

Focusing on Congenital Heart Disease



THIS EDITION OF

The Sanger Report takes an in-depth look at congenital heart disease (CHD), focusing on both children and adults who have this condition. As a result of successful

surgical and interventional programs, there are now more adults than children living with CHD.

In this issue, Donald A. Riopel, MD, our first chief of pediatric cardiology, and J. René Herlong, MD, offer an overview of the pediatric cardiology program at Sanger Heart & Vascular Institute (SHVI).

Dr. Riopel describes how the program has grown over the past year with the addition of a congenital heart surgeon, pediatric intensivists and pediatric interventional cardiologists. The expansion of our program furthers the development of a world-class pediatric cardiology and cardiovascular surgery program at Levine Children's Hospital (LCH).

We also highlight our successful cardiac screening program called "Heart of a Champion Day." SHVI co-sponsors this annual event, which offers comprehensive cardiac and physical examinations to local students who wish to participate in school athletic activities.

Benjamin B. Peeler, MD, chief of our congenital heart surgery program, discusses adult CHD and the health issues that are associated with this condition. The increased success in treating CHD over the years has created a group of adults who have unique

anatomic and physiologic characteristics, challenging the physicians who care for them. Specialized groups of healthcare providers have evolved to deal with these often-complex medical issues.

The close proximity of LCH to Carolinas Medical Center has created an ideal environment to care for CHD patients. Pediatric and adult cardiologists and cardiovascular surgeons are able to collaborate, which can only improve the care we provide right here in Charlotte.

Richard S. Musialowski Jr., MD, an adult cardiologist with expertise in CHD, reports on young adults who have this condition. He examines the difficulties associated with caring for these patients and the importance of having an integrated team of pediatric and adult cardiologists and surgeons in place, who can work together to offer the best possible care.

I hope you find this edition of *The Sanger Report* interesting and enlightening. Although CHD isn't as common as some of the other conditions we've discussed in previous issues, caring for CHD patients can be quite demanding, and we hope this information will help you in your practice.

Sincerely,

Paul G. Colavita, MD, FACC
President
Sanger Heart & Vascular Institute

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Sanger Heart & Vascular Institute

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Cardiac Care from Birth to Adulthood

[L] **Donald A. Riopel, MD, FACC**

Pediatric Cardiologist

[R] **J. René Herlong, MD, FAAP, FACC**

Pediatric Cardiologist

THE PEDIATRIC CARDIOLOGY

program at Sanger Heart & Vascular Institute (SHVI) integrates medical and surgical care to create innovative solutions for our smallest patients. Focused on creating and optimizing care tailored to the unique challenges of congenital heart disease, SHVI's pediatric team continues the traditions established over 50 years ago by Paul Sanger, MD, and Frances Robicek, MD, when they performed the first "blue baby" procedure in western North Carolina.

The concept of tailored care rings true for patients who have complex congenital

heart disease, as each child's anatomy is unique to him or her—care protocols don't apply here. Nonetheless, data-based outcomes are a central theme to the pediatrics team, and a comprehensive outcomes-based perspective is strongly utilized.

From the pediatric heart transplant center to our surgical expertise in the repair of congenital heart defects and the adult-congenital heart program, SHVI is equipped to care for people of all ages with differing levels of complexity.

As one of the most comprehensive pediatric cardiology programs in

the United States, SHVI offers subspecialties in:

- ▶ advanced cardiac imaging, including 3-D echocardiography and cardiac MRI
- ▶ pulmonary hypertension
- ▶ catheter-based interventions for congenital heart disease
- ▶ cardiac electrophysiology
- ▶ fetal cardiology
- ▶ lipid disorders
- ▶ cardiac transplantation

To learn more about how our health-care team can help your patients, call **877-999-SHVI (7484)**. ■

Sanger Heart & Vascular Institute Awards

▶ SHVI Physicians at CMC and CMC-Mercy Earn NCDR® ACTION Registry®-GWTG™ Gold Performance Achievement Award

Carolinas Medical Center (CMC) and CMC-Mercy have received the American College of Cardiology Foundation's NCDR ACTION Registry-GWTG Gold Performance Achievement Award for 2010 — two of only 135 hospitals nationwide to do so. The award recognizes the hospitals' commitment and success in implementing a higher standard of care for heart attack patients, and signifies that CMC and

CMC-Mercy have reached an aggressive goal of treating coronary artery disease patients with 85 percent compliance to core standard levels of care outlined by the American College of Cardiology/American Heart Association clinical guidelines and recommendations.

