A 9-day-old male with cyanosis

PRESENTER:

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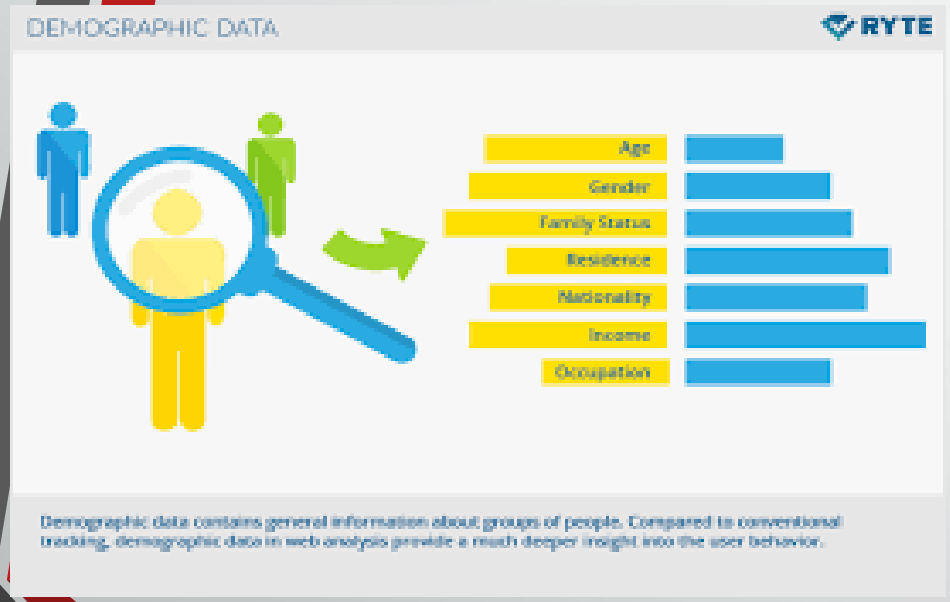
DEMOGRAPHIC DATA



- Name: N.R
- Age: 9 days
- Sex: male
- Next of kin: NA
- Address: Mbalala Mukono
- Tribe: Muganda
- Religion: Seventh day Adventist
- Nearest health center: Mukono General Hospital
- Date of first visit: 27/11/2025

PRESENTING COMPLAINT

- Difficulty in breathing since birth
- Blue discoloration of lips, hands and feet since birth

HISTORY OF PRESENTING COMPLAINT

- 9-day-old referral from Kayunga regional referral for further management.
- Presented with history of fast breathing since birth associated with blue discoloration of lips, hands, and feet since birth, interrupted breastfeeding, and excessive sweating while breastfeeding.
- No history of body swelling or cough.

Natal history

- Delivered at term by spontaneous vertex delivery from Mukono General Hospital on 19 November 2025 with a birth weight of 3.0kg.
- Mother had drainage of clear liquor two weeks before delivery, and labour lasted about thirteen hours.
- Baby did not cry immediately after birth and needed resuscitation.
- Did not breastfeed within 1st hour after delivery. Was admitted and put on oxygen since birth.
- Baby developed yellow discoloration of skin and eyes on 3rd day of life.

Antenatal history

- Mother attended antenatal care five times, the first visit was at 3months of gestation. Given three doses of tetanus toxoid, iron tablets, fansidar, and mebendazole.
- Tested for HIV and was negative.No h/o chronic illness.
- No skin rash or history of TORCHES during pregnancy.
- No history of alcohol or drug use during pregnancy or herbicide exposure.
- Did Ultrasound scan at 4months of gestation which was normal.

FAMILY SOCIAL HISTORY

- 1st born. No known familial illness.
- Mother is 18years old, she is a housewife.
- Father is 22 years old, and he is a motorcycle rider.

- A 9-day-old term baby presented with fast breathing and blue discoloration of lips, hands, and feet.
- Had interrupted breastfeeding and sweating while breastfeeding since birth.
- No cough or body swelling. Jaundice at 3days
- Delivered by SVD at term with BWT of 3.0kg and needed resuscitation at birth.
- Admitted and put on oxygen since birth.
- Mother had drainage of liquor for 14days before delivery.
- Mother is 18years old.

9-day-old with

- Cyanotic congenital heart disease
- Congenital pulmonary airway malformation
- Neonatal sepsis-neonatal pneumonia
- Neonatal jaundice

GENERAL EXAMINATION

- Sicklooking term baby, in obvious respiratory distress, central and peripheral cyanosis, no dysmorphic features, no pallor , jaundice K4, no edema , afebrile with temperature 36.9C
- Weight 3.0kg, Height 50cm,RBS 4.5mmol/L
- In mild respiratory distress with Silverman Anderson score 1/10 (LC-1), respiratory rate 64bpm, bilateral equal air entry, bronchovesicular breath sounds , no added sounds. No basal crepitations. Preductal SPO2 71% on electric CPAP, postductal 71%

Other systemic exam

CVS: warm peripheries, CRT <3s, HS I + II – normal. PR-138bpm regular ,normal volume and synchronous. Machinery murmur at LUSB radiating to the back.

CNS ; Alert , Anterior fontanelle normotensive , good suck ,good moro and grasp reflex. Normal tone.

PA: Normal fullness . Umblical stump clean, abdomen soft, non tender, liver and spleen not palpable. Bowel sounds present.

