



**BETTER CARE FOR BRIGHTER FUTURES**  
**COMPREHENSIVE EXPERTISE THAT CHANGES CHILDREN'S LIVES**

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## A MESSAGE FROM OUR PRESIDENT

Dear colleagues:

Kids should be kids. At Levine Children's Hospital (LCH), this is what inspires our daily lives. For us, kids are never diseases or conditions or problems to be solved. They are always children first, with families and futures.

To help children achieve the futures they deserve, we offer today's groundbreaking new approaches to improve our patients' health and cure even the most complex diseases. From blood and marrow transplants to fetoscopic surgeries to genetic tests that help pinpoint diagnoses, our ability at LCH to change the paths of our patients continues to grow. Achieving excellent patient outcomes, however, takes more than the latest technique or technology. Here, we also draw upon some of the nation's top pediatric specialists working together to provide high-quality care that's unique in our region.

This pursuit of clinical excellence, state-of-the-art medicine and novel research has led to a greater level of recognition from organizations like *U.S. News & World Report*. But national awards aren't what we talk about in the exam room with children and their families.

Instead, our care teams – from doctors and nurses to social workers, nutritionists and child life specialists – all focus on our patients' goals and how we can make their lives better. We provide a supportive, caring experience in our hospitals and specialty centers so children can return home as quickly and safely as possible to their families. That's the outcome we care about the most.

While we are enormously proud of our clinical outcomes and the increasing national recognition for LCH, what truly drives us is our tireless work to continuously improve the care we deliver. We believe the children of the Carolinas deserve world-class care.

Inside this book, you'll discover what makes Levine Children's Hospital an extraordinary place – like our multidisciplinary approach to care or the stories of helping our patients to overcome long odds. It's a revealing snapshot of what we do to preserve our patients' childhoods and give them a confident head start on the rest of their lives.



Sincerely,

A handwritten signature in black ink, appearing to read "H. Stacy Nicholson". The signature is fluid and cursive, with a long horizontal line extending to the right.

**H. Stacy Nicholson, MD, MPH**  
President, Children's Services  
Carolinas HealthCare System

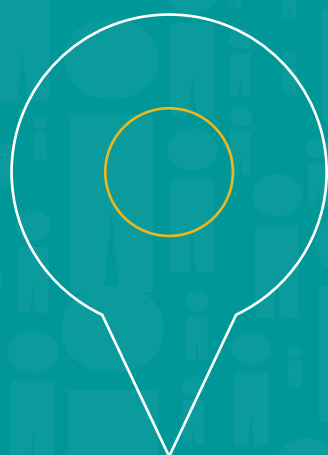


## THE NUMBERS BEHIND THOUSANDS OF HEALTHY LIVES

With 30 pediatric subspecialties, Levine Children's Hospital treats more pediatric patients per day than any other hospital in the Carolinas. See how our expertise adds up to better outcomes for patients across our network.



### OFFERING ACCESS TO EXPERTS CLOSE BY



**12** SPECIALTY CARE CENTERS

**32** PEDIATRIC PRIMARY CARE OFFICES

### EXTENDING LIVES

**100% 1-YEAR SURVIVAL RATE FOR LIVER TRANSPLANTS**

*1/1/14-6/30/16, Scientific Registry of Transplant Recipients*

**76.2% 1-YEAR SURVIVAL RATE FOR ALLOGENIC BMT (3-YEAR CYCLE) – AMONG BEST IN US**

*2012-2014, Center for International Blood and Marrow Transplant Research®*

**95% 3-YEAR SURVIVAL RATE FOR KIDNEY TRANSPLANTS**

*2014-2016, living and deceased donors, United Network for Organ Sharing*

**2.2% VS. 3.0% LEVINE CHILDREN'S HOSPITAL AMR VS. STS AVERAGE FOR CONGENITAL HEART SURGERY**

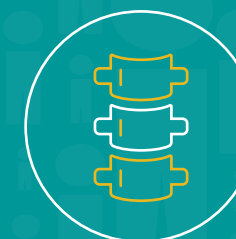
*Jan 2013-Dec 2016, Society of Thoracic Surgeons, May 2017*

### EXPERIENCE GIVES PATIENTS THE EDGE

In 2016



**145** NEW CANCER DIAGNOSES



**10,592** ORTHOPEDIC SURGERIES AND OUTPATIENT VISITS



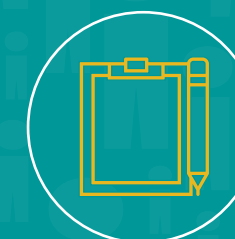
**12,319** GI PATIENT VISITS



**11** HEART TRANSPLANTS

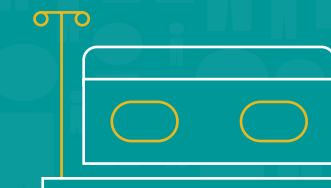


**350** NEUROLOGY REFERRALS EVERY MONTH



**157** CLINICAL TRIALS

### STARTING OFF STRONG



**LARGEST LEVEL IV NEONATAL INTENSIVE CARE UNIT**

*between Atlanta and Washington, DC*

**ONLY ECMO SUPPORT PROGRAM IN CHARLOTTE AREA**

*designated a Gold Level Center of Excellence by the Extracorporeal Life Support Organization*

**1,100 NICU ADMISSIONS** per year

### SPECIALIZED PEDIATRIC CARE UNIQUE IN OUR REGION



#### IN THE GREATER CHARLOTTE AREA, WE HAVE THE ONLY:

- Heart transplant program and cardiovascular intensive care unit
- Blood and marrow transplant unit
- Dedicated inpatient dialysis unit
- Level I trauma center
- Fetal surgery center
- Immunodeficiency program

#### IN NORTH CAROLINA, WE HAVE THE ONLY:

- Dedicated inpatient rehabilitation facility
- Level III epilepsy monitoring unit





## A NEW HEART, SUPPORTED FOR LIFE

When Ella Kate was born, she didn't breathe for eight minutes. Tumors in her lower left ventricle accounted for almost 80 percent of her heart.

After surviving for six months, her doctors – led by Gonzalo Wallis, MD, a pediatric cardiologist and director of the heart failure program at Levine Children's Hospital – determined her tumors were benign and a mechanical heart would not be appropriate. The only path forward was a heart transplant.

Ella Kate was among the 10 percent of children 2 and younger who are ABO-incompatible. "People used to think you could only receive your own blood type or O blood type, and if you crossed the lines, the heart would not work immediately. But that's not always true," says Dr. Wallis.

Thanks in part to a policy change by the United Network for Organ Sharing making it easier for newborn patients who can accept ABO-incompatible hearts to get life-saving organs, Ella Kate became the first pediatric ABO-incompatible heart transplant surgery patient in LCH history.

"A transplant typically has a lot of moving parts – this had a lot of moving parts on steroids," says Thomas Maxey, MD, a pediatric cardiovascular surgeon at LCH who performed the delicate surgery. "Ella Kate's transplant involved a lot more checks and balances – and extra steps – than a traditional heart transplant."

About a year later, Ella Kate is doing well. For the rest of her life, she will need to follow a strict regimen of medications and follow-up appointments. But her mother, Melanie Leitner, is grateful knowing that the same LCH team will be there as Ella Kate continues to grow up.

"Dr. Wallis told us that he'll follow Ella Kate forever. To know that you have a doctor who is always going to be there to support her is a wonderful thing," Melanie says.



**"Dr. Wallis told us that he'll follow Ella Kate forever. To know that you have a doctor who is always going to be there to support her is a wonderful thing."**

Melanie Leitner | Ella Kate's mother



## CARDIOLOGY AND HEART SURGERY

Behind our outstanding clinical outcomes for even the most serious cardiac conditions is a culture built on collaboration.

When our cardiologists, cardiac surgeons, cardiac intensivists, nurse practitioners, critical care nurses and child life specialists work together, we achieve more than just outstanding outcomes. We create an environment that embraces new technologies, supports life-saving research and defines a place where patients feel they are cared for more than in just the medical sense.

### COMPREHENSIVE SURGICAL CARE, WITH OUTCOMES THAT MATTER

From open heart to minimally invasive surgeries, our cardiac surgeons are experienced in treating every type of pediatric congenital heart condition. In 2016, we performed more than 500 pediatric cardiothoracic surgeries and had 12,422 pediatric outpatient visits. Even more important than volumes, our surgery outcomes – including neonatal survival rates, adjusted mortality rates and length of stay metrics – are better than the Society of Thoracic Surgeons (STS) averages on every category evaluated.

Our pediatric cardiovascular intensive care unit – the only one in our region – ensures immediate help is always available, including support

of the heart and lungs through our extracorporeal membrane oxygenation (ECMO) program. The Extracorporeal Life Support Organization has designated our program a Gold Level Center for Excellence – the only one in the Charlotte region.

Specialists at our Fetal Heart Clinic can diagnose a variety of heart conditions in fetuses as early as 12 weeks into pregnancy, allowing them to work with the multidisciplinary team to determine the best treatment plan.

### EXCLUSIVE REGIONAL EXPERTISE IN HEART TRANSPLANT

As the only pediatric heart transplant program in the greater Charlotte region, we have achieved leading survival rates since performing the region's first neonatal heart transplant in 1989. Since then, we have steadily increased our volumes, performing 11 transplants in 2016 – our highest number yet and among the highest volumes in the country. For children waiting for transplants, we are highly experienced in bridging patients with mechanical support, including mechanical hearts, and managing their risk of blood clots and stroke.



Top-ranked pediatric cardiology and heart surgery program in North Carolina



HELPING PATIENTS SURVIVE AND THRIVE

HIGH-VOLUME SURGICAL CENTER

TOP QUARTILE IN NATION

Society of Thoracic Surgeons



1.8%

OVERALL MORTALITY IN 2016

Internal data

FULL SPECTRUM OF CARDIAC SURGERIES

- Heart transplants
- Ventricular assist device (VAD) implantations
- Surgeries to treat hypoplastic left heart syndrome (Norwood, Glenn and Fontan surgeries)
- Aortic valve repair and replacement
- Mitral valve repair
- Complex neonatal repair
- Tetralogy of Fallot repair
- Thorax and chest wall repairs





“We love what we do and we enjoy doing it, and this comes across in our clinical care.”

J. René Herlong, MD | Medical Director, Pediatric Cardiology

**ADVANCING CARDIAC CARE THROUGH TECHNOLOGY AND RESEARCH**

Being at the forefront of pediatric cardiac care also means shaping its future. Our two pediatric catheterization labs are the most technologically advanced in the Carolinas, with emerging capabilities in 3D printing to create 3D heart models. From low-dose radiation imaging to 3D rotational angiography, we have incorporated the latest innovations to improve patient care.

As a pioneer in investigational device and clinical research, we conduct and publish studies at a rate comparable to traditional academic centers. Recently, we were one of 20 sites in the US selected to conduct trials on a new device to repair atrial septal defects.

**A HOME FOR ADULT CONGENITAL HEART DISEASE PATIENTS**

In collaboration with Carolinas HealthCare System's Sanger Heart & Vascular Institute, we offer one of the few comprehensive adult congenital heart disease programs in the Carolinas. This growing population of adult patients who either had

heart surgery as children or are now experiencing symptoms associated with congenital heart disease can benefit from the diagnoses and treatment regimens from our specialized teams.

**GETTING TO THE RIGHT ANSWER, TOGETHER**

Referring physicians can have confidence knowing their patients benefit from the collective experience not just of our experts but of other cardiology practices outside of LCH. We conduct weekly conferences with a broad array of local specialists – including those at other hospital systems – to determine the best ways to manage patients.

When patient cases warrant urgent attention, we aim to see them within 24 hours or even the same day when possible.

**CARING FOR PATIENTS IN AND OUTSIDE THE HOSPITAL**

In the hospital, patients benefit from psychosocial and emotional support from all of our staff. When patients leave our facilities, we offer unique programs that improve home life:

- Through a partnership between the Greg Olsen Foundation and Carolinas HealthCare Foundation, the HEARTest Yard Fund helps ease the transition from the hospital for our most complex heart patients by offering in-home private nursing care at no charge to families. The HEARTest Yard was formed by Carolina Panthers player Greg Olsen and his wife Kara after their son was treated for hypoplastic left heart syndrome at LCH. With the support of the HEARTest Yard, LCH is creating a neurodevelopmental program – one of only a few in the country – to address the cognitive and behavioral challenges that many children with congenital heart defects face over their lifetimes.
- For children with congenital heart disease, we founded and continue to participate in Camp LUCK (Lucky Unlimited Cardiac Kids) to allow them to build self-esteem and friendships at a fun, medically supervised outdoor camp.

