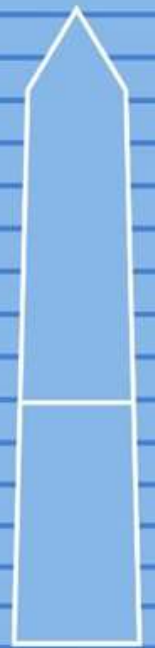


Future ^{OF} Pediatrics

Pediatric Health Network



Chest Pain in Children: To Refer or Not to Refer?

Ashraf Harahsheh, MD

Director of Quality Improvement, Cardiology

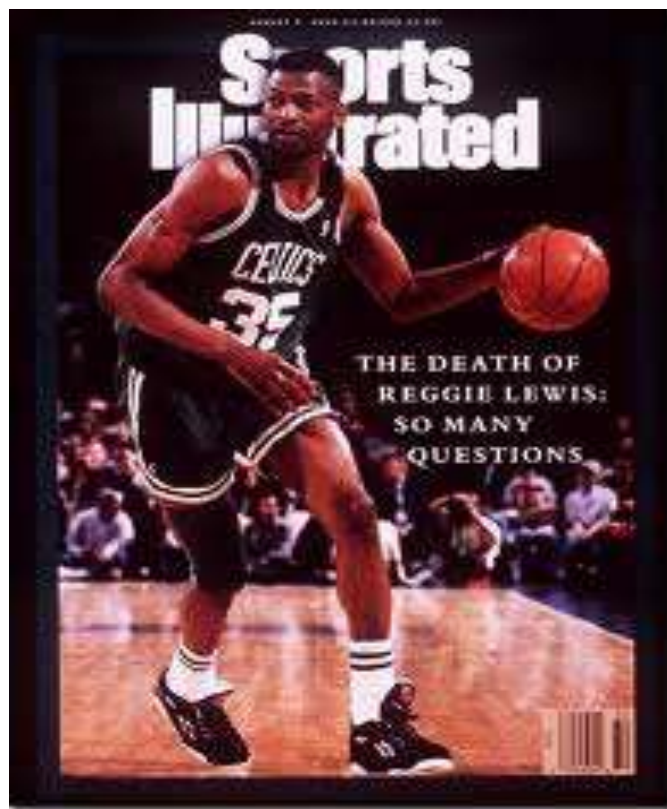
Ariel Dubelman, MD

Pediatrician, CNPA



Disclosures

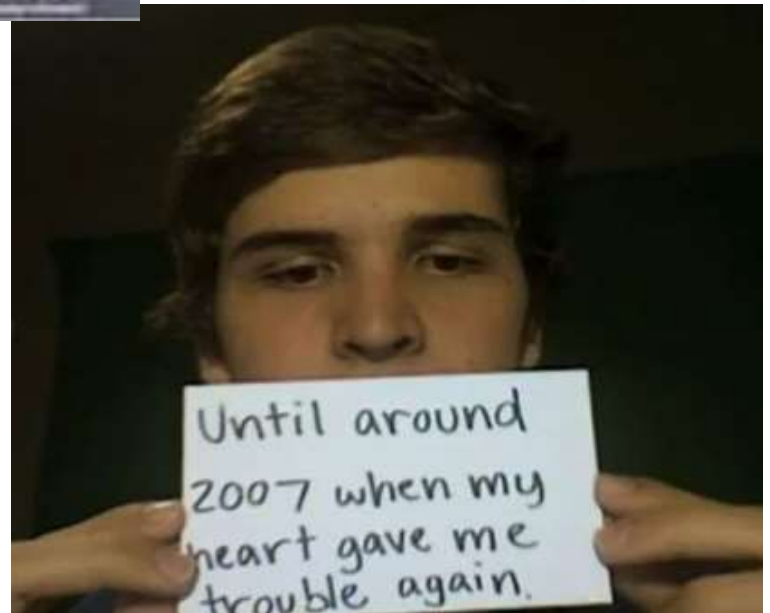
No financial disclosures to report



Girl, 17, killed by the sudden noise of her mobile phone