9 day old with

- Cyanotic congenital heart disease
- Patent ductus arteriosus
- Congenital pulmonary airway malformation
- Neonatal jaundice
- Neonatal sepsis

- Do cardiac echo, chest Xray
- Do CBC, LFTS, RFTS, electrolytes
- IV cefotaxime 300mg bd 5/7
- IV gentamicin 15mg o.d 5/7
- Breastfeed baby
- Phototherapy
- CPAP 6cmH2O
- Cord care
- Keep baby warm

INVESTIGATIONS

Investigations	Results
Complete blood count (28/11/2025)	WBC 8.86, Neut 3.67,Plt 475,Hb 18.8
RFTS (28/11/2025)	Creatinine 28,Urea 10mg/dl
Electrolytes (28/11/2025)	Na 135, Cl 104, K 5.1,Mg 1.25,Ca 2.3,Phosp 1.40
LFTS (28/11/2025)	TP 71.5, Alb 35.1
Cardiac echocardiography(01/12/2025)	D-Transposed great arteries with intact ventricular septum , small PFO(2mm), moderate to large PDA (3mm)

FOLLOWUP

Date	Progress on ward	Plan
28/11/2025	FGC , had mild respiratory distress, Child had central and peripheral cyanosis , jaundice K3 Vitals T-36.6,PR 134bpm,RR-58bpm,SPO2 81% on CPAP	Do cardiac echocardiography Do chest Xray Continue antibiotics Breastfeed baby Phototherapy
01/12/2025	FGC, mild respiratory distress had central and peripheral cyanosis. No jaundice Vitals T-37.1,PR- 142bpm,RR-45bpm,SPO2 84%	Cardiac echo D-TGA Wean to FFO2 Breastfeed baby Stop antibiotics
02/12/2025	FGC, no jaundice, central and peripheral cyanosis	Wean to room air Continue breastfeeding baby
03/12/2025	Vitals T-36.5C,PR-133bpm,RR-54bpm, SPO2 88% on room air.	Discharge through Uganda heart institute for ballon septostomy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THANK YOU

Nursing Care of a Cyanosed Newborn

By

Stella Athieno(RM-NICU)

Introduction

- Cyanosis is the bluish discoloration of the skin and mucous membranes resulting from inadequate amount of oxygen in the blood.
- Many cardiac defects cause poor oxygenation leading to cyanosis.
- Early and appropriate nursing care improves survival, reduces complications and supports both the infant and the family.

Assessment	Nursing Diagnosis	Goal/Desired Outcome	Intervention	Rationale	Evaluation
Subjective data Reports of fatigue, exertional dyspnea **Objective data** Weak peripheral pulses and the capillary refill is slow>3sec Tachypnea Low BPs Assess for fluid balance and weight gain	Decreased cardiac output related to structural heart defect as evidenced by weak peripheral pulses, tachypnea, cyanosis	Newborn will demonstrate improved cardiac output and peripheral perfusion evidenced by stronger palpable pulses,BP 60/45mmhg, SPO2(75-85%), urine output >1ml/kg/hr within 4 hrs	Monitor vital sign(H/R, RR, SPO2, BP) 2 hourly	.Early detection to prevent complications	Peripheral pulses improved within 4hrs, capillary refill time within normal limits of <3sec
			Administer oxygen as prescribed	O2 reduces hypoxia and workload on the heart	
			Monitor fluid balance	Avoid fluid overload that worsens the condition	
			Administer cardiac medicines as prescribed	Medications help maintain ductal patency	

Assessment	Nursing Diagnosis	Goal/Desired Outcome	Intervention	Rationale	Evaluation
Subjective data .Mother reports baby breathing fast .Poor feeding related to breathlessness **Objective data** .Central cyanosis .Low SPO2 levels .Tachypnea .Irritability	Impaired gas exchange related to altered blood flow pattern as evidenced by central cyanosis, low SPO2 tachypnea	Newborn will demonstrate improved respiratory status with RR 40-60br/m SPO2 levels within target range 75-85% within 1 hour	Administer oxygen as ordered	Oxygen improves saturation but may worsen some CHD lesions	Oxygen saturation levels is maintained within prescribed targets within 1 hour
			Cluster care and practice minimal handling	Allows rest which lowers O2 demands	
			Position in semi-fowler	To enhance lung expansion	
			Maintain neutral temperature	Cold and warm extremes increase	

Assessment	Nursing Diagnosis	Goal/Desired Outcome	Intervention	Rationale	Evaluation
Subjective data Interrupted breast feeding, Fatigue **Objective data** Tachypnea Exertional dyspnea Cyanosis Tachycardia Low SPO2 during exertion Poor weight gain	Activity intolerance related to imbalance between oxygen supply and demand as evidenced by poor feeding	Newborn will show improved feeding efficiency demonstrated by fewer interruptions during breastfeeding by the end of the shift	Monitor SPO2,RR during and after activity	Detects early signs of intolerance like tachypnea	Newborn will appear less fatigued with decreased tachypnea during feeds by the end of the shift
			Give small frequent feeds, use soft nipple or NGT if possible	To allow rest which helps to decrease metabolic rate	
		Parent will verbalize 2 energy conservation techniques by discharge(cluster care and	Assist parents to plan for care and rest schedules	Prevents over exertion and conserves energy	

Assessment	Nursing Diagnosis	Goal/Desired Outcome	Intervention	Rationale	Evaluation
Subjective data History of early rupture of membranes **Objective data** Cyanosis Dyspnea Low SPO2 Presence of invasive lines	Risk for infection related to invasive procedures(IV lines, blood sampling), inadequate primary defenses	Newborn will remain afebrile with temperature in normal limits of 36.5C to 37.5C throughout hospital stay	Monitor vital signs including temperature every 2 hours	Early detection of abnormal temp helps identifying infections promptly	Newborn remains afebrile with normal temperature ranges between (36.5 to 37.5) during hospitalizatio n
			Wash hands and maintain aseptic techniques	Hand hygiene is the most effective method of reducing infection	
			Administer antibiotics as ordered	To eliminate underlying bacterial infection	