**GIVING HEARTS A BETTER CHANCE**

Mortality rates for congenital heart surgery (Jan 2013 – Dec 2016)

	LEVINE CHILDREN'S HOSPITAL		
	OBSERVED	ADJUSTED	STS AVERAGE
NEONATES	5.2%	4.1%	8.5%
NEONATES & INFANTS	3.7%	3.3%	4.8%
NEONATES, INFANTS & CHILDREN	2.6%	2.2%	3.1%
NEONATES, INFANTS, CHILDREN & ADULTS	2.5%	2.2%	3.0%

Society of Thoracic Surgeons, May 2017



**TIME WASN'T ON DAVID'S SIDE – BUT WE WERE**

Waiting a few months for a liver transplant is hardly uncommon. But 9-year-old David needed one within days if he were going to survive.

When David was admitted to Levine Children's Hospital, he presented with severe stomach pain and difficulty swallowing. His skin had turned yellow, and his bilirubin levels went from 6.8 to 35 within four days. His doctors quickly confirmed their suspicions: His liver was failing.

David had Wilson's disease, a rare genetic disorder resulting in an over-accumulation of copper in the liver. Finding a new organ quickly was the only way to save his life.

Vani Gopalareddy, MD, pediatric gastroenterology and hepatology specialist at LCH, and the rest of her team worked quickly. Within 24 hours, they located a donor organ. And within four days of being admitted to the pediatric intensive care unit, David had a new liver.

"Our team has been extremely fortunate because once we have a child listed for a transplant, we haven't waited more than three months for an organ," says Dr. Gopalareddy. "And for David, getting him a new liver as soon as possible was a matter of life and death."

A year after his transplant, David's care team expects him to have a healthy future – where every day counts.

"Our team has been extremely fortunate because we haven't waited more than three months for an organ. And for David, getting him a new liver as soon as possible was a matter of life and death."

Vani Gopalareddy, MD | Pediatric Gastroenterology and Hepatology Specialist





## ■ GASTROENTEROLOGY AND HEPATOLOGY

Here, every type of digestive system and liver disorder gets the same level of care: the highest.

In treating the complete range of gastrointestinal, liver and nutrition-related conditions, we never lose sight of the details of each individual case. Named among the best by *U.S. News & World Report*, our GI physicians, advanced care practitioners and multidisciplinary team of nurses and dietitians offer customized treatment plans that incorporate the most advanced medical management and surgical procedures available. Our focus is clear: giving each child what they need to grow to his or her full potential with the fewest complications possible.

### FULL-SERVICE APPROACH TO LIVER TRANSPLANT

When patients have end-stage liver disease or unresectable liver tumors, we have one of the most experienced liver transplant teams in the Carolinas to provide care from diagnosis to long-term management. We perform cadaveric whole organ and split/segmental liver transplants – and teach patients how to adhere to a rigorous anti-rejection medication schedule.

Our team of hepatologists, nurse practitioners, transplant coordinators, transplant surgeons, nutritionists, transplant pharmacists, social workers, interventional radiologists and pathologists works closely to help our patients achieve transplant survival rates that meet or exceed national averages.

Between January 2014 and June 2016, our liver transplant one-year survival rate was reported as 100 percent by the Scientific Registry of Transplant Recipients.

In 2017, our GI team worked closely with nephrology, surgery and other programs to perform the first combined liver-kidney transplant at LCH.

### REDEFINING CARE FOR INFLAMMATORY BOWEL DISEASE

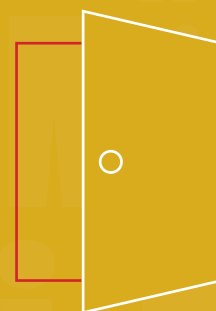
As one of the original members of Improve Care Now – an international coalition of nearly 100 hospitals seeking to improve the treatment of inflammatory bowel disease – we have committed ourselves to providing better quality care for IBD patients. Today, as one of only three Improve Care Now centers in North Carolina, we're raising the standards on reliable care for children and adolescents with Crohn's disease and ulcerative colitis. Our clinical remission rate for these diseases is 86 percent, putting our department in the top 10 percent of all Improve Care Now hospitals worldwide.

To help children with IBD lead as normal a life as possible, we offer the full spectrum of services, including medication management, personalized nutritional counseling, psychological and social support, and surgery when necessary.

### COVERING ALL ASPECTS OF INTESTINAL MOTILITY DISORDERS

Many intestinal motility disorders have complex etiologies, involving other organ systems or serious illnesses. For infants all the way to young adults, we have expertise in the evaluation and management of GI motility disorders, with a special focus on colorectal disorders.

We evaluate each child thoroughly and devise a personalized bowel management plan based on each patient's particular needs. Our department is the only one in the Carolinas to perform motility studies, using advanced tests and new, non-invasive procedures to diagnose these complicated disorders. After an exhaustive evaluation, any surgical procedure is performed only after medication- and behavioral-based approaches. When surgery would be beneficial, we work closely with our surgical colleagues to offer the least invasive, most up-to-date treatments.



**10,461**  
OUTPATIENT VISITS 2016



**100%**  
1-YEAR SURVIVAL RATE  
FOR LIVER TRANSPLANTS

1/1/14-6/30/16, Scientific Registry  
of Transplant Recipients



**89%**  
IBD PATIENTS  
EXPERIENCING  
PREDNISONE-FREE  
REMISSION 2016





**A WIDE VARIETY OF EFFECTIVE NUTRITIONAL SUPPORT**

Our program in nutritional support offers specialized care for newborns to young adults, addressing the challenges of diverse gastrointestinal disorders.

- For young children with short bowel disorders, we provide intestinal rehabilitation services. At any given time, we offer total parenteral nutrition (TPN) to about 20 patients for up to the first three years of life.
- For patients with severe metabolic or mitochondrial disorders, or certain neurological conditions, we are experienced in placing gastrostomy and other feeding tubes.
- For patients recovering from cardiac surgeries who have significant feeding intolerance, we're one of a handful of hospitals with specialized expertise in placing percutaneous endoscopic jejunostomy tubes.
- Bringing together psychologists and speech therapists in addition to our nutritional staff, we are creating a comprehensive feeding disorders clinic for patients with dysphagia.

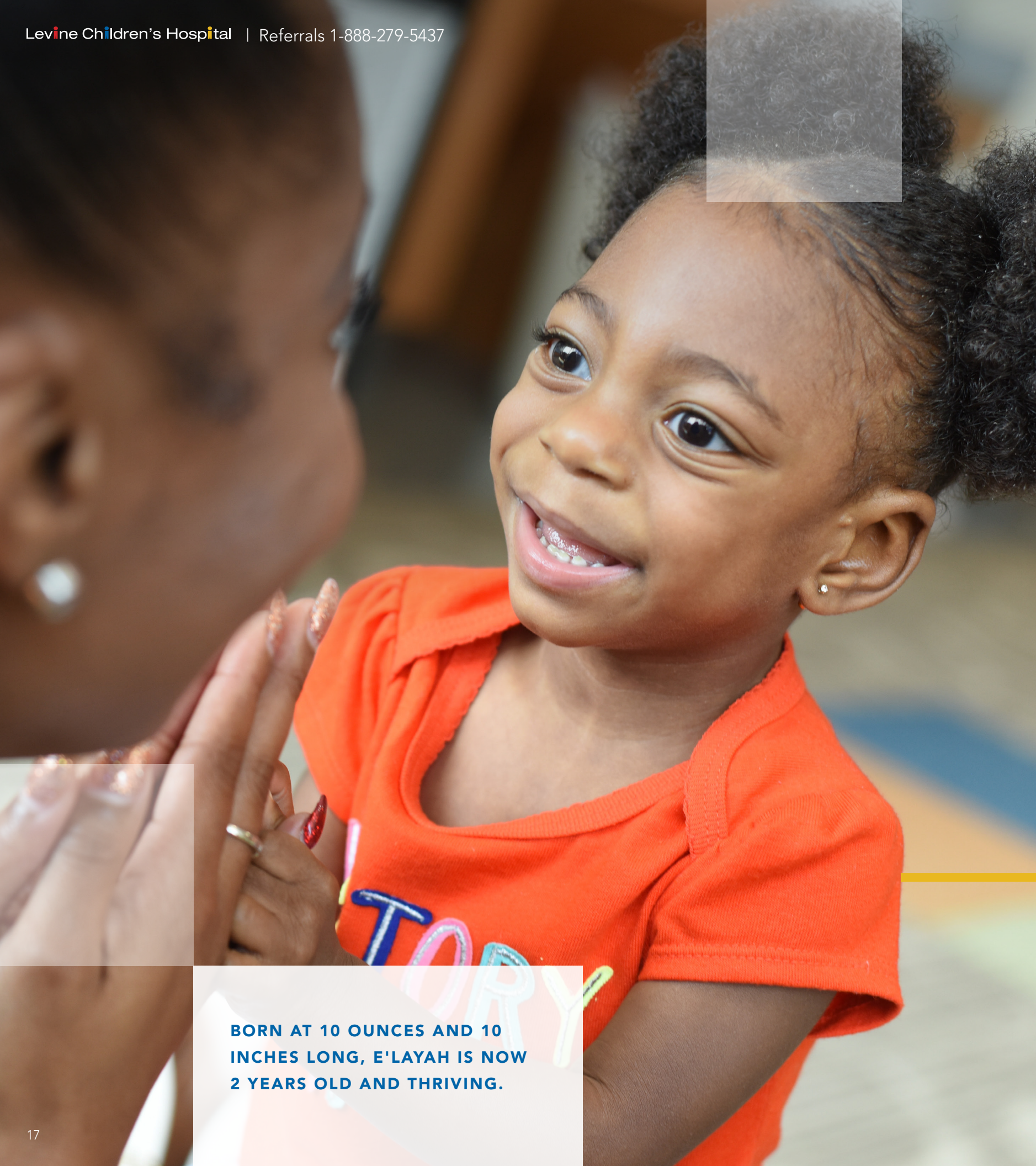
**A LARGE TEAM THAT WORKS AS ONE**

The success of our patients is tied directly to the cohesiveness of our care team. Every doctor follows the same treatment guidelines and has 100 percent participation in enrolling and maintaining patients in our quality databases. We respond immediately to referring physicians – often with photographs. Our nurses are always available to offer guidance to patients over the phone. And we collaborate with home care services to make sure patients get the nutritional supplies they need. From creating educational videos on IBD to connecting patients to local support groups, we see it as our clinical responsibility to extend care beyond the walls of LCH.

In this pursuit of innovative treatments, we have participated in large, multisite clinical trials to study many gastrointestinal and hepatic disorders, including hepatitis B and Crohn's disease.

Our department was the first in our region to perform pediatric fecal microbiota transplantation for recurrent *Clostridium difficile* (C. diff) infection.





**BORN AT 10 OUNCES AND 10 INCHES LONG, E'LAYAH IS NOW 2 YEARS OLD AND THRIVING.**

## **PROVIDING STRENGTH TO THE MOST FRAGILE**

The smallest surviving baby born at Levine Children's Hospital, E'Layah Faith made up for her lack of size with an overabundance of perseverance.

E'Layah was born at 26 weeks, 1 day gestation, weighing only 10 ounces and measuring just 10 inches long. But thanks to her fortitude and the skill of her medical team, she went home three months later, weighing almost five times as much as her birth weight.

Her team developed a special combination of formula and breast milk to keep E'Layah healthy and growing. "We had to fine-tune our approach with E'Layah," says Andrew C. Herman, MD, FAAP, one of her neonatologists and chief medical officer at LCH. "We fed her a combination of protein, fat, sugar, electrolytes and vitamins that helped prevent infections, matured her intestines and helped her gain weight."

Dr. Herman also credits E'Layah's recovery to her parents, who took turns spending days in the hospital feeding her.

"The family always had hope that one day they would all be together again, and we did whatever it took to keep that hope alive and make it reality," Dr. Herman says.

**"The family always had hope that one day they would all be together again, and we did whatever it took to keep that hope alive."**

Andrew C. Herman, MD, FAAP | Neonatologist and Chief Medical Officer



## NEONATOLOGY

The largest NICU in the region offers specialized expertise for the smallest of babies.

Drawing on the skill of our care teams and innovative supportive technologies, we offer some of the most advanced newborn care for every complex neonatal condition.

Levine Children's Hospital's Level IV neonatal intensive care unit (NICU), the largest between Atlanta and Washington, DC, joins four other NICUs across our system to offer the highest level of around-the-clock care. Our rate of survival, hospital-acquired infections, growth and retinopathy of prematurity ranked in the top 25 percent of all Level IV NICUs nationwide in 2016.

