mendelian G, **Garg V**, White P, **McBride K**. Exome sequencing in multiplex families with left-sided cardiac defects has high yield for disease gene discovery. *PLoS Genetics*. 2022 Jun 23;18(6):e1010236.

Kraler S, **Garg V**, Akhmedov A. Calcific aortic valve disease: novel insights into nitric oxide signaling. *European Heart Journal*. 2022 May 1;43(17):1665-1667.

Mansfield C, **Zhao M**, **Basu M**. Translational potential of hiPSCs in predictive modeling of heart development and disease. *Birth Defects Research*. 2022 Mar 9. [Epub ahead of print]

Matos-Nieves A, Manivannan S, Majumdar U, **McBride K**, White P, **Garg V**. A multi-omics approach using a mouse model of cardiac malformations for prioritization of human congenital heart disease contributing genes. *Frontiers in Cardiovascular Medicine*. 2021 Aug;8:683074. [Epub ahead of print]

Thomas S, Manivannan S, **Garg V**, **Lilly B**. Single-cell RNA sequencing reveals novel genes regulated by hypoxia in the lung vasculature. *Journal of Vascular Research*. 2022 Mar;59(3):163-175.



Grants Awarded to Heart Center and Cardiovascular Research Faculty

JULY 1, 2021 – JUNE 30, 2022

\$1,752,882

Research Institute Reports

CENTER FOR CHILD HEALTH EQUITY AND OUTCOMES RESEARCH

The mission of the Center for Child Health Equity and Outcomes Research in the Abigail Wexner Research Institute at Nationwide Children’s Hospital is to advance child health and well-being through research in and across clinical care, health services, health policy and community initiatives. We aspire to lead the nation in groundbreaking research that produces reduced disparities, vibrant communities, flourishing families, and equitable and best outcomes for all children. Investigators in the center develop and test new health service delivery and payment systems in partnership with pediatricians, payers and Nationwide Children’s to improve quality and equity of care — especially for those patients most at risk.

Faculty



Deena J. Chisolm, PhD
Director

Mary Ann Abrams, MD

Jeffrey A. Bridge, PhD
Director, Center for Suicide
Prevention and Research

Jennifer N. Cooper, PhD
Co-Director, Center for Surgical
Outcomes Research

Susan E. Creary, MD, MSc

Laura C. Hart, MD

Kelly J. Kelleher, MD, MPH

Alex R. Kemper, MD

Amrik S. Khalsa, MD

Peter C. Minneci, MD, MHSc
Co-Director, Center for Surgical
Outcomes Research

Sarah H. O’Brien, MD, MSc

Prasanth Pattisapu, MD, MPH

Jordee M. Wells, MD, MPH

Highlights From the Past Year

Newly awarded grants in the center expand our research in maternal and child health, health equity, and clinical innovation. These include Dr. Chisolm’s Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)-funded TIME (Targeted Investment and Meaningful Engagement) study employing structural racism histories to inform community development investing and her National Institute of Nursing Research (NIHR)-funded study on the effectiveness of a tailored perinatal nurse home visiting intervention; Dr. Cooper’s National Institute on Minority Health and Health Disparities (NIMHD)-funded award studying racial disparities in tonsillectomy; and Dr. O’Brien’s National Heart, Lung and Blood Institute (NHLBI)-funded award studying innovation in screening for von Willebrand disease.

Junior faculty were awarded noteworthy career development awards: Dr. Khalsa (NHLBI K23); Dr. Pattisapu (American Society of Pediatric Otolaryngology Career Development Award); and Dr. Wells (PEDSnet Scholar Fellowship).

Large-scale efforts in research, intervention, and advocacy include Integrated Care for Kids (InCK), a CMS demonstration project on reducing out of home placement risk in Medicaid enrollees (Dr. Chisolm); PEDSnet, a multi-specialty network that conducts observational research and clinical trials across multiple children’s hospital health systems (Dr. Kelleher); RECOVER, a multi-institution consortium studying recovery from COVID-19 infection and the development of “Long COVID” (Dr. Chisolm); and the Center for Accelerating Suicide Prevention in Real-world Settings (ASPIRES), a new National Institute of Mental Health (NIMH) P50 Centers Program-funded effort to accelerate the development and use of effective interventions to reduce suicide in children and adolescents (Dr. Bridge).

The center also continues to support Nationwide Children’s Hospital’s *Stand Against Racism/Stand for Health Equity* initiative. Notable projects in this arena include community engaged research on homelessness, infant mortality, and poverty reduction through the earned income tax credit. Faculty and staff also participate in mentoring and education designed to increase diversity in the clinical and biomedical research pipeline.

Selected Publications

Boch S, Sezgin E, Ruch D, Kelleher K, Chisolm D, Lin S. Unjust: the health records of youth with personal/family justice involvement in a large pediatric health system. *Health Justice*. 2021 Aug 1;9(1):20.

Chisolm D, Bell B, Yamoah O, Freedman D. Racialized experiences differentiate food security among African American adults. *Nursing Research*. 2021 Set/Oct 01;70(5S Suppl 1):S13-S20.

Creary S, Beeman C, Stanek J, King K, McGann P, O’Brien S, Liem R, Holl J, Badawy S. Impact of hydroxyurea dose and adherence on hematologic outcomes for children with sickle cell anemia. *Pediatric Blood and Cancer*. 2022 Jun;69(6):e29607.

Hardy R, Boch S, Keedy H, Chisolm D. Social determinants of health needs and pediatric health care use. *The Journal of Pediatrics*. 2021 Nov;238:275-281.e1.

Kemper A, Hostutler C, Beck K, Fontanella C, Bridge J. Depression and suicide-risk screening results in pediatric primary care. *Pediatrics*. 2021 Jul;148(1):e2021049999.

Khalsa A, Li R, Rausch J, Klebanoff M, Ingol T, Boone K, Keim S. Early childhood growth trajectories in a Medicaid population. *Pediatric Obesity*. 2022 Sep;17(9):e12918.

Metzger G, Asti L, Quinn J, Chisolm D, Xiang H, Deans K, Cooper J. Association of the Affordable Care Act Medicaid expansion with trauma outcomes and access to rehabilitation among young adults: findings overall, by race and ethnicity, and community income level. *Journal of the American College of Surgeons*. 2021 Dec;233(6):776-793.e16.

Wells J, Rodean J, Cook L, Sills M, Neuman M, Kornblith A, Jain S, Hirsch A, Goyal M, Fleegler E, DeLaroche A, Aronson P, Leonard J. Injury-related pediatric emergency department visits in the first year of COVID-19. *Pediatrics*. 2022 Jul 15.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

\$11,354,537

Research Institute Reports

CENTER FOR CHILDHOOD CANCER

The mission of the Center for Childhood Cancer in the Abigail Wexner Research Institute at Nationwide Children’s Hospital is to transform the care of children, adolescents and young adults with cancer through research and clinical translation. Center investigators collaborate closely to study how cells grow, divide and function, how these basic processes are usurped to allow cancers to develop, how the body responds to developing cancers, and how this knowledge can be used to better diagnose and treat these diseases. Investigators work closely with physicians at Nationwide Children’s, as well as with national and international colleagues, to translate these findings to the patient.