THE DAY MY HEART STOPPED

Girl died minutes after first kiss with boyfriend



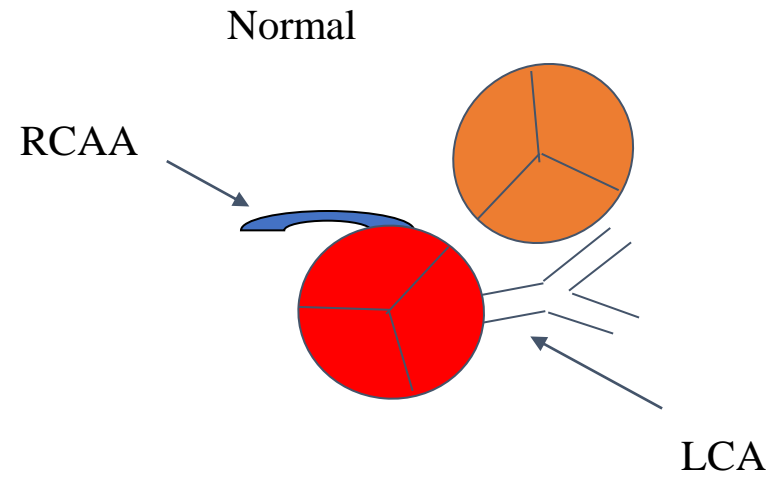
What we will cover

- List common cardiac causes of chest pain in children
- Appreciate when to refer a child presenting with chest pain to cardiology
- Appreciate the importance of QI

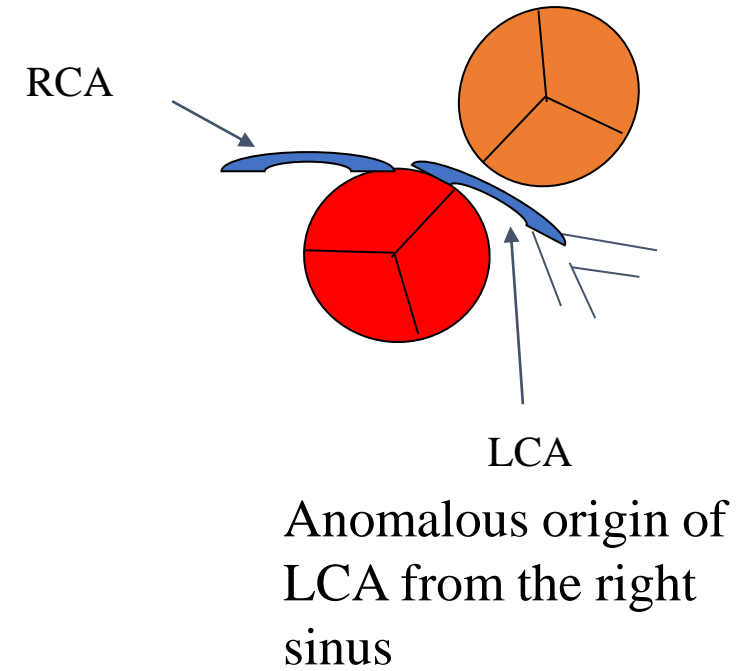
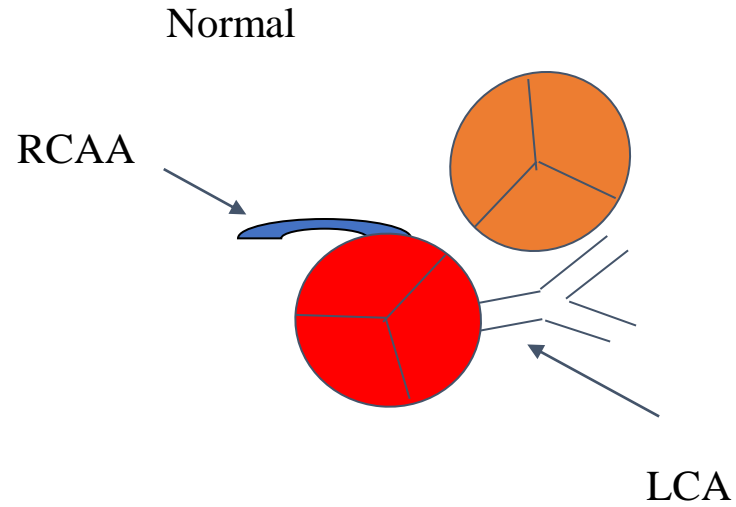
Case presentation

