PEDIATRIC NEWBORN MEDICINE CLINICAL PRACTICE GUIDELINES

Screening for Critical Congenital Heart Disease

Points of emphasis/Primary changes in practice:

CCHD Screening is mandated for all newborns prior to discharge from the hospital, unless medically contraindicated.

Questions? Please contact: Medical Director of Well Newborn Care

Clinical Guideline Name	Screening for Critical Congenital Heart Disease
Implementation Date	March 1, 2021
Due for CPC Review	March 1, 2024
Contact Person	Medical Director of Well Newborn Care
Approved By	Dept of Pediatric Newborn Medicine Clinical Practice Council CWN SPP 3/11/20 SPP Steering _____ Nurse Executive Board/CNO 3/11/20

This is a clinical practice guideline. While the guideline is useful in approaching screening for critical congenital heart disease, clinical judgment and / or new evidence may favor an alternative plan of care, the rationale for which should be documented in the medical record.

I. Purpose

The purpose of this clinical practice guideline is to outline procedures related to the routine screening of newborns for critical congenital heart disease.

II. Reliance

All CPGs will rely on the Nursing **CWN Clinical Practice Manual**. All relevant nursing PPGs are listed below.

- WNH Standard Policy Statements
- WNH D.3 Discharge of an Infant
- WNH H.1 CWN Hand-off communication
- WNH I.1 Infant Identification
- WNH R.4 Newborn Rapid Response Situations and Infant Codes (CPG)
- WNH T.4 Infant Transport

III. Scope

These guidelines apply to infants in the Neonatal Intensive care Unit (NICU) and the Well Baby Nursery (WBN).

III. Guidelines

All infants, except those who have had an echocardiogram, will be screened for CCHD.

Information:

CCHD Screening in the WBN

- CCHD screening should be performed when the infant is between 24 and 48 hours of life (HOL)
    - Earlier screening can lead to false positive results because of the transition from fetal to neonatal circulation and stabilization of systemic oxygen saturation levels.
    - In general, screening closer to 48 HOL is desirable because of an increased likelihood to detect emerging ductal dependent CCHD.
- If discharge prior to 24 HOL is planned, complete as close to discharge as possible. Follow up screening at primary care pediatrician's office is recommended.
- Screening should be performed by a registered nurse. Oxygen saturation (SpO_2) is measured in the right hand (preductal) **and** either foot (postductal). Screening at both locations can occur simultaneously or in direct sequence. Postductal measurement of SpO_2 is important because defects with right-to-left shunting of desaturated blood through the ductus arteriosus will not be detected with only preductal measurement.
- All infants in the WBN who fail the first screening will be transferred immediately to NICU (<90%). If SpO_2 is 90-94%, repeat according to algorithm. SPO_2 95% or greater is considered a pass.
- **Any infant in WBN who meets early warning criteria for a Rapid Response Situation (RRS) will have a RRS called.**

CCHD Screening in the NICU

NICU infants, when medically appropriate, should be screened as part of the discharge process.

- The presence of lung disease and other illness makes the interpretation of saturation data much more complex in these infants and CCHD screening at 24 hours after birth is often not possible.
- For those infants who have not had echocardiography performed as part of their care, the CCHD screening protocol should be followed once they have been weaned from supplemental oxygen. CCHD screening does not need to be performed prior to discharge if the baby has already had an echocardiogram.

PROCEDURE

Preparation and procedure

1. Parents/guardians should be provided with written information about the test; and the test results should be discussed with the parents/guardians
2. Obtain the pulse oximeter(s) and disposable/reusable sensor(s).
    - Screening can occur simultaneously or direct sequence
3. Turn pulse oximeter(s) on.
    - Allow time for self-test to run.
4. Select the application site.
    - Make sure that the skin is clean and dry before applying the sensor.
    - Place the photodetector portion of the sensor on the fleshy portion of the outside of the infant's hand or foot.
    - Place the light emitter portion of the sensor on the **top** of the hand or foot **directly opposite the photodetector.**
    - Right hand (pre-ductal) around the right palm with the light under the 4th or 5th finger

      AND
    - Either foot (post-ductal)
        - place outer aspect of foot with the light under the 4th or 5th toe, either foot acceptable
5. Calm and swaddle infant as necessary.
    - Pulse oximetry takes just a few minutes to perform when the infant is quiet, alert, and warm.
8. Check waveform / signal quality as appropriate to the equipment.
    - Pulse oximeters have different confidence indicators to ensure the pulse oximeter reading is accurate.
9. **Keep pulse oximeter probe on hand/foot until pulse indicates accuracy.**
    - **Test is considered complete once 10 seconds of reliable pulse oximetry has been achieved.**

Interpretation

Utilize algorithm attached for screening interpretation.
Notify responding clinician of a FAIL or a RETEST. Responding clinician is responsible for discussing results with parents/guardians.

Initial Screen:

- PASS = $SpO_2 \geq 95\%$ and ≤ 3 % difference between hand and foot
- FAIL = $SpO_2 < 90\%$ on hand or foot
- RETEST = SpO_2 is 90-94% or > 3 % difference between hand and foot

If RETEST:
Keep pulse oximeter on and monitor infant in nursery.
R**epeat screen in one hour** x1 (2 total screens):

- PASS = SpO_2 is $\geq 95\%$ in both the hand and foot and $\leq 3\%$ difference

- FAIL = SpO_2 < 95% on hand or foot and/or > 3 % difference between hand and foot.