### LIFE-SAVING CARE FOR THE TINIEST BABIES

For extremely low birth weight (ELBW) babies, we've created a specialized treatment protocol that has led to superior outcomes. Using state-of-the-art neurally adjusted ventilatory assist (NAVA) technology rather than mechanical ventilation, we have decreased the frequency and severity of chronic lung disease within this very fragile population.

We provide follow-up monitoring for all ELBW babies to evaluate developmental and motor delays from the time of discharge until they turn 2. Our team of pediatricians, neonatologists, physical therapists and social workers meets with families every six months to track progress and provide treatment when appropriate.

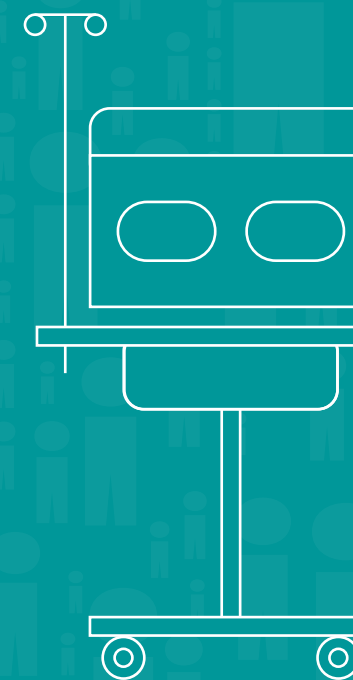
### TECHNOLOGY THAT OFFERS MAXIMUM SUPPORT

Our neonatal patients benefit from the latest in medical technology. We are the only provider in the region to offer extracorporeal membrane oxygenation (ECMO), a life-saving therapy for infants with respiratory failure. Our therapeutic hypothermia therapy is the only treatment available to diminish or even prevent severe brain damage after a loss of oxygen around delivery. And the NAVA technology has dramatically decreased the time premature infants need to be on a ventilator, minimizing injury to their fragile lungs and speeding their healing.



### AREAS OF SPECIALTY

- Extreme prematurity
- Congenital heart disease and other heart conditions
- Genetic disorders and birth defects
- Severe respiratory failure and breathing issues
- Congenital bowel disorders
- Neurologic diseases
- Infectious diseases
- Prenatal consultations for high-risk pregnancies



**1,100**  
ADMISSIONS PER YEAR

**75 NICU PATIENTS**  
ON AN AVERAGE DAY

**85-BED**  
NURSERY



**INCLUDING FAMILIES  
IN THEIR CHILDREN'S CARE**

Because parents are so critical to the long-term health of our patients, we involve them at every step of their child's treatment.

- We allow for open visitation, giving parents the opportunity to be near their child's bed 24 hours a day. When families can't be at the hospital, a secure, private webcam system, installed at each infant's bedside, offers them real-time video of their child.
- We strongly encourage "kangaroo care" – vital body-to-body contact – once the newborn has been stabilized.

- We communicate updates daily and invite parents to interact with our practitioners as they make their rounds.
- Our Neonatal Family Navigator Program provides personalized guidance and support to families throughout a child's time in the hospital and helps secure resources for the baby after discharge.

**SHARING EXPERTISE  
ACROSS DIVISIONS**

Our neonatology department benefits from the multidisciplinary expertise available at a leading children's hospital. From pediatric nephrologists providing peritoneal dialysis to pediatric cardiac surgeons performing congenital heart surgery,

many LCH teams offer consultative services for all common and rare disorders.

**COMMITTED TO  
CLINICAL RESEARCH**

Advancing our discipline through research allows us to deliver the best care with the best outcomes. In addition to our own clinical projects, we collaborate with national research networks and leading academic institutions in diverse areas, including:

- Prevention and treatment of sepsis
- Central line infections
- Antibiotic use for abdominal surgery
- Thrombosis
- Development of the eye and vision

"The dedication, collaboration and skill of our team are inspiring. It makes the care we deliver second to none."

David G. Fisher, MD | Medical Director, Neonatology

**12**  
NEONATOLOGISTS

**22**  
NEONATAL NURSE  
PRACTITIONERS

**200**  
PEDIATRIC  
NURSES



**79%** DROP IN USE  
OF MECHANICAL  
VENTILATION  
OVER LAST TWO YEARS BY INCORPORATING NAVA

**A LARGE TEAM FOR  
BETTER OUTCOMES**

- Board-certified neonatologists
- Neonatal nurses, nurse specialists and nurse practitioners
- Physical, occupational, speech and respiratory therapists
- Neonatal dietitians
- Lactation consultants
- Palliative care staff
- Social workers
- Case managers
- Neonatal family navigators and community transition navigators



## FETAL SURGERY

When a baby's life is threatened in utero, our experts are pioneering the latest ways to help.

Using the latest techniques, our fetal surgery team is able to intervene early to correct serious birth defects in utero and preserve the health of the fetus and mother. As one of only 25 fetal surgery centers in the country – and the only one between Miami and Baltimore – we offer innovative treatments, comprehensive diagnostic evaluations and family-centered support to care for the highest-risk pregnancies.



“By changing the outcomes for life-threatening fetal conditions, we’re now able to give parents a level of hope they never had before.”

Courtney Stephenson, DO | Medical Director, Fetal Surgery Program

### A HISTORY OF FETAL FIRSTS

Since 2010, we have successfully intervened in some of the most complicated fetal cases. We were the first in the region to perform fetoscopic laser ablation procedures for twin-twin transfusion syndrome to equalize blood flow between two fetuses sharing one placenta unequally. For this rare condition that had an 80-100 percent mortality rate before the advent of this procedure, we have been able to achieve close to a 90 percent survival rate for one or both twins at birth.

Our specialists were the first in the world to use microwave ablation to correct twin-reversed arterial perfusion (TRAP) sequence – a technique now being explored by the nation's top fetal care centers.

Other complex in utero treatments include:

- Fetoscopic laser surgery, a minimally invasive procedure using a laser to ablate vessels
- Microwave ablation and bipolar fetoscopic cauterization
- Thoraco-amniotic shunting for pleural effusions and congenital cystic adenomatoid malformation (CCAM), conditions that affect the lungs
- Vesico-amniotic shunting for lower urinary tract obstructions of the bladder and cloaca
- Fetal blood transfusions, percutaneous ultrasound-guided



**20-30**  
**FETOSCOPIC**  
**LASER ABLATIONS**  
**PER YEAR**

### CONSULTATIVE SERVICES FOR PERSONALIZED CARE

In addition to surgical offerings, our team is highly sought after to provide consultative services for at-risk fetuses. Our fetal surgery team performs specialized ultrasounds, echocardiograms, cardiac function studies and Doppler studies to help arrive at definitive diagnoses.

Learning about a life-threatening fetal condition can be overwhelming for parents. Beginning with a detailed one-on-one consultation with our experts, we take the time to explain a family's treatment options. Throughout the course of treatment, our team is available 24/7 for urgent calls from physicians and patients.

We collaborate with maternal-fetal medicine physicians to help manage the mother's and fetus's health throughout and shortly after pregnancy, while genetic counselors and fetal care nurses are available to answer questions and coordinate with referring physicians. When needed, we can easily transfer babies after delivery to our Level IV NICU or mothers to the adjacent Carolinas Medical Center for further treatment.



**FIRST IN**  
**THE WORLD**  
**TO USE MICROWAVE**  
**ABLATION FOR**  
**TRAP SEQUENCE**



**FOR 16 YEARS, THE SAME FACE HAS SEEN JACOB THROUGH**

As a child, Jacob was never far from a hospital. At age 3, he developed nephrotic syndrome. At 4, he was in kidney failure and on 18 medications. Two years after receiving a kidney transplant, he developed post-transplant lymphoma.

Balancing his chemotherapy with his transplant medications took tremendous coordination between his dialysis, transplant, oncology and immunology teams to fight off his cancer and the threat of organ rejection.

Jacob did well for nearly a decade, until he began to suffer chronic rejection of his donated kidney at age 15. Fortunately, his mother was a perfect match, and Jacob's second transplant was a success. Now 19 and off at college, he's managing his kidney problems well, with his major surgeries hopefully behind him.

Jacob's family credits his recovery to the care team at Levine Children's Hospital, led by Susan Massengill, MD, medical director of the nephrology department. Dr. Massengill has treated Jacob over the entire 16-year span and is helping his care team transition him to adult care.

"I think the best part of my job is being able to follow these patients and their families through the years as they grow," Dr. Massengill says. "Of course, we're there through their struggles, but that just makes their triumphs that much sweeter."



**"Of course, we're there through their struggles, but that just makes their triumphs that much sweeter."**

Susan Massengill, MD | Medical Director, Nephrology



## NEPHROLOGY

We never let a child's kidney disease define who they are.

Remembering at every step that our patients are kids, our nationally ranked nephrology experts work to give them the best chance of recovery and renewed health.

Recognized by *U.S. News & World Report* as one of the country's top pediatric kidney programs, we pride ourselves on our comprehensive services, leading outcomes and our history of clinical innovation. We're equally proud of our team's effort to focus on continuity of care. The faces our patients see will be the same day in and day out – a stability that demonstrates a commitment to quality care patients and families can count on.

### SPECIALTY CARE FOR THE MOST COMPLEX PROCEDURES

Treating the complete spectrum of nephrology conditions for infants, children and adolescents, we have specialized expertise in some of the toughest cases.

For example, we perform more kidney transplants than any other site in the state. Our multidisciplinary team – including nephrologists, clinical nurse specialists, transplant surgeons, child life specialists and social workers – works together to consistently produce outcomes that top national benchmarks. Whether we need to do a paired donor exchange

or a multi-organ transplant, we offer the latest care options available for transplant patients.

With the only dedicated on-site pediatric dialysis unit in the Carolinas, we offer tailored services and a child- and family-centered environment.

Our nephrologists diagnose and treat a variety of other complex conditions, including:

- Hemolytic uremic syndrome
- Nephrotic syndrome
- Osteogenesis imperfecta
- Cystic kidney disease
- Acid-base and electrolyte disorders
- Autoimmune disorders
- Genetic kidney disorders
- Glomerular diseases
- Hematuria
- Lupus nephritis

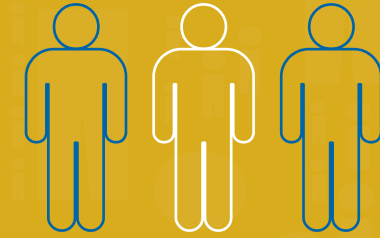
In addition, our division provides consultative services to other departments to help support acutely and chronically ill patients within cardiology, hematology/oncology, neonatology and infectious diseases. For example, we have created a red cell exchange program to support the pediatric hematology sickle cell program.

Top-ranked nephrology program in the Carolinas



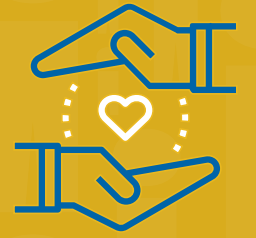
## REDEFINING EXCELLENCE IN NEPHROLOGY

Led by doctors with decades of combined experience, our nephrology program continually seeks out new ways to shape the field, including the recent formation of a Nephrology Center of Excellence. This center is built on four pillars of success:



### CLINICAL RESEARCH

We have a dozen ongoing clinical studies, with 300+ patients enrolled, in areas including atypical hemolytic uremic syndrome, treatment-resistant nephrotic syndrome and the cardiovascular effects of chronic kidney disease. We are a founding member of and hold key leadership roles in the NephCure Accelerating Cures Institute, a multicenter collaborative that focuses on improving treatment options for those with nephrotic syndrome.



### CARE DELIVERY

For our families, we are incorporating a co-production model that brings together parents and providers to share in the decision-making process around disease management and to develop specialized clinical trials as well as convenient and value-based treatment options.



### QUALITY

We have launched new initiatives to increase patient safety, drive better patient outcomes, decrease waste and enhance cost savings.



### EDUCATION

From hosting conferences to creating online education tools, our programs aim to increase awareness of pediatric kidney diseases, which are often difficult to detect and understand by the general public.





**100%**

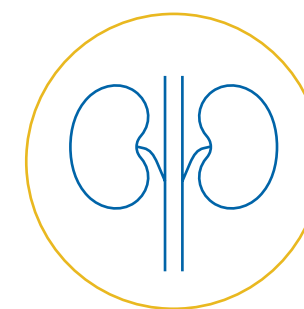
OF PEDIATRIC DIALYSIS PATIENTS ARE MEETING ADEQUACY DIALYSIS GOALS

**HELPING OUR PATIENTS LIVE WITHOUT LIMITS**

The impact of a child's kidney disease on a family can be tremendous. So we've designed programs to make their lives easier – and as close to normal as possible.