- 15 year old complained of chest pain during activity
- Mother: depression, MGF: heart attack at 52 years
- Normal examination

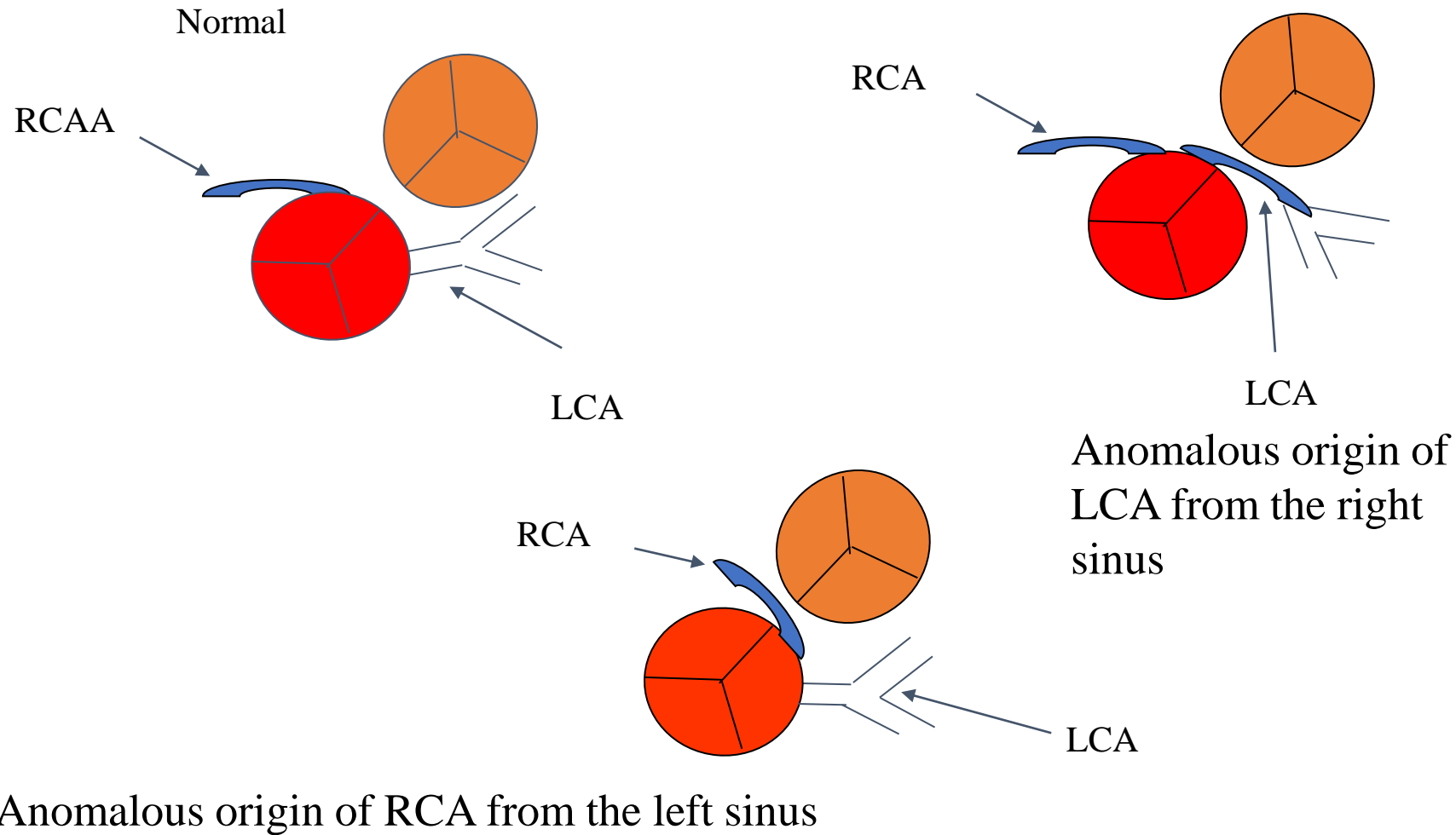
Coronary artery anomalies

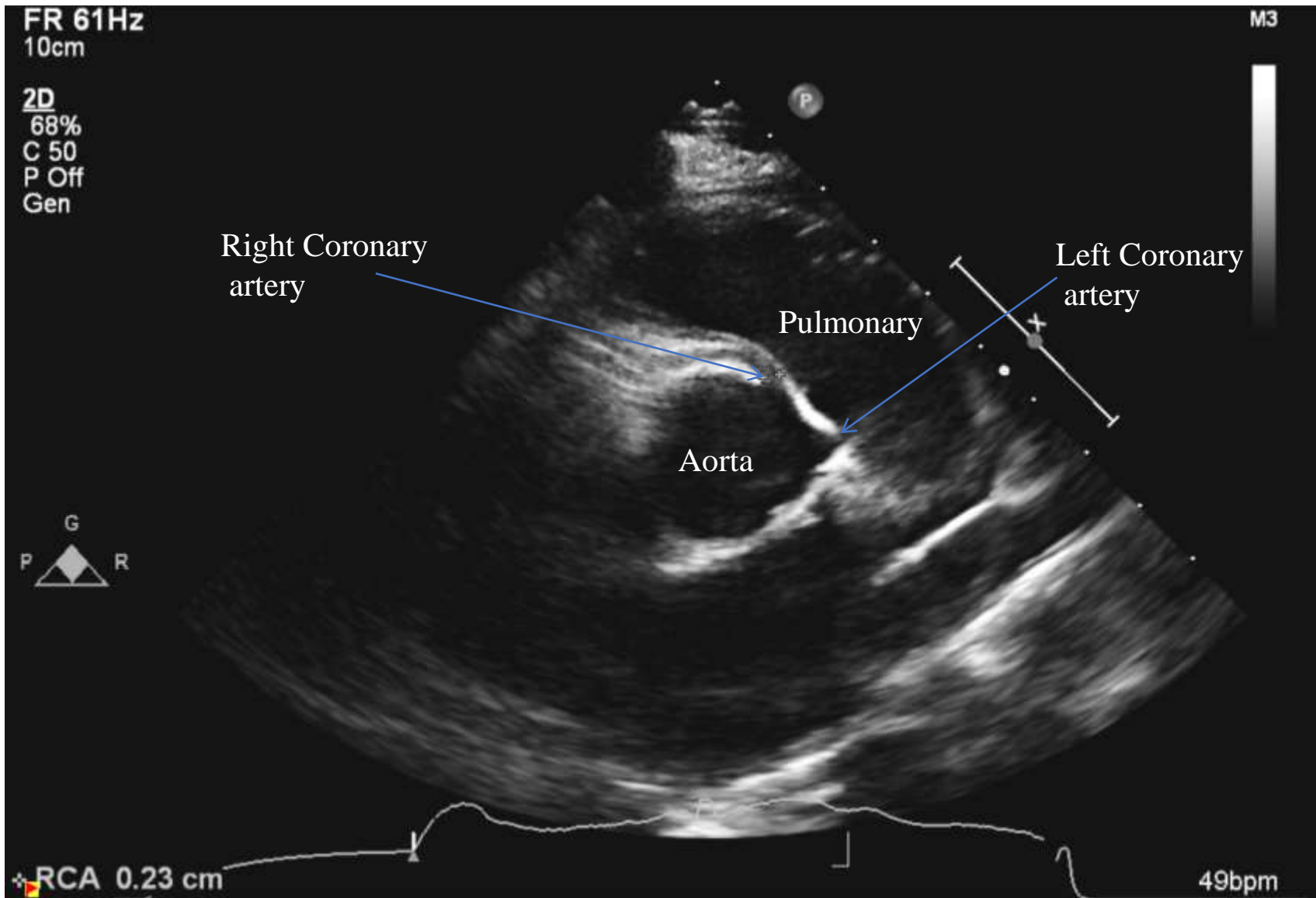


Coronary artery anomalies



Coronary artery anomalies





Case presentation

- 15 year old complained of chest pain during activity
- Mother: depression, MGF: heart attack at 52 years
- Normal examination