Faculty



Stephen L. Lessnick, MD, PhD
Director

- | | |
|---------------------------|----------------------------------|
| Kevin A. Cassady, MD | Meisam Naeimi Karaoudi, DVM, PhD |
| Dawn S. Chandler, PhD | Sara Rasmussen, MD, PhD |
| Long-Sheng Chang, PhD | Ryan D. Roberts, MD, PhD |
| Timothy P. Cripe, MD, PhD | Benjamin Z. Stanton, PhD |
| Rachid Drissi, PhD | Emily R. Theisen, PhD |
| Genevieve C. Kendall, PhD | Ruoning Wang, PhD |
| Dean A. Lee, MD, PhD | |
| Jeffrey R. Leonard, MD | |

Highlights From the Past Year

The Center for Childhood Cancer continues to have exceptional growth and success in its research programs through strong integration and collaboration among laboratories within the center, with other centers and clinical divisions, and with The Ohio State University Comprehensive Cancer Center – Arthur G. James Cancer Hospital and Richard J. Solove Research Institute (OSUCCC – James) and other programs on-campus.

Cancer mechanisms centered in the cell nucleus is one area of great strength in the center. Processes in the cell nucleus include genetic mutations, alterations in the epigenome including three-dimensional organization of the nuclear DNA, changes in gene expression, and abnormalities in mRNA splicing. These mechanisms are areas of focus in the Chandler, Kendall, Lessnick, Stanton, and Theisen labs. Indeed, these groups, and others, have conducted highly collaborative studies that leverage the expertise of each group, and has resulted in significant collaborative publications and grant awards.

Similarly, therapeutic approaches focused on harnessing both the natural immune system and engineered variants in the immune system have been an area of unique growth and development in the center. Immune mechanisms are the area of focus for the Cassady, Cripe, Lee, and Wang labs. Again, the highly collaborative nature of this area within the center has led to important collaborative publications and grants.

Ultimately, much of the work in the center focuses on understanding the underlying biology of these areas, and at the same time, bringing this understanding to children with cancer via clinical translation of this work.

Hematology, Oncology, and Blood and Marrow Transplant: See page 77 for information about the Division of Hematology, Oncology & Blood and Marrow Transplant at Nationwide Children’s Hospital.

Selected Publications

Boone M, Taslim C, Crow J, Selich-Anderson J, Byrum A, Showpnil I, Sunkel B, Wang M, **Stanton B, Theisen E, Lessnick S.** The FLI portion of EWS/FLI contributes a transcriptional regulatory function that is distinct and separable from its DNA-binding function in Ewing sarcoma. *Oncogene*. 2021 Jul;40(29):4759-4769.

Chang L, Oblinger J, Smith A, Ferrer M, Angus S, Hawley E, Petrilli A, Beauchamp R, Riecken L, Erdin S, Poi M, Huang J, Bessler W, Zhang X, Guha R, Thomas C, Burns S, Gilbert T, Jiang L, Li X, Lu Q, Yuan J, He Y, Dixon S, Masters A, Jones D, Yates C, Haggarty S, La Rosa S, Welling D, Stemmer-Rachamimov A, Plotkin S, Gusella J, Guinney J, Morrison H, Ramesh V, Fernandez-Valle C, Johnson G, Blakeley J, Clapp D; Synodos for NF2 Consortium. Brigatinib causes tumor shrinkage in both NF2-deficient meningioma and schwannoma through inhibition of multiple tyrosine kinases but not ALK. *PLoS One*. 2021 Jul 15;16(7):e0252048.

Chen X, Sunkel B, Wang M, Kang S, Wang T, Gnanaprakasam J, Liu L, Cassel T, Scott D, Muñoz-Cabello A, Lopez-Barneo J, Yang J, Lane A, Xin G, **Stanton B,** Fan T, **Wang R.** Succinate dehydrogenase/complex II is critical for metabolic and epigenetic regulation of T cell proliferation and inflammation. *Science Immunology*. 2022 Apr 29;7(70):eabm8161.

Dominguez C, Cunningham D, Venkataramany A, **Chandler D.** Heat increases full-length SMN splicing: promise for splice-augmenting therapies for SMA. *Human Genetics*. 2022 Feb;141(2):239-256.

Fehrenbach L, Adekanye A, Palillo M, Bidot W, Malbrue R, Coble D, **Kendall G.** Internal temperatures of packaging for overnight cross-country shipping of zebrafish (Danio Rerio). *Comparative Medicine*. 2022 Jun 1;72(3):195-203.

Ghonime M, Saini U, Kelly M, Roth J, Wang P, Chen C, Miller K, Hernandez-Aguirre I, Kim Y, Mo X, Stanek J, **Cripe T,** Mardis E, **Cassady K.** Eliciting an immune-mediated antitumor response through oncolytic herpes simplex virus-based shared antigen expression in tumors resistant to viroimmunotherapy. *Journal for Immunotherapy of Cancer*. 2021 Oct;9(10):e002939.

Naeimi Kararoudi M, Likhite S, Elmas E, Yamamoto K, Schwartz M, Sorathia K, de Souza Fernandes Pereira M, Sezgin Y, Devine R, Lyberger J, Behbehani G, Chakravarti N, Moriarity B, Meyer K, **Lee D.** Optimization and validation of CAR transduction into human primary NK cells using CRISPR and AAV. *Cell Reports Methods*. 2022 Jun 13;2(6):100236.

Sunkel B, Wang M, LaHaye S, Kelly B, Fitch J, Barr F, White P, **Stanton B.** Evidence of pioneer factor activity of an oncogenic fusion transcription factor. *iScience*. 2021 Jul 16;24(8):102867.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

\$14,012,416

Research Institute Reports

CENTER FOR CLINICAL AND TRANSLATIONAL RESEARCH

The Center for Clinical and Translational Research in the Abigail Wexner Research Institute at Nationwide Children’s Hospital is committed to improving the diagnosis, treatment and outcomes of society’s most important pediatric diseases by integrating high-caliber basic science research with innovative patient-based research.

Faculty



William E. Smoyer, MD,
FASN
Director

- Balamurugan Appakalai, MD

Andrea E. Bonny, MD

David R. Brigstock, PhD

Mitchell H. Grayson, MD

Mark W. Hall, MD, FAAP, FCCM

Hunter Johnson, MD

Bryce A. Kerlin, MD

Setty M. Magaña, MD

Jennifer A. Muszynski, MD
- Olubukola O. Nafiu, MD

Nicole O’Brien, MD

Vanessa A. Olbrecht, MD

Lance M. Relland, MD, PhD

Eric A. Sribnick, MD, PhD

Rachel M. Stanley, MD, MHSA

Rajan K. Thakkar, MD

Highlights From the Past Year

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

Our vision is to use the delivery of care to each pediatric patient as an opportunity to learn how to improve future care. We believe it is our responsibility to learn from every patient so that subsequent children will be able to benefit from evidence-based improvements in care.

Our center has scientists investigating several diverse areas of research. The overarching theme of our research programs is to bring new knowledge from both bedside to bench and from bench to bedside to improve the lives of children.

Our faculty are from three departments and represent nine different subspecialties: Nephrology, Hematology/Oncology, Adolescent Medicine, Critical Care, Urology, Pediatric Surgery, Anesthesia, Allergy/Immunology and Emergency Medicine. Our research programs are very diverse and include immunoparalysis after sepsis or trauma, pathophysiology of stored RBC-induced immune suppression, novel treatments for nephrotic syndrome, pathophysiology of thrombosis, burn injury, abdominal sepsis, hepatic fibrosis, cancer genetics, adolescent addiction, interventions for traumatic brain injury, spinal cord injuries, mechanisms behind viral infection and allergic disease, perioperative respiratory complications, neonatal pain assessments and the role of pain control in immune function.