References

- Nurseslabs.(2024,April 30).*6 Congenital Heart Disease Nursing care plan.* https://nurseslabs.com/congenital-heart-disease-nursing-care-plans/

- Maulida, D.Y., Nova, F., & Nenty, S. (2023).Nursing care in complex congenital heart disease and respiratory distress syndrome for baby in NICU. *Journal of Applied Nursing and Health, 5(1), 55-65.* https://doi.org/10.55018/janh.v5i1.123

Thank you

Approach to the newborn with cyanosis

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Cyanosis in the Newborn

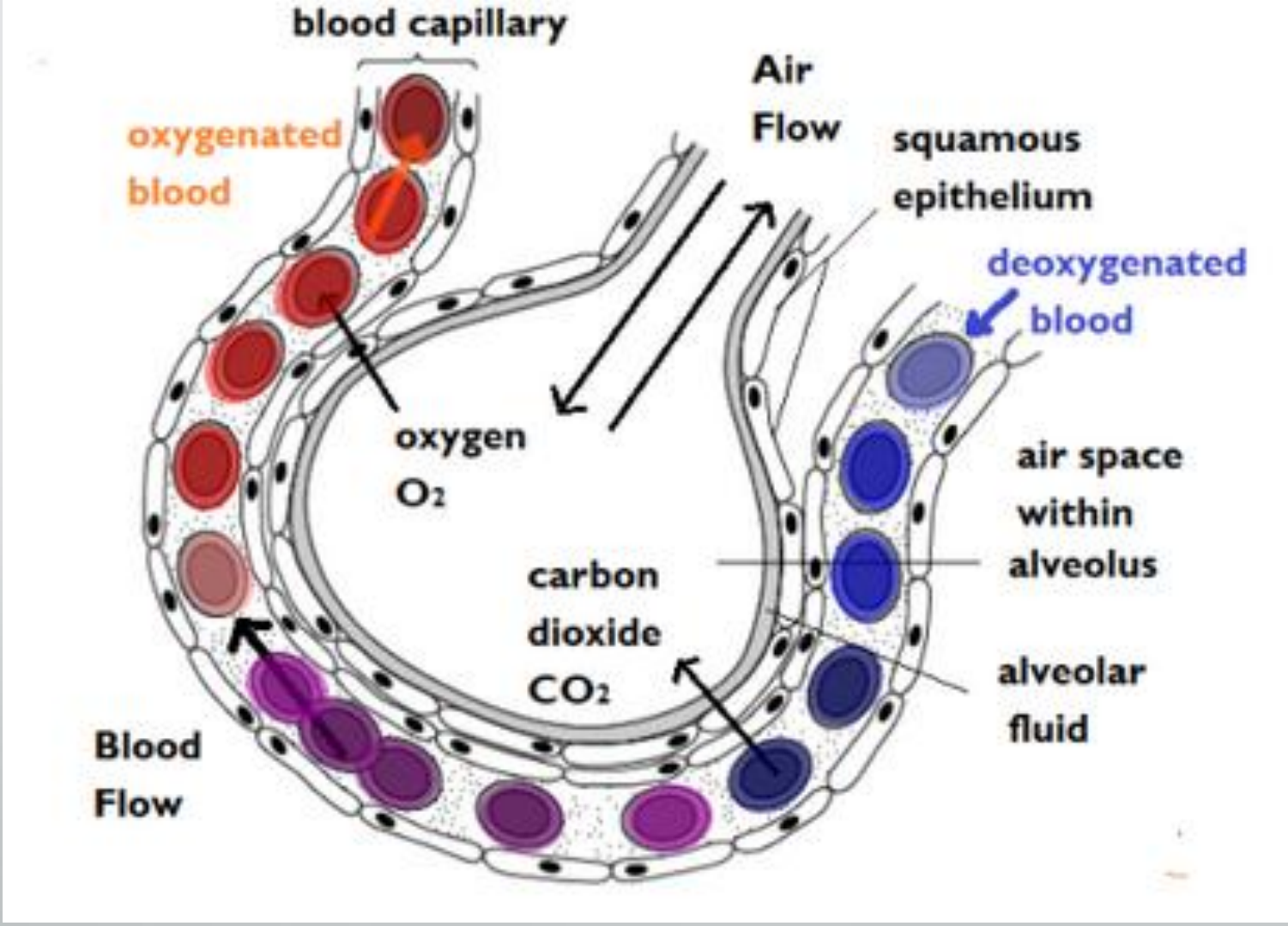
- **Definition**: Bluish discoloration of skin and mucous membranes due to increased deoxygenated hemoglobin

- Always evaluate urgently

Achieving normal oxygen saturations

- 1. **Inspired O2** reaches alveolar-capillary units: **Adequate ventilation**.
- 2. **Deoxygenated blood** flows thru the pulmonary arteries to alveolar-capillary units.
- 3. In the alveolus, **O2 diffuses from the airspace→ capillary blood**.
- 4**. Oxygen binds to Hb in the RBCs** flowing thru the pulmonary capillaries.
- 5. Oxygenated blood from all regions of the lungs mixes together as it returns to **the left side of the heart → systemic circulation**

Normal oxygen uptake at Alveoli



Pathophysiology

- **Ventilation problems**: Airway/Lung disease → low PaO_2
- **Perfusion problems:** CCHD → Right-to-left shunts
- **Hemoglobin problems:** Methemoglobinemia
- **Neuromuscular causes:** Hypoventilation

Key Differential Diagnoses

- **Pulmonary**: RDS, pneumonia, MAS, TTN, PPHN, Congenital Airway abnormalities
- **Cardiac (The 5 Ts):** TGA, TOF, Tricuspid atresia, TAPVR, Truncus arteriosus

