



HEALTH HOLDING

HAFER ALBATIN HEALTH  
CLUSTER  
MATERNITY AND  
CHILDREN HOSPITAL

<b>Department:</b>	Neonatal Intensive Care Unit (NICU)		
<b>Document:</b>	Departmental Policy and Procedure		
<b>Title:</b>	CCHD Screening for Neonates		
<b>Applies To:</b>	All NICU and CCHD Staffs		
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## 1. PURPOSE:

- 1.1 Use evidence based guidelines utilizing pulse oximetry to early detect Critical Congenital Heart Disease (CCHD) in the newborn's before their discharge.
- 1.2 Prevent the morbidity and mortality associated with delayed diagnosis of CCHD such as damage to various vital organs including possible hypoxic/ischemic brain injury.
- 1.3 Develop strategies for the implementation of safe, effective, and efficient screening.
- 1.4 Arrange for timely and accurate diagnostic assessment with echocardiography for positively screened cases.

## 2. DEFINITIONS:

- 2.1 Newborns with critical congenital heart disease (CCHD) may appear normal at birth and until discharge; because the ductus arteriosus is still opened and these lesions are ductus dependent i.e. the ductus arteriosus is essential for maintaining either pulmonary or systemic blood flow.
- 2.2 The timing of constriction or closure of the ductus arteriosus explains why children with CCHD may present with cardiovascular collapse soon after discharge from the hospital.
- 2.3 Systematic review and meta-analysis of pulse oximetry screening for CCHD in asymptomatic newborn babies revealed high sensitivity and very high specificity. The false positive rate was low when it was done after 24 hours from birth.
- 2.4 **Pulse oximetry screening** is most likely to detect seven of the critical CHDs.
- 2.5 **Perfusion Index (PI)** is the ratio of the pulsatile blood flow to the nonpulsatile static blood flow in a patient's peripheral tissue, such as fingertip, toe, or ear lobe. Perfusion index is an indication of the pulse strength at the sensor site. The perfusion index varies depending on patients, physiological conditions, and monitoring sites.

## 3. POLICY:

- 3.1 Healthy newborn infants delivered in MCH will be screened for early detection of critical congenital heart disease at the age of 24 or more hours or as late as possible before discharge if early discharge is planned.
- 3.2 Screening is done also for admitted newborn before transfer or discharge from the hospital (including neonatology admitted patients e.g. patients in observation room, out born newborn) while patient is in room air (after weaning from oxygen).
- 3.3 Screening is performed according to the evidence based algorithm recommended by the American Academy of Pediatrics, American Heart association and Center of Disease Control and prevention (Appendices 7.1: Algorithm for early detection of critical congenital heart diseases).
- 3.4 Assigned nurses performing the test are educated in the use of the algorithm (appendices 7.1) and pulse-oximetry.
- 3.5 Assigned nurse will inform the assigned physician of the screening results.
  - 3.5.1 **Negative "Pass" screen:**  
Screening that has a pulse oximetry reading of 95% or more in the right hand or foot with a 3% or less difference between the right hand and lower extremity is considered a negative



- "pass" result and screening would end.
- 3.5.2 **Positive "failed" screening:**
  - 3.5.2.1 Any oxygen saturation measure is less than 90% (in the initial or repeat screening), or,
  - 3.5.2.2 Oxygen saturation is less than 95% in the right hand and foot on three (3) measures, each separated by one (1) hour, or,
  - 3.5.2.3 There is a more than 3% difference in oxygen saturation between the right hand and foot on three (3) measures, each separated by 1 hour.
- 3.6 Results will be documented in the newborn medical record and the MOH database of screening for CCHD.
- 3.7 Pediatric cardiology consultation will be done for all babies who failed the screening test to rule out CCHD by echocardiogram.

