Pediatric Echocardiography (PE) Tasks
Anatomy and Physiology 16%
Normal anatomy and physiology
Apply knowledge of closure of the patent foramen ovale after birth
Apply knowledge of decreasing pulmonary vascular resistance and pressure after birth
Apply knowledge of ductal closure after birth
Apply knowledge of normal chamber motion in systole and diastole
Apply knowledge of normal great vessel flow in systole and diastole
Apply knowledge of normal pulmonary venous flow in systole and diastole
Apply knowledge of normal superior vena cava flow in systole and diastole
Apply knowledge of normal valve flow in systole and diastole
Apply knowledge of normal valve motion in systole and diastole
Identify abdominal aorta
Identify abdominal situs
Identify all cardiac valves
Identify all chambers, atrial and ventricular septa, and includes basic embryology
Identify aortic arch
Identify aortic arch vessels (e.g., brachiocephalic/strap)
Identify arch sidedness (e.g., right versus left)
Identify atrial situs
Identify azygos vein
Identify bridging innominate vein
Identify coronary arteries and proximal branches
Identify coronary artery origins
Identify coronary sinus
Identify inferior vena caval return to the right atrium
Identify pulmonary artery and branches
Identify pulmonary venous return to the left atrium
Identify superior vena caval return to the right atrium
Identify venous valves (e.g., eustachian and Chiari)
Organ development
Apply knowledge of ductal flow pattern before birth
Apply knowledge of flow patterns across the patent foramen ovale before birth
Pathology 49%
Abnormal physiology
Analyze left heart inflow and outflow tract obstructions
Analyze right heart inflow and outflow tract obstructions
Identify abnormalities associated with constrictive cardiomyopathy
Identify abnormalities associated with restrictive cardiomyopathy
Identify anomalous left coronary artery from pulmonary artery trunk
Identify arch anomalies
Identify arch anomalies (e.g., aberrant LSCA)
Identify lesions associated with Holt-Oram syndrome
Identify lesions associated with tuberous sclerosis
Identify possible echocardiographic abnormalities associated with chest pain in children
Identify possible echocardiographic abnormalities associated with hypertension in children
Identify possible echocardiographic abnormalities associated with syncope in children
Perform pre-op arterial switch assessment for patients with DTGA
Perform pre-op TOF assessment

Congenital anomalies
Analyze abnormalities of cardiac situs and position
Analyze atrial and ventricular septal defects
Analyze atrioventricular septal defects
Analyze various abnormalities of the aortic valve
Analyze various abnormalities of the mitral valve
Analyze various abnormalities of the pulmonic valve
Analyze various abnormalities of the tricuspid valve and includes Ebstein anomaly
Identify abnormal ventriculoarterial connection (e.g., D-TGV and L-TGV)
Identify anomalies of pulmonary venous return
Identify anomalous coronary arteries
Identify arteriovenous fistulas
Identify azygos and hemiazygos continuation of the inferior vena cava to the superior vena cava
Identify cardiac tumors
Identify conotruncal defects (e.g., TOF, DORV, truncus, and AP window)
Identify cor triatriatum
Identify discontinuous pulmonary artery branches
Identify double aortic arch
Identify left superior vena cava
Identify lesions associated with muscular dystrophy
Identify lesions associated with Shone complex
Identify patent ductus arteriosus
Identify pulmonary artery sling
Postoperative (surgically corrected) anatomy
Analyze arterial switch repair for transposition of the great arteries
Analyze atrial switch (Mustard or Senning) repair of transposition of the great arteries
Analyze Damus-Kaye-Stansel procedure
Analyze Fontan anastomosis with and without fenestration
Analyze Glenn anastomosis for univentricular heart
Analyze modified Blalock-Taussig shunt or central shunt
Analyze Norwood procedure for hypoplastic left heart syndrome
Analyze patients after balloon dilation of valves and great vessels
Analyze patients after stenting of great vessels
Analyze pulmonary artery banding
Analyze Rastelli repair for DORV
Analyze repair of anomalous pulmonary venous connection
Analyze Ross repair
Analyze septal defect repairs
Analyze shunt closure devices
Analyze surgical repair for coarctation of the aorta
Analyze tetralogy of Fallot repair
Analyze valve repair/replacement
Abnormal pathology (acquired)
Analyze pericardial effusion and severity
Identify abnormalities associated with dilated cardiomyopathy
Identify coronary artery abnormalities associated with Kawasaki disease
Identify echocardiographic abnormalities associated with cardiac transplantation rejection
Identify echocardiographic abnormalities associated with hypertrophy cardiomyopathy (IHSS)
Identify echocardiographic findings associated with post pericardiotomy syndrome

