

# heart institute



THE CHOC CHILDREN'S HEART INSTITUTE OFFERS STATE-OF-THE-ART DIAGNOSIS AND TREATMENT FOR AN ENTIRE SPECTRUM OF CARDIAC CONDITIONS. OUR EXPERT TEAM OF BOARD-CERTIFIED PEDIATRIC CARDIOLOGISTS, SURGEONS AND INTERVENTIONALISTS SPECIALIZE IN OPEN-HEART AND MINIMALLY INVASIVE CARDIAC PROCEDURES. IN FACT, CHOC IS THE ONLY ORANGE COUNTY FACILITY TO PERFORM NEONATAL AND PEDIATRIC OPEN-HEART SURGERY AND CARDIAC CATHETERIZATION. WE PROUDLY OFFER ONE OF THE ONLY PEDIATRIC ELECTROPHYSIOLOGY PROGRAMS IN THE REGION AND A DEDICATED CARDIOVASCULAR INTENSIVE CARE UNIT WITH THE MOST ADVANCED BEDSIDE MONITORING EQUIPMENT AVAILABLE. THERE TRULY IS NO PLACE LIKE CHOC.



## BIG INNOVATIONS FOR TINY HEARTS

### Specialized Expertise

Children are not small adults and their health care needs, especially cardiac concerns, should be diagnosed and treated by specialists who understand the needs of children. Our nationally recognized cardiac experts were trained at some of the top programs in the nation and exclusively evaluate and treat newborns, infants, children, teens and young adults with all types of congenital heart defects, acquired heart disease and vascular problems, including:

- Aortic stenosis
- Arrhythmias
- Atrial septal defect
- Atrioventricular canal defect
- Cardiomyopathy
- Chest pain
- Coarctation of the aorta
- Dyslipidemia
- Heart failure
- Heart murmurs
- Hypertension (high blood pressure)
- Hypoplastic left heart syndrome
- Kawasaki disease
- Patent ductus arteriosus
- Pulmonary artery stenosis
- Pulmonary atresia
- Pulmonary hypertension
- Syncope (fainting)
- Palpitations
- Tetralogy of Fallot

- Transposition of the great vessels (arteries)
- Truncus arteriosus
- Vascular anomalies
- Ventricular septal defect.

### Cardiodiagnostics

The CHOC Children's Heart Institute is dedicated to providing the least invasive, most advanced cardiodiagnostic services available for heart-related problems in children. We offer traditional echocardiograms, as well as specialized 2D and 3D real-time resting, stress and sedated echocardiograms, transesophageal echocardiograms and fetal echocardiograms that can help provide prenatal cardiac diagnosis. In addition to the traditional ECGs, we offer Holter monitoring and cardiac event recording, as well as special pediatric electrocardiogram stress testing using a stationary bicycle or traditional treadmill and the ability to add pulmonary and metabolic testing as needed. In our cardiac catheterization labs we offer the very latest, minimally invasive diagnostic catheterization techniques and electrophysiological studies.

Our impressive imaging offerings are second to none. We offer low-dose X-ray and fluoroscopy specially calibrated for our young patients. We are the only hospital in Orange County to provide pediatric 3D CT and MRI heart imaging for diagnosing complex heart problems and planning for surgery. Our flash CT scan machine produces detailed images of the smallest vessels—even in infants—in a matter of seconds while using a very low dose of radiation. This incredible machine also allows our technologists to customize the scan according to a child's size and symptoms and to protect dose-sensitive organs.

## Surgical Services

CHOC is the only hospital in Orange County that performs newborn and pediatric open-heart surgery, and we have done so on infants weighing as little as 1.4 kilograms (3 pounds 1 ounce). The hospital's impressive offering of surgical services includes dedicated, cardiovascular operating rooms with extracorporeal life support, a life-saving technology not found anywhere else in the county.

The Heart Institute's surgical team includes board-certified, pediatrics-trained heart surgeons and cardiac anesthesiologists, all using the latest techniques to repair congenital heart defects in patients of all ages. We offer a full range of surgical procedures to correct congenital heart defects including:

- Arterial switch for transposition of the great vessels
- Norwood procedure for hypoplastic left heart syndrome
- Surgical repair for AV canal defect, tetralogy of Fallot, atrial septal defect (ASD) and ventricular septal defect (VSD).

CHOC has long been a leader in cardiac surgical care.