▶ Sanger Physicians to Participate in EXCELL Study

SHVI has been selected to participate in the EXCELL study for the treatment of left main coronary disease. The selection process was stringent as only 125 sites were selected out of more than 400 that

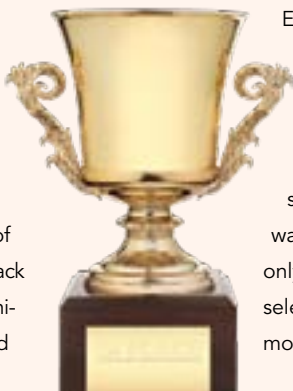
applied. R. Mark Stiegel, MD, and Michael J. Rinaldi, MD, will serve as site co-principal investigators.

Enrolled patients with left main coronary artery disease will be randomized to CABG or unprotected LMCA DES. Currently, LMCA stenting is considered a class 2b indication in patients with acceptable surgical risk. The SYNTAX study, which randomized patients with LMCA and multivessel CAD to CABG or DES, showed that patients with low or moderately complex anatomy (SYNTAX scores ≤ 32) had similar one- and two-year outcomes with LMCA stenting vs. CABG, compared with higher anatomic complexity (>32) where CABG was superior. Long-term outcomes remain to be established

for DES in LMCA disease. Thus clinical equipoise may exist and this is an important area for further study.

▶ Former Heart Group Joins Sanger Team

Heart Group of the Carolinas, with offices in Concord and Albemarle, merged with Sanger Heart & Vascular Institute effective Sept. 1. The practice will operate under the SHVI name, although office locations will not be affected. Physicians continue to see existing patients and new patients will be accepted. The staff includes 10 physicians, six mid-level providers and 48 staff members, including clinical staff, cardiac imaging technicians, cardiac nuclear medicine technicians and exercise specialists. ■





Pediatric Cardiac Care Update

Donald A. Riopel, MD, FACC
Pediatric Cardiologist

THE DIVISIONS OF PEDIATRIC

Cardiology and Pediatric Cardiac Surgery are pleased to welcome several new healthcare professionals and new services that are available at Sanger Heart & Vascular Institute (SHVI).

CARDIAC SURGERY

In November 2009, **Benjamin B. Peeler, MD**, from the University of Virginia, joined surgeon **Larry T. Watts, MD**, and he serves as the chief of the Pediatric Cardiac Surgery Division.

Also within the surgical arena, we welcome **Kshitij Mistry, MD**, and **Lauren Piper, MD**, who join us from Duke University. They, along with **Yuliya Dominina, MD**, serve as our pediatric cardiac intensivists.

Our pediatric cardiac nurse practitioners **Erica Wintering, RN, CRNP**, **Erin Dugan, RN, CRNP**, and **Mark Moore, RN, CRNP**, assist the surgeons and intensivists in the postoperative care of patients in the Pediatric Cardiovascular Intensive Care Unit. **Kari Crawford, RN, CRNP**, a nurse practitioner from Bowman Gray School of Medicine, joined us in June and will work on the hospital unit that is dedicated to pediatric cardiac patients. She is experienced in running a pulmonary artery hypertension (PAH) clinic and will be an important contributor to Pediatric Cardiology's PAH clinic that is headed by **Andrew S. Bensky, MD**, and **Allen Harsch, MD**, a pediatric pulmonologist from Carolinas Medical Center-NorthEast.

INTERVENTIONAL MEDICINE

On Sept. 1, we welcomed **Joseph Paolillo, MD**, from the University of Florida, as our pediatric interventional cardiologist. He has been in charge of their catheterization lab for the past three years.