Selected Publications

Hussain SA, Rohlfing M, Resiliac J, Santoro J, Peeples ME, Garcin D, **Grayson MH**. Atopic neutrophils prevent post-viral airway disease. *Journal of Immunology*. 2021 Nov 15;207(10):2589-2597.

Magaña SM, Peterson TE, Evans JE, Decker PA, Simon V, Eckel-Passow JE, Daniels DJ, Parney IF. Pediatric brain tumor cell lines exhibit miRNA-depleted, Y RNA-enriched extracellular vesicles. *Journal of Neurooncology*. 2022 Jan;156(2):269-279.

Snyder A, Jedreski K, Fitch J, Wijeratne S, Wetzel A, Hensley J, Flowers M, Bline K, **Hall MW, Muszynski JA**. Transcriptomic profiles in children with septic shock with or without immunoparalysis. *Frontiers in Immunology*. 2021 Oct 1;12:733834.

Sribnick EA, Warner T, **Hall MW**. Traumatic brain injury and hemorrhage in a juvenile rat model of polytrauma leads to immunosuppression and splenic alterations. *Journal of Neuroimmunology*. 2021 Dec 15;361:577723.

Thakkar RK, Penatzer J, Simon S, Steele L, Fabia R, Groner JI, Keesari R, **Hall M**. Measures of adaptive immune function predict the risk of nosocomial infection in pediatric burn patients. *Journal of Burn Care and Research*. 2022 Apr 18:irac050.

Willer BL, Mpody C, Tobias JD, **Nafiu OO**. Association of race and family socioeconomic status with pediatric postoperative mortality. *JAMA Network Open*. 2022 Mar 1;5(3):e222989.

Zhang P, Tossone K, Ashmead R, Bickert T, Bailey E, Doogan NJ, Mack A, Schmidt S, **Bonny AE**. Examining differences in retention on medication for opioid use disorder: An analysis of Ohio Medicaid data. *Journal of Substance Abuse Treatment*. 2022 May;136:108686.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022
\$5,907,538

Research Institute Reports

CENTER FOR GENE THERAPY

The primary mission of the Center for Gene Therapy in the Abigail Wexner Research Institute at Nationwide Children’s Hospital is to develop novel genetically based therapies for inherited diseases in order to ease the burden of these diseases on children and their families. This mission is pursued by a dedicated team of laboratory scientists whose work is directed toward clinical applications, and by the efforts of clinician-scientists who are tasked with bringing these therapies into clinical trials. To do this, the center works closely with the regulatory expert staff of Nationwide Children’s Office of Research Regulatory Affairs and is affiliated for clinical manufacturing with Andelyn Biosciences and other biotech partners. This integrated approach allows us to accelerate the transfer of promising therapies from the bench to the bedside.

Faculty



Kevin M. Flanigan, MD
Director

Principal Investigators

- Lindsay Alfano, DPT
 - Allison Bradbury, PhD
 - Liubov Gushchina, PhD
 - Scott Harper, PhD
 - Stephen Kaler, MD, MPH
 - Linda Lowes, PhD
- Paul Martin, PhD
 - Jerry R. Mendell, MD
 - Kathrin Meyer, PhD
 - Afrooz Rashnonejad, PhD
 - Nizar Saad, PhD
 - Zarife Sahenk, MD
 - Sriram Vaidyanathan, PhD

- Megan Waldrop, MD
- Nicolas Wein, MD

Associate Faculty

- Anne Connolly, MD
- Kim McBride, MD
- Kristen Truxal, MD
- Christopher Walker, PhD

2021 – 2022 Fellows

- Renatta Knox, MD
(Gene Therapy Fellow)
- Stefan Nicolau, MD
(Gene Therapy Fellow)

Support Staff

- Tabatha Simmons, PhD
Director, Gene Therapy Clinical
Research Unit

Highlights From the Past Year

The Center for Gene Therapy again had a highly productive and collaborative year, and successfully recruited three new faculty as principal investigators. Dr. Sriram Vaidyanathan joined as an assistant professor, having completed his post-doctoral fellowship at Stanford, to work on gene editing and cystic fibrosis (Dr. Vaidyanathan, et al). Dr. Afrooz Rashnonejad completed her fellowship at Nationwide Children’s and joined as an assistant professor, with an interest in RNA-based therapies and in treatment of Charcot-Marie-Tooth syndromes. Dr. Nizar Saad joined as a research assistant professor, with an interest in extracellular vesicles as diagnostic and therapeutic tools for the muscular dystrophies (Dr. Saad, et al).

This year saw publications addressing the lessons of and challenges to pre-existing antibodies in gene therapies (Dr. Mendell, et al) and demonstrating persistent clinical benefits from exon skipping therapy for Duchenne muscular dystrophy (DMD) (Dr. Mitelman, et al). Highly promising preclinical data were published supporting a gene therapy approach for a rare form of Charcot-Marie-Tooth (CMT2D) (Dr. Sahenk, et al), among other syndromes. Clinical observational studies described an important but underrecognized mutational class in DMD patients (Dr. Waldrop, et al) and the development and validation of a novel measure of gross motor function relevant to multiple childhood inherited diseases (Dr. Alfano, et al).

Clinical gene therapy trials included a first-in-human U7 snRNA-mediated exon skipping to restore full-length dystrophin expression in DMD patients with a single exon duplication, supported by comprehensive analysis showing a lack of off-target effects (Dr. Wein, et al); results from this trial, presented at the American Society of Gene and Cell Therapy, showed the first expression of full-length dystrophin in an infant treated with gene therapy. Other gene therapy trials continued, with meeting presentations showing promising results with gene transfer of microdystrophin in boys with DMD, and with gene replacement for mucopolysaccharidosis types 3A and 3B. Robust collaboration continued; as one example, Dr. Megan Waldrop initiated a first-in-human trial of adeno-associated virus (AAV)-delivery of the *IGHMBP2* gene in patients with SMARD1/CMT2S, using a vector developed by Dr. Kathrin Meyer. The operationalization of new trials continued to be facilitated by the maturation of the Gene Therapy Clinical Research Unit, made available to all investigators.

Finally, the center has continued its highly visible efforts in education of the next generation of gene therapists, hosting its 10th annual Nationwide Children’s/OSU Myology Course for lab and clinical trainees, and initiating two new graduate level courses within the OSU graduate school catalogue, taught nearly entirely by Center for Gene Therapy faculty.

Neurology: See page 101 for related information about the Section of Neurology at Nationwide Children’s.

Selected Publications

Alfano LN, Iammarino MA, Reash NF, Powers BR, Shannon K, Connolly AM, Waldrop MA, Noritz GH, Shell R, Tsao CY, Flanigan KM, Mendell JR, Lowes LP. Validity and reliability of the neuromuscular gross motor outcome. *Pediatric Neurology*. 2021 Sep;122:21-26.

Mendell JR, Connolly AM, Lehman KJ, Griffin DA, Khan SZ, Dharia SD, Quintana-Gallardo L, Rodino-Klapac LR. Testing preexisting antibodies prior to AAV gene transfer therapy: rationale, lessons and future considerations. *Molecular Therapy—Methods & Clinical Development*. 2022 Feb 26;25:74-83.