Cardiac causes of chest pain

Cardiac causes of chest pain

- Hypertrophic cardiomyopathy
- Coronary artery anomalies
- Aortic stenosis
- Pulmonary hypertension
- Pericarditis/Myocarditis
- Rhythm abnormalities

Chest Pain: When to Refer

Items Representing Red-Flag for Referrals:

- Patient History

- Chest pain with exertion
- Exertional syncope
- Chest pain that radiates to back, jaw, left arm, or left shoulder
- Chest pain that increases with supine position
- Chest pain temporally associated with fever ($>38.4^{\circ}\text{C}$)

- Past Medical History*

- Hypercoagulable state
- Arthritis/Vasculitis
- Immobilization



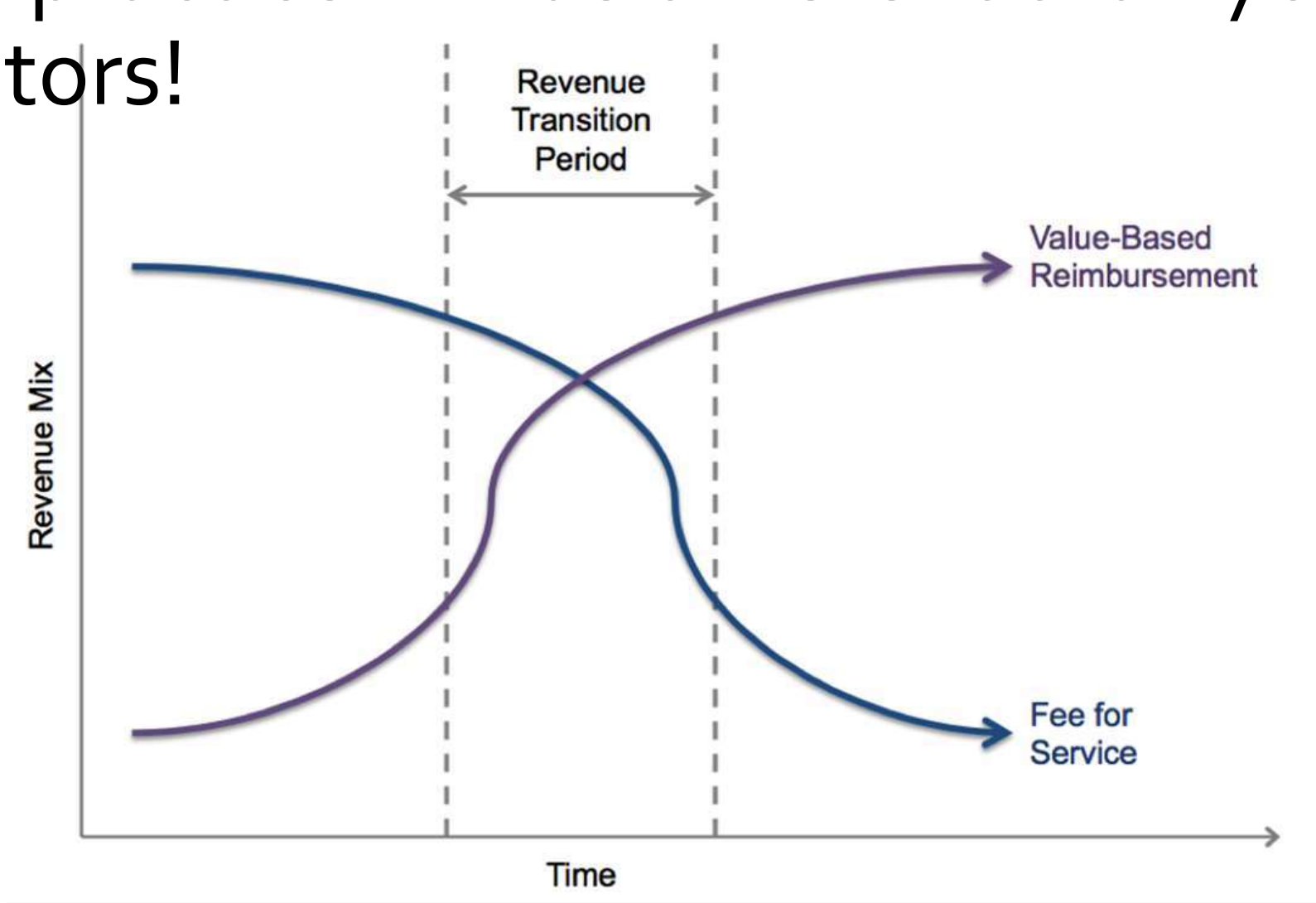
- Family History

- Sudden unexplained death
- Cardiomyopathy
- Hypercoagulable state

- Physical Examination

- RR > 40
- Temperature $> 38.4^{\circ}\text{C}$
- Ill-appearing
- Painful/swollen extremities
- Non-innocent murmur
- Distant heart sounds
- Gallop
- Pulmonic component of S2
- Pericardial friction rub
- Peripheral edema

Your practice will be different than your mentors!



- Courtesy of Mark Weissman