Joel Lutterman, MD, from Le Bonheur Children's Hospital in Memphis, will be joining us in early October. Dr. Lutterman will function mainly as a pediatric cardiac hospitalist. He's also an interventionalist and, together with Dr. Paolillo, will round out the Interventional Division.

IMAGING

J. René Herlong, MD, joined us from Duke University three years ago. Dr. Herlong, **A. Resai Bengur, MD**, Dr. Bensky and **Lisa R. Klein, MD**, form the core of our Imaging Division. An expanding part of imaging is fetal echocardiography, which requires specialized sonographers. Cardiac MRI is another area of Dr. Herlong's expertise.

SATELLITE OFFICES AND SPECIAL CLINICS

We have two permanent pediatric cardiologists outside of our main campus: Dr. Klein, in Hickory, and Dr. Bengur, at CMC-NorthEast. Dr. Klein serves SHVI satellite offices in Boone and Rutherfordton. Dr. Bengur attends satellites in Salisbury and Davidson.

Nicholas B. Sliz Jr., MD, and I attend satellites in Rock Hill, Fort Mill, Ballantyne, Indian Trail, Gastonia

and Shelby. We also hold a lipid clinic several times a month, along with our contracted nutritionist **Betty Fleming** and **Melissa Day, NP**, office nurse practitioner. In this clinic, we treat children with lipid problems.

Richard (Tom) Smith Jr., MD, our pediatric electrophysiologist, in addition to ablating dysrhythmic pathways, also runs our transplant section and performs a large share of cardiac catheterizations.

Our growing Adult Congenital Clinic is staffed by **Geoffrey A. Rose, MD**, **Richard S. Musialowski Jr., MD**, and myself.

CONFERENCES

This fall, we hosted the Annual Southeastern Pediatric Cardiology Society Meeting held Sept. 23–25. ■





Heart of a Champion Day

Nicholas B. Sliz Jr., MD, FACC

Pediatric Cardiologist

Contributing author: Robin Leahy, RN, BSN, CCDS, FHRS

Cardiac Rhythm Device Management



ON SATURDAY, JUNE 5, THE THIRD annual Heart of a Champion Day was held on the main campus of Carolinas Medical Center. More than 1,000 student-athletes from the Charlotte-Mecklenburg school system participated in the program, which was supported by Sanger Heart & Vascular Institute's (SHVI's) Division of Pediatric Cardiology.

A UNIQUE PROGRAM

Student-athletes received advanced cardiac screening and traditional general medical, vision and orthopaedic (musculoskeletal) exams. The cardiac screening component included blood pressure readings, 12-lead ECGs and echocardiograms.

Conventional sports screenings may not reliably detect heart conditions such as long-QT syndrome, hypertrophic cardiomyopathy and congenitally abnormal coronary arteries—potentially life-threatening conditions that can affect an athlete's ability to participate in sports.

More than 80 students were identified as needing further evaluation and/or treatment. Several were found to have orthopaedic or general medical conditions such as:

- ▶ possible fractures and tendon ruptures
- ▶ uncontrolled or previously unknown elevated blood pressure
- ▶ uncontrolled asthma
- ▶ potential eating disorders
- ▶ unresolved concussions
- ▶ significant visual impairments

Approximately 12 students required further cardiac evaluation and were cleared to partake in their respective sport(s).

The program's success is made



One of the many student-athletes who received an echocardiogram at Heart of a Champion Day.



A student is prepared for a 12-lead ECG by a healthcare volunteer at the event.

possible through the efforts of roughly 400 volunteers, including physicians, nurses, technicians and support staff from SHVI and across Carolinas HealthCare System (CHS), who donate their time and expertise. The CHS portion of this

program represents a community benefit exceeding \$1.5 million.

