



# Cincinnati Children's Fetal Care Center

*Guide for Parents*



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*“We are here to provide you and your baby with personalized care, from the day of your diagnosis to the day you bring your baby home. Our Fetal Care Center is set up to provide outcomes that can change the path of your baby’s life.”*

**—MOUNIRA HABLI, MD**

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***We are here to provide hope. For you, for your baby, for the journey you're taking together.***

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As surgical director, I believe Cincinnati Children's Fetal Care Center is one of the best places in the world for mother and baby care.

Fetal surgery allows us to help babies affected by severe health conditions in a way that conventional therapy cannot. The Fetal Care Center team works hard to provide care resulting in the best possible outcomes for our patients. This care includes offering education, outreach and research for our families and the community.

We provide family-centered care as we evaluate and manage all types of fetal conditions. Our team is here for you, to ensure you truly understand your baby's condition and options for care. We educate the family about the condition's natural history, the risks and benefits of treatment options, expected long-term outcomes and any challenges the child may face.

The family is an integral part of a child's care team. That's why it's so important to include them in the child's management. We frequently see the positive impact of family involvement in a child's health.

At Cincinnati Children's, we celebrate some of the best outcomes in the country and the world for fetal and pediatric conditions.

In these pages, you'll find an overview of our capabilities and differentiated volumes and outcomes. We are one of a few comprehensive fetal care centers in the world, specially equipped to care for fetal conditions—and if you ask us, there's no better place.

All the best,

**Foong-Yen Lim, MD**

*Surgical Director*

*Cincinnati Children's Fetal Care Center*

When you need advanced care for your baby, we're here for you.

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*Before, during, and after delivery.*

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*At Cincinnati Children's Fetal Care Center, our innovative treatment options bring real hope to families. Led by physicians from Cincinnati Children's, TriHealth and University of Cincinnati Medical Center; we are dedicated to exploring the unique challenges that face each patient and unborn baby from diagnosis to delivery.*



# The Power of Collaboration

Cincinnati Children’s Fetal Care Center, a leader in innovation, research, and education, is a collaboration of three health organizations—Cincinnati Children’s, TriHealth and University of Cincinnati Medical Center. These organizations bring together extensive medical resources in a single setting, which allows our team to offer comprehensive care for mothers and babies facing the most complex fetal conditions or high-risk pregnancy and delivery.



## Cincinnati Children’s

The Fetal Care Center is located within Cincinnati Children’s, ranked in the top 5 in the nation in the *U.S. News & World Report’s* 2021-22 list of Best Children’s Hospitals. Fetal surgeons provide a complete range of fetal treatment and fetal surgery options, and neonatologists and pediatric specialists provide the highest level of care for your baby after birth.



## TriHealth

TriHealth provides expertise in maternal-fetal medicine (MFM), fetal intervention, obstetrics care, and manages our Special Delivery Unit located at Cincinnati Children’s. Independently, TriHealth is the region’s premier women’s health services provider including the area’s largest network of MFM specialists. TriHealth MFM specialists are highly regarded for quality, state-of-the-art care for moms and babies when complications arise during pregnancy.



## University of Cincinnati Medical Center

The University of Cincinnati Medical Center (UCMC) provides expertise in MFM, fetal intervention, and obstetrics care. UCMC is a leader in innovation, research and education for maternal-fetal medicine and is the first and only Level IV Regional Perinatal Health Care Center in Greater Cincinnati. Additionally, it is one of just seven Level IV maternity hospitals in Ohio, providing the highest and most specialized level of MFM care in the state.

# From Diagnosis to Delivery and Beyond

At Cincinnati Children's Fetal Care Center, we focus on comprehensive management of care. We involve subspecialists to guide your journey at every step, so you never have to worry about managing communication with different providers. We approach everything together as a team to determine the right plan of care for you and your baby—all based on your individual needs and feedback.

## The Continuum of Care

### 1. Diagnosis



### 3. Obstetrics



### 5. Beyond Delivery



### 2. Treatment



### 4. Delivery

# From Diagnosis to Delivery and Beyond



*“When families talk to a full range of specialists, they can make the most informed decision about the right procedure for the optimal outcome in their specific situation.”*

—JOSE PEIRO, MD, PhD



## Diagnosis

### One Team, One Visit

To help make your treatment as smooth as possible, our collaborative team offers the resources to conduct all the necessary initial testing and provides a definitive diagnosis and counseling plan during one visit to our center.