Needs Assessment


- Primary care providers have identified gaps in their education surrounding subspecialty referral
- recognizing red flags for referral

Hamburger et al. Academic pediatrics 2015;15:5-8

Pediatric Chest Pain—Low-Probability Referral: A Multi-Institutional Analysis From Standardized Clinical Assessment and Management Plans (SCAMPs®) the

Pe
Da
Me

Ash
Bill

Clinical Pediatrics
2017, Vol. 56(13) 1201–1208
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Cardiac Disease
Explaining Chest Pain
8/3167 (0.25%)





Group 1
1656/3167
(52.3%)

Group 2
1511/3167
(47.7%)

Patients that met Red Flag
Criteria

Patients that did not meet
Red Flag Criteria

Cardiac cause for chest pain	8/1,656 (0.48%)
---	------------------------

0/1511 (0%)

The presence of any red-flag identified subjects with a cardiac cause of chest pain with:

- 100% sensitivity (**zero false negatives**)
- 48% specificity
- 0.5% positive predictive value
- 100% negative predictive value

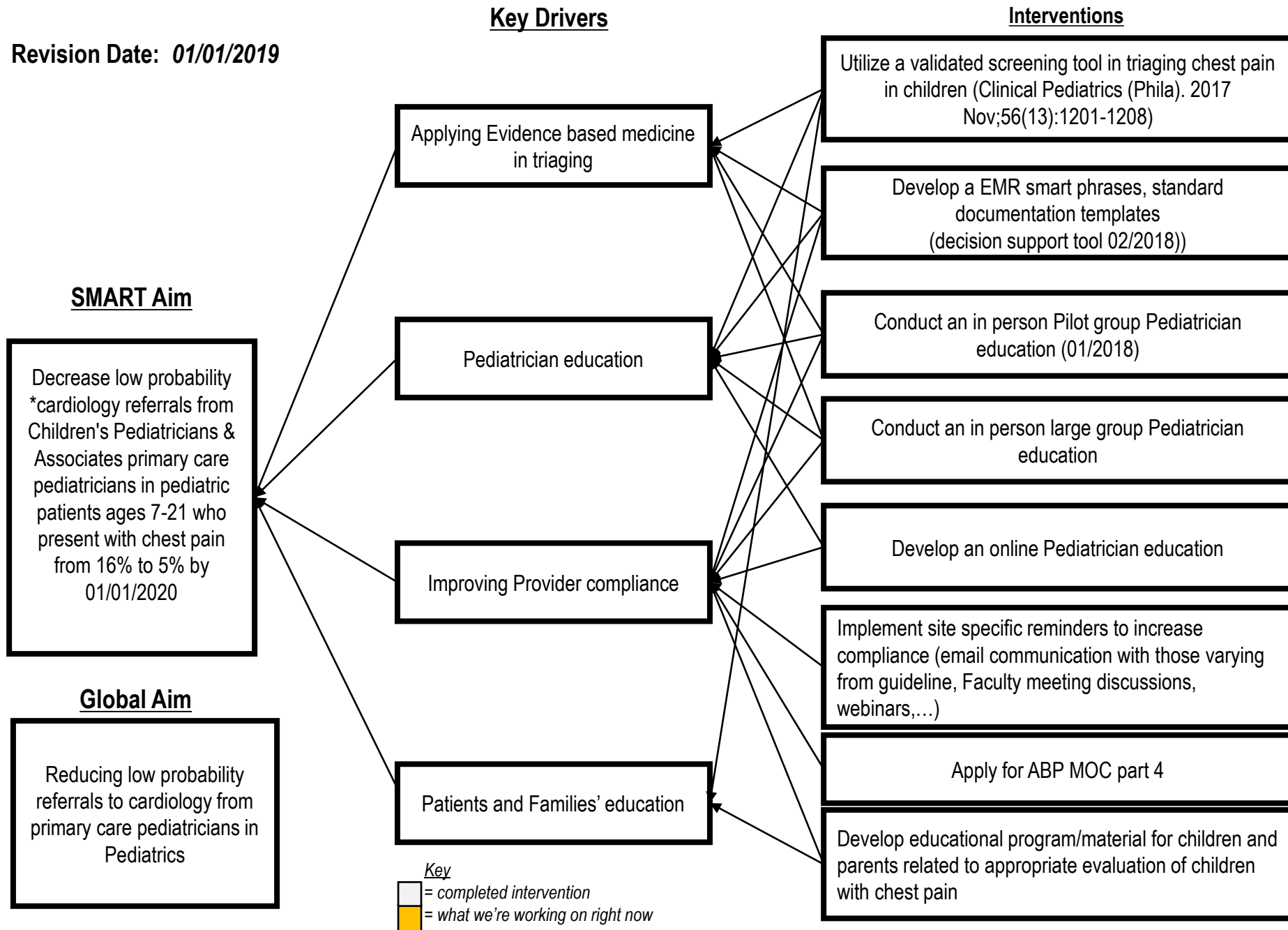
**** Highly Sensitive Tests are Ideal for Screening ****