Plans for the fourth annual Heart of a Champion Day will begin in early 2011. To learn more, call **877-CMC-SPORTS (877-262-7767)**. ■



Congenital Heart Disease

Benjamin B. Peeler, MD, FACS
Pediatric Cardiac Surgeon

DURING THE LAST DECADE, THE number of adults with congenital heart disease (CHD) has begun to exceed the number of children with CHD. This is in stark contrast to the situation prior to the 1980s, at which time children with complex CHD were not expected to survive into adulthood. Advances in surgery, echocardiography, interventional cardiology, perioperative care and the use of prostaglandins beginning in the 1980s led to a dramatic fall in mortality. Complex repairs early in the neonatal period and infancy have replaced palliative operations at later ages in many cases. The results of staged palliation for single ventricle lesions have vastly improved as well. During the advent of surgical treatment in the 1950s, mortality rates greater than 50 to 60 percent were usual, while 50 years later; the rate of survival is greater than 90 percent in most hospitals. Today, more than 85 percent of children born with CHD are expected to survive into adulthood.

TREATING ADULTS WITH CHD

With the increased success in treating CHD, a challenging group of adults with unique anatomy and physiology, along with

the usual effects of aging, has been created. While in some cases surgical treatment of CHD in children has been curative, with an appropriately connected two-ventricle circulation without septal defects, a large proportion of patients have been treated with palliative operations as their best treatment option.

Due to the significant evolution in our understanding of CHD and its surgical treatment in the last 50 years, there are many patients now entering adulthood who have had repairs that by current practice would be considered historical, as they are rarely performed. One example is the Mustard procedure for transposition of the great arteries. Additionally, another 10 percent of congenital heart defects are not discovered until adulthood.

These patients present unique challenges, and their best care requires a bridging of pediatric and adult medical and surgical care. Studies show that surgical care is best provided by congenitally trained cardiac surgeons in medical centers with expertise in caring for adults who have CHD. As this group of patients ages, however, the usual comorbidities associated with aging become a more important

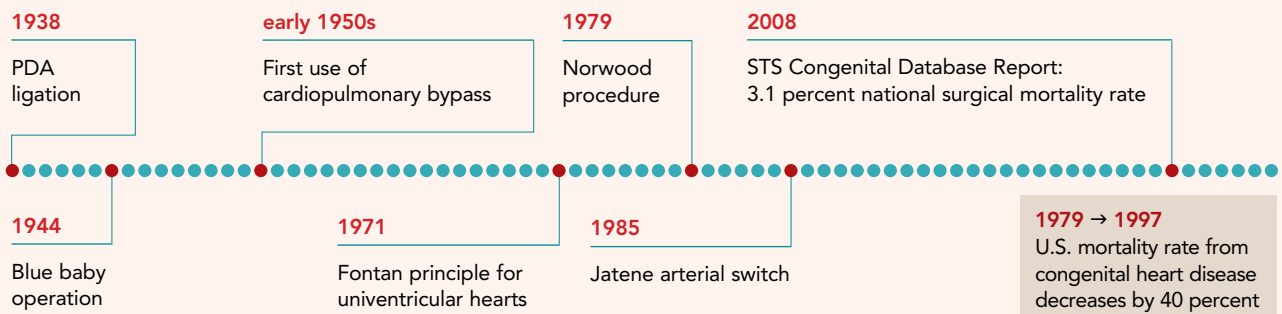
aspect of their care. Specialized groups of providers are evolving to deal with these complex medical issues.

SPECIALTY CARE A MUST

Despite the complexity of the medical and surgical treatment of adults with CHD, the current results are excellent. While superior survival rates have been achieved with improvements in largely pediatric subspecialties, the development of comorbidities in adulthood mandates that ready access to adult specialist care be available in the perioperative period.

The close physical proximity of Levine Children's Hospital as a free-leaning children's hospital in relation to Carolinas Medical Center creates the ideal environment to care for these patients. It allows the ready availability of a wide range of adult subspecialists, in addition to experienced adult-congenital cardiologists, cardiac surgeons, anesthesiologists and critical care nurses. This enables Sanger Heart & Vascular Institute to create an optimal system of care for a group of patients who face increasingly complex medical conditions, and whose numbers will continue to grow. ■

Congenital Heart Surgery: A Brief Timeline





Young Adults with Congenital Heart Disease

Richard S. Musialowski Jr., MD, FACC
Adult Cardiologist

YOUNG ADULTS WHO HAVE

congenital heart disease (CHD) continue to be a complex and emerging subset of cardiovascular patients. Since the advent of corrective surgical procedures in the 1970s, both short- and long-term mortality rates have dramatically improved with an estimated 85 percent of all patients surviving into adulthood.