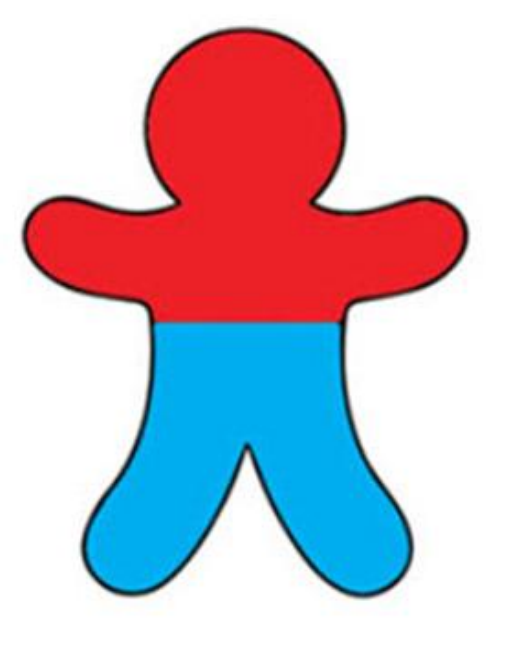
(Other cardiac: HLHS, Ebstein anomaly, pulmonary atresia)

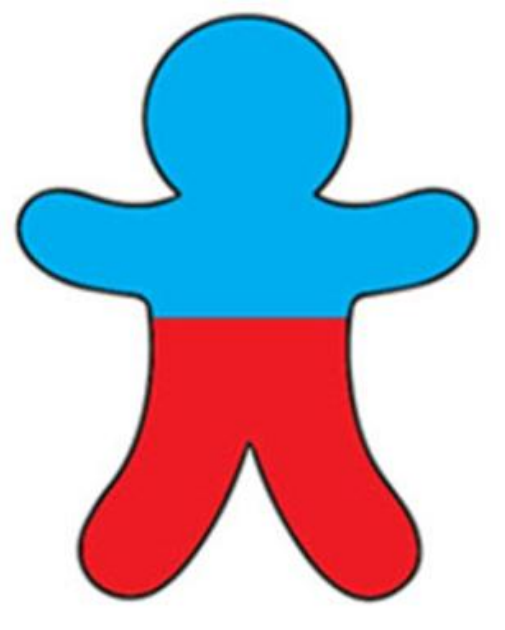
- **Hematologic:** methemoglobinemia, polycythemia
- **GIT Disorders:** Esophageal atresia/Tracheoseophageal fistula, CDH
- **CNS/neuromuscular** and miscellaneous causes: Apnea, hypothermia

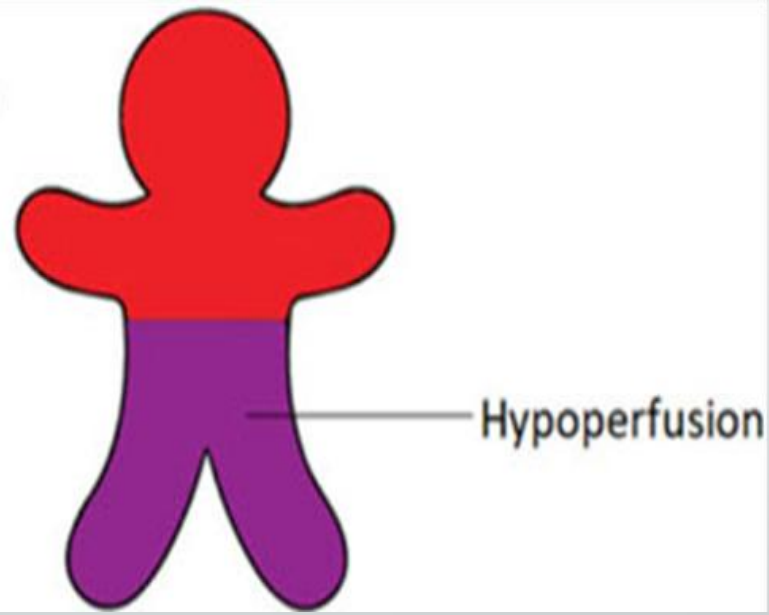
Patterns of cyanosis in the newborn

- **Central Cyanosis:** cyanosis affecting both mucous membranes and skin
- **Peripheral cyanosis (Acrocyanosis):** Involves only extremities
- **Differential cyanosis**: Only lower limbs are cyanosed
- **Reverse differential cyanosis:** Only upper limbs are cyanosed

