

### Scientific Discovery

- The American Heart Association funds research related to heart health and heart disease in children, including congenital heart disease.
- The American Heart Association funds more pediatric cardiac research than any U.S. organization except the federal government.
- In 2016, we funded 95 new research awards that investigators reported to be broadly related to pediatrics or congenital heart defects. These awards total over \$13.5 million. This was part of the \$163 million we funded in all aspects of cardiovascular diseases and stroke. Much of the funds go to basic biomedical research, and the outcomes of these studies can ultimately be applied to many types of congenital and acquired heart and blood vessel diseases.
- Many of these awards fund research projects aimed at determining how the heart develops before birth and how congenital heart defects develop.
- The association funds awards related to acquired children's heart disease, and maintaining heart health in children.
- American Heart Association research awards mirror the proportion of applications received within each science topic.
- Across the country, 480 applications related to cardiovascular development and pediatrics were submitted in 2015-16.
- The AHA classifies research into more than 40 categories. Most pediatric-related science falls into the two categories for Cardiovascular Development:

#### Cardiovascular Development — Basic Science

- Animal Models of Cardiovascular Development — e.g., Mouse Models-Drosophila-Zebrafish-Avian and Xenopus
- Bioinformatics-Systems Biology
- Cardiovascular Cell Fate: Lineage and Differentiation — e.g., Vascular Smooth Muscle-Endothelial Cells and Cardiomyocytes
- Cardiovascular Congenital Malformations
- Cardiovascular-Molecular Signaling Pathways During Development — e.g., Cardiovascular Transcription Factors- Growth Factors and Cardiovascular Protein
- Cardiovascular Morphogenesis
- Developmental Bioengineering — e.g., Blood Flow- Shear Stress
- Development of Conduction System — e.g., Electrophysiology

- Epicardium
- Gene Regulation — e.g., Cardiovascular microRNA- Promoter Analysis and Epigenetics
- Genomics and Genetics of Cardiovascular Development
- Neural Crest
- Pediatric Cardiovascular Disease
- Proteomics — e.g., Protein Biochemistry and Structural Biology
- Pulmonary Development
- Stem Cells — iPS Cells — Regenerative Science
- Valve Development and Morphogenesis

#### Cardiovascular Development — Clinical/Transitional

- Cardiovascular Congenital Malformations — Adult
- Cardiovascular Congenital Malformations — Pediatrics
- Cardiovascular-Molecular Signaling Pathways During Development — e.g., Cardiovascular Transcription Factors- Growth Factors and Cardiovascular Protein
- Cardiovascular Morphogenesis-Cardiac Teratology
- Gene Regulation — e.g., Cardiovascular microRNAPromoter Analysis and Epigenetics
- Genomics and Genetics of Cardiovascular Development
- Human Cardiovascular Development and Diseases
- Pediatric Cardiovascular Disease
- Proteomics — e.g., Protein Biochemistry and Structural Biology
- Pulmonary Development
- Stem Cells-iPS Cells — Regenerative Medicine
- Tissue Engineering

- Additional applications related to pediatric heart disease could be assigned to other study sections. For example, proposals related to surgical treatment of a congenital heart defect could be reviewed by the Surgery Review Committee.
- In addition to funding research awards, we fund scientific conferences and symposia to update the understanding of the anatomy, diagnosis and medical and surgical management of congenital heart disease.
- The AHA's 16 scientific councils are made up of science and research professionals who actively support our mission through research, education and advocacy. The councils help develop AHA statements and guidelines, and organize scientific conferences. The Council on Cardiovascular Disease in the Young is focused on pediatric scientific issues.

## Pediatric Research Milestones

**1944** – Dr. Helen B. Taussig founded the field of pediatric cardiology. She developed the concept for a procedure that would extend the lives of children born with Tetralogy of Fallot (blue baby syndrome). This concept led to the Blalock-Taussig shunt, a procedure developed by Dr. Alfred Blalock and Vivien Thomas, who were Taussig's colleagues at the Johns Hopkins Hospital. AHA supported Taussig with a 1973 Grant-in-Aid, "Follow-Up Patients With Tetralogy Of Fallot."