At our on-site dialysis unit, we have a dedicated teacher who makes sure our patients are never limited in their educational opportunities. During the summer, we help kids attend camps and participate in outdoor activities while still making time for their dialysis.

Our goal is to help our patients incorporate their disease into their world rather than re-arranging their lives around their disease.



**8-10**

RENAL TRANSPLANTS PER YEAR

**95%**

3-YEAR SURVIVAL RATE FOR KIDNEY TRANSPLANTS

(2014-2016, living and deceased donors, United Network for Organ Sharing)



**12**

CLINICAL STUDIES

**300+**

PATIENTS ENROLLED





## **SETTLING IS NEVER AN OPTION**

*Nothing more can be done.* Those are some of the most troubling words a parent can hear, even when they know their child struggles with severe epilepsy and daily seizures.

For the parents of 9-year-old Mikisa, those words spurred greater determination. Even when seven neurologists told them that symptom-relieving medication was their daughter's only option.

Then they found Kate Van Poppel, MD, a pediatric neurologist at Levine Children's Hospital, who introduced them to the idea of a hemispherectomy. Removing half their child's brain was a scary thought, but they would do everything they could for Mikisa, who they'd adopted from Uganda four years earlier. She deserved a chance to grow and develop like any other child.

Mark Van Poppel, MD, who specializes in pediatric neurosurgery at LCH, determined quickly that Mikisa was a perfect surgical candidate.

"A hemispherectomy is a fairly rare and very involved surgery," says Dr. Mark Van Poppel. "I was confident Mikisa would respond well to this treatment. It requires a well-trained pediatric neurologist, a pediatric neurosurgeon and a pediatric epilepsy team working together."

Within four weeks of the surgery, Mikisa was walking. Soon after, she was running and jumping. Her mother, Christina Felten, says Mikisa has closed the gap on many of her developmental delays.

"What the doctors gave us was a fresh start for Mikisa – a reset button," says Christina. "We now have hope. We don't know what the future will hold, but this provides so much more opportunity for her."

**"What the doctors gave us was a fresh start for Mikisa – a reset button. We now have hope. We don't know what the future will hold, but this provides so much more opportunity for her."**

Christina Felten | Mikisa's mother



## NEUROLOGY AND NEUROSURGERY

Our neurosciences program continues to grow – in expertise, state-of-the-art capabilities and national recognition.

From specialized epilepsy care to endovascular surgery, our pediatric neurology and neurosurgery program offers advanced care across the continuum. For all kinds of neurological conditions, we do everything we can to give our patients a better chance of recovery – a commitment that has led to our being named one of the nation's best by *U.S. News & World Report*.

### THE MOST ADVANCED EPILEPSY CARE IN THE CAROLINAS

From diagnosis to surgery, our nationally recognized Children's Epilepsy Center offers exceptional care. Located at Jeff Gordon Children's Hospital, the only dedicated pediatric Level III epilepsy monitoring unit in North Carolina allows patients to keep active and out of bed while they undergo electroencephalogram (EEG) testing. For select procedures, such as intracranial monitoring, we also have a Level IV epilepsy center – one of only three in the state – connected to the LCH campus.

When anticonvulsant medication is unable to control symptoms, our board-certified epileptologists provide other treatment options, including vagus nerve stimulation. Our specialized dietitians also offer variations of the ketogenic diet, which can control seizures for many patients.

For patients requiring surgical interventions, our pediatric neurosurgeons are highly experienced in all forms of epilepsy surgery, including laser ablation, temporal lobe resection, corpus callosotomy and hemispherectomy.

### A NEUROSURGERY TEAM THAT STANDS APART

With five pediatric neurosurgeons – the largest team on the East Coast outside of Boston – we offer distinct advantages for our patients. This large number of providers ensures that there will never be a time when patients don't have access to a pediatric specialist. In addition, the team of pediatric neurosurgeons performs hundreds of highly technical and complex brain, spinal cord and spine surgeries on adults each year. Because these operations are relatively rare in children, this additional caseload offers our team a greater level of experience and mastery.

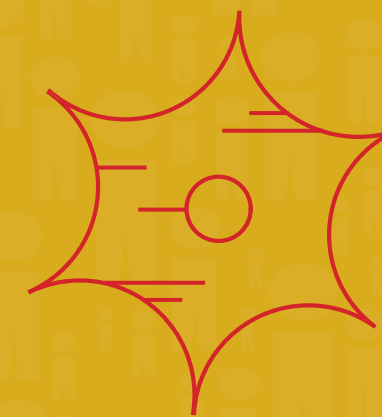
Many of our surgeries use minimally invasive techniques and computer-guided navigation to remove lesions and reduce complications such as pain and scarring. When possible, we also use nasal endoscopic procedures to remove skull base tumors from the nose or perform hair-sparing surgeries through 1-cm incisions for patients with hydrocephalus.

These advanced techniques combined with our experience have led to outstanding outcomes, including infection rates that are more than 70 percent lower than the national average.



### CONDITIONS TREATED

- Acute developmental regression
- Brain and spine trauma
- Brain, spinal cord, spine and peripheral nerve tumors
- Brainstem and midbrain tumors and vascular conditions
- Cerebral palsy
- Change in mental status
- Congenital spinal conditions
- Craniosynostosis and craniofacial syndromes
- Double vision and blindness
- Epilepsy and seizures (including surgical treatment)
- Headaches and migraines
- Hydrocephalus
- Muscular dystrophy and other neuromuscular diseases
- New onset weakness
- Neurovascular disease (AVM, aneurysm, cavernous malformation, moyamoya, stroke)



**350**  
NEUROLOGY  
REFERRALS  
every month

One of only two hospitals in the nation to have disease-specific certification in epilepsy through The Joint Commission

Only dedicated pediatric Level III epilepsy monitoring unit in North Carolina



**EXCELLENCE ACROSS THE CONTINUUM**

From the moment children arrive at our hospitals until their discharge, we offer expert neurological care across the continuum. The Hemby Pediatric Trauma Institute, the only pediatric Level I trauma center in the greater Charlotte area, provides emergency services for traumatic brain or spinal cord injury, while the only dedicated pediatric inpatient rehabilitation facility in North Carolina speeds patients toward recovery through intensive therapy.

Along our patients' journeys, our neurosciences team works hand in hand with other specialties at our facilities to deliver integrated care. For example, we bring together the right experts in neuro-oncology,

orthopedics or genetics to treat diseases that cross many disciplines, such as tuberous sclerosis or mitochondrial disorders.

**EMBRACING THE LATEST TECHNIQUES**

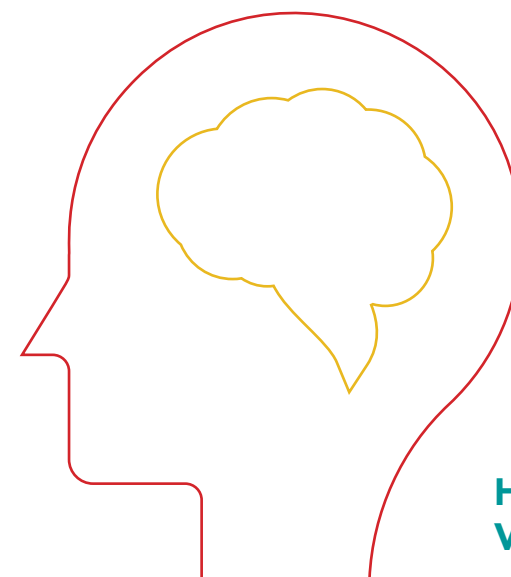
Some of the latest technologies are at our disposal to improve clinical care:

- The full range of diagnostic testing, including functional MRI, PET, SPECT, transcranial Dopplers, brain perfusion studies and electromyography testing
- Laser interstitial thermal therapy for deep brain tumors
- Advanced cerebrovascular techniques to treat the most complex brain and spinal cord vascular conditions

- Advanced endoscopic techniques to treat hydrocephalus without shunts or to safely remove shunts
- Botox injections (awake or sedated) to treat spasticity for children ages 1 to 18

**OFFERING PATIENTS PEACE OF MIND**

When we see patients, we want them to be as comfortable as possible. Every time patients come in, they see the same specialist so there's no added anxiety with a new doctor. That's the same reason we are committed to using non-invasive therapies when possible. New patients can usually see us within one week – and referring physicians can expect a callback by the next business day.



**HIGHEST NEUROSURGICAL VOLUMES IN THE CAROLINAS**

2014-2016

**444**  
SHUNT SURGERIES

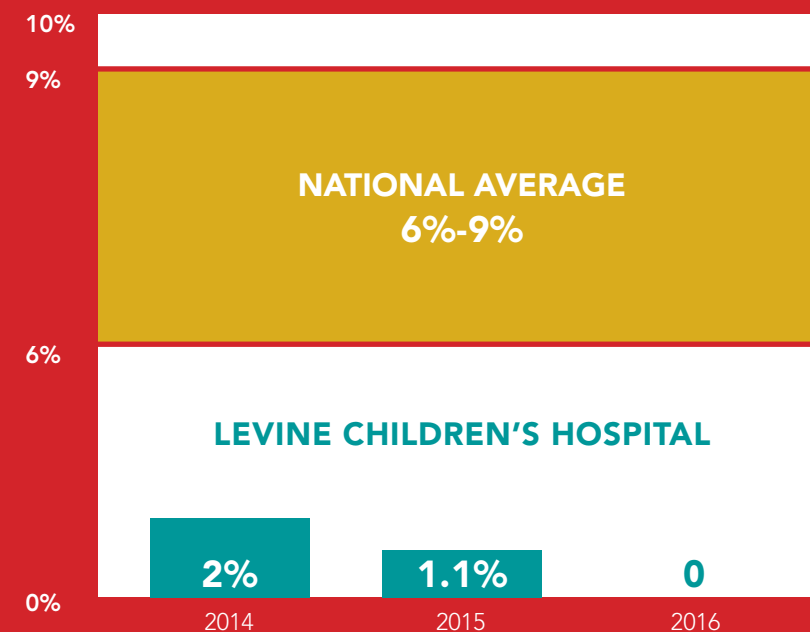
**167**  
ENDOSCOPIC SURGERIES

**114**  
BRAIN TUMORS

**80**  
CRANIOSYNOSTOSIS SURGERIES



**REDUCING INFECTION RATES – SHUNT SURGERIES**



J Neurosurg Pediatr. 2011 Jul;8(1):22-9. doi: 10.3171/2011.4.PEDS10551.



## SIZING UP THE RAREST OF CONDITIONS

At 7 years old and barely three feet tall, Landen Johnson will never be the tallest kid in the room. But he is a giant in spirit.

Landen has a rare form of primordial dwarfism called ligase IV syndrome that compromises his immune system and blood production. He is one of just a few children in the US and about 20 in the world with this condition.

Susceptible to severe and frequent infections, Landen had only one chance for survival: a bone marrow transplant. After determining that his siblings did not provide an ideal match, Landen's doctors at Levine Children's Hospital identified a cord blood unit match from the national registry.

Combining expertise in BMT and pediatric infectious disease, Landen's team provided a "one-stop shop" for his comprehensive treatment. "At LCH, we can involve so many subspecialties that even for the rarest conditions, we can give our patients everything they need," says Philip Roehrs, MD, PhD, medical director of BMT, who treated Landen.

After undergoing a successful stem cell infusion, Landen continued to be monitored for his platelet levels and reaction to his anti-rejection medications. In about two months, after being discharged for a brief stint at the Ronald McDonald House of Charlotte to keep close to the hospital, Landen was able to go home with his family.

Despite the physically taxing procedure and recovery, Landen can always be counted on for a joke and a smile. You could say Landen has the biggest personality in the room.



**"At LCH, we can involve so many subspecialties that even for the rarest conditions, we can give our patients everything they need."**

Philip Roehrs, MD, PhD | Pediatric BMT Medical Director



## ONCOLOGY, HEMATOLOGY, AND BLOOD AND MARROW TRANSPLANT

We know top-ranked cancer care can be delivered in a family-centered way – because we do it every day.

At Levine Children's Hospital, we have created a nurturing environment where nationally recognized experts, clinical researchers, families and referring physicians come together to provide novel treatments for some of the rarest cancers and blood disorders. Named one of the best cancer programs in the country by *U.S. News & World Report*, we are proud to meet the unique needs of our patients and return them to active, healthy lives and the care of their referring physicians.