An early and accurate diagnosis is vital to clarifying the treatment plan for high-risk pregnancies and improving outcomes. Our specialists use a variety of high-tech tools to assess and diagnose fetal conditions including fetal ultrasound, fetal echocardiogram, and ultrafast fetal MRI.

We offer a 1- or 2-day comprehensive diagnostic testing and evaluation process, that culminate in a team consult which includes maternal-fetal medicine, fetal surgery, neonatology, and other subspecialists as needed based on your diagnosis (e.g. cardiology, neurosurgery, genetics, urology) to develop your individualized care plan.

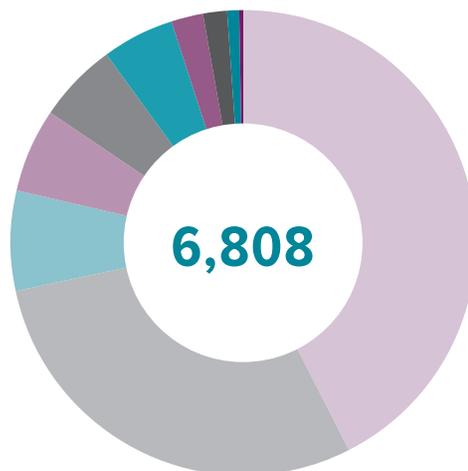
## Conditions We Treat

### Total High-Risk Pregnancy

**Evaluations . . . . . 6,808**

■ Twin-Twin Transfusion Syndrome (TTTS) . . . . .	<b>1,984</b>
■ Bladder Outlet Obstruction (BOO)/Posterior Urethral Valves (PUV) . . . . .	<b>482</b>
■ Myelomeningocele (MMC)/Spina Bifida . . . . .	<b>397</b>
■ Congenital Pulmonary Airway Malformation (CPAM) . . . . .	<b>367</b>
■ Congenital Diaphragmatic Hernia (CDH) . . . . .	<b>351</b>
■ Fetal Tumors . . . . .	<b>143</b>
■ Twin Reversed Arterial Perfusion (TRAP) Sequence . . . . .	<b>122</b>
■ Amniotic Band Syndrome (ABS) . . . . .	<b>62</b>
■ Chorioangioma . . . . .	<b>21</b>
■ Other . . . . .	<b>2,879</b>

\*Data from fetal patients cared for by Cincinnati Children's Fetal Care Center through June 30, 2020



# From Diagnosis to Delivery and Beyond



*“Each plan is personalized to provide the best possible outcomes for both mom and baby and is presented by one, comprehensive team in a single setting.”*

—DAVID MCKINNEY, MD



## Treatment

The Fetal Care Center offers the most current diagnostic capabilities and complete spectrum of treatment options to enhance the survival and long-term quality of life for babies with complex conditions. We offer innovative interventions, along with strong outcomes for the most complex conditions.

As one of only a few fetal surgery centers in the United States with the expertise to perform the full range of fetal surgical interventions, we house a dedicated fetal surgery unit at Cincinnati Children’s.

The operating rooms are specifically designed for open fetal surgery, minimally invasive fetoscopic surgery and complex ex-utero intrapartum treatment (EXIT) procedures. To ensure the best possible outcome, our unique design and inclusion of surgical equipment, medical video equipment, voice activation and image management solutions enable our surgeons to operate with the highest level of efficiency and communication.

## Procedures Performed

**Total Procedures . . . . . 1,857**

### Ultrasound-Based Procedures

■ Radiofrequency Ablation (RFA) . . . . . 122

### Surgical Procedures

■ Fetoscopic . . . . . 1,497

■ Open Fetal Surgeries (excluding EXITs) . . . . . 81

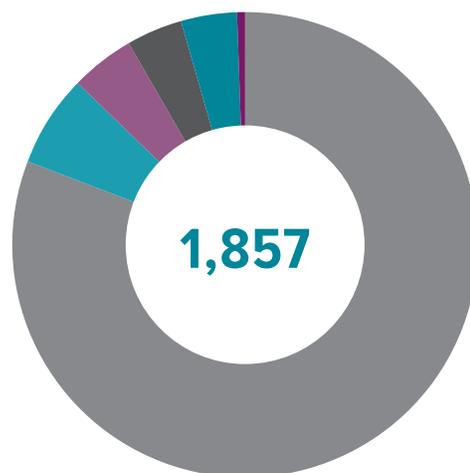
### Delivery Interventions

■ Cesarean with ECMO standby . . . . . 73

■ Ex-utero Intrapartum Treatment (EXIT) . . . . . 70

■ Delivery with Procedures on Placental Support . . . . . 14

\*Data from fetal patients cared for by Cincinnati Children’s Fetal Care Center through June 30, 2020