Patterns of cyanosis in the newborn







Acrocyanosis

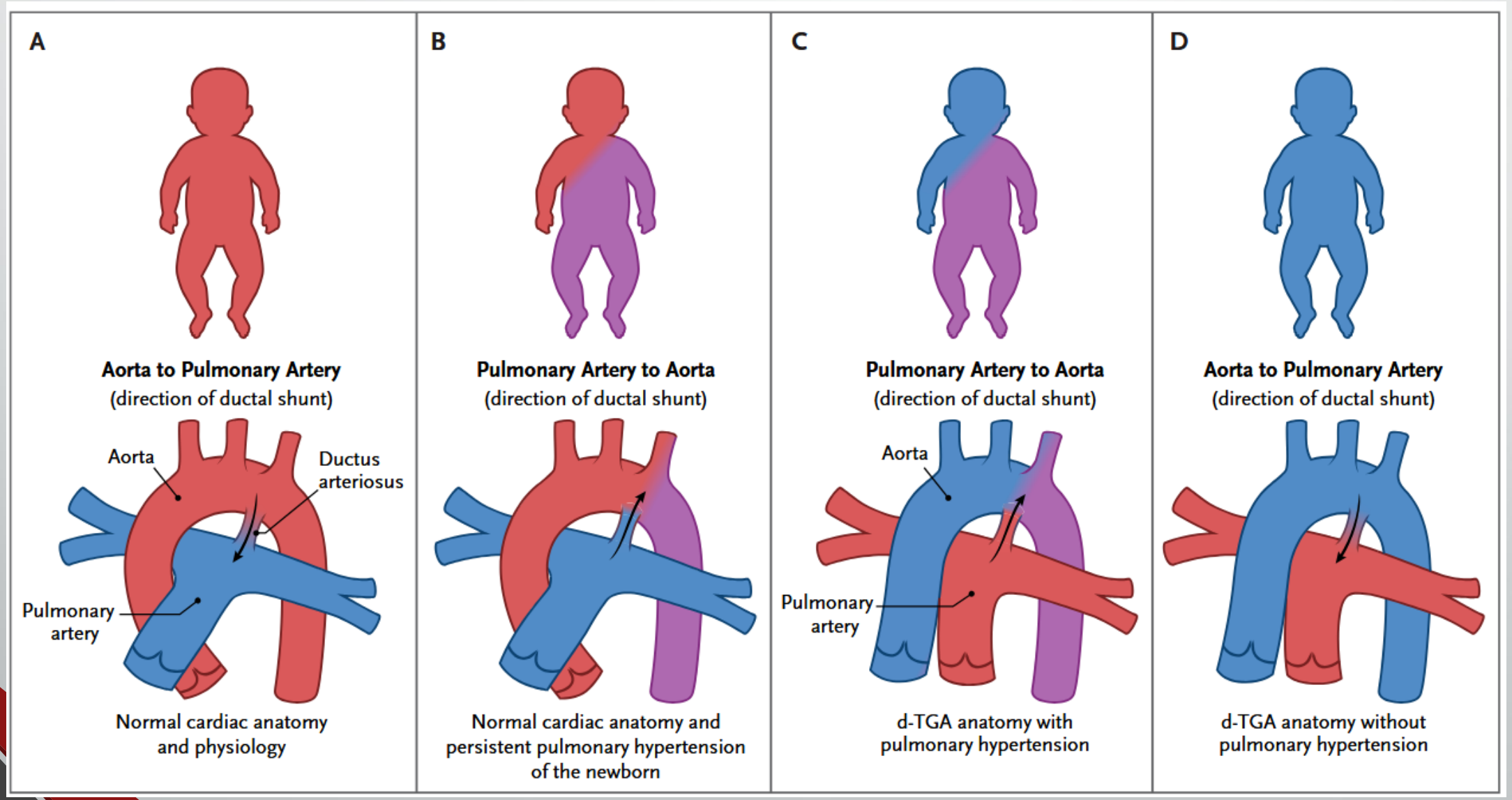
Clinical Evaluation

- **Relevant history: Pregnancy h/o,** Prematurity, PROM, Prolonged labour, Delivery mode, APGAR score
- **Features of respiratory distress:** SAS score
- **Pattern of cyanosis**
- **Detailed Respiratory exam**
- **Detailed CVS exam**
- **Neuromuscular system**

Diagnostic Evaluation

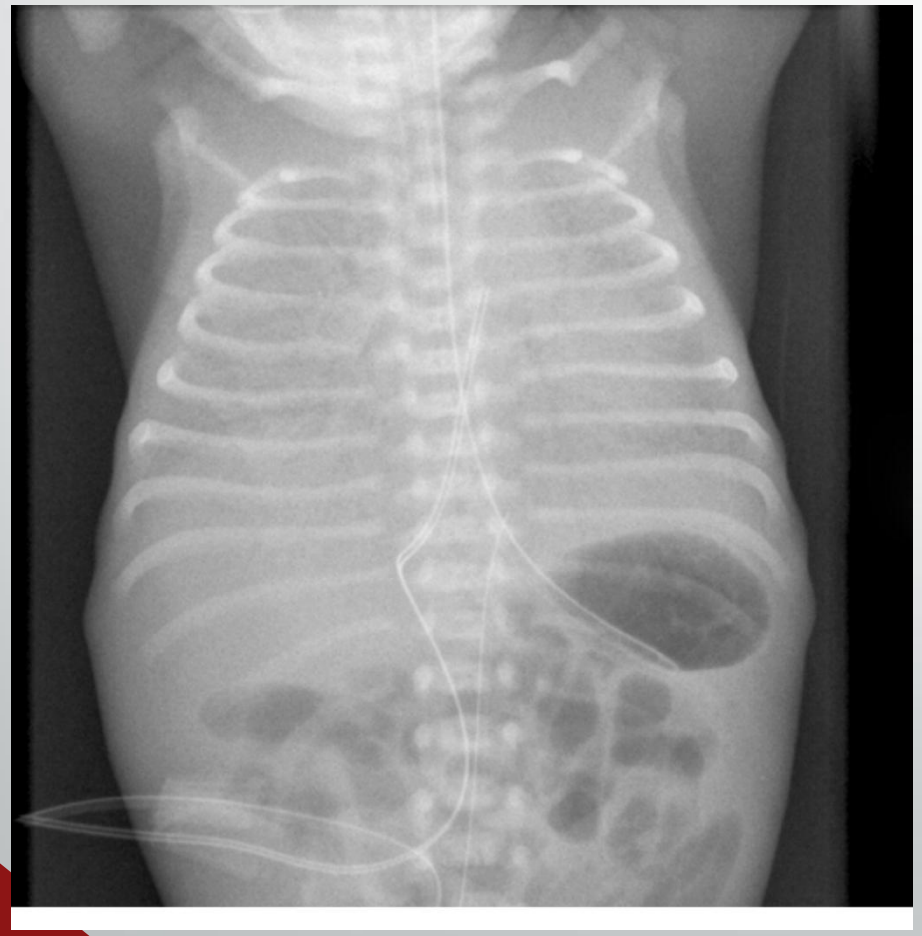
- Pre- vs post-ductal saturations
- Hyperoxia test
- Random Blood glucose, Blood gas, CBC, CRP, cultures
- Chest X-ray
- Echocardiography