### SPECIALIZED BMT EXPERIENCE

As the only pediatric blood and marrow transplant (BMT) unit in Western North Carolina, we deliver BMT outcomes ranking in the top 10 centers in the country. We perform a range of transplants, including the latest approaches for half-match transplants that give us added confidence we can find donors for more of our patients.

Highly complex with many potential complications, sickle cell disease is an area where many doctors do not feel comfortable with providing BMT when required. However, our hematologists are experienced in performing BMT for children and young adults with sickle cell disease, and they welcome and actively pursue new cases.

### INTEGRATED CLINICS

A multidisciplinary approach is key to our vision of comprehensive cancer care. Our team of pediatric oncologists and hematologists, BMT doctors and specially trained nurses works with experts across LCH to offer specialized clinics:

- **Vascular anomalies.** Staffed by a team from oncology, surgery, ENT, radiology and plastic surgery to treat the rarest tumors and malformations
- **Tuberous sclerosis.** Includes neurosurgeons and nephrologists, among others, to treat tumors of the brain and other vital organs
- **Neurofibromatosis type 1.** Brings together multiple subspecialties, including genetics, pediatrics, neuro-oncology, neuro-ophthalmology, ophthalmology and orthopedics to treat this rare genetic disorder
- **Primary immunodeficiency.** Treats immunocompromised patients in need of BMT transplants
- **Hemophilia and thrombosis.** Offers the most advanced anti-coagulant therapies

- **General survivorship.** Focuses on a child's wellness and potential late effects of therapy once cancer has entered remission – providing support, education, guidance and preventive care
- **Neuro-oncology survivorship.** Monitors patients for abnormal signs early on and offers family counseling to navigate the long-term effects of their child's illness

### TREATING THE FULL SPECTRUM OF PEDIATRIC ONCOLOGY AND HEMATOLOGY CONDITIONS

#### Cancers

- Leukemia
- Hodgkin and non-Hodgkin lymphoma
- Sarcomas, including Ewing's sarcoma, rhabdomyosarcoma and osteosarcoma
- Neuroblastoma
- Liver tumors
- Brain tumors
- Kidney cancer
- Bone and soft tissue tumors

#### Blood disorders

- Anemia
- Hemophilia
- Sickle cell disease
- Von Willebrand's disease
- Thrombosis
- Vascular anomalies





**THERAPIES ON THE CUTTING EDGE**

From the latest surgical interventions to immunotherapies, we are one of a few hospitals across the country able to provide a broad range of state-of-the-art treatments.

- We are building a dedicated room to deliver metaiodobenzylguanidine (MIBG) therapy to treat high-risk neuroblastoma. We will be one of fewer than 20 centers in the US to offer this type of therapy.
- For relapsed neuroblastoma patients – from as far away as

Ireland and Dubai – we offer difluoromethylornithine (DFMO) therapy, which has shown increases in survivorship over the current standard of care. LCH was one of five founding research partners that studied DFMO as part of the Beat Childhood Cancer consortium.

- We are one of a few hospitals in the nation to offer hyperthermic intraperitoneal chemotherapy (HIPEC) for children, adolescents and young adults. HIPEC treatments deliver chemotherapy agents directly into a patient's abdominal cavity to eliminate

certain advanced tumors that cannot be safely removed through surgery.

**ACCESS TO EXPERIMENTAL TREATMENTS**

Our dedicated Phase I developmental therapeutics program can give patients access to the latest emerging medicines and potentially curative therapies. Staffed by research-focused doctors, nurses, pharmacists and study coordinators, our team offers more than 60 clinical trials, including investigator-initiated trials in solid tumors and leukemia.

**DEDICATED CARE FOR ADOLESCENTS AND YOUNG ADULTS**

As part of our commitment to the adolescent and young adult population, we continue to care for patients at our facility into their twenties. Deploying pediatric-specific regimens, we collaborate with our colleagues at Levine Cancer Institute, part of Carolinas HealthCare System, to transition these patients seamlessly to an adult-focused setting.

**REDEFINING THE PATIENT EXPERIENCE**

Beyond providing encouragement and fun activities, we have gone a step further to improve the patient experience – creating special programs that help our patients feel more comfortable while they undergo treatment.

- The only dedicated inpatient pediatric dialysis unit in the Carolinas gives our patients an age-appropriate setting to receive plasma exchange.
- A dedicated child psychologist can help address emotional, behavioral

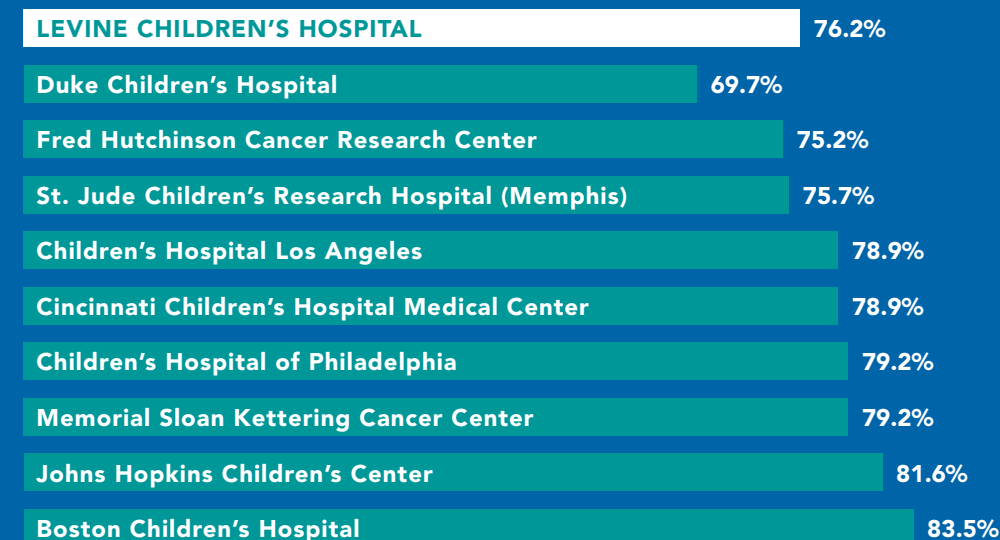
or neurocognitive issues related to cancer treatment.

- Our patients have the option of receiving their chemotherapy with the use of home pumps, resulting in equivalent effectiveness, increased cost-efficiency and a better quality of life for families.
- For BMT patients and those involved in Phase I or II clinical trials, we offer a virtual care platform for referring physicians so they can stay up to date with their patients' progress. We are introducing telemedicine services directly for patients who live far from our facilities.



**PEDIATRIC BMT OUTCOMES: RANKING WITH THE NATION'S BEST**

1-year survival for allogenic BMT (3-year cycle)



2012-2014, Center for International Blood and Marrow Transplant Research®





## HOW A MAGNETIC ROD RESHAPED A CHILDHOOD

As a 7-year-old with early-onset scoliosis, Charlie had already become accustomed to wearing a back brace and was anticipating years of spinal surgeries.

But her doctors at Levine Children's Hospital introduced a new surgical procedure that immediately brightened her future.

Traditionally, rods are implanted in the spine to treat scoliosis. As the child grows, the rods are replaced with longer ones in a series of frequent surgeries that carry the risk of complications and infection.

The new technique involves inserting adjustable magnetic rods that can be lengthened via remote control – requiring only the initial surgery. Lengthening is performed at short outpatient visits.

"This new approach means children are spared repeated surgeries," says Brian Scannell, MD, medical director of pediatric orthopedics. "And because we can do the operation through a tiny incision, it's less invasive than a traditional spinal fusion surgery."

One of the first patients at LCH to receive the new magnetic rod, Charlie was home within days. Within weeks, she'd gained three inches in height and was back to her favorite activity, gymnastics. Now *that* is a childhood to look forward to.

"This new approach means children are spared repeated surgeries. And because we can do the operation through a tiny incision, it's less invasive than a traditional spinal fusion surgery."

Brian Scannell, MD | Medical Director, Pediatric Orthopedics



## ■ ORTHOPEDICS

Our patient numbers speak volumes about our commitment to orthopedic quality and innovation.

With nearly 10,000 annual outpatient visits, our orthopedic specialists have successfully treated virtually every kind of complex case. From trauma to long-term management of congenital malformations, we bring a level of experience – as well as dedication to research and education – that can be found in only a few orthopedic programs in the Southeast.

### INNOVATION IN SURGICAL INTERVENTIONS

Recognized as one of the best programs in the nation by *U.S. News & World Report*, we offer complete pediatric and adolescent musculoskeletal care. Our board-certified pediatric orthopedic surgeons have specialized expertise in many conditions, including:

- **Leg-length discrepancy and deformity.** Whether congenital or acquired, leg-length discrepancies can pose serious threats to a child's mobility. Our cutting-edge techniques to lengthen the shorter limb include using a magnetically controlled intramedullary lengthening nail without the need for external pins or wires – a procedure that can add up to 8 cm of bone.

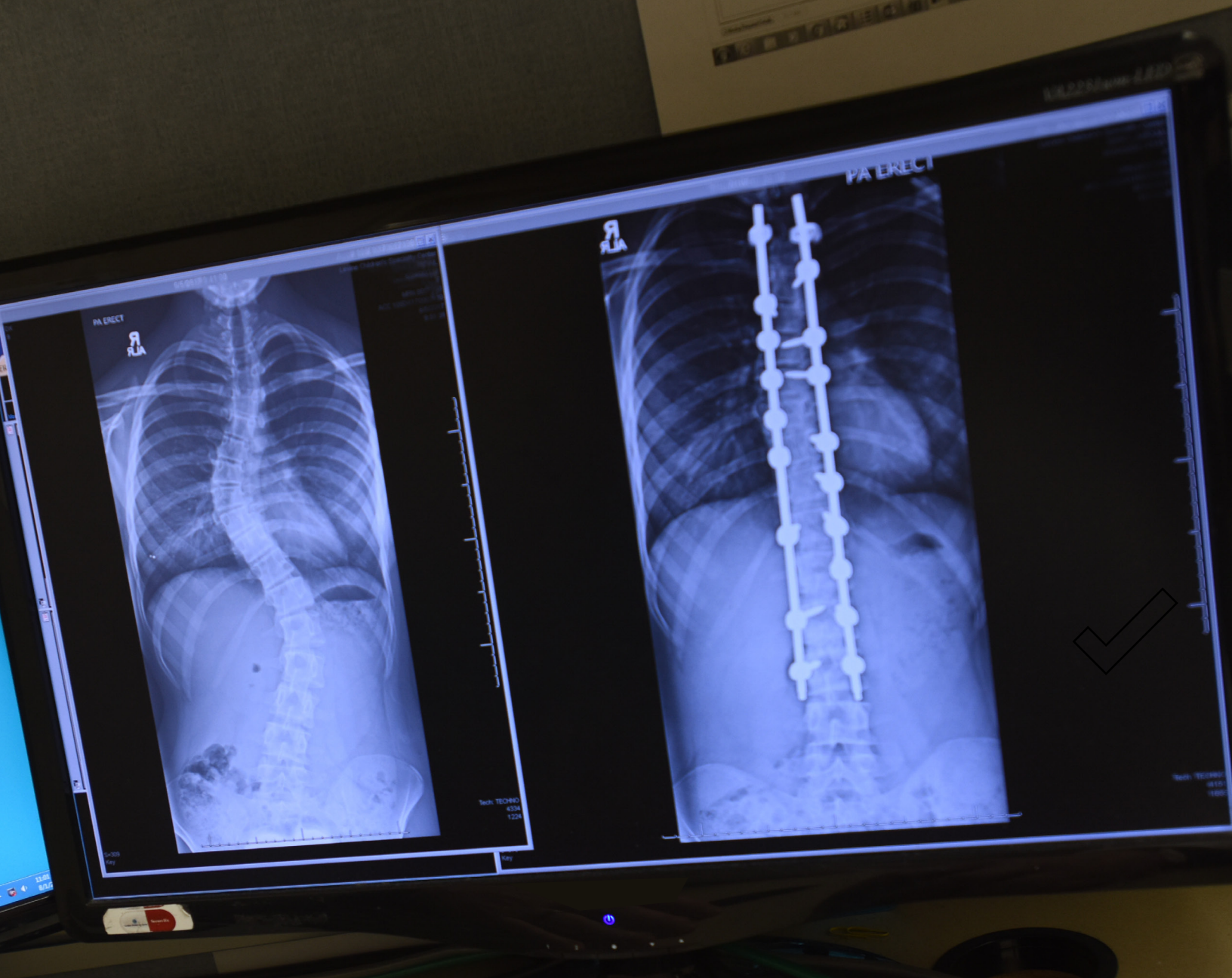
- **Spinal disorders.** In 2016, we performed about 100 spinal surgeries – and currently follow about 1,200 patients with scoliosis or other spine deformities. To reduce our patients' exposure to radiation in the outpatient setting, we use low-dose radiation imaging, which provides extremely detailed, high-quality images with an ultra-low dose of radiation about eight to 10 times lower than that of X-rays.