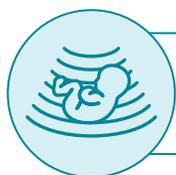


# From Diagnosis to Delivery and Beyond



*“When mom recovers next to baby, it increases the quality of the entire experience.”*

—JOSE PEIRO, MD, PhD



## Obstetrics

As our patient, you're able to transfer your routine obstetrics care to our center, and we can take care of everything for you through the time of your delivery. Along with frequent ultrasounds to check on the development of your baby, we'll assess your nutrition, safety, and health through every step of the process.

We will assess your and your baby's well-being to determine the plan and timing of your delivery.



## Delivery

If your baby needs advanced medical care or surgery right after birth, you may be able to deliver at our Special Delivery Unit (SDU). In collaboration with TriHealth, we staff a 6 bed SDU, where we deliver the most fragile babies, eliminating the need for transport immediately after birth. It's one of only a few birthing centers in the world located inside a pediatric hospital. It also means that you're able to recover right down the hall from your baby. This keeps you close to your newborn and eliminates worries about transporting your tiniest loved one between hospitals.

**Special Delivery Unit Deliveries . . . . . 310+**

# From Diagnosis to Delivery and Beyond



*“We offer the full package, starting from time of counseling and ending with long-term follow up for your child.”*

—FOONG-YEN LIM, MD



## *Beyond Delivery*

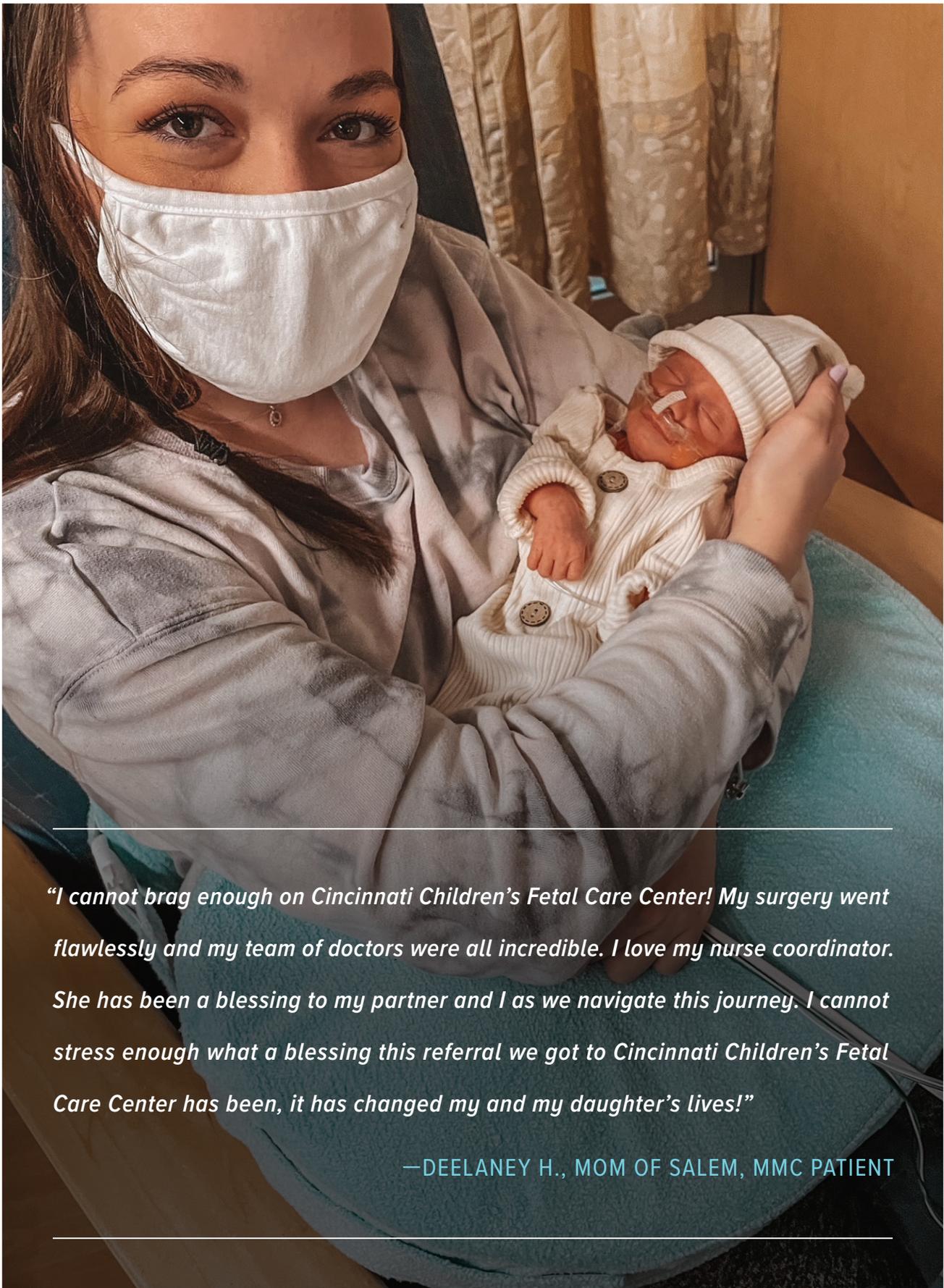
From the moment your baby is born, they are surrounded by the expertise, excellence, and exceptional care that only Cincinnati Children’s Newborn Intensive Care Unit (NICU) and Cardiac Intensive Care Unit (CICU) can offer.