Dr. Richard Gates, CHOC surgeon-in-chief and medical director of the Heart Institute, was instrumental in the development of new systems that protect children's hearts during surgery and improve heart-lung machine technology. Although previously available for adults, Dr. Gates worked with industry leaders to develop techniques and instrumentations that could be used to bring cardiopulmonary bypass technology to children—including babies as small as 2 kilograms (4 pounds 6.5 ounces). The resulting technology is the pediatric myocardial protection system (MPS) that delivers oxygen to the heart during open-heart surgery. CHOC was the very first institution to offer this lifesaving technology that is now used in more than 60 institutions around the globe.

We are continuing to raise the standard of care and surgical outcomes for neonates undergoing open-heart surgery. Traditionally, a baby's body temperature is lowered to close to 18 degrees Celsius (approximately 64 degrees Fahrenheit) for surgeries including procedures to repair hypoplastic left heart syndrome, truncus arteriosus, arterial switch and transposition of the great vessels. Although this is a generally accepted practice around the world, lowering a baby's body temperature can lead to neurological damage that can have both short- and long-term consequences. At CHOC, we are dedicated to not only caring for each child's immediate health concerns, but their long-term health as well. Because of this, our surgeons have successfully pioneered surgical techniques that can be used to maintain a child's normal circulation and

body temperature during surgery. We are the only hospital in Southern California providing surgeries to neonates without cooling the child's body temperature and actively participate in research studies documenting the neurological benefits of these techniques. Moreover, our experts have presented these groundbreaking techniques to other pediatric surgeons from around the world at meetings and conferences for the Society of Thoracic Surgeons and the Congenital Heart Surgeons Society.



## INNOVATIVE PROGRAMS

At CHOC Children's we are dedicated to providing the life-saving equipment, technology, expertise and healing environment pediatric patients need. Our specialized programs go beyond traditional cardiac care to provide even the most fragile children and their families with personalized treatment plans and the peace of mind that comes with working with some of the country's most renowned pediatric cardiology experts.

**Extracorporeal Life Support Program:** CHOC is the only institution in Orange County to offer extracorporeal life support (ECLS). ECLS supports the heart and lungs by taking over the heart's pumping function and the lung's oxygen exchange until they can recover from injury or illness. CHOC helped pioneer this lifesaving technology as one of the first institutions to use it nearly 40 years ago. Today, we are one of 45 centers in the world to receive a three-year designation as an Extracorporeal Life Support Organization Center of Excellence and provide the only ECLS transport unit in Orange County. The state-of-the-art centrifugal pumps used with patients of all ages at CHOC are the latest form of ECLS technology and require less blood and have a lower risk of blood clotting than previous technology. Our dedicated ECLS team is composed of cardiothoracic and pediatric surgeons, intensive care and neonatal physicians, nurses, respiratory therapists and cardiopulmonary perfusionists who are experts in their fields and have received additional education to manage the complex equipment and medical needs of the children needing this life-saving technology.

**Lipid Clinic:** Since 2005, the Lipid Clinic has been caring for children who are at risk for developing heart disease because of genetic or acquired dyslipidemias. Using a multidisciplinary approach that includes an exercise educator, dietitian and cardiologist, patients receive ongoing medical monitoring three to four times per year, as well exercise and lifestyle recommendations with expert meal planning based on each

patient's specific lipid imbalances and, in some cases, drug therapy when indicated.

**Pulmonary Hypertension Clinic:** Children with primary and secondary pulmonary hypertension have very specific needs. In order to make it easier for these medically fragile children to access this care, our Pulmonary Hypertension Clinic provides families with the opportunity to undergo tests like echocardiograms, electrocardiograms and pulmonary function tests, and meet with their pulmonologist and cardiologist, all in one clinic visit. By teaming together at each appointment, the cardiologist and pulmonologist work to come up with and maintain the very best short- and long-term treatment plans for each child.

**Pacemaker and Implantable Cardioverter Defibrillator Program:** CHOC offers one of the largest pediatric pacemaker and implantable cardiac defibrillator (ICD) programs in the region. We work with patients and families throughout Southern California and beyond to treat and monitor children who need a pacemaker or ICD. Once a device has been inserted, we provide peace of mind with our remote monitoring program. Our specialists are able to monitor each patient's defibrillator, battery supply, wire integrity and much more without the patient ever having to leave the comfort of home by using a special wireless connection and the Internet. Devices are monitored every one to three months or even more frequently if requested by the child's caregiver. Our specialists are even able to monitor a patient's device if they have left the state or country while on vacation or away at college.

**Sports Cardiology Program:** To address the growing incidence of sudden cardiac arrest in young athletes, the Heart Institute collaborates with the Orange County Department of Education to provide the Life-Threatening Events Associated with Pediatric Sports (LEAPS) program at local high schools. CHOC's pediatric cardiologists work one-on-one with school coaches, staff and students to educate them on heart conditions and offer electrocardiogram screenings to identify athletes at risk.



