Standardized Pediatric Cardiology Resident Curriculum: An Alternative Online Platform Approach

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Introduction

- Cardiology currently consists of 4% of the general content outline published by the American Board of Pediatrics.

Domain 17: Cardiology (4%)

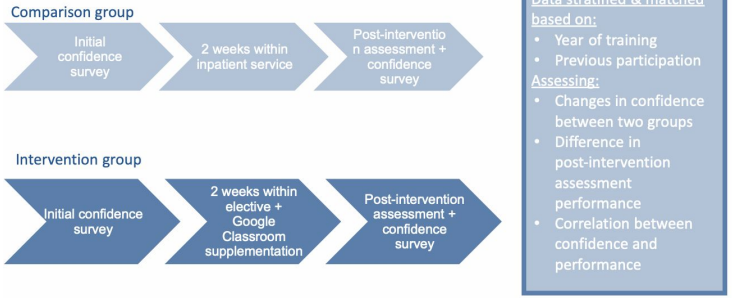
A. Clinical presentation (eg, abnormal blood pressure, chest pain, syncope)
B. Diseases, disorders, and conditions
   1. Congenital heart disease
      a. Cyanotic
      b. Acyanotic
   2. Dysrhythmias
   3. Cardiomyopathies
   4. Infection/vasculitis
   5. Connective tissue disease
   6. Dyslipidemias

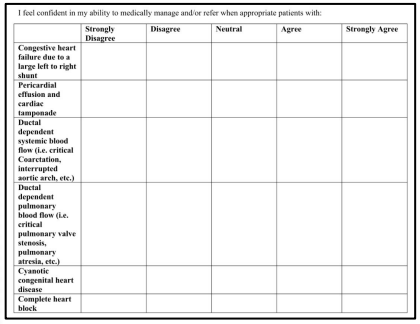
- Pediatric heart disease has low incidence, but high morbidity and mortality.
- Currently, University Hospitals (UH) attempts to meet this requirement through an inpatient pediatric cardiology rotation and an optional pediatric cardiology elective, but given the nature of the conditions, it's unlikely that a resident enrolled in either or both of these will get to see all possible pediatric cardiology diseases they are expected to know.
- Graduate medical education is increasingly using "asynchronous learning"
- To be effective, online learning can be instructor-guided to ensure effective self-testing and self monitoring by learners
- Interactive, Case-Based exercises seem to be a method to impose supervision and self-monitoring in an asynchronous curriculum
- Case-Based learning promotes clinical reasoning, deep learning, and critical thinking skills

Research Question

P	I	O	C
In UH Pediatric Residents enrolled in a two-week cardiology elective,	would supplementing in-person training with online activities	lead to better confidence and accuracy in diagnosing, treating, and referring pediatric patients	when compared to residents within the in-patient pediatric cardiology rotation who did not have access to this resource

Description of Program/Intervention

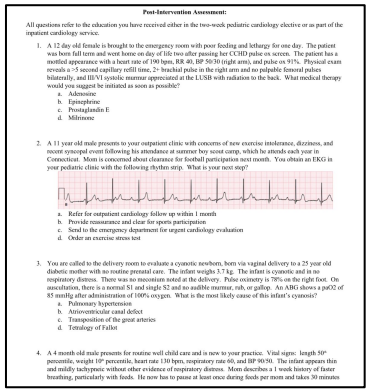




I feel confident in my ability to medically manage and/or refer when appropriate patients with:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Congestive heart failure due to a large left to right shunt					
Pericardial effusion and cardiac tamponade					
Ductal dependent systemic blood flow (i.e. critical Coarctation, interrupted aortic arch, etc.)					
Ductal dependent pulmonary blood flow (i.e. critical pulmonary valve stenosis, pulmonary atresia, etc.)					
Cyanotic congenital heart disease					
Complete heart block					

PRE + POST: Likert Scale Confidence Survey



Post-Intervention Assessment:

All questions refer to the education you have received either in the two-week pediatric cardiology elective or as part of the inpatient cardiology service.

1. A 12 day old female is brought to the emergency room with poor feeding and lethargy for one day. The patient was born full term and went home on day of life two after passing her CCHD pulse ox screen. The patient has a mottled appearance with a heart rate of 190 bpm, RR 40, BP 50/30 (right arm), and pulse ox 91%. Physical exam reveals a >5 second capillary refill time, 2+ brachial pulse in the right arm and no palpable femoral pulses bilaterally, and III/VI systolic murmur appreciated at the LUSB with radiation to the back. What medical therapy would you suggest be initiated as soon as possible?
   a. Adenosine
   b. Epinephrine
   c. Prostaglandin E
   d. Milrinone
2. A 11 year old male presents to your outpatient clinic with concerns of new exercise intolerance, dizziness, and recent syncopal event following his attendance at summer boy scout camp, which he attends each year in Connecticut. Mom is concerned about clearance for football participation next month. You obtain an EKG in your pediatric clinic with the following rhythm strip. What is your next step?
   a. Refer for outpatient cardiology follow up within 1 month
   b. Provide reassurance and clear for sports participation
   c. Send to the emergency department for urgent cardiology evaluation
   d. Order an exercise stress test
3. You are called to the delivery room to evaluate a cyanotic newborn, born via vaginal delivery to a 25 year old diabetic mother with no routine prenatal care. The infant weighs 3.7 kg. The infant is cyanotic and in no respiratory distress. There was no meconium noted at the delivery. Pulse oximetry is 78% on the right foot. On auscultation, there is a normal S1 and single S2 and no audible murmur, rub, or gallop. An ABG shows a paO2 of 55 mmHg after administration of 100% oxygen. What is the most likely cause of this infant's cyanosis?
   a. Pulmonary hypertension
   b. Atrioventricular canal defect
   c. Transposition of the great arteries
   d. Tetralogy of Fallot
4. A 4 month old male presents for routine well child care and is new to your practice. Vital signs: length 50th percentile, weight 10th percentile, heart rate 130 bpm, respiratory rate 60, and BP 90/50. The infant appears thin and mildly tachypneic without other evidence of respiratory distress. Mom describes a 1 week history of faster breathing, particularly with feeds. He now has to pause at least once during feeds per mom and takes 30 minutes

POST: Targeted Multiple Choice Assessment

Project Plan: Current Status

- Have worked with UH Pediatric Cardiology attendings to create targeted case-based exercises for residents to access on Google Classroom
- Have worked with UH Pediatric Cardiology faculty to create a post-intervention assessment that assesses resident understanding of the targeted cardiac conditions
- Have set up a RedCap data collection system
- Aim to recruit around 60 residents for our study, with 30 in each group

Key Lessons Learned

- In the wake of the COVID-19 pandemic, having a targeted online curriculum ensures that residents are receiving a standardized education regardless of their circumstances
- Residents appreciate having the option to learn on their own time
- Google Classroom provides a convenient, intuitive, and centralized platform for communication with residents and presentation of curricula
- Ensuring that residents receive a standardized education in pediatric cardiology outside of their in-person time allows for increased ability to cater to residents' interests within the elective

References

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3. McLean SF. Case-Based Learning and its Application in Medical and Health-Care Fields: A Review of Worldwide Literature. J Med Educ Curric Dev. 2016;3.