Plus, your baby is born with the support of our top-ranked Neonatology, Pulmonology, and other subspecialist teams and programs such as Cardiology, Gastroenterology, and Neurology—ensuring that you receive some of the best care in the world. Specialists at Cincinnati Children’s have vast experience treating patients born with conditions with long-term effects such as congenital diaphragmatic hernia (CDH), bronchopulmonary dysplasia (BPD), and congenital heart defect (CHD).

## Long-term Care and Improved Outcomes

Cincinnati Children’s offers a magnitude of multi-disciplinary centers and clinics to support a range of complex fetal conditions. Our specialized, comprehensive services improve outcomes from delivery and beyond. A few of our programs that provide continuing care are:

- Neonatology Follow-Up Clinic
- Heart Institute
- Intestinal Rehabilitation Program
- Posterior Urethral Valves (PUV) Center
- Center for Spina Bifida Care



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*“I cannot brag enough on Cincinnati Children’s Fetal Care Center! My surgery went flawlessly and my team of doctors were all incredible. I love my nurse coordinator. She has been a blessing to my partner and I as we navigate this journey. I cannot stress enough what a blessing this referral we got to Cincinnati Children’s Fetal Care Center has been, it has changed my and my daughter’s lives!”*

—DEELANEY H., MOM OF SALEM, MMC PATIENT

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# Our Support Services

**Our family-centered care focuses on working together for the best possible outcome for you and your baby—and supporting you in that journey. Our dedicated teams offer comprehensive, family-centered psychosocial care for women, their partners, and their families. We recognize that every journey is unique and we'll work with you to customize support for your individual situation.**

## Concierge Services

We can help you plan your travel details, so you can focus on you and your baby's care. Whether you need help with travel before or after you arrive, we can make sure your time with us is as easy and comfortable as possible. While your family is here, we can help you with activities during your leisure time. We provide complimentary and discounted tickets to popular Cincinnati area attractions for patients and families who live outside the eight surrounding counties.

## Family Financial Aide

Our family financial advocates can help you navigate insurance, work through the Medicaid system, and answer any concerns you have regarding the financing of your care.

## Family Resource Center

As our patient, you and your family have access to our Family Resource Center, which provides a place to relax and get assistance with non-clinical amenities. Access our fully equipped computer lab, catch up on work in a private office, charge your phone, or read a book or watch TV by the fire.