Mitelman O, Abdel-Hamid HZ, Byrne BJ, Connolly AM, Heydemann P, Proud C, Shieh PB, Wagner KR, Dugar A, Santra S, Signorovitch J, Goemans N; investigators from the LNMRC Natural History study, McDonald CM; investigators from the CINRG Duchenne National History Study, Mercuri E; investigators from The DMD Italian Group, Mendell JR. A combined prospective and retrospective comparison of long-term functional outcomes suggests delayed loss of ambulation and pulmonary decline with long-term eteplirsen treatment. *Journal of Neuromuscular Disease*. 2022;9(1):39-52.

Saad NY, Al-Kharsan M, Garwick-Coppens SE, Chermahini GA, Harper MA, Palo A, Boudreau RL, Harper SQ. Human miRNA miR-675 inhibits DUX4 expression and may be exploited as a potential treatment for Facioscapulohumeral muscular dystrophy. *Nature Communication*. 2021 Dec 8;12(1):7128.

Sahenk Z, Ozes B, Murrey D, Myers M, Moss K, Yalvac ME, Ridgley A, Chen L, Mendell JR. Systemic delivery of AAVrh74.tMCK.hCAPN3 rescues the phenotype in a mouse model for LGMD2A/R1. *Molecular Therapy—Methods & Clinical Development*. 2021;22:401-414.

Vaidyanathan S, Ryan AL. Editorial: genome editing to treat cystic fibrosis and other pulmonary diseases. *Frontiers in Genome Editing*. 2022 Jun 9;4:917916.

Waldrop MA, Moore SA, Mathews KD, Darbro BW, Medne L, Finkel R, Connolly AM, Crawford TO, Drachman D, Wein N, Habib AA, Krzesniak-Swinarska MA, Zaidman CM, Collins JJ, Jokela M, Udd B, Day JW, Ortiz-Guerrero G, Statland J, Butterfield RJ, Dunn DM, Weiss RB, Flanigan KM. Intron mutations and early transcription termination in Duchenne and Becker muscular dystrophy. *Human Mutation*. 2022 Apr;43(4):511-528.

Wein N, Dunn DM, Waldrop MA, Gushchina LV, Frair EC, Weiss RB, Flanigan KM. Absence of significant off-target splicing variation with a U7snRNA vector targeting DMD Exon 2 duplications. *Human Gene Therapy*. 2021 Nov;32(21-22):1346-1359.



Grants Awarded to Center for Gene Therapy and Neurology Clinical and Research Faculty

JULY 1, 2021 – JUNE 30, 2022

\$8,328,612

Research Institute Reports

CENTER FOR INJURY RESEARCH AND POLICY

The Center for Injury Research and Policy in the Abigail Wexner Research Institute at Nationwide Children’s Hospital works globally to reduce injury-related pediatric death and disability. Established in 1999, the center serves as a pioneer by translating cutting-edge injury research into education, advocacy, and advances in clinical care. From design changes in consumer products to new public policy, the Center for Injury Research and Policy’s influence is leading the way to a safer world.

Faculty



Gary A. Smith, MD, DrPH
Director

Julie C. Leonard, MD, MPH
Lara B. McKenzie, PhD, MA
Nichole L. Michaels, PhD, MPH
Henry Xiang, MD, MPH, PhD, MBA
Jinzghen (Ginger) Yang, PhD, MPH
Motao Zhu, MD, MS, PhD

Postdoctoral Fellows
Robyn Feiss, PhD, MS
Fangda Zhang, PhD

Highlights From the Past Year

The Center for Injury Research and Policy works from local to global levels to reduce death and disability due to injuries and violence through research, education, advocacy, and advances in clinical care. The center aims to improve the scientific understanding of the epidemiology, prevention, acute treatment, rehabilitation, and biomechanics of injuries. It provides leadership in the development, implementation, and scientific evaluation of public policy regarding prevention of injuries and violence.

The center has been awarded Injury Control Research Center (ICRC) designation by the Centers for Disease Control and Prevention since 2008. The center is one of only nine centers nationally with this designation, and it is the only ICRC focused on pediatric injury research and prevention.

The multidisciplinary Center for Pediatric Trauma Research at Nationwide Children’s, led by Dr. Henry Xiang, conducts evidence-based trauma care and policy research to achieve the best outcomes for pediatric trauma patients. Focusing on pre-hospital emergency medical services, acute treatment and rehabilitation care, researchers associated with the Center for Pediatric Trauma Research help promote the mission of the Center for Injury Research and Policy.

A study by Dr. Smith and colleagues (Smith GA, Kistamgari S, Splaingard M. Age-Dependent Responsiveness to Smoke Alarm Signals Among Children. *Pediatrics*. 2022;149(5):e2022056460) concluded a series of published studies over approximately a decade that evaluated the effectiveness of various smoke alarm signals among children 5-12 years old with respect to awakening and performance of an escape procedure upon awakening. Although it has been established that audible smoke alarms have more difficulty awakening children from sleep than adults, no attempt had been previously made to characterize how smoke alarm responsiveness changes with age during childhood. This study demonstrated the substantial influence of child age on the effectiveness of audible smoke alarms during childhood. Among 12-year-olds, only 56.3% escaped within one minute (and 67.6% within two minutes) to a high-frequency tone (the type of alarm found in most U.S. homes). However, a hybrid voice low-frequency tone alarm was >96% effective at awakening and prompting escape within one minute among children 9 years and older.

Selected Publications

McKenzie L, Roberts K, McAdams R, Abdel-Rasoul M, Kristel O, Szymanski A, Keim S, Shields W. Efficacy of a mobile technology-based intervention for increasing parents' safety knowledge and actions: a randomized controlled trial. *Injury Epidemiology*. 2021 Oct 1;8(1):56.

Michaels N, Letson M. Child maltreatment fatalities among children and adolescents 5-17 years old. *Child Abuse & Neglect*. 2021 Jul;117:105032.

Miller K, MacDonald J, Sullivan L, Venkata L, Shi J, Yeates K, Chen S, Alshaikh E, Taylor H, Hautmann A, Asa N, Cohen D, Pommering T, Mardis E, Yang J; NCH Concussion Research Group. Salivary miRNA expression in children with persistent post-concussive symptoms. *Frontiers in Public Health*. 2022 May;10:890420.

Xiang H. Infobugs: agent for contagious transmission of violence, suicide and other social events. *Injury Prevention*. 2022 Feb;28(1):1-2.

Zhu M, Shen S, Redelmeier D, Li L, Wei L, Foss R. Bans on cellphone use while driving and traffic fatalities in the United States. *Epidemiology*. 2021 Sept;32(5):731-739.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022
\$6,622,532

Research Institute Reports

CENTER FOR MICROBIAL PATHOGENESIS

The Center for Microbial Pathogenesis in the Abigail Wexner Research Institute at Nationwide Children’s Hospital is home to 13 full-time basic and clinician scientist investigators and also hosts the Oral and GI Microbiology Research Affinity Group. We are dedicated to the development of a greater understanding of the molecular mechanisms by which microorganisms cause disease, as well as how we respond to these disease states. To do so, our faculty identify virulence mechanisms and define host immune response patterns by use of a variety of molecular, cellular and “omics”-based approaches, with the overarching goal of identifying opportunities to interfere in the disease process and/or promote our ability to combat disease. We strive to rapidly translate our findings into the development of new and/or better ways to diagnose, treat, and ideally, prevent infectious diseases to improve the lives of children worldwide.

