

# STANDARD TREATMENT WORKFLOW (STW)

## CRITICAL HEART DISEASE IN THE NEWBORN

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### CITATION

Kumar K, Gupta S, Jain S, Solomon RS, Sasikumar N, Ganguly D. CRITICAL HEART DISEASE IN THE NEWBORN. Journal of the Epidemiology Foundation of India. 2024;2(2Suppl):S313-S314.

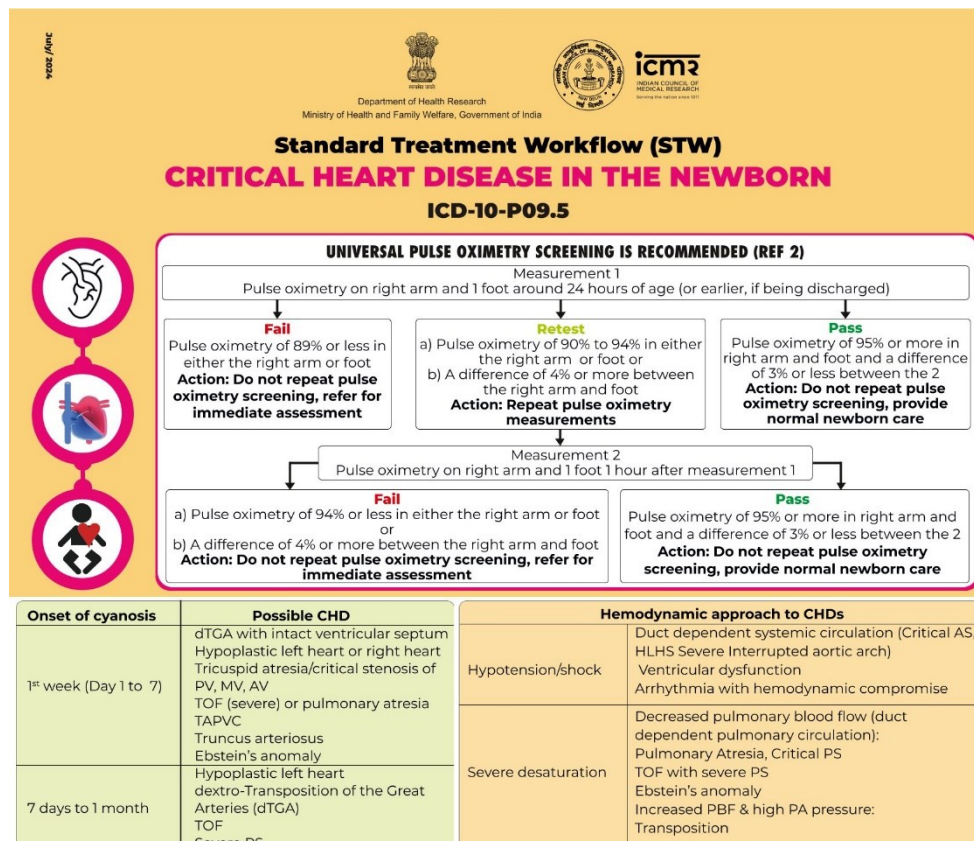
DOI: <https://doi.org/10.56450/JEFI.2024.v2i2Suppl.029>



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Ministry of Health and Family Welfare, Government of India

## Standard Treatment Workflow (STW)

### CRITICAL HEART DISEASE IN THE NEWBORN

#### ICD-10-P09.5

UNIVERSAL PULSE OXIMETRY SCREENING IS RECOMMENDED (REF 2)

Measurement 1  
Pulse oximetry on right arm and 1 foot around 24 hours of age (or earlier, if being discharged)

<p style="text-align: center; color: #e91e63; font-weight: bold;">Fail</p> <p>Pulse oximetry of 89% or less in either the right arm or foot <b>Action: Do not repeat pulse oximetry screening, refer for immediate assessment</b></p>	<p style="text-align: center; color: #e91e63; font-weight: bold;">Retest</p> <p>a) Pulse oximetry of 90% to 94% in either the right arm or foot or b) A difference of 4% or more between the right arm and foot <b>Action: Repeat pulse oximetry measurements</b></p>	<p style="text-align: center; color: #e91e63; font-weight: bold;">Pass</p> <p>Pulse oximetry of 95% or more in right arm and foot and a difference of 3% or less between the 2 <b>Action: Do not repeat pulse oximetry screening, provide normal newborn care</b></p>
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Measurement 2  
Pulse oximetry on right arm and 1 foot 1 hour after measurement 1

