Division Photo


Division Data Summary

Research and Training Details

<table>
<thead>
<tr>
<th>Category</th>
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<tr>
<td>Number of Faculty</td>
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<td>Number of Research Fellows</td>
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Clinical Activities and Training

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<td>Outpatient Encounters</td>
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Faculty Members

Thomas Kulik, MD, Professor; Director, Division of Cardiology
Research Interests: Pulmonary Hypertension

Robert Beekman, MD, Professor
Research Interests: Cardiac Catheterization & Intervention, Quality Improvement, Coarctation of the Aorta

D. Woodrow Benson, MD, PhD, Professor; Co-Director Fellowship Program; Director, Cardiovascular Genetics
Research Interests: Cardiovascular Genetics
William Border, MD, Assistant Professor Clinical
Research Interests: Diastolic Function and Exercise Performance in Single Ventricle Patients.

Randal Claytor, PhD, Adjunct Associate Professor

James F. Cnota, MD, Associate Professor Clinical
Research Interests: Fetal Cardiology

Linda H. Cripe, MD, Associate Professor Clinical
Research Interests: Cardiomyopathies, Neuromuscular Disorders, Echocardiography

William Gottliebson, MD, Assistant Professor Clinical; Director, MRI Cardiology
Research Interests: Cardiac MRI techniques to evaluate myocardial function, synchrony, and energetics.

Robert B. Hinton, MD, Assistant Professor
Research Interests: Cardiovascular Genetics & Developmental Biology

Russel Hirsch, MD, Associate Professor Clinical; Director, Cardiac Catheterization Lab
Research Interests: Cardiac Catheterization & Intervention, Device Development

Kan Hor, MD, Assistant Professor Clinical
Research Interests: MRI technology to diagnose and follow heart disease, in particular DMD cardiomyopathy.

Holly M. Ippisch, MD, Instructor Clinical
Research Interests: Echocardiography, preventative cardiology and pediatric obesity.

Thomas R. Kimball, MD, Professor; Director, Cardiac Ultrasound; Director, Cardiovascular Imaging Core Research Lab
Research Interests: Echocardiography, Ventricular function, Cardiovascular Effects of Obesity and Type II Diabetes.

Shelley Kirk, PhD, Assistant Professor Clinical
Research Interests: The efficacy, safety and feasibility of interventions for the management of pediatric obesity.

Timothy Knilans, MD, Associate Professor Clinical; Director, Electrophysiology & Pacing
Research Interests: Identification and risk stratification of causes of sudden death.

Catherine Krawczeski, MD, Associate Professor Clinical; Director, CICU
Research Interests: The effects of cardiopulmonary bypass and postoperative physiology on extra-cardiac organ systems in the pediatric cardiac surgical patient.

Angela Lorts, MD, Assistant Professor Clinical
Research Interests: Heart failure and myocardial remodeling

Bradley S. Marino, MD, Associate Professor
Research Interests: Outcomes Research

Richard A. Meyer, MD, Adjunct Professor
Research Interests: Adult Congenital Heart Disease and Marfan/EDS

Erik Michelfelder, MD, Associate Professor Clinical; Director, Fetal Cardiology
Research Interests: Fetal Cardiology and Echocardiography

Robert Spicer, MD, Professor Clinical; Co-Director Fellowship Program; Medical Director, Cardiac Transplantation Program
Research Interests: Heart Failure Transplant

Elaine Urbina, MD, Associate Professor
Research Interests: Relating non-invasive vascular measures of carotid ultrasound, arterial stiffness and endothelial function to conditions such as CV risk factors, obesity, diabetes, renal disease and sleep disorders.

Karen Uzark, PhD, Associate Professor Clinical; Director, Cardiac Process Improvement & Clinical Effectiveness
Research Interests: Heart Transplant, Quality of Life, Outcomes in Children with Heart Disease

Joint Appointment Faculty Members

Jeanne James, MD, Research Associate Professor
Molecular Cardiovascular Biology
Molecular cardiology and animal models of cardiac disease.