#### 4. PROCEDURE:

- 4.1 Assigned neonatology physician performs complete physical examination for all delivered neonates. Pulse oximetry monitoring should not replace a complete history and physical examination, which can sometimes detect CCHD before the development of hypoxia. Pulse oximetry monitoring is used to complement the physical examination.
- 4.2 Screening of healthy newborn in the postnatal and post caesarean wards will be done preferably at or after the age of 24 hours. If earlier discharge is planned, screen the baby as late as possible before discharge e.g. at 12 hours of age (False positive results may increase if screening is done before 24 hours of age).
- 4.3 **How to screen: "Nurses Role"**
  - 4.3.1 The nurse performing the screening should have completed training and passed the competency on performing CCHD screening.
  - 4.3.2 Ensure the following:
    - 4.3.2.1 A quiet environment.
    - 4.3.2.2 The infant is calm and warm during the reading (movement, shivering and crying can affect the accuracy of the pulse oximeter reading). Swaddle the infant.
    - 4.3.2.3 Conduct screening while the infant is awake, alert (if possible), should be quiet during the test. Do not test on an actively crying or cold infant.
    - 4.3.2.4 Vital signs within normal limit.
    - 4.3.2.5 Newborn is in room air.
    - 4.3.2.6 During performing the test, do not place infant in bright light, including bilirubin lamps and surgical lights, (this can affect the accuracy of the pulse oxymeter reading.). Cover the pulse oximeter probe with a blanket; turn off bright lights prior to screening (if possible).
  - 4.3.3 Parent may be present. Encourage family involvement to promote comfort while obtaining the reading and provide parent(s) with education related to the pulse oximeter screening and CCHD.
  - 4.3.4 Pulse oximeter probe placement:
    - 4.3.4.1 Select application site on the outside, fleshy area of the infant's hand or foot (appendices 7.2)
    - 4.3.4.2 Place the photo detector portion of the probe on the fleshy portion of the outside of the infant's hand or foot.
    - 4.3.4.3 Place the light emitter portion of the probe on the top of the hand or foot. Place the photo detector directly opposite of light emitter, on the bottom of the hand or foot.
    - 4.3.4.4 Remember, the photo detector and emitter must be directly opposite each other in order to obtain an accurate reading.
    - 4.3.4.5 Secure the probe to the infant's hand or foot using the adhesive tape recommended by the manufacturer. Do not use tape to secure probe placement.
  - 4.3.5 Obtain the oxygen saturations in the right hand and one foot while accompanying physician during the daily rounds or at any other time, preferably after the age of 24 hours.
    - 4.3.5.1 If oxygen saturation is 95% or more in either limbs or the difference between the two limbs is 3% or less, the test is finished; infant passed (negative screen).



- 4.3.5.2 If oxygen saturation is less than 90% in right hand or foot, the test is finished; infant failed (positive screen).
- 4.3.5.3 If the saturation is 90-94% in right hand and foot or more than 3% difference between right hand and foot, repeat the test after one hour:
  - 4.3.5.3.1 Monitor infant for signs and symptoms of cardiac or respiratory distress.
  - 4.3.5.3.2 If saturation is 95% or more in either limbs or the difference between the two limbs is 3% or less, the test is finished; infant passed (negative screen).
  - 4.3.5.3.3 If the obtained saturation is still between 90-94% with more than 3% difference, repeat again after one hour.
  - 4.3.5.3.4 If still the same result after the third test, the infant failed the screening (Positive screen).
- 4.3.6 The assigned nurse will immediately inform assigned physician of positive "Failed" results
- 4.3.7 Documentation:
  - 4.3.7.1 The assigned nurse will document the readings and results in the patient's medical record; on the sheet for screening of congenital heart disease and on the nurses progress notes and inform assigned physician of results.
  - 4.3.7.2 There is one nurse assigned to enter the results of all new-born in the MOH database of screening for CCHD.
- 4.4 For new-born with a positive screen, the assigned physician will:
  - 4.4.1 Evaluate for other causes of hypoxemia.
  - 4.4.2 Consult cardiologist to rule out CCHD by echocardiogram.
  - 4.4.3 Explain the situation and plan of care to the parents/patient guardian.
  - 4.4.4 Monitor infant for signs and symptoms of cardiac or respiratory distress.