Quality Improvement

Aim

- ...To decrease low probability cardiology referrals from Children's Pediatricians & Associates primary care pediatricians in pediatric patients ages 7-21 who present with chest pain from 17% to 5% by 01/01/2020

Revision Date: 01/01/2019





Process measure

**Improve primary
pediatrician's Utilization
of Decision Support
Tool (DST) (red-flags
for referral)**



**Outcome Goal:
Decrease low probability
referrals to cardiology
for chest pain**



**Balancing measure-
Patient safety- missing
life threatening event
and/or incidental
cardiac finding**

Decision Support Tool (DST) (red-flags for referral)

Form: **ChestPain-ReferralDecisionAide** Auto Neg Uncheck All

CC Chest Pain - Red Flags for Referral ROS PE PE2 Assessment/Plan Draft Search Outline Preview

History of Present Illness

- Y N Intro HPI
- Y N chest pain [browse + F.bt]

Symptom Checklist

- Y N chest pain with exertion
- Y N fainting with exercise (syncope)
- Y N chest pain radiating to the jaw or left arm/shou...
- Y N chest pain made worse by lying down
- Y N fever >38.4 C with chest pain

Past Medical History

- Y N Arthritis/Vasculitis
- Y N Hypercoagulable State
- Y N prolonged bedrest or sitting position
- Y N Congenital Heart Disease
- Y N Secondary Valvular Heart Disease
- Y N Acquired Septal Defect

Physical Exam

- Y N Tachypnea RR>40
- Y N Fever >38.4
- Y N General Appearance - Ill-Appearing
- Y N Non innocent murmur
- Y N Peripheral Edema
- Y N Heart Sounds Distant
- Y N Heart Sounds Gallop
- Y N Pericardial Friction Rub
- Y N S2 with Accentuated P2
- Y N Painful/Swollen Extremities

Family History

- Y N Hypercoagulability
- Y N sudden unexplained deaths
- Y N Cardiomyopathy
- Y N heart disease/MI <50yrs old

***Items listed are considered "red flags" that chest pain may be cardiac related. If any items are checked as yes, this indicates that a cardiology referral is indicated unless clearly explained by other medical diagnosis.*