Faculty



Lauren O. Bakaletz, PhD
Director

- | | |
|--------------------------|-------------------------------|
| Juhi Bagaitkar, PhD | Ross M. Maltz, MD |
| Michael T. Bailey, PhD | Kevin M. Mason, PhD |
| Jennifer L. Edwards, PhD | Christopher P. Montgomery, MD |
| Steven D. Goodman, PhD | Santiago Partida-Sanchez, PhD |
| John S. Gunn, PhD | Chack-Yung Yu, DPhil |
| Samantha J. King, PhD | |
| Benjamin T. Kopp, MD | |

Highlights From the Past Year

Despite lingering challenges with the global pandemic, faculty within the Center for Microbial Pathogenesis sustained our long-term vision to combat infectious diseases that remain a leading cause of morbidity and mortality globally. We welcomed Juhi Bagaitkar, PhD, and her laboratory team with their extensive expertise in pathogenesis of disease in the oral cavity in February 2022. Collectively, our investigators study diseases of the respiratory tract (Lauren Bakaletz, PhD; Samantha King, PhD; Benjamin Kopp, MD; Kevin Mason, PhD), gastrointestinal tract (Michael Bailey, PhD; John Gunn, PhD; Ross Maltz, MD), skin (Christopher Montgomery, MD), oral cavity (Steven Goodman, PhD; Juhi Bagaitkar, PhD), genitourinary system (Jennifer Edwards, PhD), and the humoral and cellular immune response to disease (Santiago Partida-Sanchez, PhD; Chack-Yung Yu, DPhil). This year we continued to collaborate with colleagues nationally and internationally to advance our multidisciplinary approaches to unravel how bacteria and viruses cause infections, then, whenever possible, use this understanding to develop novel ways to improve clinical care for children battling these diseases. We also continued to advance our mission to teach the next generation of basic and clinician scientists by welcoming a variety of trainees. The importance of our work is evidenced by notable faculty appointments, high-impact publications and presentations at national and international meetings, as well as awards of \$4.1 million in external grants – including multiple new grants, and approximately \$3.8 million awarded by the National Institutes of Health (NIH). Selected highlights include:

- Center faculty published 57 primary peer-reviewed, high impact research papers.
- Awards to center faculty provided nearly \$1 million in new year-one direct costs.
- Juhi Bagaitkar, PhD, was invited to speak at two international meetings [Gordon Conference on Proteolytic Enzymes and *Porphyromonas gingivalis* 2022 (Pg2022)].
- Mike Bailey, PhD, was elected Secretary/Treasurer of the PsychoNeuroImmunology Research Society (PNIRS) wherein he will also serve on the society’s Executive Committee.

- Lauren Bakaletz, PhD, was elected Fellow of the American Association for the Advancement of Science.
- Jenn Edwards, PhD, was chosen as the first elected President of the international *Neisseria gonorrhoeae* Research Society.
- Steve Goodman, PhD, and Lauren Bakaletz, PhD, published in *Cell* on the role of rare Z-form DNA in biofilm recalcitrance.
- Aliyah Bennett, MLS(ASCP)CM, (MD/PhD student for John Gunn, PhDs) was awarded an NIH/NIAID Diversity Research Supplement to study carriage of *Salmonella* in the gallbladder.
- Sam King, PhD, was invited to speak at two international glycobiology conferences (Society for Glycobiology Meeting and FASEB Microbial Glycobiology).
- Ben Kopp, MD, and Santiago Partida-Sanchez, PhD, were awarded a new NIH MPI R01 grant to define how highly effective CFTR modulator therapy alters CF phagocyte function and immunophenotype people with CF.
- Ross Maltz, MD, published a high-impact paper on patient and caregiver’s perspectives on biosimilar use in pediatric inflammatory bowel disease in the *Journal of Pediatric Gastroenterology and Nutrition*.
- Kevin Mason, PhD, served as topic editor of the special issue, “Otitis Media,” for *Frontiers in Cellular and Infection Microbiology*.
- Chris Montgomery, MD, established a biorepository (clinical data, blood samples, microbiome swabs) of 313 children hospitalized with *S. aureus* infection and 131 healthy children.
- Chack-Yung Yu, DPhil, was invited to speak on deficiency and low copy number of complement C4 at the international 2022 Global Conference in Myositis.
- Trainees received numerous travel awards, recognition for exceptional performance and funds to support research proposals.
- Faculty participated in and provided leadership service for multiple cross-campus academic initiatives (e.g., Biofilms in Human Medicine, Cure Cystic Fibrosis Columbus (C3), Infectious Diseases Institute).

Infectious Diseases: See page 85 for information about the Division of Infectious Diseases at Nationwide Children’s.

Selected Publications

Allen JM, Mackos AR, Jagggers RM, Brewster PC, Webb M, Lin CH, Ladaika C, Davies R, White P, Loman BR, Bailey MT. Psychological stress disrupts intestinal epithelial cell function and mucosal integrity through microbe and host-directed processes. *Gut Microbes*. 2022 Jan-Dec;14(1):2035661.

Bagaitkar J. Environment tames CGD macrophages. *Blood*. 2022 Mar 17;139(11):1611-1612.

Buzzo JR, Devaraj A, Gloag ES, Jurcisek JA, Robledo-Avila F, Kesler T, Wilbanks K, Mashburn-Warren L, Balu S, Wickham J, Novotny LA, Stoodley P, Bakaletz LO, Goodman SD. Z-form extracellular DNA is a structural component of the bacterial biofilm matrix. *Cell*. 2021 Nov 11;184(23):5740-5758.e17.

Chahal G, Quintana-Hayashi MP, Gaytán MO, Benktander J, Padra M, King SJ, Linden SK. *Streptococcus oralis* employs multiple mechanisms of salivary mucin binding that differ between strains. *Frontiers in Cellular and Infection Microbiology*. 2022 Jun 17;12:889711.

Day CJ, Hardison RL, Spillings BL, Jurcisek JA, Mak J, Jennings MP, Edwards JL. Complement receptor 3 mediates HIV-1 transcytosis across an intact cervical epithelial cell barrier: new insight into HIV transmission in women. *mBio*. 2022 Jan 11;13(1):e0217721.

Li Z, Beesetty P, Gerges G, Kleinhenz M, Moore-Clingenpeel M, Yang C, Ahmed LB, Hensley J, Steele L, Chong AS, Montgomery CP. Impaired T-lymphocyte responses during childhood *Staphylococcus aureus* infection. *The Journal of Infectious Diseases*. 2022 Jan 5;225(1):177-185.

Woolard KJ, Sandala JL, Melander RJ, Gunn JS, Melander C. Development of small molecules that work cooperatively with ciprofloxacin to clear salmonella biofilms in a chronic gallbladder carriage model. *European Journal of Medicinal Chemistry*. 2022 Mar 15;232:114203.

Zhou D, Rudnicki M, Chua GT, Lawrance SK, Zhou B, Drew JL, Barbar-Smiley F, Armstrong TK, Hilt ME, Birmingham DJ, Passler W, Auletta JJ, Bowden SA, Hoffman RP, Wu YL, Jarjour WN, Mok CC, Ardoin SP, Lau YL, Yu CY. Human complement C4B allotypes and deficiencies in selected cases with autoimmune diseases. *Frontiers in Immunology*. 2021 Oct 26;12:739430.



Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

\$5,873,861

Research Institute Reports

CENTER FOR PERINATAL RESEARCH

The Center for Perinatal Research in the Abigail Wexner Research Institute at Nationwide Children’s Hospital has a unique, integrative approach to prematurity research that extends from before birth to long after. In close collaboration with the Section of Neonatology, the mission of faculty in the Center for Perinatal Research is to conduct innovative basic, translational, and clinical research focused on prevention of preterm birth and improvement of prematurity-related outcomes.

Faculty



Lynette K. Rogers, PhD
Interim Director

- | | |
|----------------------------|--------------------------------|
| Carl H. Backes, MD | Yusen Liu, PhD |
| Kristen Benninger, MD | Leif D. Nelin, MD |
| Gail E. Besner, MD | Leeann R. Pavlek, MD, MPH |
| Rodney Britt, PhD | Susan Reynolds, PhD |
| Bernadette Chen, MD | Pablo Sánchez, MD |
| Sudarshan R. Jadcherla, MD | Jonathan L. Slaughter, MD, MPH |
| Mark A. Klebanoff, MD, MPH | Jennifer K. Trittman, MD, MPH |

Highlights From the Past Year

Complications from preterm birth are the leading cause of infant mortality and morbidity. The investigators in the Center for Perinatal Research focus on prevention of prematurity and understanding and treating the complications that occur as a result of preterm birth. Our diverse team encompasses expertise in both basic science and clinical investigations.

The basic science group explores the mechanisms involved in development of neonatal morbidities:

- Bronchopulmonary dysplasia (Lynette K. Rogers, PhD)
- Pulmonary hypertension (Leif D. Nelin, MD; Bernadette Chen, MD; Jennifer K. Trittman, MD, MPH)
- Asthma (Rodney D. Britt, PhD)
- Infection and inflammation (Yusen Liu, PhD)
- Stem cell therapy in cystic fibrosis (Susan Reynolds, PhD)
- GI disorders such as necrotizing enterocolitis (Gail E. Besner, MD).

Our diverse clinical research delves into:

- Prematurity prevention and maternal health (Mark A. Klebanoff, MD, MPH)
- Infant feeding disorders (Sudarshan R. Jadcherla, MD)
- Infectious diseases (Pablo Sánchez, MD)
- Comparative effectiveness in pharmacoepidemiology (Jonathan L. Slaughter, MD, MPH) and cardiopulmonary deficiencies (Carl H. Backes, MD; Leeann R. Pavlek, MD, MPH)
- Neurological disorders or injuries (Mary Lauren Neel, MD; Kristen Benninger, MD)

The center is one of the sites of the Neonatal Research Network (Dr. Sánchez, site PI), a consortium of 17 institutions from across the United States funded by the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) to conduct randomized, controlled trials of promising therapies and observational studies to advance care of the highest-risk newborns.

The center is also the home for a 24-site multicenter trial, PIVOTAL (Percutaneous Intervention Versus Observation of Arterial ductus in Low weight infants), to evaluated therapies for patent ductus arteriosus (PDA, Dr. Backes and Dr. Slaughter, MPI) in preterm infants.

Investigations into the mechanisms of corticosteroid resistant asthma (Dr. Britt, PI) and stem cell therapies for Cystic Fibrosis (Dr. Reynolds, PI) continue to make strides toward new and novel therapeutic strategies.

Neonatology: See page 91 for information about Neonatology, home to one of the largest networks of clinical neonatal care in the United States.

Selected Publications

Barcroft M, McKee C, Berman D, Taylor R, Rivera B, Smith C, **Slaughter J**, El-Khuffash A, **Backes C**. Percutaneous closure of patent ductus arteriosus. *Clinics in Perinatology*. 2022 Mar;49(1):149-166.

Barley T, Murphy P, Wang X, Bowman B, Mormol J, Mager C, Kirk S, Cash C, Linn S, Meng X, **Nelin L**, **Chen B**, Hafner M, Zhang J, Liu Y. Mitogen-activated protein kinase phosphatase-1 controls PD-L1 expression by regulating type I interferon during systemic Escherichia coli infection. *The Journal of Biological Chemistry*. 2022 May;298(5):101938.

Jackson D, Walum J, Banerjee P, Lewis B, Prakash Y, Sathish V, Xu Z, **Britt R Jr**. Th1 cytokines synergize to change gene expression and promote corticosteroid insensitivity in pediatric airway smooth muscle. *Respiratory Research*. 2022 May 16;23(1):126.

Jadcherla S, Helmick R, Hasenstab K, Njeh M, Alshaikh E. Impact of esophageal mucosal permeability markers on provocation-induced esophageal reflexes in high-risk infants. *Physiological Reports*. 2022 Jun;10(12):e15366.

Korada S, Jebbia M, **Pavlek L**. Linking the perinatal environment to neonatal cardiovascular outcomes. *Neoreviews*. 2022 Jun 1;23(6):e400-e408.

Magers J, Prusakov P, Speaks S, Conroy S, **Sánchez P**. Safety and efficacy of nafcillin for empiric therapy of late-onset sepsis in the NICU. *Pediatrics*. 2022 May;149(5):e2021052360.

Ragan M, Wala S, Goodman S, Bailey M, **Besner G**. Next-generation probiotic therapy to protect the intestines from injury. *Frontiers in Cellular and Infection Microbiology*. 2022 Jun 28;12:863949.

Valentine C, Khan A, Brown A, Sands S, Defranco E, Gajewski B, Carlson S, Reber K, **Rogers L**. Higher-dose DHA supplementation modulates immune responses in pregnancy and is associated with decreased preterm birth. *Nutrients*. 2021 Nov 26;13(12):4248.



Grants Awarded to Neonatology Clinical and Research Faculty

JULY 1, 2021 – JUNE 30, 2022

\$7,255,092

Research Institute Reports

CENTER FOR REGENERATIVE MEDICINE

The Center for Regenerative Medicine in the Abigail Wexner Research Institute at Nationwide Children’s Hospital applies the principles of engineering, computer modeling and life sciences to develop biological substitutes to restore or improve tissue function. Regenerative medicine is the process of creating living, functional tissues to repair or replace tissue or organ functions, lost primarily due to congenital defects or disease. The center currently focuses on producing blood vessels, valvular patches and heart valves, offering a positive impact on children with congenital heart disease. Other areas of regenerative medicine research in progress include intestinal and tracheal replacement.

Faculty



Christopher K. Breuer, MD
Director

Tendy Chiang, MD
John M. Kelly, MD
Oluyinka O. Olutoye, MD, PhD
Toshiharu Shinoka, MD, PhD
Mitchel R. Stacy, PhD

Post-Doctoral Scientists

Ting-Heng Chou, PhD
Takahiro Kitsuka, MD, PhD (year 1-3)
Mahboubeh Nabavinia
James Reinhardt (year 4-7)
Anudari Ulziibayar, MD (year 1-3)
Tatsuya Watanabe (year 1-3)

Surgery Research Fellows

Rahul Gadde
Jason Xia

Highlights From the Past Year

Medical advances have made it possible to save more patients from life-threatening injuries, diseases and congenital conditions. However, after the onset of these conditions, the damage is occasionally lifelong. Often, symptoms can be treated with success, but the underlying tissue or organ damage remains unhealed and can cause further complications over time. To develop new clinical applications that address the unmet needs of these patients, the Abigail Wexner Research Institute at Nationwide Children’s established the Center for Regenerative Medicine in 2017.