Based on physiologic criteria and staff concern, RRS activation or transfer to the NICU will be initiated for all infants who FAIL CCHD screening.

The following CCHD pulse oximetry screening information in the infant's medical record.

- Whether written CCHD screening information given to parents/guardians, AND results discussed with parents/guardians
- If the screen was not done on an infant, this should be documented in the medical record, as well as the reason the test was not done such as the medical condition of the newborn or a religious objection of the parent/guardian.

Cleaning

1. Clean reusable sensor with hospital approved disinfectant after each use.

OR

2. Discard single use probes after test.

References:

1. American Academy of Pediatrics, Strategies of Implementing Screening for Critical Congenital Heart Disease. Kemper A.R., Mahle WT, Martin GR. Cooley WC, Kumar P, Morrow WR., Kelm K, Pearson GD, Glidewell J, Grosse SD, Howell RR. Pediatrics Vol. 128, No.5, November, 2011, pp. 1259-1267.
2. Children's National Medical Center, Washington, D.C. Congenital Heart Disease Screening Program Toolkit 4nd Ed..2013. www.childrensNational.org.
3. American Academy of Pediatrics, Newborn Screening for CCHD, 2016. https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/PEHDIC/Pages/Newborn-Screening-for-CCHD.aspx#topic4
4. Commonwealth of Massachusetts Department of Public Health, Critical Congenital Heart Disease (CCHD) Pulse Oximetry Screening, August 2014. http://blog.mass.gov/publichealth/wp-content/uploads/sites/11/2014/08/CCHD-Presentation-PHC-August-2014-FINAL.pdf
5. Oster, M (2020) Newborn Screening for critical congenital heart disease using pulse oximetry. UpToDate accessed May 4, 2020.
6. Martin, GR, Ewer AK, Gaviglio A, Hom LA,, Saarinen A, Sontag, M, Burns, KM, Kemper, AR, Oster, ME. (2020) Updated Strategies for Pulse Oximetry Screening for Critical Congenital Heart Disease. PEDIATRICS Volume 146, number 1, July 2020: e201916.

ATTACHMENT

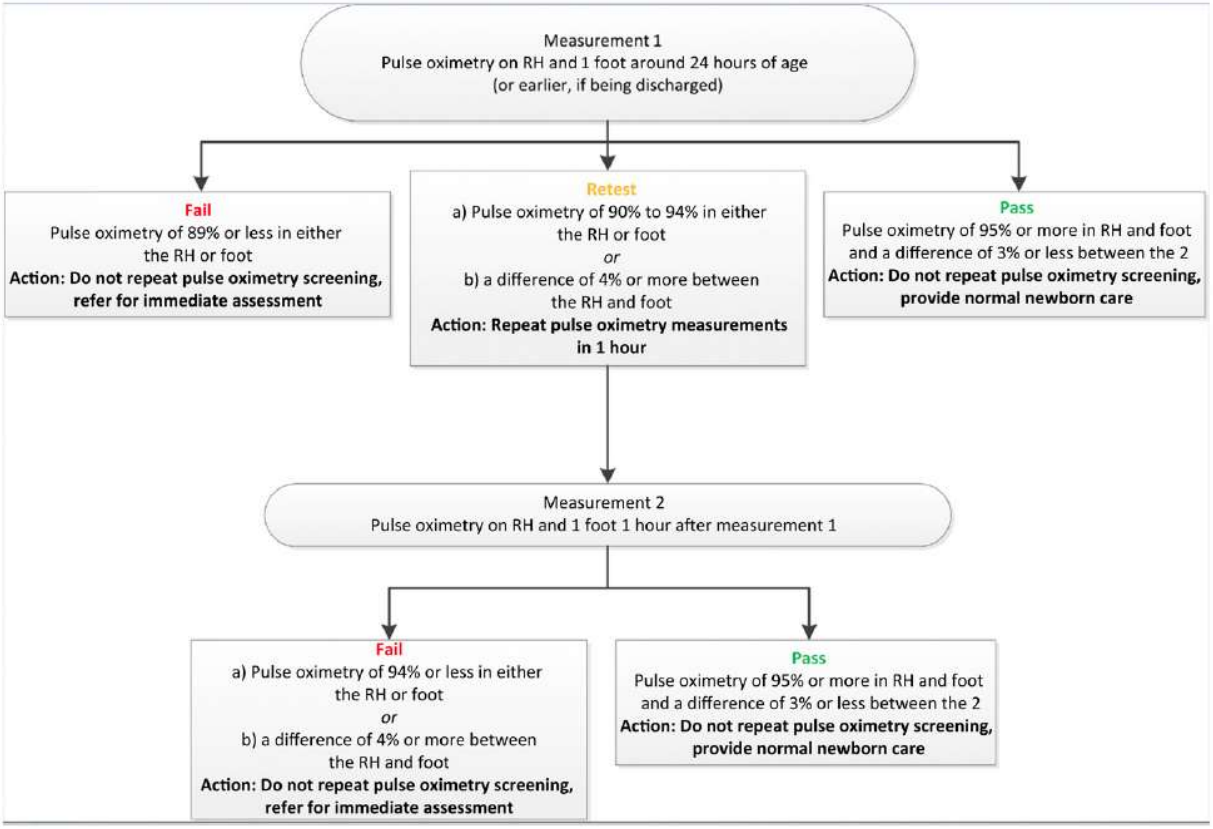

FIGURE 2
Revised algorithm for CCHD screening with pulse oximetry. RH, right hand.