Clinical Staff Members

Lisa Lee, MD
Trainees

- Jeff Anderson, MD, PL6, UNC Hospital, Chapel Hill, NC
- Allison Divanovic, MD, PL6, Cincinnati Children's Hospital/University of Cincinnati
- Haleh Heydarian, MD, PL6, Columbus Children's, Columbus, OH
- Michael Alice Moga, MD, PL6, Massachusetts General Hospital, Boston, MA
- Priya Sekar, MD, PL6, Children's Hospital, Oakland, CA
- Jamie Sutherell, MD, PL6, Washington University/St. Louis Children's, MO
- John Hambrook, MD, PL5, Eastern Virginia Medical School, Norfolk, VA
- David Crowley, MD, PL4, Barbara Bush Children's Hospital, Portland, ME
- Sean Hagenbuch, MD, PL4, Baystate Medical Center, Springfield, MA
- Steven Kindel, MD, PL4, Children's Memorial Hospital, Chicago, IL

Significant Accomplishments in FY08

The Hybrid Cardiac Catheterization Suite at Cincinnati Children's Hospital Heart Institute.

Since the inception of the hybrid catheterization suite at Cincinnati Children’s Hospital in February of 2007, 45 hybrid procedures have been completed successfully. These procedures have involved either the simultaneous use of both catheterization and surgery, or staged use, with surgery following on the catheterization procedure, or vice-versa. During the same period, 18 combination procedures, involving cardiac catheterization and an additional, non-cardiac surgery related procedures (such as bronchoscopy, etc.) have also been completed. Those procedures, in effect, have saved the risk of transporting infants or children to other sites in the hospital while under anesthetic, and in many cases, have saved patients undergoing additional general anesthetic procedures.

Highlights of the hybrid catheterization program at the Heart Institute have included the following:

Care of newborn infants with ante-natal diagnosis of congenital heart disease incompatible with sustained life after birth. On three separate occasions, Cesarean delivery was performed in one hybrid catheterization room, allowing immediate transfer to the other hybrid room where neonatal intervention could take place successfully.

Staged atrial septal defect closure. In those patients in whom the atrial level defect was deemed to be difficult to close percutaneously, and in fact was unsuccessful after multiple attempts, the cardio-thoracic surgery team performed immediate surgery to repair the defect. This family centered approach decreases the risk to the patient, precludes the need to undergo another general anesthetic, and greatly increases family convenience. No other center in the United States offer this service to families.

Neonatal hybrid interventions. The hybrid catheterization facility has allowed the Heart Institute to perform neonatal interventions which have combined both the diagnostic and therapeutic elements in the same setting for the highest risk patients. On seven occasions, neonates have had combined procedures, avoiding multiple staged procedures and transportation that would have been previously necessary. Three of those procedures involved cardio-pulmonary bypass, and one, extra-corporeal membrane oxygenation support.

Pacemaker and Automatic Internal Cardiac Defibrillator Placement: The hybrid catheterization suite has become the main location for surgical placement of these devices.

General diagnostic and interventional catheterization. For the academic year ending July 2007, 496 total cath lab procedures were completed with a procedural mortality of less than 1%. This is well below accepted national standards for catheterization associated mortality.

Local and international exposure of the hybrid catheterization suite has been as follows:

Pediatric Interventional Cardiac Catheterization Symposium (PICCS). In July of 2008, the hybrid suite was featured with three satellite transmissions of live cases to that symposium. The audience was an international body of more than two-hundred and fifty interventional pediatric cardiologists from around the world.

Channel 5 News Broadcast. A local broadcast featuring two children who have recently undergone successful procedures in the hybrid suite. One of those cases involved Cesarean delivery and immediate neonatal intervention as described above.

Publications: Two publications, one of which describes the planning, design prerogatives and the functionality of the hybrid catheterization suite, and the other the utility of the facility for immediate neonatal interventions, have been published in one of the major peer-reviewed interventional catheterization journals.
Quality of Life Assessment in the Pediatric Cardiac Population:

Primary Investigator: Bradley S. Marino, MD, MPP, MSCE

Co-investigators: Dennis Drotar, PhD, Richard Ittenbach, PhD, Peter Margolis, MD, PhD, Michael Seid, PhD, Robert Beekman, MD

Congenital heart disease (CHD) is the most common defect in children. Over the last several decades, new surgical techniques and advances in cardiopulmonary bypass (CPB), intensive care, cardiac catheterization, heart transplantation, imaging modalities, and medical therapies have improved survival and prolonged the lives of children and adolescents with CHD. Operative mortality for children with the most complex CHD is now less than 10%. This has changed the focus of clinical research on the pediatric cardiac population from short-term surgical survival to the assessment of short- and long-term morbidity. The hemodynamic effects of the specific heart defect and the medical and surgical therapy received by the child can result in significant morbidity. The child’s neurodevelopmental, psychosocial, and physical functioning are impacted by these morbidities and may adversely affect the child’s quality of life (QOL).