Adding to the complexity is the heterogeneity of congenital lesions within this patient group, with the more common entities (ASD, VSD, bicuspid aortic valve) intermingled with the more complex tetralogy of Fallot, transposition of the great arteries and single ventricle physiology.

MOVING INTO ADULTHOOD

The vast majority of patients who have adult-congenital heart disease (ACHD) have had at least one surgical procedure prior to adulthood—ranging from a simple VSD closure and/or aortic valve replacement to complete reconstruction of ventricular inflow and/or outflow tracts to repair single ventricle physiology. Since many of these procedures are performed during the pre-adolescent years, patients outgrow their initial palliative surgeries, requiring subsequent procedures to accommodate their growth into adulthood.

Also, the prosthetic material used to make the repair will inevitably require revision due to material failure over time. As a result, repeat thoracotomy procedures are common and require significant surgical expertise given the complexity of the initial repair and the challenges presented during re-operation.

The long-term management of these patients requires recognition of the long-term sequelae of the original defects and, in many cases, a discriminating eye to observe and define the optimal strategy in patients who have more rare and less well-studied congenital defects. For example, congenital aortic stenosis, which was surgically corrected during a patient's teenage years, was thought to be complete surgical correction, with a lack of recognition of the systemic nature of aortopathy that accompanies the original lesions. It has now become clear that ascending root aneurysms form late, after repair of these patients, and as a result, appropriate surveillance of these known associations is essential for continued long-term survival and to anticipate optimal timing of surgical correction.

COMMON PROBLEMS

As these patients survive longer into adulthood, new health issues arise, including cardiac arrhythmias—some severe enough to cause sudden death. With lower mortality and longer life spans, these individuals now experience the specter of chronic noncardiovascular disease as well.

What is clear is that this emerging

group of cardiovascular patients needs to receive their care from an integrated healthcare system involving pediatric and adult cardiologists working in tandem with access to subspecialty cardiologists who are familiar with the complexities of congenital heart disease. The true advantage of the Sanger Heart & Vascular Institute (SHVI) approach lies in the innovative thinking that's necessary when caring for ACHD patients. Care that's facilitated by the close proximity and working relationship of SHVI with Levine Children's Hospital. For more information or to refer patients in need of expert cardiac care, call **877-999-SHVI (7484)**. ■

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Patient Support Programs

SANGER HEART & VASCULAR INSTITUTE (SHVI)

believes that support groups and additional services play an important role in patient recovery. SHVI is proud to sponsor the following support groups and services for our patients:

► **The Heart of a Woman Support Group** unites women

who have survived a cardiac event with women who are striving to prevent similar experiences. Participants are empowered to begin or maintain a heart-healthy lifestyle. For more information, visit www.heartofawoman.org.

► **The ICD (Implantable Cardioverter Defibrillator) Support Group** is for ICD

recipients, their families and friends. For more information, visit www.sangerheart.org/support.php.

► **Levine Children's Hospital's Cardiac Kids** supports children who are being treated for, or have recently been diagnosed with, congenital heart defects and their families. For more information

and upcoming events, visit www.levinecardiackids.com.

► **Dare to C.A.R.E. Carolinas** is a cardiovascular disease early-detection program, providing free vascular ultrasound examinations and education about cardiovascular disease. For more information and upcoming events, visit www.daretocarecarolinas.org. ■



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WHEN THE FINEST PHYSICIANS COME TOGETHER, OUR PATIENTS WIN.

Heart Group of the Carolinas has joined the region's most comprehensive team of cardiologists, surgeons and cardiac interventionists – *Sanger Heart & Vascular Institute*. By bringing together world-class physicians, education, research and compassionate care, we're setting the highest cardiovascular standards for heart patients in Cabarrus and Stanly counties. Find out how the Sanger team treats a full spectrum of cardiovascular needs with the latest technology and treatments by calling **1-877-999-SHVI** or visiting www.sangerheart.org.



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