### Cardiac Catheterization

The Heart Institute offers one of the largest pediatric cardiac catheterization programs in Southern California. We provide cardiac catheterization to patients of all ages—from newborns to young adults—in two state-of-the-art laboratories. Our cath labs are outfitted with the very latest technologies designed specifically to diagnose and treat children and are staffed by a dedicated team of expert nurses and technicians. Cardiac catheterization can be used to diagnose and treat congenital heart problems, acquired cardiac disease and arrhythmias. It can provide invaluable information that other tests cannot match.

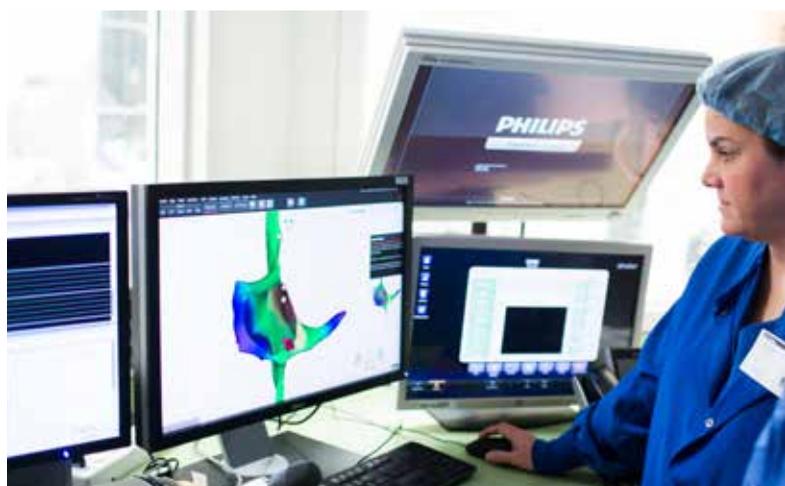
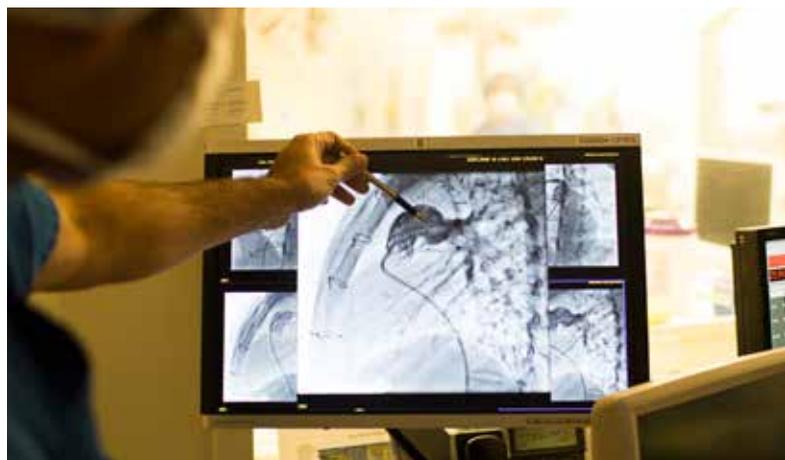
Among the number of treatment options available through cardiac catheterization is the Melody® Transcatheter Pulmonary Valve that offers children with failing pulmonary valve conduits an alternative to open-heart surgery. Other tests and treatments include:

- Right and/or left heart catheterization
- Diagnostic angiography
- Transcatheter valve replacement
- Intracardiac echocardiography
- Intravascular ultrasound
- Endomyocardial biopsy
- Loop recorder placement
- Hybrid cardiac procedures
- Percutaneous cardiac intervention including closure of atrial septal defect (ASD) and ventricular septal defect (VSD), patent foramen ovale (PFO), patent ductus arteriosus (PDA), balloon angioplasty or valvuloplasty, closure of collateral vessels, balloon/blade septostomy and stent placement.

### Electrophysiology Services

CHOC Children's is a leader in the detection and treatment of arrhythmias in children with comprehensive noninvasive and invasive electrophysiological services. When a child is diagnosed with an arrhythmia, our electrophysiology team offers a variety of research-based diagnostic and treatment options for children of all ages—from babies still in the womb to young adults.

Our skilled physicians, nurse practitioners, nurses and technicians specialize in electrophysiology and have the skills and equipment necessary to diagnose and treat the most complex heart rhythm cases. As a leader in this field, CHOC was one of the first hospitals in the United States to perform radiation-free electrophysiological studies and cardiac catheter ablation. Today, we are the only institution in Orange County to perform



this revolutionary form of electrophysiological assessment on children and eliminate 95 percent of upper chamber arrhythmias in the more than 100 patients we treat each year.