Quality of life refers to the impact of a specific illness or medical therapy on the ability of the child to function in situational contexts (e.g., family, school, peers) and to draw personal satisfaction from a physical, psychological, and social functioning perspective. In the past, quantitative assessment of QOL in the pediatric cardiac population has been limited due to the wide age range of children, varying and developing neurodevelopmental and psychosocial capabilities, the variety of underlying disease processes and treatment modalities, and the spectrum of outcomes. Disease specific QOL instruments are more comprehensive for a specific disease, more sensitive to change in condition over time and a better discriminator of differences in subgroups within a disease category. Existing disease-specific pediatric cardiac instruments were limited by lack of patient and parent reporting, narrow age range, inadequate generalizability data, and poor discrimination between subgroups in the pediatric cardiac population.

To address the limitations, our research team developed the Pediatric Cardiac Quality of Life Inventory (PCQLI) in 2004. The PCQLI is a self-administered, reliable and valid, disease-specific questionnaire that quantitatively assesses health-related QOL in children (age 8-12) and adolescents (age 13-18) with congenital and acquired heart disease. Over the last four years, this tool has undergone extensive reliability, validity, and generalizability testing in a multi-center, multi-national testing trial at 11 centers in the United States and 3 centers in the United Kingdom. To date, over 1,500 patients and their parents (>3,000 respondents) have participated in this study. This study is currently funded by an NICHD K23 award (PI: Brad Marino, MD) and by a local CCHRF grant award.

Data from the PCQLI Testing Trial has shown that higher disease complexity is associated with lower QOL score in the CHD population and that increasing medical care utilization is associated with a lower QOL. However, the analysis also showed that QOL score varied significantly within specific diagnostic sub-groups in the CHD population. Given the variability in QOL score, our team tested for demographic and medical predictors of QOL, and found that they account for only a small portion of the variability in QOL scores in these children. We hypothesize that neurodevelopmental, psychosocial, and physical functioning morbidity factors account for some of this unexplained variability in QOL score. Currently, we are conducting a study looking at how specific psychosocial morbidity factors (post-traumatic stress disorder symptomatology, trait anxiety, parental stress, and family functioning) mediate the association between CHD complexity and QOL score. In addition, we are initiating a study to assess the association between neurodevelopmental outcome (intelligence; academic achievement; neuropsychological functioning) and QOL. The overall, long term goal of our research team is to develop and test comprehensive biological (e.g. cardiovascular anatomic, hemodynamic, physical functioning, and surgical variables), neurodevelopmental, and psychosocial models that will reveal modifiable predictors of lower QOL in children with CHD, and to create new early opportunities for prevention and intervention to improve QOL for children and their families.

Significant Publications in FY08


This study demonstrated that HLHS is due almost entirely to genetic factors and is a severe form of valve malformation.

In this study, detailed fetal echocardiography revealed that significant fetal cardiovascular abnormalities can be present, even in the early stages of twin-twin transfusion syndrome. This data underscores the importance of cardiovascular pathophysiology in the natural history of twin-twin transfusion syndrome, and suggests an important role for fetal echocardiography in the diagnosis and serial evaluation of twin gestations complicated by twin-twin transfusion.


This manuscript described the development of the Pediatric Cardiac Quality of Life Inventory (PCQLI), a new disease specific quality of life (QOL) measure that quantitatively assesses QOL in children and adolescents with congenital and acquired heart disease. The questionnaire has a Child Form (Age 8-12 years) and an Adolescent Form (Age 13-18 years) with parent proxy reporting.


In this paper, we explored the effect of obesity and insulin resistance on arterial stiffness in a healthy school aged cohort. We found that overweight led to a reduction in brachial artery distensibility which was further compromised by the addition of hyperinsulinemia. Therefore, development of obesity and pre-diabetes leads to vascular dysfunction well before the onset of overt type 2 diabetes.

Division Publications


35. Dorfman AT, Marino BS, Wernovsky G, Tabbutt S, Ravishankar C, Godinez RI, Priestley M, Dodds KM, Rychik


Grants, Contracts, and Industry Agreements

Grant and Contract Awards

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<td>SCCOR in Pediatric Heart Development and Disease</td>
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<td>Genetic Mechanisms of Cardiac Disease in the Young</td>
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**Current Year Direct** $3,209,755

**Industry Contracts**

Cripe, L
MedImmune Inc. $35,779

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<td>Sankyo Pharma Inc.</td>
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Current Year Direct Receipts: $56,064

Total: $3,265,819