### HIGH QUALITY, OVER AND OVER AGAIN

Seeing thousands of patients annually doesn't detract from our quality – in fact, it increases it. Our protocols and post-operative pathways have led to top outcomes in length of stay, readmission rates, infection rates and pain. For our surgical patients, we rarely have to use ICUs – a reflection of having longstanding OR teams (some of our orthopedic nurses have more than 30 years of experience) contributing to successful procedures.







**LIMB LENGTHENING**  
**80%**  
**INCREASE IN NUMBER OF PROCEDURES**  
 2017 vs. 2016

**READY TO TREAT TRAUMA**

For trauma patients, we provide excellent care in the emergent and post-acute care settings. Our Level I pediatric trauma center – the only one of its kind in the greater Charlotte area – treats an unmatched volume for our region, excelling in the speed at which our patients get to the operating room. We have launched one of only a few Pediatric Trauma Survivors Network programs in the nation to offer support for trauma patients and their families.

**ACADEMIC FOCUS, GROUNDED IN RESEARCH AND EDUCATION**

We maintain a commitment to research and education similar to that found in academic hospitals. In 2016, our surgeons combined to produce 13 peer-reviewed publications; 22 regional, national and international conference presentations; and five book chapters. We also oversee more than 20 residents as part of one of the major pediatric orthopedic training programs in the country.

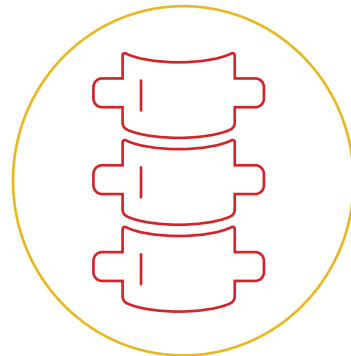
**WORKING SEAMLESSLY ACROSS DISCIPLINES**

Because many of our patients present with multiple co-morbidities, we collaborate with experts across LCH to treat conditions ranging from spinal injuries to bone and joint infections. This close connection offers patients not only outstanding multidisciplinary care but also added convenience. It's not uncommon for patients to see three specialists in one visit to our specialty care center in Charlotte.

**ORTHOPEDIC CARE FOR THE FULL RANGE OF PEDIATRIC AND ADOLESCENT CONDITIONS**

- Conditions affecting the back, spine, foot, ankle, hip and knee
- Developmental abnormalities including cerebral palsy, muscular dystrophy, knock knees, bowlegs and club foot
- Fractures and dislocations
- Infections and orthopedic tumors
- Neuromuscular conditions
- Scoliosis
- Spina bifida and other spinal deformities
- Sports-related injuries
- Walking (gait) abnormalities

**SCOLIOSIS SURGERIES**



**12%**

**INCREASE IN NUMBER OF SURGERIES**

2017 vs. 2015

**<1%**

**READMISSION RATE**

within 30 days following surgery



## ■ ENDOCRINOLOGY

For our endocrinology patients, we help make sure complex diseases don't complicate their lives.

Caring for children with diabetes, growth disorders or other problems of the endocrine system takes more than advanced diagnosis and management approaches. We help our patients integrate lifestyle changes to better manage their conditions and lead healthier lives.

### SPECIALIZED CARE FOR TYPE 1 DIABETES

As a complex disease that requires lifelong management, Type 1 diabetes presents patients with several medical and psychosocial challenges. Dedicating more than one-third of our caseload to these patients, we provide the expertise and resources to help reduce complications and improve health.

We have led the way in medication management, pioneering the use of continuous glucose monitoring and insulin pumps in children. Plans are underway to provide all newly diagnosed patients with Type 1 diabetes their own glucose monitor at discharge; we'll be one of the first hospitals in the US to do so.

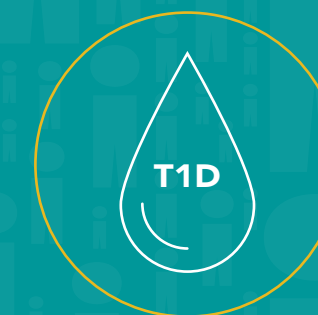
### GOING THE EXTRA MILE – IN AND OUTSIDE THE CLINIC

After diagnosis and treatment plans are complete, we provide ongoing support that eases the transition into the outpatient setting. But our commitment to our patients doesn't stop at the clinic door. Our diabetes educators not only equip individual patients with self-care techniques but also visit schools and daycare centers to train caregivers on appropriate treatment.

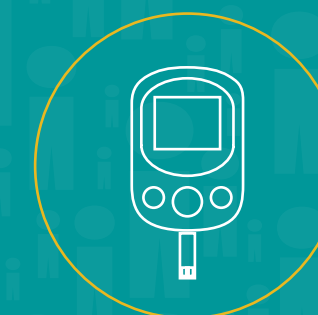
Several of our doctors have served on the boards of the Charlotte chapter of JDRF (formerly known as the Juvenile Diabetes Research Foundation). In addition, we donate weeks of our time during the summer to provide medical direction to Camp Kudos and Camp Carolina Trail, which provide outdoor activities specifically for diabetes patients.

### AREAS OF SPECIALTY

- Diabetes (Types 1 and 2)
- Abnormal calcium and/or phosphorus metabolism
- Abnormal pubertal development (early or delayed)
- Abnormalities of vitamin D or parathyroid hormone secretion
- Adrenal conditions (congenital adrenal hyperplasia, adrenal insufficiency, adrenal excess)
- Disorders of sexual differentiation
- Pituitary disorders
- Growth disorders (growth failure or rapid growth)
- Hypoglycemia
- Insulin resistance
- Hormone-secreting tumors (including pheochromocytoma and multiple endocrine neoplasia syndromes)
- Thyroid conditions, including hyperthyroidism and hypothyroidism



Providing care for the largest population of Type 1 diabetes patients in the Charlotte area



We will be one of the first hospitals in the US to provide all newly diagnosed Type 1 diabetes patients with their own glucose monitor at discharge.



## ■ GENERAL SURGERY

For any type of surgical procedure, we place children in the best possible hands.

Working across all disciplines and available 24 hours a day, our surgical team – part of the region's most established pediatric surgical program – is highly experienced in operating on the most complex conditions. Fluent in minimally invasive techniques, the surgeons at Levine Children's Hospital strive to provide the highest quality care before, during and after surgery.

### EXPERTISE, PROVEN ON A DAILY BASIS

Unlike surgical departments at many children's hospitals where the caseload is spread among a large number of surgeons, we have the advantage of being relatively small. This allows each surgeon to perform many more of the same procedure, garnering valuable experience to benefit our patients. We see – and treat – the full range of congenital and acquired conditions, including:

- **Congenital diaphragmatic hernia (CDH).** In a recent international meeting, we presented findings from operating on patients with CDH for the past eight years: 25 thoroscopic repairs with no recurrences.
- **Congenital pulmonary airway malformation (CPAM).** We work closely with the fetal surgery program to safely remove lung lesions that can pose serious threats to fetuses.

- **GI congenital disorders.** We surgically treat intestinal atresia, Hirschsprung's disease, anorectal malformations and motility disease to help restore long-term functioning.

### MORE WAYS TO OPERATE LESS INVASIVELY

When a minimally invasive approach is the right choice for our patients, we have the capability and experience to provide a range of laparoscopic, thoroscopic and endoscopic procedures. LCH has made a significant investment in equipping our teams with minimally invasive devices specially designed for use in infants and children. From abdominal shunt placement to short gut repair, we can offer smaller incisions that hurt less, require less narcotic medicine and reduce scarring.

### QUALITY OUTCOMES – PLUS A QUALITY EXPERIENCE

Everyone on our surgical team – from dedicated pediatric anesthesiologists to specialized nurses – is focused on quality improvement. We participate in the American College of Surgeons National Surgical Quality Improvement Program®, tracking patient data to guide decisions for better surgical outcomes. A major proponent of enhanced recovery after surgery (ERAS), we are implementing care pathways for our most common

procedures, including one for appendectomy patients that can lead to their discharge only four to six hours after surgery.

Outside of the operating room, we provide a patient-centered experience pre- and post-op. A dedicated member of the surgery team makes rounds on all surgical patients every day at LCH, and our post-op recovery room offers a calm, supportive place for families to gather after a child's procedure.

Performing better than national benchmarks for pediatric surgery in the ACS National Surgical Quality Improvement Program®





## ■ GENETICS

Our experts know how to untangle the genetic connection for many hereditary disorders.

As the only genetics team in the greater Charlotte region, we offer comprehensive diagnostic, management and treatment services for the full range of genetic and metabolic conditions. Our board-certified medical geneticists and certified genetic counselors are experts in ordering and interpreting the latest tests.

### GETTING THE RIGHT RESULTS FROM THE RIGHT TESTS

New genetic and metabolic tests become available every few months, offering new panels and insights into newly discovered genes. From our in-house labs and our trusted diagnostic partners using advanced DNA analysis techniques, we know which tests are most clinically appropriate – and most cost-effective for our patients. Moreover, our decades of experience allow us to interpret which genetic variants have true relevance – and what disease management steps need to be taken next.

We also work closely with maternal-fetal medicine specialists at Carolinas Medical Center Women's Institute to offer personalized reproductive genetic counseling, and we partner with adult-focused geneticists to evaluate patients who were unable to receive genetic diagnoses years ago.

### WE'RE THERE FOR THE LONG HAUL

Once testing is complete, we coordinate care with the right specialists at Levine Children's Hospital or continue to see some patient populations within our department. For example, for patients with Down syndrome – one of our most common diagnoses – we have a specialized clinic that brings together audiology, physical, speech and occupational therapy, social work and nutrition to meet their specific needs. We monitor Down syndrome patients for years, conducting thyroid testing, ordering spinal X-rays and evaluating where they fit on the developmental spectrum.

### WORKING ACROSS DEPARTMENTS FOR BETTER OUTCOMES

Because genetics crosses over into so many specialties, we have developed close collaborations across LCH. For instance, we sit in on weekly pediatric tumor boards to determine which cancer patients are best suited for genetic testing. With the cardiology department, we have created a connective tissue clinic for patients with Marfan syndrome or other vascular abnormalities. We also offer comprehensive metabolic clinics and pediatric cancer susceptibility clinics. For all types of conditions – from developmental disabilities to cystic fibrosis to orthopedic diseases – we provide consultative services that improve clinical care for our patients.



Only group of geneticists in the Charlotte area



Care for the largest population of Down syndrome patients in Charlotte

### AREAS OF SPECIALTY

- Growth problems, such as skeletal dysplasia
- Birth defects
- Dysmorphic facial features
- Chromosomal conditions such as Down syndrome
- Developmental delays and neurological problems such as autism
- Metabolic and lysosomal disorders
- Epilepsy
- Neurofibromatosis
- Cystic fibrosis
- Connective tissue disorders
- Pediatric cancer susceptibility
- Tuberous sclerosis
- Disorders of sexual development



## INFECTIOUS DISEASE AND IMMUNOLOGY

We give our patients' immune systems a second line of defense.

From treating persistent infections to collaborating on bone marrow transplants (BMT) for immunodeficient patients, our infectious disease and immunology team is available 24/7 to help kids fight off their illnesses – whether inpatient or outpatient.

### TREATING ALL TYPES OF INFECTIOUS DISEASES

Providing consultative services for all departments at LCH, we treat a wide variety of acquired diseases including pediatric HIV, recurrent MRSA infections, bone and joint infections, tuberculosis (TB), central line infections and fevers of unknown origins. Program highlights include:

- Our Global Health Services program provides pediatric and adult immunizations through a travel clinic and also offers consultative services for international and tropical diseases.
- Our TB clinic is staffed by leading experts on complicated TB cases.
- We offer telemedicine consultations for online diagnosis and follow-up at Jeff Gordon Children's Hospital and Carolinas HealthCare System Union.
- We have a robust clinical research program with National Institutes of Health and industry-sponsored studies in fields such as TB, immunoglobulin replacement, congenital cytomegalovirus and global health education.

### BOOSTING QUALITY ACROSS LCH

We run an antimicrobial stewardship program for LCH, with a team of physicians and pharmacists monitoring patients daily to ensure they get the optimal antimicrobial therapy while minimizing resistance development. At a higher level, our goal is to help protect the public from multidrug-resistant bacteria such as MRSA.

