Pediatric Cardiology

- Cardiology Section of AAP established - 1957
- Sub board of ASP established - 1901
- Currently 1074 Board Certified Pediatric Cardiologists
- 48 Pediatric Cardiology Training Programs
- Incidence of CHD - 0.7/1000 live births
- 640,000 children in U.S. with heart disease

Nebraska
- 26,600 live births annually
- 185 babies with congenital heart disease born annually

Pediatric Cardiology
- Congenital Heart Disease
- Rheumatic Heart Disease
- Arrhythmias
- Myocarditis and Cardiomyopathy
- Kawasaki Disease
- Lipid Disorders and Preventive Cardiology
- Adults with Congenital Heart Disease
- Cardiac Transplantation

Not All Congenital Heart Disease Presents in Infancy
- Some diseases are progressive
- Murmurs are not specific and may appear late
- Elevation of pulmonary vascular resistance
- Symptoms of cardiac disease are not specific

- Count the respiratory rate

Innocent Murmurs of Childhood
- Still's murmur
- Pulmonary flow murmur
- Pulmonary branch murmur
- Carotid or supraclavicular bruit
- Venous hum

Physiologic Categories of Congenital Heart Disease
- Right-to-left shunts
- Left-to-right shunts
- Obstructive lesions
- Admixture lesions
- Myocardial abnormalities
**Right-to-Left Shunt**
Condition in which desaturated systemic venous blood passes directly into the systemic arterial circulation without passage through the lungs.

**Oxygen Challenge Test**

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<tr>
<th></th>
<th>Room Air</th>
<th>(\text{FiO}_2=1.0)</th>
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<tbody>
<tr>
<td>(pO_2)</td>
<td>85</td>
<td>200+</td>
</tr>
<tr>
<td>(pCO_2)</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Lung Disease (includes pulmonary edema)</td>
<td>&lt;50</td>
<td>&gt;100</td>
</tr>
<tr>
<td>R→L shunt</td>
<td>&lt;50</td>
<td>&lt;50</td>
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**Cyanotic Congenital Heart Defects**
- Tetralogy of Fallot
- Transposition of the Great Arteries
- Tricuspid Atresia
- Pulmonary Atresia with Intact Ventricular Septum
- Total Anomalous Pulmonary Venous Return
- Complex Lesions
- Others

**Tetralogy of Fallot**
- Anatomy

- Therapy
  - Palliative: Prostaglandin E\(_1\), Propranolol, Aorto-pulmonary shunt
  - Definitive: Intracardiac repair
  - Postop Problems: Persistent RV hypertension, Residual shunt, Arrhythmias

**Transposition of the Great Arteries**
- Anatomy

- History of Therapy
  - 1950 Blalock-Hanlon septectomy
  - 1959 Senning operation (atrial switch)
  - 1964 Mustard operation (atrial switch)
  - 1966 Rashkind balloon septostomy
  - 1975 Jatene (arterial switch)
  - 1979 Yacoub (arterial switch – 2 stages)

**Left-to-Right Shunt**
Condition in which oxygenated pulmonary venous blood is recirculated through the lungs, rather than delivered to the systemic arterial circulation.
Left-to-Right Shunts – Physiology
1. Increased ventricular work
2. Increased pulmonary blood flow
3. Salt and water retention

Pulmonary edema

Congestive Heart Failure
- Signs and Symptoms
  Tachypnea
  Tachycardia
  Poor feeding
  Diaphoresis
  Hepatosplenomegaly
  Rales
  Edema
  Pallor

Ventricular Septal Defect
- Anatomy and Physiology

Atrial Septal Defect
- Anatomy and Physiology
  - Clinical Features
    Paucity of symptoms
    More common in females
    Atrial arrhythmias
    Pulmonary hypertension
    Echocardiography

Coarctation of the Aorta
- Anatomy
  - Clinical Features
    Congestive heart failure in newborns
    Hypertension in older children
    Encephalopathy, stroke, endocarditis
    90% mortality by age 50

Aortic Valve Stenosis
- Angiogram
- Echocardiogram
- Pathology specimen
Echocardiogram – Indications
1. Anatomy of congenital heart disease
2. Pericardial effusion
3. Ventricular function
4. Intracardiac vegetations or tumors
5. Doppler flow patterns and velocities

Echocardiogram – Examples
- Left Atrial Myxoma
- Hypertrophic Cardiomyopathy

Angiography - Examples
- Coarctation of aorta
- Truncus arteriosus
- Hemitruncus arteriosus
- Anomalous left coronary artery
- TAPVR

Interventional Catheterization
- Balloon Valvuloplasty
- Ductus Occlusion Device

Risks of Cardiac Catheterization
- Allergic Reaction to Contrast
- Perforation
- Arrhythmias
- Shock
- Loss of Arterial Pulses
- Stroke
- Venous thrombosis
- Infection
- Rupture of chordae on valve tissue
- Death
- Hemorrhage

Endocarditis
- Prophylaxis
I. Introduction

II. Innocent murmurs
   A. Still's murmur
   B. Pulmonary Flow murmur
   C. Venous Hum
   D. Pulmonary Branch murmur

III. Types of Congenital Heart Disease

IV. Right-to-Left Shunts
   A. Definition
   B. Oxygen Challenge Test
   C. Types of Cyanotic Lesions
   D. Examples
      1. Tetralogy of Fallot
         a. Anatomy
         b. Management
      2. Transposition of Great Arteries
         a. Anatomy
         b. Management

V. Left-to-Right Shunts
   A. Definition
   B. Physiology
   C. Clinical Signs
   D. Examples
      1. VSD
         a. Anatomy
         b. Management
      2. ASD
         a. Anatomy
         b. Management

VI. Obstructive Lesions
   A. Examples
      1. Coarctation of Aorta
      2. Aortic Valve Stenosis

VII. Echocardiography
    A. Indications
    B. Examples

VIII. Angiography and Catheter Studies
    A. Examples
    B. Hazards

IX. Endocarditis Prophylaxis