## 5. MATERIAL AND EQUIPMENT:

- 5.1 Motion tolerant pulse oximeter and sensors.
- 5.2 Blankets for warming the infant and blocking extraneous light
- 5.3 Computer to enter results to MOH database.

## 6. RESPONSIBILITIES:

- 6.1 Physician
- 6.2 All NICU, CCHD Staffs






## 7. APPENDICES:

- 7.1 Algorithm for: Newborn Screening for Critical Congenital Heart Disease (CCHD)
- 7.2 Application site for pulse oximetry probe

## 8. REFERENCES:

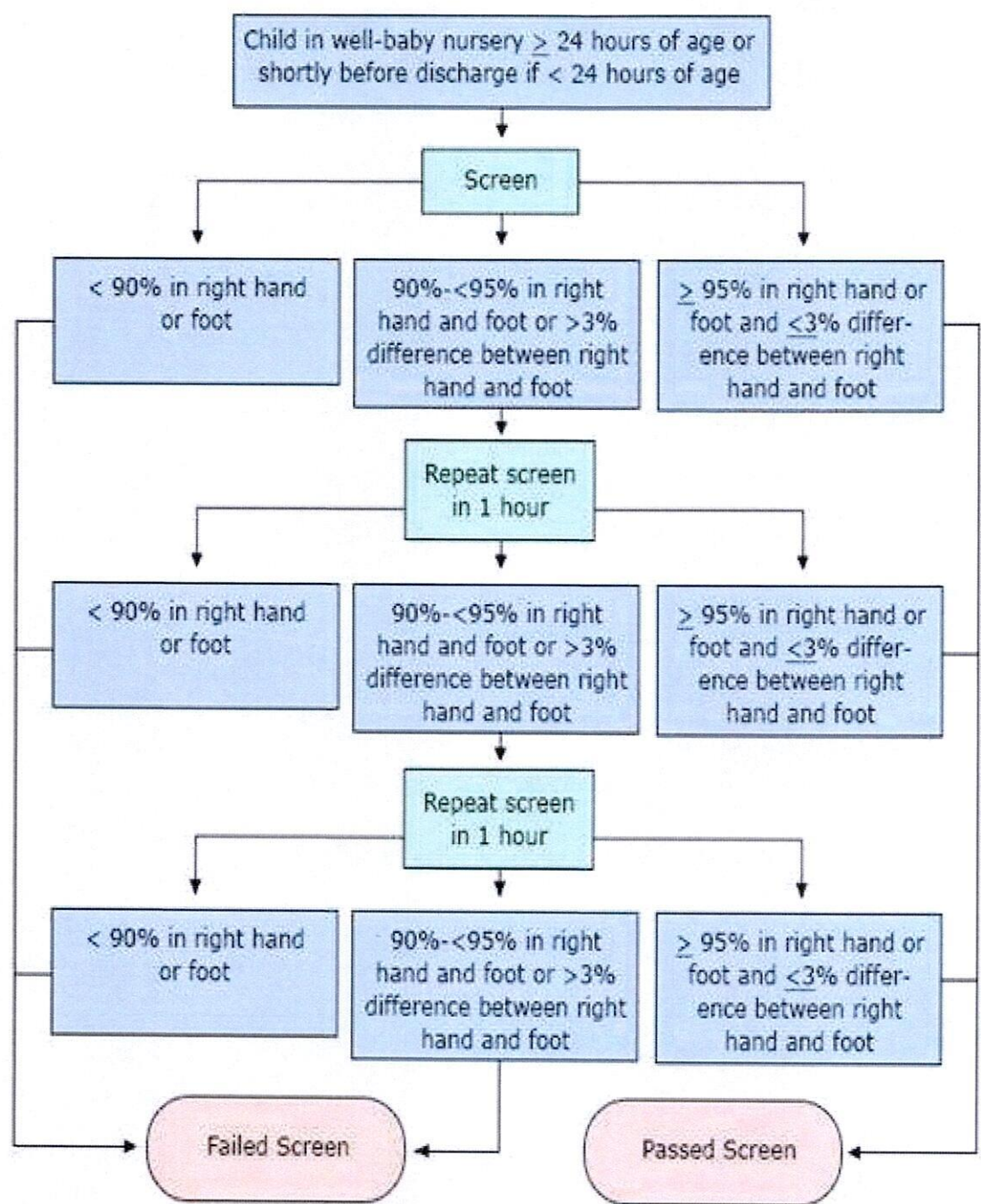
- 8.1 American academy of paediatrics. Policy Statement. Endorsement of Health and Human Services Recommendation for Pulse Oximetry Screening for Critical Congenital Heart Disease. Paediatrics Vol.129, Number 1, January 2012.
- 8.2 Kemper A R et al. Strategies for Implementing Screening for Critical Congenital Heart Disease. Paediatrics 2011J28:e1259. <http://pediatrics.aappublications.org/content/early/2011/10/06/peds.2011-1317>
- 8.3 Role of Pulse Oximetry in Examining Newborn's for Congenital Heart Disease: A Scientific Statement from the AHA and AAP. Paediatrics Vol. 124, No. 2; 2009
- 8.4 Center Disease Control and prevention. Facts about critical congenital heart defects. May 21, 2015. [www.cdc.gov/ncbddd/heartdefect/cchd-facts.html](http://www.cdc.gov/ncbddd/heartdefect/cchd-facts.html)
- 8.5 Hospital Guidelines for implementing Pulse Oximetry. [www.adph.org/newbornscreening/..fhs.NBS.CCHDGuidelines](http://www.adph.org/newbornscreening/..fhs.NBS.CCHDGuidelines).