## Psychologists

When patients are diagnosed with a medical condition there is usually a period of adjustment: First to the diagnosis itself and then to the intervention recommended to treat the diagnosis. Our expert teams of psychologists work to help families cope, and manage treatments and medication schedules in their busy lives.

## Ronald McDonald House (RMH)

Over 60% of our patients come from out of town, and relocation can be one of the first challenges that arise for families determining how to proceed with care. We can help. Cincinnati's Ronald McDonald House is the largest in the world—and it is located right across the street from the hospital. Offering meals, activities, and a community of compassion and support; The RMH provides out-of-town families a "home away from home" while you and your baby receive the care you need.

# Our Support Services



*“A high-risk pregnancy affects more than just the patient. Support Services are available to help the entire family navigate these difficult circumstances.”*

—HEATHER STRIEF, LISW-S

## Social Services

Our clinical social workers understand that managing any type of illness or hospitalization is a stressful experience. As members on every medical team, the clinical social workers provide ongoing support and counseling, crisis intervention, advocacy, education, and connection to community resources.

## Spiritual Support

The Department of Pastoral Care at Cincinnati Children’s offers spiritual guidance, or simply emotional support, to people of all faiths who are struggling with challenging medical conditions and decisions. Our chaplains and bereavement specialists are available to assist families on-site, 24 hours a day. We are knowledgeable about and sensitive to a variety of faiths and practices and we maintain strong relationships with local clergy and faith communities.

## Whole Person Care

The Child Life and Integrative Care team focuses on therapeutic, evidence-informed interventions that support the overall health and wellbeing for children and parents. These services of the Fetal Care program are included as part of your stay at Cincinnati Children’s and may include energy work, guided imagery/meditation, acupressure, mindfulness, and clinical massage therapy when clinically appropriate. Attention to specific family needs, including the developmental needs of siblings, are addressed to assist the family in adapting with the healthcare experience.

# Our Innovation, Your Hope

**Our team can perform advanced treatments and procedures that only a few fetal centers in the country can offer. These procedures offer benefits to both mom and baby. In some cases, they offer a chance at survival for the baby. In others, they provide a less invasive surgical option for mom with consistent outcomes for baby.**

**We perform a wide array of treatments for an even wider array of fetal conditions. Here are a few examples of the innovative interventions we offer:**

## **Carpediem™ Machine**

As one of the few centers in the world to offer this breakthrough technology, the Carpediem™ Machine provides dialysis in the newborn intensive care unit. Rather than modifying the adult machine like most other centers, our Carpediem™ Machine is designed for babies.

Our Nephrology Program is one of the best in the country—and we are one of a few centers that have a dedicated team managing newborn dialysis for our smallest patients. Our team provides care for the mother and baby from in-utero therapy to newborn dialysis, and finally, to transplant.

“With the addition of the new Carpediem™ dialysis machine, we have the ability to provide the most advanced and ideal forms of dialysis to infants who require this technology in the days and weeks after birth,” says Dr. Stefanie Riddle.

## **Fetoscopic Endoluminal Tracheal Occlusion (FETO) for Congenital Diaphragmatic Hernia (CDH)**

Cincinnati Children’s was one of the first places in the nation to offer this minimally invasive procedure that involves inserting a tiny balloon into the fetus’ trachea. Performed by one of the most skilled and experienced teams of physicians in the world, this offers babies with severe cases of CDH a real chance at survival.

“In severe cases of CDH, the survival rate ranges from less than 20% to 50%, but with FETO, we’re seeing a huge improvement in odds of survival,” said Dr. Foong-Yen Lim. “Right now, it looks like survival rates as high as 80–90% are possible, and we’re still learning.”

Watch our educational surgical animation video of the FETO procedure [here](#).

# Our Innovation, Your Hope



*“We’re pioneers of these approaches—and one of a few in the world that can do them.”*

—JOSE PEIRO, MD, PhD

## Fetoscopic Repair for Myelomeningocele (MMC)

We can do prenatal repairs for MMC while the baby is in utero. Our surgeons have considerable experience performing both open and fetoscopic fetal operations.

Prenatal surgery for MMC takes place between the 19<sup>th</sup> and 26<sup>th</sup> weeks of pregnancy. Unlike in the open surgery where the doctor makes an incision across the mother’s abdomen and opens the uterus, the fetoscopic procedure is much less invasive and aims to allow the same neurosurgical repair. Our team, including a neurosurgeon, removes the myelomeningocele sac, if one is present, and repairs the spinal defect in layers before closing the skin to protect the spinal cord from exposure to amniotic fluid.