### HOLISTIC SUPPORT FOR IMMUNODEFICIENT PATIENTS

As the only Jeffrey Modell Foundation Diagnostic Center for Primary Immunodeficiencies in Charlotte, we ensure our patient population has access to the highest levels of treatment. In addition, when the state of North Carolina began requiring newborn screening for severe combined immunodeficiency disorder (SCID) in 2017, we became the only referral center for SCID in Charlotte.

Complementing our diagnostic and treatment options is an unmatched level of patient support. Our immunodeficiency advocacy and support group cares for the unique needs of immunocompromised children, currently offering education, activities and fundraising opportunities for more than 150 patient families.

### A CRUCIAL PART OF TRANSPLANT TEAMS

For the growing number of patients who need solid organ transplants or have primary immunodeficiency diseases requiring BMT, we can offer specialized experience. We are the only pediatric immunodeficiency program in the Charlotte area and operate, along with our pediatric oncology colleagues, one of only three pediatric BMT transplant centers in North Carolina. In 2015, we performed our first BMT for a patient with hyperimmunoglobulinemia E (hyper IgE) syndrome – the third successful operation of its kind in the world.



As the only Jeffrey Modell Foundation Diagnostic Center for Primary Immunodeficiencies in Charlotte, we ensure our patient population has access to the highest levels of treatment.



**35%  
GROWTH  
IN INPATIENTS**  
2014-2016

### 13 CLINICAL TRIALS

- TUBERCULOSIS
- ANTIVIRAL THERAPIES
- PRIMARY IMMUNODEFICIENCY



## PULMONARY MEDICINE

We welcome the most medically complex pulmonary cases.

From Levine Children's Hospital to Jeff Gordon Children's Hospital to any of our four outpatient clinics, our board-certified pediatric pulmonologists and multidisciplinary teams provide advanced treatment options for newborns to adolescents. Our focus: improving not just our patients' health but also their outlook on life.

### SUBSPECIALTY CLINICS WITH A DEDICATED FOCUS

We treat the full spectrum of short-term and chronic breathing challenges with four specialized clinics:

#### Cystic Fibrosis

Funded by the Cystic Fibrosis Foundation and developed in collaboration with leading physicians from the community, our program provides comprehensive care for cystic fibrosis (CF) patients. Our doctors work hand in hand with respiratory therapists, social workers, dietitians and nurses to slow disease progression while minimizing symptom severity and complications. Our ultimate goal: to become the CF Foundation's care center for all of Charlotte.

#### Technology-Dependent Ventilation

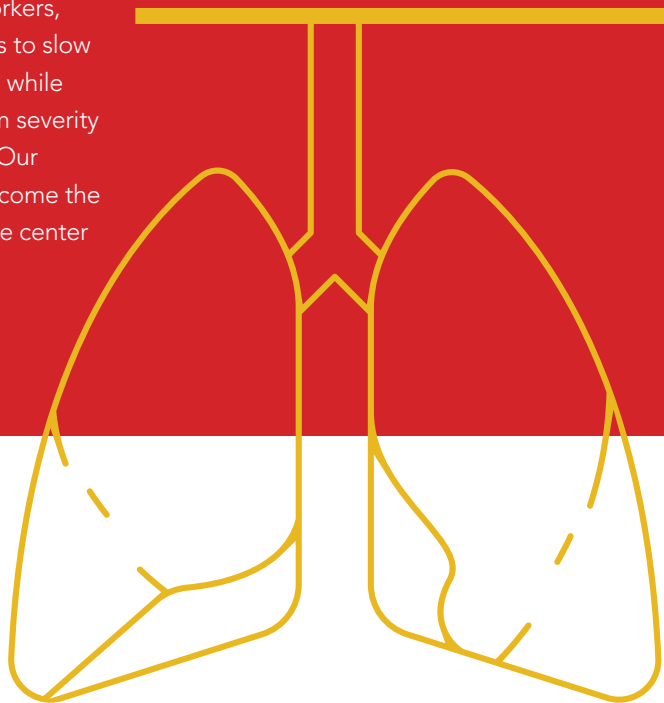
We serve as the medical home for technology-dependent patients in Western North Carolina, offering invasive and non-invasive therapies based on the patient's disease severity and ventilation requirements.

#### Apnea

We are highly experienced in treating patients with severe apnea or bronchopulmonary dysplasia and managing those who require NICU follow-up or home oxygen.

#### Severe Asthma

We offer specialized approaches for children whose asthma results in high utilization of healthcare services, including pediatric intensive care, inpatient admissions and ER visits.



#### CYSTIC FIBROSIS

50

PATIENTS FOLLOWED PER YEAR

500

VISITS PER YEAR



## PULMONARY MEDICINE

### A FOCUS ON ASTHMA THAT GOES BEYOND TREATMENT

Patients with asthma will find a network of support from our specialists. To promote asthma control and prevent readmissions, our nurses and social workers visit our patients where they live to make sure asthma action plans are being followed – even delivering medicines to their homes or schools.

To increase medication compliance in a kid-friendly way, we have created "The Amazings," an asthma app that helps children identify triggers and practice good health habits.



### TECHNOLOGY-DEPENDENT

75

PATIENTS FOLLOWED PER YEAR



## REHABILITATION

Getting better and getting home – those are the outcomes that matter most to our patients and their families.

With more pediatric rehabilitation patients under our care than any other center in the region, we understand what it takes to return children to healthy, active lives. Offering specialized therapy programs and spaces tailored for children and teens, we consistently top national benchmarks for functional gain and length of stay. It's one reason we've once again achieved a three-year accreditation by the Commission on Accreditation of Rehabilitation Facilities (CARF).

### ONE-OF-A-KIND INPATIENT FACILITY

With the only dedicated pediatric inpatient rehabilitation facility in North Carolina, we provide intensive services for a full range of neurological, cardiac, orthopedic and cancer-related conditions. Our patients benefit from:

- Medical supervision by board-certified pediatric rehabilitation physicians, dedicated therapists and nurses, as well as social workers and teachers

- More than 20 hours of therapy per week, on average, including physical therapy, occupational therapy, speech therapy, recreational therapy and cognitive education
- State-of-the-art approaches, such as activity-based restorative therapies to promote recovery of neural pathways and our Emerging Responsiveness Program, designed for children who have experienced a brain injury and exhibit a low level of consciousness
- Advanced technologies, including robotic-assisted gait rehabilitation and the same kind of anti-gravity treadmill used by astronauts and professional athletes
- Cheerful and engaging playrooms and classrooms for children and teens

### OUTPATIENT CLINICS COMPLETE THE CARE JOURNEY

Roughly 95 percent of our inpatients are able to return home with their families/or caregivers – compared to the 91 percent national average. For patients requiring additional care after their inpatient stay, we help them transition to one of our five outpatient facilities, where they can continue to participate in a full range of rehabilitation services.

For new patients who have not been treated at our inpatient rehabilitation facility, our rehabilitation liaisons can help coordinate referrals and admissions, interface with insurance companies and meet with families to answer their questions.



**170**  
INPATIENTS FROM NC, SC, GA AND VA IN 2016

## REHABILITATION

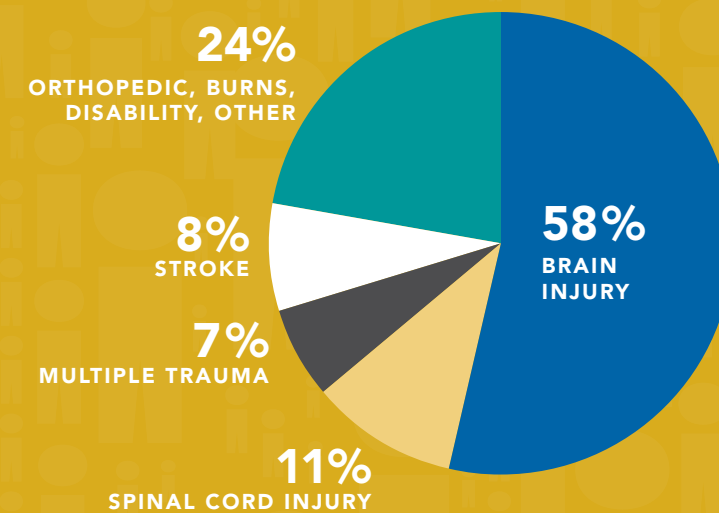
### REDUCING INPATIENT LENGTH OF STAY



### INCREASING INPATIENT WEEFIM SCORES



### CONDITIONS TREATED – INPATIENT





## RHEUMATOLOGY

We bring clarity to treating the many complexities of rheumatic diseases.

When it comes to making a diagnosis or choosing the appropriate treatment for conditions like lupus, there's no substitute for experience. Our board-certified pediatric rheumatologists, the only ones in the greater Charlotte region, provide care for some of the toughest cases while helping to redefine disease management strategies through our research collaborations.

### HIGHLY EXPERIENCED IN GETTING TO THE RIGHT DIAGNOSIS

Diagnosis of rheumatic conditions has never been straightforward. But today's advanced imaging modalities and growing number of available genetics tests allow us to reach answers more quickly and with more confidence. For example, with the help of the National Institutes of Health, we identified the world's first patient with juvenile arthritis stemming from a particular genetic mutation.

### A COLLECTIVE FOCUS ON FINDING CURES

To help prevent and cure rheumatic diseases, we work closely with some of the country's leading research organizations.

- We contribute to the quality improvement initiatives of the Pediatric Rheumatology Care & Outcomes Improvement Network (PR-COIN) in areas such as access for joint injection to help increase remission rates, improve functional status and decrease pain.
- We are studying the effectiveness of consensus treatment plans with the Childhood Arthritis and Rheumatology Research Alliance (CARRA), with more than 100 of our own juvenile arthritis and lupus patients enrolled.
- Our involvement with the industry-sponsored studies of the Pediatric Rheumatology Collaborative Study Group gives our patients early access to experimental treatments.

### BRINGING TOGETHER EVERYTHING OUR PATIENTS NEED

In delivering the most comprehensive care possible, we coordinate across specialties. That means helping our patients with lupus see the right nephrologist at LCH to deal with hypertension or arranging for visits to eye doctors or orthopedists in the community. It also means having a dedicated physical therapist who works with our patients to improve their physical condition and a social worker to facilitate appropriate accommodations at patients' schools.

### CONDITIONS TREATED

- Juvenile arthritis (rheumatoid and idiopathic)
- Lupus
- Scleroderma
- Dermatomyositis
- Fibromyalgia
- Lyme disease
- Psoriatic arthritis
- Joint diseases that cause chronic arthritis, including ankylosing spondylitis
- Uveitis
- Vasculitis



Largest pediatric rheumatology group in Charlotte



270

CHILDREN ENROLLED  
IN OUR PR-COIN  
REGISTRY FOR  
JUVENILE ARTHRITIS



## UROLOGY

Our growing urology department offers patients easy access to a full range of services.

Our team offers more than just the expertise to treat serious urological conditions. We also make sure we're always available to patients, offering appointments as quickly as possible and making time to answer all of their questions about their health.

### LATEST APPROACHES FOR THE MOST COMPLEX DISORDERS

From performing genitourinary reconstruction to treating Wilms tumors or spina bifida, we bring together specialists across Levine Children's Hospital to offer the latest diagnostic, medical and surgical approaches.

This collaboration allows us to care for the most complex urological issues, while never losing sight of what's important to our patients and their families and how health issues can affect all aspects of their lives.

Working with our pediatric nephrologists, our team has created a dedicated pediatric stone center to provide comprehensive medical and surgical care for children with kidney stones. We work with our maternal-fetal medicine team to offer prenatal counseling visits when there is concern for genitourinary abnormalities. For children with complex disorders of sex development, we work with our pediatric endocrinologists, neonatologists and geneticists to develop a unified treatment plan.

### AT THE FOREFRONT OF UROLOGICAL CARE

At Levine Children's Hospital, we have the latest technology available to provide leading-edge care. The first pediatric patient in Charlotte to have robotic urological surgery was here at LCH.

We're proud to offer the most advanced technologies available, including PET or PET/CT scanning and video pediatric urodynamics, as well as the capability to perform complex procedures, such as ureteroscopy with holmium laser, laparoscopic surgery and percutaneous nephrolithotripsy.

