



Information for health care professionals

Pulse Oximetry Screening

Every year nearly 100 babies are born in New Zealand with a critical heart defect. If not detected early, critical defects can result in death or neurodevelopmental impairment. Timely recognition of these conditions allows the possibility of intervention that may influence the natural history of the condition and subsequent outcome.

Current strategies to detect congenital heart disease (CHD) are antenatal ultrasound ('anatomy scans') and newborn physical examination. Up to 20% of newborns with critical CHD will not be detected by these screening methods. With the addition of pulse oximetry screening we will be able to identify some of these infants.

What is pulse oximetry?

Pulse oximetry is a test that measures how much oxygen is in the blood. The test will enable us to identify infants who are hypoxaemic secondary to cardiac, respiratory or other diseases such as infection. Detecting cyanotic congenital heart disease is the main target of pulse oximetry screening programmes.

Who should be screened?

Newborn infants with a gestational age ≥ 35 weeks' will be eligible for screening.

When will the screening be done?

The pulse oximetry screening test should be done between 2 and 24 hours after birth. If screening did not take place in the first 24 hours in healthy infants with a gestational age ≥ 35 weeks', for whatever reason, arrangements should be made to perform the test at the earliest possible time.

Screening before 2 hours of age is associated with higher false-positive rates. Very early screening can therefore potentially delay discharge or transfer from hospital. Infants should remain in hospital until they have reached saturations of $\geq 95\%$.

Babies with a gestational age ≥ 35 weeks' that are admitted to a neonatal unit will usually have ongoing saturation monitoring during their admission. It is the responsibility of the attending paediatric team to ensure that these babies have reached target saturations and that it has been recorded, prior to discharge from the unit.

Which limb will be used for screening?

The post-ductal saturation level should be measured. The sensor can be attached to the left or right foot to obtain this reading. Pre-ductal measurements from the right hand do not need to be obtained routinely, but may be requested for diagnostic purposes. A difference between pre- and post-ductal saturations may point towards persistent pulmonary hypertension or left outflow tract obstruction.

What can affect test accuracy?

Movement and crying may affect test accuracy. Ensure that the infant is calm and warm during the screening procedure. Promote parental involvement to comfort the infant. Screening may be performed while the baby is feeding.

Bright light from phototherapy lamps can interfere with the accuracy of the test. Switch these lights off while the test is performed.

Reusable sensors must be cleaned with disinfectant solution or alcohol swabs before and after screening each infant. Dirty sensors can affect the accuracy of the reading and can transmit infection.

How often can a sensor and foam wrap be used?

All units are equipped with *reusable* sensors to perform cost-effective pulse oximetry screening. **Do not** discard these sensors; they can be used again after being cleaned.

Disposable sensors cannot be used again. Use a new, clean sensor for each infant. These sensors are also available, but should not be used for the purposes of screening on postnatal wards or in the community, as it will result in unnecessary costs.

Disposable and reusable sensors are secured to an infant's foot with a foam wrap. Foam wraps are disposable; a new one should be used for each infant. If the test has to be repeated on an infant, the foam wrap should be re-used on that infant.

What does it mean if a baby does not reach saturation targets?

A low oximetry reading can be normal in newborns adjusting to the extra-uterine environment. We have adopted an early screening strategy to ensure infants with CHD are diagnosed prior to cardiovascular compromise and collapse, but earlier screening can result in higher false-positive rates. It is important to accurately follow the steps in the screening algorithm if a baby with low saturations is identified.

Referral to paediatric services is indicated if an infant fails to reach target saturations or if there are clinical concerns at any stage. Further investigations, including echocardiography, will be at the discretion of the paediatric team.

Can a baby with CHD have a normal pulse oximetry reading?

The test will not detect all forms of CHD. Pulse oximetry can only identify cardiac anomalies that produce low oxygen saturation levels. Anomalies causing obstruction of the left outflow track, e.g. coarctation of the aorta or aortic valve stenosis will usually produce a normal pulse oximetry reading. Reduced or absent femoral pulses

may be the only indicator of congenital heart disease in these cases. It is important to remain vigilant and to report any clinical concern.

Parents should be advised to seek medical advice if they notice any of the following: fast breathing when the baby is at rest or sleeping; sweating around the head; a bluish skin colour, or if the baby tires easily during feeds.

Informed consent

Verbal consent has to be obtained prior to performing the screening test on a baby. The parent or guardian should be informed that the primary purpose of the test is to screen for serious heart defects in babies, but that other diseases may also be detected. Ensure that they understand that pulse oximetry screening will not detect all forms of cardiac disease.

Caregivers have the right to decline screening.

More information

Do not hesitate to approach a senior colleague for assistance with parental counselling or with performing pulse oximetry screening. Refer to the screening guidelines on the Starship Children's Hospital website for more information.