

Pulse Oximetry Screening for Critical Congenital Heart Disease (CCHD) in Newborn Infants: Midwife-Attended Out of Hospital Births in Wisconsin

PATIENT POPULATION AND/OR AREA AFFECTED

All Wisconsin infants born in licensed midwife-attended out of hospital (OOH) settings

GENERAL INFORMATION

Critical Congenital Heart Disease (CCHD) has an incidence of approximately 2.5/1000 births. Prenatal ultrasound and fetal echocardiography have increased early detection of CCHD. However, due to test limitations, infants with CCHD are often not identified prenatally.

Many infants who have CCHD are asymptomatic in the first days of life. Clinical signs of CCHD may include tachypnea, bradycardia, tachycardia, hepatomegaly, decreased perfusion and decreased femoral pulses. Heart murmurs are an important sign of CCHD, but many infants with CCHD do not present with a heart murmur, and heart murmurs do not always signify CCHD. Low blood oxygen saturations are also an important sign of CCHD. Unfortunately, low blood oxygen saturations can be difficult to detect in newborns. Only severe decreases in oxygen saturation are visibly apparent in newborns as cyanosis.

In asymptomatic infants, pulse oximetry complements the clinical exam in detecting CCHD by identifying clinically undetectable hypoxemia. Heart defects targeted by pulse oximetry screening include, but are not limited to, hypoplastic left heart syndrome, pulmonary atresia, tetralogy of fallot, total anomalous pulmonary venous return, transposition of the great arteries, tricuspid atresia, truncus arteriosus, interrupted aortic arch, and coarctation of the aorta.

Presentation of CCHD can be sudden and catastrophic when the ductus arteriosus closes in the first few days after birth. Early recognition of CCHD can help to ensure timely intervention and treatment and reduce morbidity and mortality.

OUT OF HOSPITAL PULSE OXIMETRY (POX) SCREENING PROTOCOL

All Wisconsin infants born in licensed midwife-attended OOH settings should be offered pulse oximetry screening for CCHD between 24 and 48 hours after birth per the following protocol:

Pulse Oximetry screening should be done using motion-tolerant pulse oximeters that report functional oxygen saturation cleared by the FDA for use in newborns.

- Disposable or reusable probes may be used
- Use manufacture-recommended pulse oximeter-probe combinations

Given routine early discharge from birth care (<24 hours), perform initial screen on the infant at the 24-48 hour follow-up visit.

- It is best to perform test when baby is quiet and alert to avoid false positives due to deep sleep
- Measure saturation (SP0₂) on right hand and either right or left foot. May be done sequentially
- Ensure good pulse waveform. Do not hold probe with your own hand.
- Observe good pulse waveform for at least 1 full minute
- Measure and record baseline oxygen saturation.

Interpret and Respond to POX results as follows: Infant may PASS, FAIL or require REPEAT SCREEN. Infant has three chances to pass pulse oximetry screen

First Screening:

Pass: SPO2 is $\geq 95\%$ in right hand or either foot with $\leq 3\%$ difference in SPO2 between right hand and foot: No further screening needed. Normal newborn care

Fail: SPO2 is $< 90\%$ in right hand or foot: No further screening needed. Contact appropriate medical provider for further evaluation.

Repeat Screening Needed: SPO2 is 90-94% on both extremities and/or there is $> 3\%$ difference in SPO2 between the right hand and foot

- If signs of distress, contact appropriate medical provider for further evaluation
- If there are no signs of distress, repeat POX screen in 1 hour

Second Screening:

Pass: SPO2 is $\geq 95\%$ in right hand or either foot with $\leq 3\%$ difference in SPO2 between right hand and foot: No further screening needed. Normal newborn care

Fail: SPO2 is $< 90\%$ in right hand or foot: No further screening needed. Contact appropriate medical provider for further evaluation.

Repeat Screening Needed: SPO2 is 90-94% on both extremities and/or there is $> 3\%$ difference in SPO2 between the right hand and foot

- If signs of distress, contact appropriate medical provider for further evaluation
- If there are no signs of distress, repeat POX screen in 1 hour

Final Screening:

Pass: SPO2 is $\geq 95\%$ in right hand or either foot with $\leq 3\%$ difference in SPO2 between right hand and foot: No further screening needed. Normal newborn care

Fail: SPO2 is $< 90\%$ in right hand or foot: No further screening needed. Contact appropriate medical provider for further evaluation.

Fail: SPO2 is 90-94% on both extremities and/or there is $> 3\%$ difference in SPO2 between the right hand and foot: Contact appropriate medical provider for further evaluation.

FAILED PULSE OXIMETRY SCREEN

Infants who FAIL pulse oximetry screen require timely clinical evaluation. If a non-cardiac explanation for hypoxemia is not identified, CCHD must be excluded.

- Stabilize infant as needed
- Contact appropriate medical care provider for clinical evaluation

Congenital Heart Disease (CHD) Assessment

09/11

Child in well-baby nursery 24-48 hours of age or shortly before discharge if < 24 hours of age

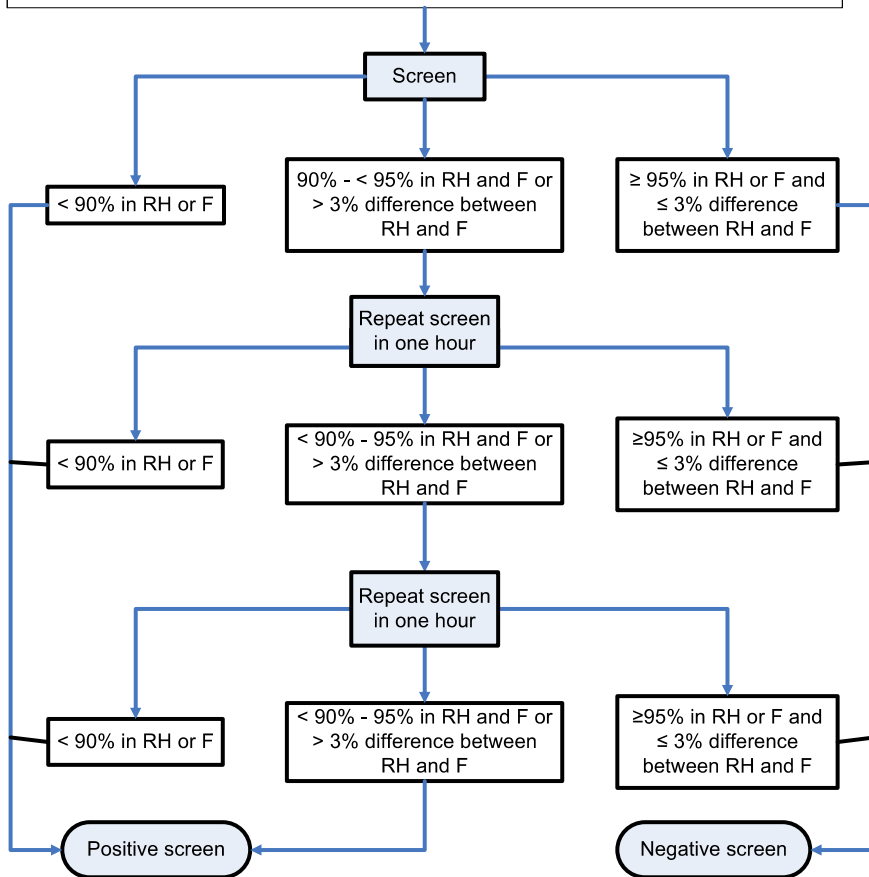


Figure. The proposed pulse oximetry monitoring protocol based on results from the right hand (RH) and either foot (F).