Center for Regenerative Medicine clinicians and researchers, led by Christopher Breuer, MD, are using degradable scaffolds to bioengineer blood vessels, intestines, and tracheas. Further, we are identifying progenitor cells that mediate neotissue formation in hopes to develop ways to enhance tissue repair and growth. And to diversify the center’s research strengths, we are actively recruiting principal investigators.

Our vision is to pioneer new approaches in tissue regeneration and to develop next-generation reparative solutions. Further, we believe it is our responsibility to learn from every patient so our care for the next child will be improved.

This year, our has center expanded our capabilities and pushed the envelope in the field of regenerative medicine. Not only have we made significant progress on our Department of Defense and National Institutes of Health (NIH)-funded research, but we have also fostered new partnerships with sponsors and labs to help develop the next generation of biomaterials that regenerate tissue. In 2021, we began the second phase of our human tissue-engineered vascular graft (TEVG) clinical trial for patients undergoing a Fontan repair. Excitingly, we have also recently established a large animal model of the Fontan circulation. As we study implantation of our biodegradable scaffolds, we also hope to unravel the many pathophysiological changes that occur in this patient population.

Ultimately, this comprehensive approach means that the Center for Regenerative Medicine has the ability to turn promising laboratory discoveries into proven treatments and make them available to patients.

Selected Publications

Blum K, Zbinden J, Ramachandra A, Lindsey S, Szafron J, **Reinhardt J**, Heitkemper M, **Best C**, **Mirhaidari G**, Chang Y, **Ulziibayar A**, **Kelly J**, Shah K, Drews J, Zakko J, Miyamoto S, Matsuzaki Y, Iwaki R, Ahmad H, Daulton R, Musgrave D, Wiet M, **Heuer E**, Lawson E, Schwarz E, McDermott M, Krishnamurthy R, Krishnamurthy R, Hor K, Armstrong A, Boe B, Berman D, Trask A, Humphrey J, Marsden A, Shinoka T, **Breuer C**. Tissue engineered vascular grafts transform into autologous neovessels capable of native function and growth. *Communications Medicine (London)*. 2022 Jan 10;2:3.

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Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

\$8,124,383

Research Institute Reports

CENTER FOR VACCINES AND IMMUNITY

The Center for Vaccines and Immunity in the Abigail Wexner Research Institute at Nationwide Children’s Hospital has a single purpose: to improve the health of children through fundamental and applied research to better predict and understand the course of serious virus infections, and to translate this information into improved therapies and preventive vaccines.

Faculty



Chris Walker, PhD
Director

- Katherine Bline, MD

Zongdi Feng, PhD

Jonathan Honegger, MD

Amit Kapoor, PhD

Asuncion Mejias, MD, PhD, MSCS

Mark Peeples, PhD

Octavio Ramilo, MD
- Masako Shimamura, MD

Nicole Skinner, MD, PhD

Zhaohui Xu, PhD

Highlights From the Past Year

Viral respiratory infections are a major cause of illness and hospitalization in young children. A significant highlight of the past year was the award of a multi-project NIH grant to understand how different respiratory viruses shape immune responses in very young children. The work will provide insight into factors causing severe infection with viruses like influenza and comparatively mild infection with SARS-CoV-2 in this population. This new research is led by Dr. Octavio Ramilo of Nationwide Children’s in collaboration with Dr. Virginia Pasqual of the Weill Medical College of Cornell University.

Studies by center Investigators have provided new insight into the course of SARS-CoV-2 infection in children. In a study published in the *Journal of Infectious Diseases*, Dr. Asun Mejias and her team demonstrated that the risk of longer hospitalization, admission to the ICU, and requirement for supplemental oxygen is highest in children with prolonged detection of the virus in blood. Dysregulated immune responses are also found in children with severe SARS-CoV-2 infection. This may be caused by an increase in specialized white blood cells called MDSC that suppress immune responses, as demonstrated in a study by Dr. Katie Bline in collaboration with Drs. Mejias and Ramilo.

Severe lung disease caused by respiratory syncytial virus is a leading cause of infant hospitalization. Dr. Mejias led studies that found an association between the severity of RSV lung disease and nasal co-infection with two species of bacteria, an insight that may help predict and prevent serious RSV illness as published in the *Journal of Infectious Diseases*.

Congenital cytomegalovirus infection transmitted from mothers to children is a significant cause of hearing loss and other complications early in life. Dr. Masako Shimamura and her team provided the first evidence that antibodies against two CMV components (designated gM and gN) are weak in pregnant women. Antibodies against these components are known to neutralize CMV, and so boosting their levels in women may provide a way to prevent virus transmission to children.

Infection with hepatitis viruses is also a major focus of the center. Dr. Amit Kapoor was awarded a new NIH grant to unravel mechanisms of protective immunity against a rodent hepatitis C virus (HCV). This work is expected to have a significant impact on development of a protective vaccine against HCV in humans, a high public health priority for the United States and globally. Drs. Kapoor and Feng were also awarded a new NIH grant to study mechanisms of immune evasion and disease caused by the hepatitis E virus (HEV), an understudied virus that is responsible for a major share of acute viral hepatitis globally. Finally, a grant to support HCV vaccine development was awarded to a consortium of scientists at Stanford University, the University of Alberta and Nationwide Children’s. Dr. Walker will lead development of next generation mRNA vaccines to generate broad immunity that prevents infection with the wide range of HCV variants that circulate globally.

Publications over the past year provided insight into mechanisms of protective immunity against HEV by Dr. Walker and collaborators at Nationwide Children’s Hospital and Emory University, testing for hepatitis C virus in early infancy by Rob Honegger and his team, and progress towards development of a new cell culture model for hepatitis B virus infection by Dr. Feng.

The center is very pleased to welcome our newest investigator, Nicole Skinner, MD, PhD. Dr. Skinner joined us after completing research and adult Infectious Diseases Fellowship training at the Johns Hopkins University. She is an expert in use of genomic approaches to assess B cell/antibody responses to the hepatitis C virus. This is critical expertise for vaccine development that will be of broad benefit to other investigators in our center and the AWRI. Welcome Nicole!

Selected Publications

Bline K, Andrews A, Moore-Clingenpeel M, Mertz S, Ye F, Best V, Sayegh R, Tomatis-Souverbielle C, Quintero A, Maynard Z, Glowinski R, **Mejias A**, **Ramilo O**. Myeloid-derived suppressor cells and clinical outcomes in children with COVID-19. *Frontiers in Pediatrics*. 2022 Jun 6;10:893045.

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Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

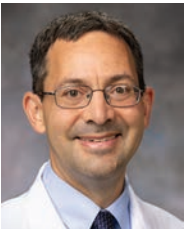
\$9,856,012

Research Institute Reports

KIDNEY AND URINARY TRACT CENTER

The Kidney and Urinary Tract Center offers patients access to expert surgical and medical treatment of urologic, genital and kidney issues. The center is a collaborative, integrated process designed to combine patient care, advocacy, research and training to develop the next generation of nephrology and urology treatment for children. Nephrology and urology physicians, surgeons, scientists and care staff at Nationwide Children’s are nationally recognized in patient care and research by peers for reputation and outcomes.