“With the fetoscopic procedure, we aim to achieve the same positive newborn outcomes as with open surgery. Also, it’s much less risk with fewer potential complications for mom,” says Dr. Jose Peiro.

## Fetoscopic MMC by the Numbers

Total number of evaluations:

**400+**

Prenatal MMC repairs:

**100+**

Fetoscopic Prenatal MMC Repairs  
(2016+):

**40+**

Fetoscopic Prenatal MMC Repairs  
Delivering Vaginally (2016+):

**40%+**

\*Data from fetal patients cared for by Cincinnati Children’s Fetal Care Center through December 2020

# Fetal Diagnoses Treated

What's more impressive than our level of expertise is our success in treating these conditions. Here are some of the conditions we have the capacity and expertise to care for:



## Brain and Spinal Cord

- Arachnoid Cyst
- Dandy-Walker Malformation
- Encephalocele
- Hydrocephalus
- Myelomeningocele (MMC)/Spina Bifida
- Neuroblastoma
- Vein of Galen Aneurysm



## Chest

- Bronchopulmonary Sequestrations (BPS)
- Congenital Diaphragmatic Hernia (CDH)
- Congenital High Airway Obstruction Syndrome (CHAOS)
- Congenital Pulmonary Airway Malformation (CPAM)
- Pentalogy of Cantrell
- Pleural Effusions
- Pulmonary Agenesis



## Complications of Multiple Gestation

- Anomalies in Monochorionic Twins
- Conjoined Twins
- Selective Intrauterine Growth Restriction (IUGR)
- Twin Anemia Polycythemia Sequence (TAPS)
- Twin-Reversed Arterial Perfusion (TRAP) Sequence
- Twin-Twin Transfusion Syndrome (TTTS)



## Fetal Heart

- Complete Heart Block
- Heterotaxy Syndrome
- Hypoplastic Left Heart Syndrome (HLHS)
- Single Ventricle Anomalies
- Transposition of the Great Arteries

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The **Fetal Heart Program** at Cincinnati Children's is dedicated to taking a comprehensive and compassionate approach to pregnancy for mothers with a fetal diagnosis of heart disease before birth. And for babies who need surgical interventions after birth, the Heart Institute's top-tier cardiology and heart surgery program provides exemplary outcomes and advanced care for even the most complex cases.

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# Fetal Diagnoses Treated



*“Collaboration is at the heart of our approach. We encourage parents to participate in every aspect of their child’s care and we value their input.”*

—FOONG-YEN LIM, MD



## Gastrointestinal

- Duodenal Atresia
- Enteric Duplicational Atresia
- Esophageal Atresia
- Gastroschisis
- Imperforate Anus
- Intra-abdominal Cysts
- Omphalocele



## Kidney, Urinary, and Genital

- Bilateral Multicystic Dysplastic Kidney
- Bladder Exstrophy
- Bladder Outlet Obstruction (BOO)
- Cloaca
- Cloaca Exstrophy
- Hydronephrosis
- Obstructive Uropathy



## Skeletal

- Amniotic Band Syndrome (ABS)
- Skeletal Dysplasia



## Teratoma

- Cervical Teratoma (CT)
- Mediastinal Teratoma
- Pericardial Teratoma
- Sacrococcygeal Teratoma (SCT)



## Other

- Lymphangioma
- Oligohydramnios
- Trisomy 13
- Trisomy 18
- Trisomy 21
- Multiple Anomalies

# By the Numbers

We are at the forefront of innovations in fetal diagnostics and intervention therapies, and our experience and expertise show in our numbers and research. Though we care for the most complex fetal conditions, our outcomes are promising.

