THAMES VALLEY & WESSEX NEONATAL OPERATIONAL DELIVERY NETWORK

Guideline for Targeting Oxygen Saturations	
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Related documents	**References** 1) Dawson JA et al. Defining the reference range for oxygen saturation for infants after birth *J. Pediatrics 2010*: 125(6) 2) B Toth et al. Oxygen saturation in healthy newborn infants immediately after birth measured by pulse oximetry. *Arch Gynecol Obst.* 2002;226(2) 105-7) 3) Poets et al. Arterial Oxygen Saturations in healthy term infants. *Eur J Pediatr.* 1996;155:219-23 4) O'Brien et al. Oxygen Saturations during the first 24 hours of life. *Arch Dis Child Fetal Neonatal Ed.* 2000;83:F35-38 5) Askie et al. Oxygen-saturation targets and outcomes in extremely preterm infants. N Engl J Med 2003;349:959-967 6) Askie LM, Brocklehurst P, Darlow BA, Finer N, Schmidt B, Tarnow-Mordi W; NeOProM Collaborative Group: NeOProM: Neonatal Oxygenation Prospective Meta-analysis Collaboration study protocol. BMC Pediatr 2011; 11:6. 7) SUPPORT Study Group of the Eunice Kennedy Shriver NICHD Neonatal Research Network; Carlo WA, Finer NN, Walsh MC, Rich W, Gantz

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Implications of race, equality & other diversity duties for this document	**This guideline must be implemented fairly and without prejudice whether on the grounds of race, gender, sexual orientation or religion.**

Guideline for Targeting Oxygen Saturations

Contents

1.0 Aim of Guideline

- To target oxygen saturations associated with best outcome based on the currently available evidence
- To aid identification of infants who have respiratory/cardiac pathology
- To provide consistency of practise regarding delivery of oxygen therapy

2.0 Scope of Guidelines

The guideline applies to all neonates who require oxygen saturation monitoring beyond the initial period of resuscitation, who are born in neonatal units and maternity units covered by Thames Valley & Wessex Neonatal ODN. This includes the following hospitals:

Thames Valley	
Buckinghamshire Healthcare NHS Trust	- Stoke Mandeville Hospital, Aylesbury
Frimley Health NHS Foundation Trust	- Wexham Park Hospital, Slough
Milton Keynes University Hospital NHS Foundation Trust	- Milton Keynes General Hospital
Oxford University Hospitals NHS Foundation Trust	- John Radcliffe Hospital, Oxford
Oxford University Hospitals NHS Foundation Trust	- Temporarily Closed (Horton General Hospital, Banbury)
Royal Berkshire NHS Foundation Trust	- Reading
Wessex	
Dorset County Hospital NHS Foundation Trust	- Dorset
Hampshire Hospitals NHS Foundation Trust	- Basingstoke
Hampshire Hospitals NHS Foundation Trust	- Winchester
Isle of Wight NHS Trust	- St Mary's Hospital
Poole Hospital NHS Foundation Trust	- Poole Hospital
Portsmouth Hospitals NHS Trust	- Queen Alexandra Hospital
Salisbury NHS Foundation Trust	- Salisbury
University Hospital Southampton NHS Foundation Trust	- Princess Anne Hospital
Western Sussex Hospitals NHS Foundation Trust	- St Richard's Hospital, Chichester

3.0 Guideline Summary (Introduction)

Category	Corrected Gestation	Target Saturations	Alarm Limits
Infants requiring Oxygen therapy	<36/40	91 - 95%	90 - 96%
	≥36/40	94 - 98%	93 - 99%
Infants with/without respiratory support in air*	<36/40		90 - 100%
	≥36/40		94 - 100%
All infants with or at risk of pulmonary hypertension	Discuss with Neonatologist		
Ex-preterm infants who are still in oxygen at 36 weeks CGA			
Babies with structurally abnormal hearts	Discuss with Cardiologist		

* reset limits as soon as Oxygen therapy restarts

Oxygen is a drug. Whilst it is essential for metabolism, free radicals and reactive oxygen species are produced as by-products. These are produced in larger quantities both if arterial oxygenation is too high and during re-oxygenation following hypoxia.

4.0 Guideline

Term Infants

In normal term infants, median time to reach SpO2 >90% is 7.9 minutes (IQR 5-10 minutes) (1), SpO_2 rates of >95% are reached 12 min (2–55 min) preductally and 14 min (3–55 min) postductally after birth (2) Median value at 20-24 hours of life (97.8%) is similar to that for healthy full term infants between 2 and 7 days of age (97.6%) (3,4)

Preterm infants

There are competing risks which have to be considered when setting oxygen saturation targets in preterm infants;

- Lower oxygen saturations are associated with increased risk of death, cerebral palsy, patent ductus arteriosus, pulmonary resistance and apnoea
- High oxygen saturations are associated with increased risk of ROP blindness and chronic lung disease

The original **BOOST study** (5) demonstrated that maintaining oxygen saturations between 91-94% after 32 wks CGA, in infants born at <30 wks gestation, was associated with the same growth and development as infants whose saturations were targeted at 95-98%. There was significantly less bronchopulmonary dysplasia in the low saturation arm and there were less pulmonary deaths in the low saturation arm although this did not reach statistical significance.

The NeOProM collaboration was established to enable the results of 5 large-scale randomized controlled trials with similar study design to be compared in a prospective meta-analysis (6). The trials (from USA, Canada, UK, Australia and New Zealand) all compared

targeting lower (85-89%) versus higher (91-95%) pulse oximeter saturation (SpO2) targets for extremely preterm infants and included more than 4,800 infants (7-11). The 2016 NeOProM metaanalysis (12) confirmes that the lower SpO2 range (85-89%) was associated with a significant increase in the risk of death. There was no significant difference between the two target ranges in the rate of disability at 18-24 months, including blindness. The lower target range (85-89%) did not reduce bronchopulmonary dysplasia or severe visual impairment, but it did increase the risk of necrotizing enterocolitis requiring surgery or causing death.

5.0 Guideline Framework

Version Control (add when final draft agreed and ready for ratification):

Version	Date	Details	Author(s)	Comments
1				
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2	Feb 2018	Change limit for respiratory support in air	Dr Eleri Admas	Ratified by TVW governance group Sept 2018
Review Date:	*(this date should be the same as the table on the front page)*			