**1966** – Along with Dr. William Miller, pediatric cardiologist Dr. William Rashkind at the Children's Hospital of Philadelphia developed balloon atrial septostomy, a lifesaving technique and device for neonates with transposition of the great arteries. A father of interventional catheterization, Rashkind also created devices to close atrial septal defects and persistent patent ductus arteriosus. A longtime AHA volunteer, he received a 1983 Grant-in-Aid titled "Transcatheter Treatment Of Congenital Heart Disease."

**1986** – Dr. Craig Lillehei received a Midwest Affiliate Fellowship, "Ventricular Function During Cardiac Allograft Rejection." As an attending surgeon, he later worked with technology pioneer Redmond Burke to perform the first three pediatric heart-lung transplantations in New England, with the help of colleagues from Brigham and Women's Hospital including Malcolm Decamp and Sari Aranki.

**1990** – The FDA approves Exosurf Neonatal to treat respiratory distress syndrome, a life-threatening condition for premature infants with heart and lung defects. The drug is developed by AHA career investigator Dr. John Clements.

**2010** — Donna M. Ferriero, MD, professor of neurology and pediatrics and director of child neurology at the University of California, San Francisco receives the American Stroke Association's highest honor, The Thomas Willis Award, for groundbreaking work detailing the molecular and cellular mechanisms of hypoxic-ischemic injury in the developing brain. Her accomplishments in the laboratory are matched by an equally inspiring body of work translating those advances to the clinical realm, including playing key roles in the success of the first trial of hypothermia for neonatal brain injury, the first multicenter randomized clinical trial of a neuroprotective intervention in childhood ischemic brain injury, and making major contributions in neuroimaging and clinical pathophysiology of neonatal brain injury.

## Scientific Statements and Guidelines

The American Heart Association and American Stroke Association publish medical scientific statements on various cardiovascular disease and stroke topics. AHA/ASA volunteer scientists and healthcare professionals write the statements. The statements are supported by scientific studies published in recognized journals and have a rigorous review and approval process. Scientific statements generally include a review of data available on a specific subject, an evaluation on its relationship to overall cardiovascular disease science, and often an AHA/ASA position on the basis of that evaluation.

Since 1995, 51 statements have been published relative to pediatric cardiology issues, including topics on traditional risk factors, on fetal diagnosis, neurodevelopmental outcomes and diagnostic issues.

## Congenital Heart Disease Resources

Written by Cardiovascular Disease in the Young experts for the AHA website: *Adults With Congenital Heart Defects* and *If Your Child Has a Congenital Heart Defect*

The American Heart Association is working to help kids and families live heart-healthy lives.

Many exciting resources can be found at

[http://www.heart.org/HEARTORG/GettingHealthy/HealthierKids/Healthier-Kids\\_UCM\\_304156\\_SubHomePage.jsp](http://www.heart.org/HEARTORG/GettingHealthy/HealthierKids/Healthier-Kids_UCM_304156_SubHomePage.jsp)



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| <p><b><a href="#">Our Kids' Programs</a></b> - Find out what we're doing to improve children's health and create a nation of healthier kids.</p>   | <p><b><a href="#">Childhood Obesity</a></b> - As a parent, you want the best for your child. Every parent does. And we can help.</p>  |
| <p><b><a href="#">Activities for Kids</a></b> Join the American Heart Association as we strive to teach kids the importance of staying active and eating healthy. Help your child live a stronger, healthier life with some of these programs and activities.</p>                | <p><b><a href="#">Simple Cooking with Heart™ for Kids</a></b> - We've created this demonstration guide with kid-friendly recipes to spark young people's interest in food, cooking and health.</p>  |
| <p><b><a href="#">Life's Simple 7™ for Kids</a></b> - Life's Simple 7 for kids was developed to help you understand how your lifestyle affects your heart so that you can make small heart-healthy choices every day.. Learn more by exploring the articles in this section.</p> | <p><b><a href="#">How to Make a Healthy Home</a></b> - Parents and caregivers are essential decision-makers when it comes to the nutrition, physical activity and health needs of their children. Help your child develop healthy habits for lifelong benefits.</p> |