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## Fetal Diagnosis Volumes & Outcomes\*

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**1,800+**

**Fetal Procedures**

**6,800+**

**Patient Evaluations**

**~1,500**

**Fetoscopic Interventions**

\*Data from fetal patients cared for by Cincinnati Children's Fetal Care Center through December 2020

# By the Numbers



*“At Cincinnati Children’s, we celebrate some of the best outcomes in the country and world for fetal and pediatric conditions.”*

—FOONG-YEN LIM, MD

*We are the nation’s highest volume fetoscopic center.*

Conditions	Evaluations	Interventions	Facts
<b>TTTS</b>	<b>1900+</b>	<b>1200+</b> SFLPs	<b>91% survival</b> of at least 1 twin**
<b>MMC</b>	<b>400+</b>	<b>100+</b> Prenatal repairs	<b>3<sup>rd</sup> largest center</b> in the nation for MMC procedures performed
<b>CDH</b>	<b>350+</b>	<b>40+</b> FETO procedures performed by our fetal surgeons	<b>80% survival</b> for severe CDH post FETO
<b>BOO</b>	<b>480+</b>	<b>200+</b> Patients receiving intervention	<b>Innovative therapy options</b>
<b>CPAM</b>	<b>350+</b>	<b>50+</b> Fetal procedures	<b>95% survival rate</b>

\*\*All patients *including* placental insufficiency/growth restriction and patients with short cervix

# Our Team

Our Center is staffed by experienced, expert providers who are leaders in their respective fields. They will meet with you to help you understand your options, provide supportive care and non-directive counseling, and help set expectations for your journey. They work with your primary OB/GYN or maternal-fetal medicine specialist to formulate a collaborative plan of care.

**Our nationally-recognized team offers the experience and expertise to meet any need.**

## Fetal Surgery

- Foong-Yen Lim, MD
- Jose Peiro, MD, PhD
- Beth Rymeski, DO

## Maternal-Fetal Medicine Specialists

- Mounira Habli, MD
- Mallory Hoffman, MD
- Kara Markham, MD
- David McKinney, MD

## Neonatology

- Amil Allen, MD
- DonnaMaria Cortezzo, MD
- Alan Kenny, MD, PhD
- Paul Kingma, MD, PhD
- Emily Miller, MD, MS
- Amy Nathan, MD
- Stefanie Riddle, MD

## Radiology

- Rama Ayyala, MD
- Maria Calvo-Garcia, MD
- Beth Kline-Fath, MD
- Usha Nagaraj, MD

## Nursing

- Kim Burton, MSN, MBA, RNC-NIC
- Elizabeth Erickson, BSN, CPN
- Angela Ervin, BSN, CPN
- Erinn Goetz, BSN, RNC-OB
- Morgan Laumann, BSN, RNC-NIC
- Melissa Minges, BSN, CPLC
- Darlene Mokson, BSN, RNC-NIC
- Deah Wright, BSN, CPN

## Anesthesiology

- John Herrold III, MD
- Rupi Parikh, MD

# Our Team



*“Each member of the team brings something different to the table, but the one thing we all share is a passion for what we do.”*

—ERINN GOETZ, BSN, RNC-OB

## Cardiology

- James Cnota, MD
- Allison Divanovic, MD
- Eunice Hahn, MD
- Garick Hill, MD, MS
- Elisa Marcuccio, MD
- Christopher Statile, MD

## Developmental and Behavioral Pediatrics

- Jason Woodward, MD, MS

## Nephrology

- Donna Claes, MD
- Elif Erkan, MD, MS
- Stuart Goldstein, MD
- Meredith Schuh, MD

## Neurology

- Mark Schapiro, MD
- Cameron Thomas, MD, MS
- Marissa Vawter-Lee, MD
- Charulata Venkatesan, MD, PhD

## Neurosurgery

- Karin Bierbrauer, MD
- Charles Stevenson, MD

## Urology

- Michael Daugherty, MD
- William DeFoor, Jr., MD, MPH
- Eugene Minevich, MD
- Pramod Reddy, MD
- Andrew Strine, MD
- Brian Vanderbrink, MD

# Long-Standing Excellence

Cincinnati Children's Fetal Care Center is well-established and has been treating patients with complex fetal conditions for more than 15 years. In that time, we have evaluated more than 6,800 patients and performed more than 1,850 fetal surgical procedures.

Plus, when you choose our center, you're also choosing one of the top pediatric hospitals in the country.



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*“We are with families every step of the way to provide hope and outcomes that truly matter when faced with the most complex fetal diagnosis.”*

**—FOONG-YEN LIM, MD**



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[cincinnatichildrens.org/fetal](http://cincinnatichildrens.org/fetal)

