



## CRITICAL CONGENITAL HEART DISEASE PULSE OXIMETRY SCREENING FACT SHEET FOR HEALTH CARE PROVIDERS

Newborn Screening Ontario has worked with hospitals and midwifery practices to implement universal pulse oximetry screening for Critical Congenital Heart Disease (CCHD) across Ontario. The goal of this screening is to increase the rate of detection of CCHD prior to clinical deterioration in affected newborns. It is considered standard of care for newborns.

- CCHD defined as cardiac disease, present from birth requiring surgery or catheter intervention in the first year of life
- Incidence of CCHD in Canada is 3/1000 live births
- CCHD accounts for more deaths than any other congenital malformation
- 10-30% of CCHD diagnoses are not made prior to discharge from hospital
- Early diagnosis and follow-up are essential first steps in preventing infant morbidity and mortality
- Pulse oximetry screening, used in conjunction with prenatal ultrasound and physical examination, is the best approach to detecting CCHD in newborns

### PULSE OXIMETRY SCREENING

A CCHD screen involves a pre-ductal (right hand) and post-ductal (either foot) oxygen saturation measurement, obtained in direct sequence and evaluated using either the NSO CCHD algorithm or the NSO CCHD screening chart. The screen will result in a *PASS* (screen negative) or a *REFER* (screen positive).

The criteria for a screen negative or *PASS* result are as follows:

- The pulse oximetry is greater than or equal to 95% in the right hand or either foot AND there is a less than or equal to 3% difference in oxygen saturation between the right hand and foot

A *PASS* requires no further follow up.

The criteria for a screen positive or *REFER* result are as follows:

- The pulse oximetry is **less than 90%** in the right hand or either foot  
*OR*
- The pulse oximetry is **less than 95% on both extremities** OR pulse oximetry **difference in oxygen saturation is greater than 3%** between the right hand and either foot for 3 consecutive measures each separated by 1 hour

A *REFER* result will require urgent (suggest within 6-8 hours) follow up by a physician for examination. Recommendations for clinical investigation are full vital signs including a 4 limb BP, pre and post ductal saturations and palpation of femoral pulses. An electrocardiogram and chest X-Ray may also be beneficial when considering other non-cardiac causes of cyanosis (examples are delayed transition, pulmonary disease, or infection).

If the most likely cause remains cardiac or is unclear, consultation with paediatric cardiology (with echocardiogram) to rule out CCHD is warranted.

*Please note some diagnoses of CCHD, specifically TAPVR, can be difficult to pick up and typically present with persistent borderline saturations. Based on their physical exam, a high clinical index of suspicion should remain for all babies, regardless of their CCHD screening result. If you are unsure of next steps in the work up or management of a baby please contact your local designated pediatric or NICU referral centre.*



**The following are excellent resources regarding CCHD pulse oximetry screening in Canada.**

1. Practice Point, Canadian Paediatric Society, Pulse oximetry screening in newborns to enhance detection of critical congenital heart disease (cps.ca, Practice Point, July 2017)  
<https://www.cps.ca/en/documents/position/pulse-oximetry-screening>
2. Position Statement, Canadian Cardiovascular Society, Canadian Cardiovascular Society/Canadian Pediatric Cardiology Association Position Statement on Pulse Oximetry Screening in Newborns to Enhance Detection of Critical Congenital Heart Disease (ccs.ca, guideline, 2016)  
<http://www.ccs.ca/en/guidelines/guidelines-library>

*Thank you for your front line commitment to promoting healthy starts for Ontario's babies!*