## 9. APPROVALS:

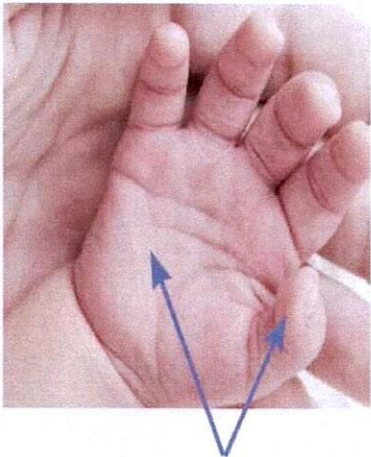
	Name	Title	Signature	Date
Prepared by:	Ms. Afrah Saud Al Shammari	NICU Head Nurse		January 05, 2025
Prepared by:	Dr. Falah Nabhan Al Shammari	NICU Quality Coordinator		January 05, 2025
Reviewed by:	Mr. Sabah Turayhib Al - Harbi	Director of Nursing		January 07, 2025
Reviewed by:	Dr. Sarhan Hamdan Al Shammari	NICU Head of the Department		January 08, 2025
Reviewed by:	Mr. Abdullellah Ayed Al Mutairi	QM&PS Director		January 09, 2025
Reviewed by:	Dr. Tamer Mohamed Naguib	Medical Director		January 12, 2025
Approved by:	Mr. Fahad Hazam Al - Shammari	Hospital Director		January 19, 2025



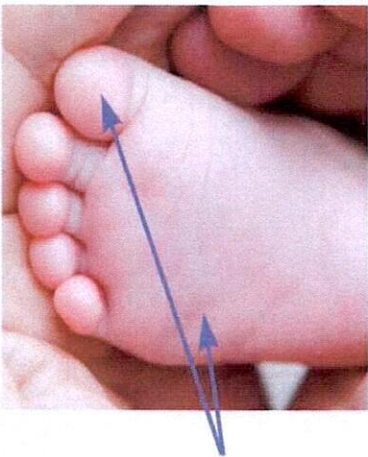
Appendices 7.1: Algorithm for: Newborn Screening for Critical Congenital Heart Disease (CCHD)



Appendices 7.2 Application site for pulse oxymetry probe



RH Application Sites



Foot Application Sites