Patterns of cyanosis in CHD



Chest x-ray in selected respiratory causes of cyanosis

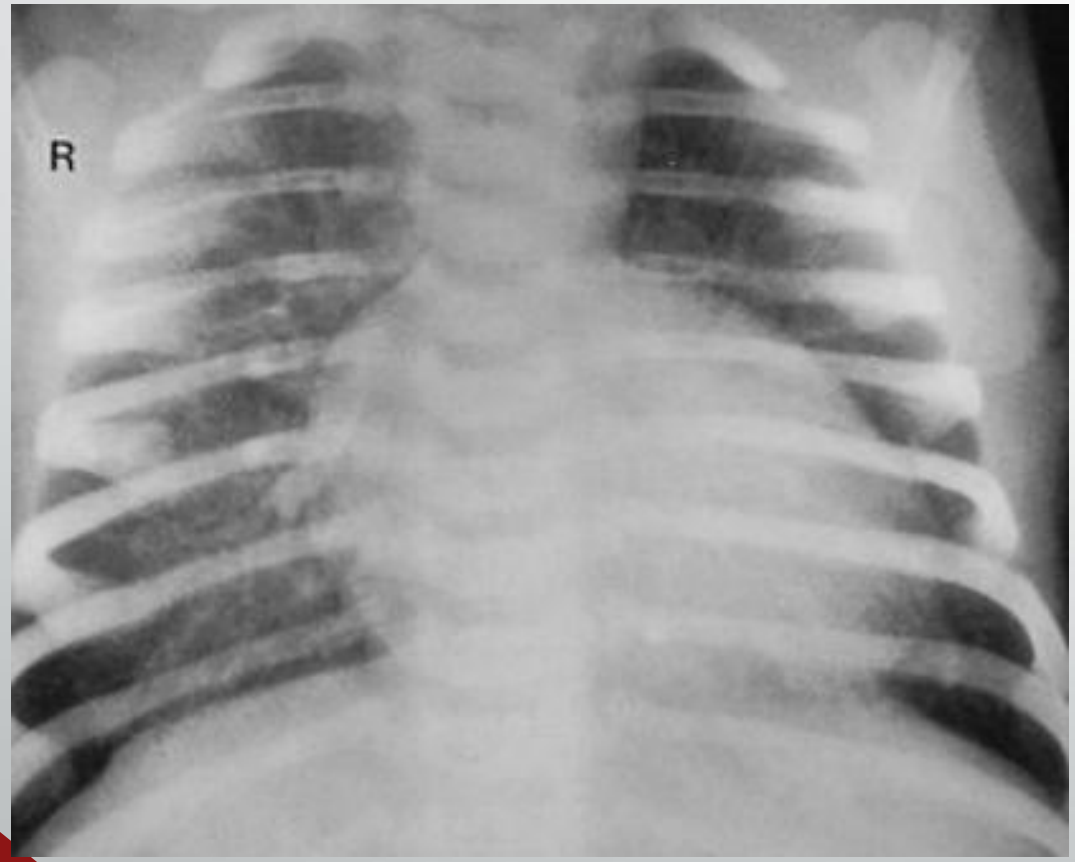
RDS



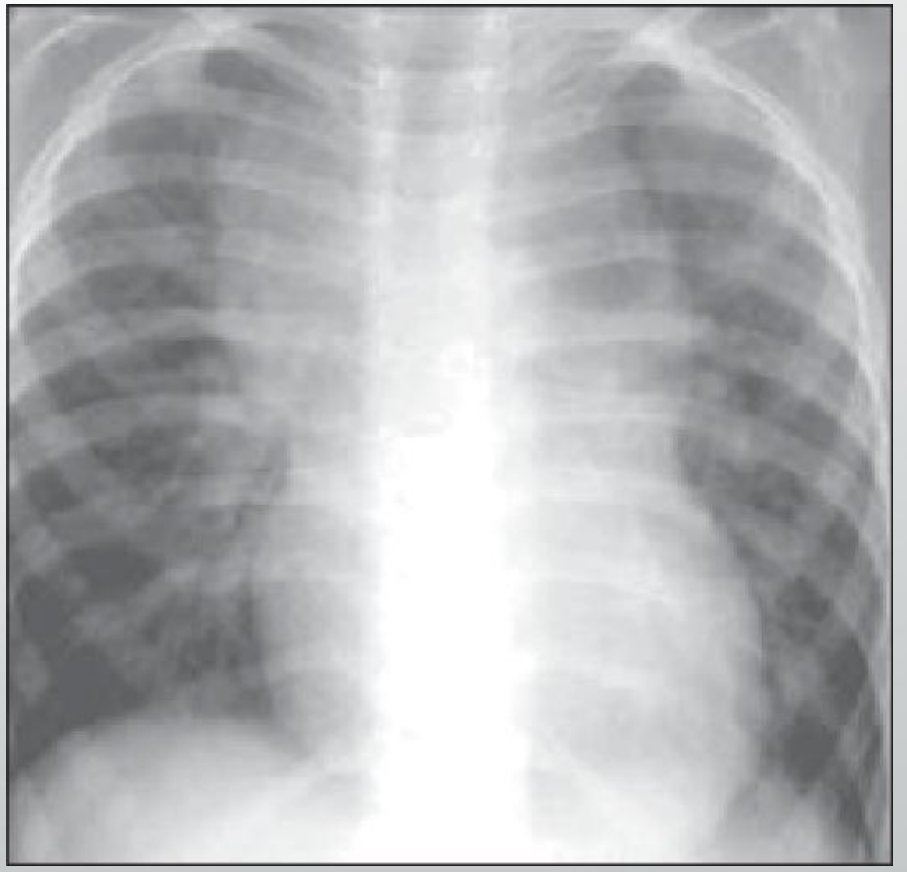
MAS

CXR in selected cyanotic CHD

TGA



Supracardiac TAPVR

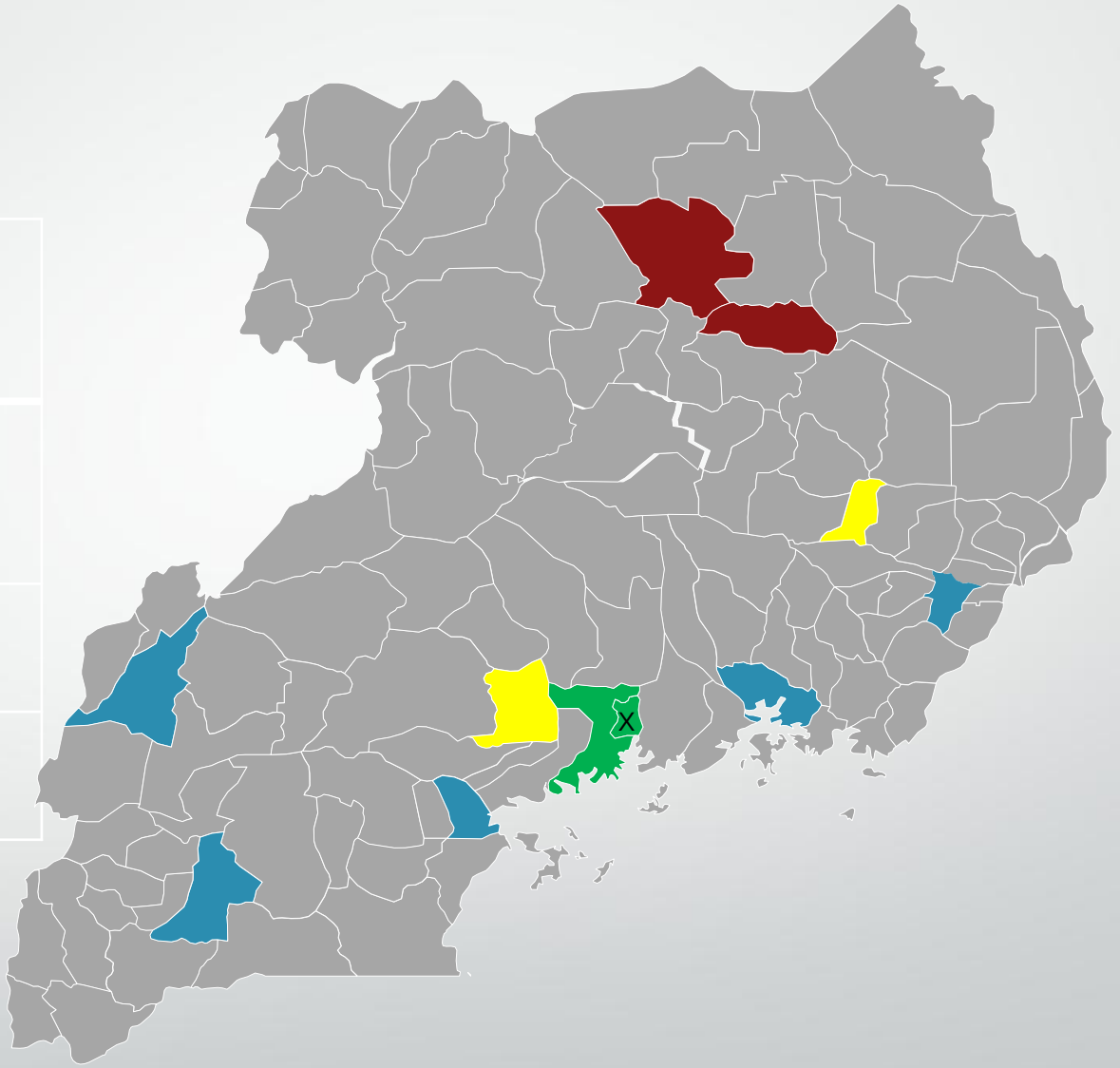


Pre-referral Management of the newborn with cyanosis

- **Stabilize ABCs**: airway, breathing and circulation: Suction, bag-mask,
- **Keep warm and clean**
- **Supplemental oxygen as per requirements:** Nasal prongs
- Start **antibiotics** as per protocol/Suspect sepsis
- **Ensure Feeding**: IV D10/NGT
- **Pre-post ductal sPO2 measurements**
- **Counselling and Education**
- **Phone consult with doctor at the referral facility**

Where you can get help for echo

	Nurse/Radiographers trained in echo	**Gulu, Lira**
	Resident cardiologists	Mbale, Jinja, Fort portal Masaka, Mbarara
	Soon to have cardiologists	Mityana, Soroti
	Center of Excellence	UHI, Kampala, Wakiso



Management of cyanotic newborns at referral centers

- **Pre-post ductal sPO2**
- **Advanced ventilation optimization**: CPAP/Intubation
- **Chest radiograph**
- **Sildenafil for PPHN**
- **Screening echo**
- **Counselling**
- **Phone consult** with the specialist at the next level of care
- **Referral to Regional Heart Center/Uganda Heart Institute**

Services available at the UHI for newborns with cyanotic CHD

- **Echocardiography**
- Oral Dinoprostone: starting 25-45mcg/kg QIH
- **Parental Counselling**
- **Interventional Procedures:** Balloon atrioseptostomy, PDA stenting
- **Surgical Procedures**: Modified BT Shunt