Faculty



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Rama Jayanthi, MD
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Urology Chief



John David Spencer, MD
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Highlights From the Past Year

A major goal of the Kidney and Urinary Tract Center is to enhance the health of children with kidney and urinary tract disorders by engaging in high-quality, innovative research. This includes identifying new therapeutic and diagnostic targets, validating them in preclinical models, and translating these discoveries into the clinic setting so that novel therapies and management strategies can improve clinical outcomes and lead to new cures.

Our physician-scientists and basic scientists have already made many contributions to advance the understanding of disorders commonly treated by pediatric nephrologists and urologists – including acute kidney injury, chronic kidney disease, urinary tract infections, congenital anomalies of the kidney and urinary tract, and nephrotic syndrome.

Selected Publications

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Grants Awarded

JULY 1, 2021 – JUNE 30, 2022
\$2,278,335

Research Institute Reports

STEVE AND CINDY RASMUSSEN INSTITUTE FOR GENOMIC MEDICINE

The Steve and Cindy Rasmussen Institute for Genomic Medicine at Nationwide Children’s Hospital focuses on improving our patients’ outcomes using molecular diagnostic testing and advanced analysis in both research and clinical settings. Since its inception in 2016, the institute’s mission has been to build a seamless continuum between research, clinical testing, and patient care by involving specialty-focused providers in translational genomics protocols that explore how best to apply different technologies in appropriate disease settings. The institute combines robust clinical diagnostics, leading-edge research and development, and computational genomics to enable precision genomic medicine. Another area of emphasis is providing educational opportunities for care providers and all levels of trainees as a means by which genome-based results are made accessible and meaningful to the patients and families we serve.

Faculty from the Battelle Center for Computational Biology in the Abigail Wexner Research Institute at Nationwide Children’s Hospital formally joined the Steve and Cindy Rasmussen Institute for Genomic Medicine in April 2022. These faculty are composed of computational researchers focused on applying state-of-the-art quantitative methods in basic and clinical research to better inform and improve clinical care in pediatrics. As part of our Computational Genomics Group, these faculty work collaboratively with internal and external scientists, utilizing their expertise in mathematics, statistics, and quantitative methods to advance the organization’s mission.

Senior Leadership



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Elaine R. Mardis, PhD
Co-Executive Director



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Senior Director, Clinical Laboratory



Peter White, PhD
Senior Director, Computational Genomics

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Post-Doctoral Research Fellows

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Swetha Ramadesikan, PhD

Beulah Solivio, PhD

Jennifer L. Watts, PhD

Kevin L. Ying, PhD

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Highlights From the Past Year

The Steve and Cindy Rasmussen Institute for Genomic Medicine aims to advance the application of genomic medicine through cutting-edge translational research, the introduction of new genomics-based clinical tests, the development of computational genomics methods, and the application of data science and Big Data technologies. By combining novel laboratory methods, state-of-the-art bioinformatics solutions, quantitative methods, and machine learning, our team is driven to create a future where no child with genetic disease goes undiagnosed, and every child with cancer receives optimal treatment based on their genomic profile. Some highlights from the past year include:

- We enrolled our 124th patient/family on the rapid genome sequencing (rGS) protocol that studies critically ill patients with likely genetic causes. With its pending clinical validation, this approach will enable a 60- to 72-hour diagnostic pathway for critically ill children (typically neonates) for whom no conclusive diagnosis has previously been achieved. Once clinically validated, the test will be orderable for Nationwide Children’s patients.
- We advanced our translational research protocol to study the genomes of patients and families with diagnoses of autism, bipolar disease, and suicidality/depression who are being cared for at the Big Lots Behavioral Health Pavilion at Nationwide Children’s Hospital. Genome sequencing and the application of computational genomics techniques are helping to identify the underlying genetic causes for these disorders, opening new avenues of collaboration with other researchers in this space.
- We reached a clinical testing transition point for our pediatric cancer translational protocol, gaining CAP/CLIA and New York State Department of Health (NYSDOH) approval for the tumor/normal exome test and the CNS methylation classifier test. We can now offer this advanced testing to Nationwide Children’s Oncology and Pathology providers for direct use in patient care. The tumor-normal exome and diagnostic methylation assays will inform pediatric patients’ enrollment in clinical trials of the newest molecularly targeted therapies and immunotherapies.
- We continued to discover the genomic events and mechanisms driving treatment-refractory epilepsy through our translational protocol that studies DNA and RNA from affected brain tissue removed by surgery for curative intent. Here, we have demonstrated our ability to detect mosaic genetic variation associated with the disease diagnosis, providing the underlying alterations that explain seizures. Importantly, these results have a dual benefit: they educate patients and parents about the root cause of epilepsy, often informing reproductive decision-making, and fuel additional research into how these altered genes cause epilepsy.
- We have significantly advanced our cloud computing-based computational genomics infrastructure which provides a critical component of precision medicine and fuels our discoveries in the translational genomics protocols. Clinically, this HIPAA-compliant cloud computing approach provides rapid diagnostic information across several clinical testing regimens, ensuring our providers have patient-specific results as quickly as possible for use in decision-making.

- Our computational genomics program has focused on the interface between genomics, Big Data and computational biology, utilizing disruptive technologies to rapidly analyze and interpret genomic data sets, leading to the discovery of novel genetic etiologies in cancer, rare disease, and congenital heart disease. We have applied novel cloud computing technologies to address genomic science’s substantial data processing challenges. Our Genomics Cloud Computing Platform has successfully eliminated analysis bottlenecks, enabling researchers to focus on interpreting complex genomic experiments.
- We signed a five-year contract with the National Cancer Institute to provide a multi-assay clinical characterization of pediatric solid tumor samples from patients enrolling in the Children’s Oncology Group (COG) Project Every Child registry, providing clinical results within a 14-day turnaround time as part of the Molecular Characterization Initiative (MCI). We have clinically characterized samples from over 190 pediatric brain or sarcoma cancer patients.

Selected Publications

Bedrosian TA, Miller KE, Grischow OE, Yoon H, Schieffer KM, Miller AR, Navarro JB, Westfall JJ, LaHaye S, Leraas K, Choi S, Williamson R, Fitch JR, Kelly BJ, White P, Cottrell CE, Magrini V, Leonard J, Shaikhouni A, Boue D, Thompson D, Pierson CR, Wilson RK, Ostendorf AP, Mardis ER, Koboldt DC. Detection of brain somatic variation in epilepsy-associated developmental lesions. *Epilepsia*. 2022 Jun;63(8):1981-1997. [Epub ahead of print]

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LaHaye S, Fitch JR, Voytovich KJ, Herman AC, Kelly BJ, Lammi GE, Arbesfeld JA, Wijeratne S, Franklin SJ, **Schieffer KM,** Bir N, McGrath SD, Miller AR, Wetzel A, **Miller KE, Bedrosian TA, Leraas K, Varga EA,** Lee K, Gupta A, Setty B, Boue DR, Leonard JR, Finlay JL, Abdelbaki MS, Osorio DS, Koo SC, **Koboldt DC, Wagner AH,** Eisfeld AK, Mrozek K, Magrini V, **Cottrell CE, Mardis ER, Wilson RK, White P.** (2021) Discovery of clinically relevant fusions in pediatric cancer. *BMC Genomics*. 2021 Dec 4;22(1):872.

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Grants Awarded

JULY 1, 2021 – JUNE 30, 2022

\$8,776,000



ACKNOWLEDGEMENTS

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