<p style="text-align: center; color: #e91e63; font-weight: bold;">Fail</p> <p>a) Pulse oximetry of 94% or less in either the right arm or foot or b) A difference of 4% or more between the right arm and foot <b>Action: Do not repeat pulse oximetry screening, refer for immediate assessment</b></p>	<p style="text-align: center; color: #e91e63; font-weight: bold;">Pass</p> <p>Pulse oximetry of 95% or more in right arm and foot and a difference of 3% or less between the 2 <b>Action: Do not repeat pulse oximetry screening, provide normal newborn care</b></p>
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Onset of cyanosis	Possible CHD	Hemodynamic approach to CHDs
1 <sup>st</sup> week (Day 1 to 7)	dTGA with intact ventricular septum Hypoplastic left heart or right heart Tricuspid atresia/critical stenosis of PV, MV, AV TOF (severe) or pulmonary atresia TAPVC Truncus arteriosus Ebstein's anomaly	Hypotension/shock Duct dependent systemic circulation (Critical AS, HLHS Severe Interrupted aortic arch) Ventricular dysfunction Arrhythmia with hemodynamic compromise
7 days to 1 month	Hypoplastic left heart dextro-Transposition of the Great Arteries (dTGA) TOF Severe PS Truncus arteriosus	Severe desaturation Decreased pulmonary blood flow (duct dependent pulmonary circulation): Pulmonary Atresia, Critical PS TOF with severe PS Ebstein's anomaly Increased PBF & high PA pressure: Transposition
Late onset cyanosis	TOF Double outlet right ventricle (DORV) with VSD - PS, dTGA with VSD -PS, Tricuspid atresia with VSD -PS	Heart failure Pulmonary plethora: L -> R shunt With cyanosis/desaturation - CCHD with increased pulmonary blood flow (PBF) With severe desaturation and pulmonary venous hypertension: Obstructed TAPVC

ASK/LOOK/FEEL	CATEGORY	INTERPRETATION
Does the baby have decreased activity and feeds poorly? Is the baby cyanotic? Pulse Oximetry screen	Activity and feeding Cyanosis/Desaturation	Decreased activity is a common presentation of heart failure/shock in neonates Look for bluish discoloration of fingers and tongue. If extremities are blue, to rule out peripheral cyanosis- warm the baby and re check
Is there any evident respiratory distress or Tachypnoea? Does the baby have Inappropriate Tachycardia/Bradycardia	Respiration Heart Rate	Chest indrawing/grunting/use of accessory muscles/RR more than 60 per minute Normal awake new born 100-180 normal sleeping new born 80-160
Is the baby in shock? peripheral temperature	Perfusion	Peripheries cold and clammy OR Cardiac resynchronization therapy (CRT) > 3 seconds, core - difference more than 2 degrees even after warming/external temperature is controlled/ appropriate correction of ambient temperature is done
Is the baby in heart failure? Is the baby sucking from the breast normally?	Heart Failure Feeding	Look for Tachypnoea, Tachycardia, Tender Hepatomegaly Normal: sucking vigorously, no suck rest suck breast cycle, no breathlessness/ forehead sweating while feeding, no prolonged feeding times

#### APPROACH TO SHOCK

Shock

Start PG E1 and refer if:

- Identifiable that femoral pulses are distinctly feeble compared to upper body
- Right arm - SpO<sub>2</sub> difference more than 3%

Intravenous/Intraosseous access and fluid resuscitation 10 ml per kg of isotonic fluid, (max 40 ml per kg until perfusion improves or hepatomegaly develops).  
Manage Hypothermia, Hypoglycemia, hypocalcemia  
Appropriate antibiotic  
Monitoring to assess response

Manage shock as per Neonatal shock guidelines

Low threshold for Paediatric Cardiology Evaluation

Refractory Shock, Unlikely to be sepsis - Urgent referral to Pediatric Cardiologist

Septic shock likely if:

- Predisposing maternal and neonatal factors
- Core peripheral temperature difference > 3
- Sepsis Screen Positive

#### APPROACH TO CYANOSIS

Cyanosis (<SpO<sub>2</sub><95%)

Rule out TAPVC

SpO<sub>2</sub> < 80%?

No | Yes

No: Chest X-ray S/O whiteout lung/ Ground glass appearance /pulmonary venous hypertension

Yes: Early Paediatric Cardiology Consultation & Echo Late discharge once diagnosis confirmed Close SpO<sub>2</sub> monitoring through first week of life (for decrease in SpO<sub>2</sub> on ductal closure) Heart Failure Management (if only clinical features of CHF) Iron supplementation

Significant congenital heart disease likely

Duct dependent pulmonary circulation (All forms of Pulmonary Atresia/Critical PS) TGA with intact septum

Start PGE1 infusion refer for urgent paediatric cardiology evaluation (within hours)

SpO<sub>2</sub> <80% On serial monitoring

#### ABBREVIATIONS

AS: Aortic Stenosis	L->R: Left to Right	PV: Pulmonary Valve	TV: Tricuspid Valve
AV: Aortic Valve	MV: Mitral Valve	TAPVC: Total anomalous pulmonary Venous Connection	VSD: Ventricular Septal Defect
CCHD: Cyanotic Congenital Heart Disease	PA: Pulmonary Artery	TGA: Transposition of Great Arteries	
CHD: Congenital Heart Disease	PG E1: Prostaglandin E1	TOF: Tetralogy of Fallot	
HLHS: Hypoplastic Left Heart Syndrome	PS: Pulmonary Stenosis		

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INVOLVE A PAEDIATRIC CARDIOLOGIST AS SOON AS CRITICAL CHD IS SUSPECTED

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