Newborn screening for critical cyanotic CHD using pulse oximetry

- A screen is considered passed when there is sPO2 measurement that is:

1. ≥95% in BOTH the right hand and foot
2. ≤3% absolute difference between the right hand and foot

Failed newborn Pulse-oximetry screens

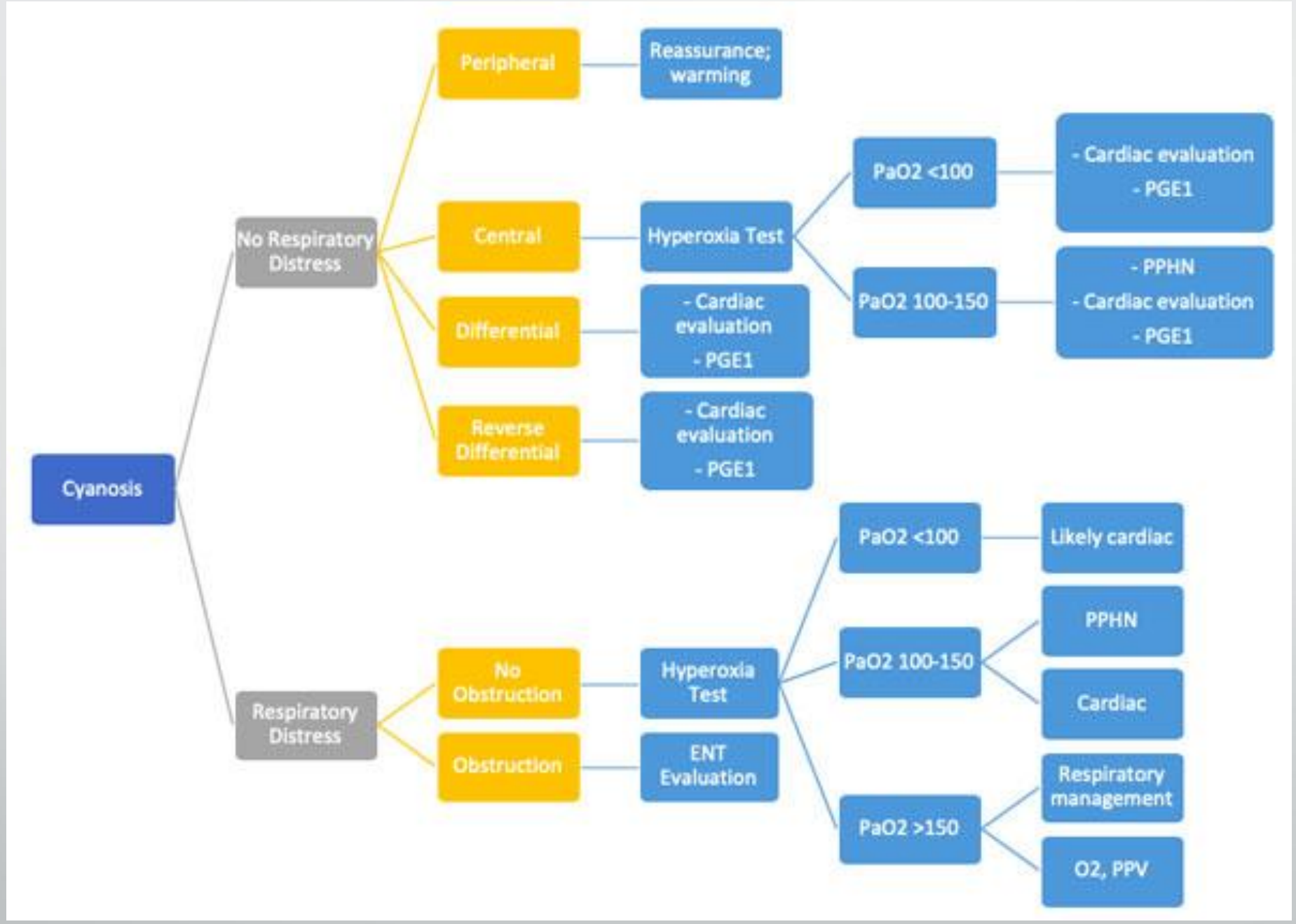
A screen is considered **FAILED** if at least one of these occur:

1. **Any oxygen (O2) saturation <90%** in either the right hand or foot (initial screen/repeat screen)
2. **O2 saturation is <95%** in either the right hand or foot on 2 measurements*
3. **A >3% difference in O2 saturation** between the right hand and foot on 2 measurements*

* separated by at least one hour

Ways to reduce false positive screens

1. Screen the newborn while he or she is **alert.**
2. Screen the newborn at **≥24 hours old.**
3. Screen the newborn after he or she has been **weaned off supplemental Oxygen**


Cyanosis
No Respiratory Distress
Peripheral
Reassurance; warming
Central
Hyperoxia Test
PaO2 <100
- Cardiac evaluation
- PGE1
PaO2 100-150
- PPHN
- Cardiac evaluation
- PGE1
Differential
- Cardiac evaluation
- PGE1
Reverse Differential
- Cardiac evaluation
- PGE1
Respiratory Distress
No Obstruction
Hyperoxia Test
PaO2 <100
Likely cardiac
PaO2 100-150
PPHN
Cardiac
PaO2 >150
Respiratory management
O2, PPV
Obstruction
ENT Evaluation

Take home points

- Cyanosis in the newborn has **varied etiology**
- Differentiate **pulmonary vs cardiac causes**
- **Hyperoxia test and CXR are rapid tools**
- **PGE1 (or Dinoprostone)** can be lifesaving
- **Echocardiography** is critical to exclude CHD
- **Early coordinated** referral is essential


Thank You!