### CONDITIONS TREATED

- Tumors of the kidney, bladder and testicles
- Kidney stones, kidney stone management
- Bladder exstrophy and epispadias
- Spina bifida and related neurogenic bladder conditions
- Disorders of sexual differentiation (DSD)
- Vesicoureteral reflux
- Ureteropelvic junction obstruction
- Prenatally detected hydronephrosis
- Hernia/Hydrocele
- Undescended testes
- Testicular torsion
- Hypospadias





## ■ TRAUMA AND EMERGENCY DEPARTMENT

Treating life-threatening injuries or illnesses is our passion, around the clock.

With the region's only ACS Level I pediatric trauma center and an emergency department staffed by board-certified pediatric specialists, Levine Children's Hospital is the premier location in the Charlotte area for caring for critical pediatric patients.

### A COMPREHENSIVE APPROACH FOR BETTER PERFORMANCE

With trauma the leading cause of death and disability for people 18 and younger, an expert trauma program must be an integral part of any top children's hospital. As one of only three pediatric Level I trauma centers in North Carolina, our Hemby Pediatric Trauma Institute is setting the standard for the care of the most critically injured children. For example, our

extracorporeal membrane oxygenation (ECMO) support program – the only one in the Charlotte area – has been designated a Gold Level Center of Excellence by the Extracorporeal Life Support Organization.

Working with specialists in emergency medicine, neurosurgery, orthopedics, plastic surgery, rehabilitation, radiology and anesthesia, our trauma team provides comprehensive inpatient care as well as outpatient follow-up. This extends to rehabilitation care, as well as research, education and advocacy.

As part of this wide-ranging mission, we launched one of only a few Pediatric Trauma Survivors Network programs in the nation. Part of the American Trauma Society, this program is designed to

provide a variety of support services to our injured patients and their families.

### THE RIGHT CARE, RIGHT AWAY

Offering 24/7 care, our emergency department serves as the gateway to LCH. Approximately 15 percent of patients admitted to LCH originate in the ED, where they are stabilized before being seamlessly transferred to the trauma team or appropriate subspecialty.

In addition to our emergency medicine physicians and nurses, our pediatric ED team comprises many valuable roles, including child life specialists who can explain procedures to our patients in a way that helps them feel more comfortable and a little less scared.



**1,500 TRAUMA PATIENTS SEEN EACH YEAR**

## ■ HOSPITALISTS AND INTENSIVISTS

24 hours a day, 365 days a year, we have only one focus: delivering the best possible care at our hospitals.

Our specialized pediatric hospitalists and intensivists are available around the clock to make sure our most complex cases have access to the right specialists and resources.

### HOSPITALISTS

When a child is admitted to Levine Children's Hospital, our team of hospitalists takes charge. For patients who require care from multiple specialties, such as those with seizure disorders or chronic breathing problems, we coordinate with subspecialists to create a comprehensive care plan and arrange family meetings to keep everyone informed and aligned. With overnight coverage, we can respond to the needs of our patients and families in real time while ensuring care plans are continually monitored and implemented. Highly skilled in the breadth of pediatric care, our hospitalists also consult on subspecialty patients who have general medical needs.

This same level of pediatric hospitalist care can be found at four other hospitals throughout our network.

### INTENSIVISTS

At the Ricky Hendrick Centers for Pediatric Intensive Care located at Levine Children's Hospital, our board-certified pediatric intensivists provide a level of care unique in the region. For example, we're the only designated Level I trauma center, with a pediatric ICU that can care for solid organ and bone marrow transplant patients.

In addition, our team, including cardiac intensivists and neonatologists, offers advanced treatment modalities, including extracorporeal membrane oxygenation (ECMO) support; neurally adjusted ventilatory assist (NAVA); airway pressure release ventilation (APRV); high frequency oscillatory ventilation (HFOV); continuous renal replacement therapy; and hemodialysis.



### JEFF GORDON CHILDREN'S HOSPITAL

Part of the LCH family, Jeff Gordon Children's Hospital in Concord, NC, provides pediatric care close to home for patients from birth to age 18 in Cabarrus and surrounding counties. Services include neonatal intensive care, pediatric subspecialty care, endoscopy and surgical services, and the region's only pediatric epilepsy monitoring unit.



## PATIENT AND FAMILY SUPPORT

Staying in a hospital should never prevent a child from learning, growing or having fun.

When illness or injury keeps our patients here for an extended stay, we strive to make Levine Children's Hospital like a second home. Our support staff provides a warm yet stimulating environment and a range of educational and recreational activities to improve the experience for our patients as they reach their developmental milestones and their health improves.

### CHILD LIFE SPECIALISTS

Coping with disease can be confusing for children and adolescents. Our certified child life specialists are professionally trained to help our patients better understand their hospital experience as they grow cognitively, socially and emotionally. From explaining medical procedures in terms they understand to using toys, games and videos to offer much-needed distraction, our child life specialists are experts at making our patients feel safer and more in control. Working across departments, child life specialists round with care teams and are also available to support families.

### FAMILY RESOURCES

For us, family-centered care means providing parents and siblings the resources to stay intimately connected to their children and understand their treatment. As the true experts on their child, families are considered part of the care team and given every opportunity to ask questions and be actively involved.

- Clinical social workers counsel families confronted with social and financial difficulties or crisis situations, and provide information and referrals to community resources for treatment and support.
- At our Family Resource Library, a full-time medical librarian can help families research their child's condition. Large gathering spaces and internet-accessible computers help families connect with others facing similar diagnoses.
- We offer in-room sleeping arrangements so parents can stay at their child's bedside, and we provide kitchen areas so families can prepare meals together.

### DAILY ACTIVITIES

Helping our patients feel engaged and happy can go a long way toward recovery. We offer ever-changing activities, from special visits from entertainment groups to music and pet therapy programs that can calm anxious minds. The local Arts for Life chapter works with LCH patients and their families to create art as a safe, relaxing way to express fears and reduce stress. Our many recreational areas and playrooms, including one specially designed for teens, offer games that can be played with siblings or fellow patients. When a child is

unable to visit the playrooms, our child life assistants or volunteers can bring the fun bedside.

### HOSPITAL SCHOOL

When children leave LCH, we want them to return to school on track with their peers. Staffed by a North Carolina-licensed educator, our hospital school provides direct instruction for K-12 students – and even one-on-one instruction for children unable to leave their rooms. Our pediatric dialysis unit and inpatient rehabilitation program also have their own dedicated teachers.

### SEACREST STUDIOS

Giving patients and families a fun outlet to explore their creative sides, Seacrest Studios is our in-house broadcast center that offers hands-on participation in video projects, music programming and celebrity interviews. Kids can listen from their rooms, call in requests or even become DJ for a day. Sponsored by the Ryan Seacrest Foundation and other local philanthropic organizations, Seacrest Studios can be found in only 10 children's hospitals nationwide.





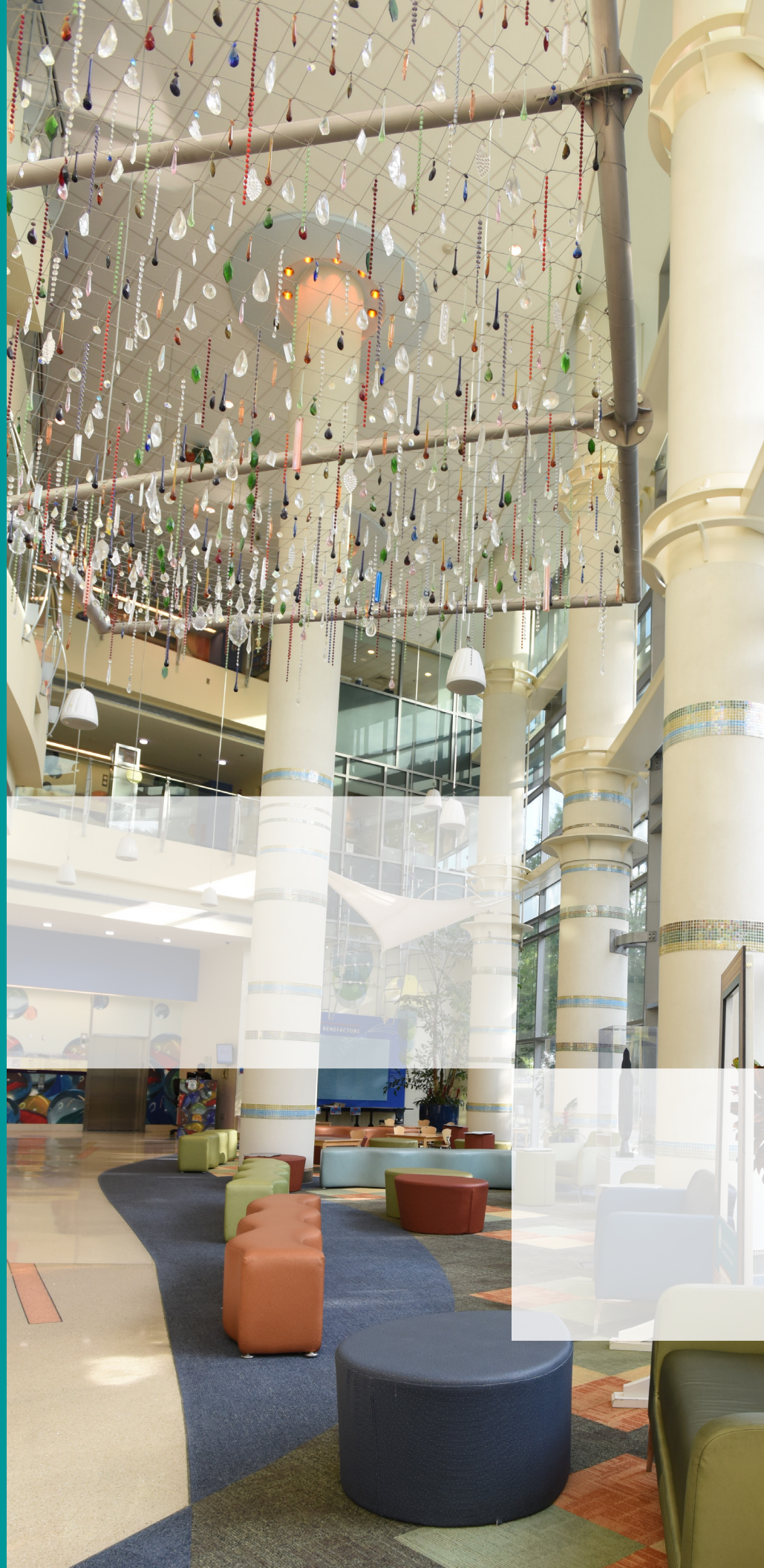
## ■ PEDIATRIC RESIDENCY AND FELLOWSHIP PROGRAMS

As an academic teaching hospital, Levine Children's Hospital provides a nationally recognized pediatric residency program, offering a new generation of physicians a depth and breadth of training that rivals other top children's hospitals' programs.

But with a class size of only 12, the dedicated faculty of our Department of Pediatrics can offer more one-on-one supervision and more opportunities to bring state-of-the-art medicine to the bedside. Our residents also participate in our Center for Advancing Pediatric Excellence, leading a series of quality improvement projects focused on improving patient care, safety and satisfaction.

In addition, residents in the Carolinas HealthCare System General Surgery and Orthopedics programs train at LCH with our pediatric faculty. Exposed to a broad range of surgical contexts, these residents are provided an optimal environment to develop exceptional technical and critical skills.

Our pediatric emergency medicine fellowship program offers our fellows the chance to discover novel approaches to clinical care, lead research projects and present their work nationally to prepare for their next career step.



## WE GIVE OUR BEST TO GET YOUR PATIENTS BETTER.

When you refer your patients to Levine Children's Hospital, you can count on two things: the highest level of care for your patients and a close, collaborative relationship with our specialists. We'll work together closely until we can transition each patient back to you for long-term care.

Making a referral to LCH is easy. No matter where you're located – close to Charlotte or across the country – our referral coordinators can help connect your patients to the right experts. We can arrange phone consultations, referrals or transfers – and will be a trusted resource at every step of your patient's journey.

### REFER TODAY

# 888-279-KIDS (5437)

Our referral coordinators are available 24 hours a day, seven days a week.

## CONTACT OUR LEADERS OF CHILDREN'S SERVICES



**Callie Dobbins, RN, MSN, NEA-BC**  
Facility Executive  
Levine Children's Hospital  
704-381-0922



**Andrew Herman, MD, FAAP**  
Chief Medical Officer  
Levine Children's Hospital  
704-381-0922



**H. Stacy Nicholson, MD, MPH**  
President, Children's Services  
Carolinas HealthCare System  
704-381-3353



**Jennifer Terry, MHA, FACHE, CMPE**  
Vice President, Children's Services  
Carolinas HealthCare System  
Medical Group  
704-446-1366





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