Identify echocardiographic findings with paralyzed diaphragm
Identify echocardiographic findings with pleural effusions
Identify functional abnormality associated with drug toxicity (e.g., Doxorubicin chemotherapy)
Identify lesions associated with gestational or maternal diabetes
Identify lesions associated with systemic lupus
Identify para-aortic abscess associated with infective endocarditis
Identify thrombus
Identify valve regurgitation associated with rheumatic fever
Identify vegetations associated with infective endocarditis
Genetic disorders
Identify lesions associated with DiGeorge syndrome
Identify lesions associated with Down syndrome
Identify lesions associated with Friedreich ataxia
Identify lesions associated with Marfan syndrome
Identify lesions associated with mitochondrial disease
Identify lesions associated with Noonan syndrome
Identify lesions associated with sickle cell anemia
Identify lesions associated with trisomy 18
Identify lesions associated with Turner syndrome
Identify lesions associated with Williams syndrome
Protocol 26%
Clinical standards and guidelines
Obtain a high, left parasternal imaging view
Obtain a parasternal long-axis view
Obtain a parasternal short-axis view
Obtain a right parasternal imaging view
Obtain a subxiphoid coronal imaging view
Obtain a subxiphoid longitudinal imaging view
Obtain a suprasternal long-axis view
Obtain a suprasternal short-axis view
Obtain an apical 2-chamber view
Obtain an apical 4-chamber view apex down
Obtain an apical long-axis/5-chamber view
Provide technical assistance during intravenous contrast agents
Measurement techniques
Analyze the severity of aortic regurgitation
Analyze the severity of pulmonary regurgitation
Analyze ventricular regional wall motion qualitatively
Assess atrial septal shunting gradients
Assess right ventricular pressure by tricuspid and pulmonary regurgitant jet velocities
Assess severity of tricuspid and mitral regurgitation
Assess the isovolumic contraction and relaxation time
Assess ventricular septal defect gradients
Calculate aortic valve area using the continuity equation
Calculate cardiac output using aortic cross sectional area and Doppler interrogation of flow
Calculate ejection fraction by 2-D
Calculate fractional shortening or ejection fraction by M-mode
Calculate indices of diastolic function (e.g., EA Ratio)
Calculate left ventricular mass by 2-D

Calculate left ventricular mass by M-mode
Calculate maximal pressure gradients using the expanded Bernoulli equation
Calculate maximal pressure gradients using the modified Bernoulli equation
Calculate mean pressure gradients of valves
Demonstrate echocardiographic findings at specific times during the ECG (cardiac) cycle
Interrogate aortic arch by color and spectral Doppler
Interrogate atrial and ventricular septum by color and spectral Doppler
Interrogate four cardiac valves by color and spectral Doppler
Interrogate pulmonary artery and branches by color and spectral Doppler
Interrogate pulmonary venous return by color and spectral Doppler
Interrogate systemic venous return by color and spectral Doppler
Measure chamber sizes and wall thickness by 2-D
Measure chamber sizes and wall thickness by M-mode
Perform linear measurements by 2-D
Utilize pressure half-time for severity of aortic regurgitation
Utilize pressure half-time for severity of mitral stenosis
Non-sonographic techniques
Perform M-mode recording of ventricles and cardiac valves
Physics and Instrumentation 2%
Hemodynamics
Assess normal IVC flow in systole and diastole
Perform all the diastolic function assessments
Imaging instruments
Select appropriate settings to optimize image quality and Doppler information
Select appropriate transducer(s) for patient size, window, modality
Treatment 4%
Interventional procedures
Provide technical assistance during echo-guided balloon atrial septostomy
Provide technical assistance during echo-guided pericardiocentesis
Provide technical assistance during transesophageal echocardiography
Other 3%
New technologies
Perform 3-D echocardiography
Perform Doppler tissue imaging (DTI)
Miscellaneous
Identify implantable devices
Identify tip of indwelling catheter