

<b>MONITORING OF OXYGEN SATURATION LEVELS IN THE NEWBORN IN A MIDWIFERY SETTING</b>	<b>CLINICAL GUIDELINES</b> Register Number 04220 Status: <b>Public</b>
---	--

Developed in response to:	Best clinical practice Review of Guideline
CQC Fundamental Standards:	12

<b>Consulted With:</b>	<b>Post/Committee/Group:</b>	<b>Date:</b>
Anita Rao Alison Cuthbertson Dr A Hassan Paula Hollis Chris Berner Sarah Moon Lavina D'souza Toni Laing Deborah Lepley	Clinical Director for Women's and Children's Division Deputy Clinical Director/Head Midwifery Consultant Paediatrician Lead Midwife Acute Inpatient Services Lead Midwife Clinical Governance Specialist Midwife Guidelines and Audit Lead Midwife for Postnatal Ward Lead Nurse Neonatal Unit Library and Information Services Manager	May 2018
<b>Professionally Approved By:</b>		
Dr Hassan	Consultant Lead for Risk Management	May 2018

Version Number	5.0
Issuing Directorate	Women and Children's
Approved by	DRAG Chairman's Action
Approved on	18 <sup>th</sup> June 2018
Trust Executive Board Date	July 2018
Implementation Date	16 <sup>th</sup> July 2018
Next Review Date	May 2021
Author/Contact for Information	Sharon Pilgrim, ANNP
<b>Policy to be followed by</b>	<b>Midwives, Obstetricians, Paediatricians and Neonatal nurses</b>
Distribution Method	Intranet & Website. Notified on Staff Focus
Related Trust Policies (to be read in conjunction with)	04071 Standard Infection Prevention 04072 Hand Hygiene Policy 04219 Guideline for the Management of Hypoglycaemia 08074 Postnatal Observations of Babies Born with Prolonged Rupture of Membranes and Meconium Stained Liquor & Infants of GBS Mothers who receive antibiotics in labour 04225 Examination of the Newborn Infant 04255 Guideline for Admission to the Neonatal Unit Eof E Saturation targeting in the infant admitted to the Neonatal unit 07074 Neonatal Resuscitation

**Document Review History:**

<b>Version No:</b>	<b>Reviewed by:</b>	<b>Issue Date:</b>
1.0	Julie Bishop	November 2006
2.0	Sharon Pilgrim	October 2009
3.0	Sharon Pilgrim	January 2013
3.1	Sharon Pilgrim (clarification of point 6.1)	June 2013
4.0	Mhuireann Mulvihill	April 2015
5.0	Sharon Pilgrim	16 <sup>th</sup> July 2018

## **INDEX**

- 1. Purpose**
- 2. Equality and Diversity**
- 3. Infants who require Saturation Monitoring**
- 4. Equipment Required**
- 5. Procedure**
- 6. Alarm Settings**
- 7. Benefits of saturation monitoring**
- 8. Limitations and pitfalls of saturation monitoring**
- 9. Infection Prevention**
- 10. Staff and Training**
- 11. Professional Maternity Advocates**
- 12. Audit and Monitoring**
- 13. Guideline Management**
- 14. Communication**
- 15. References**

## **1.0 Purpose**

- 1.1 To quickly identify the hypoxic neonate and treat appropriately.
- 1.2 To reduce unnecessary admissions to the neonatal unit (NNU).
- 1.3 To reduce unnecessary separation of the baby from its parents.

## **2.0 Equality and Diversity**

- 2.1 Mid Essex Hospital Services NHS Trust is committed to the provision of a service that is fair, accessible and meets the needs of all individuals.

## **3.0 Infants who Require Saturation Monitoring**

- 3.1 The following infants require oxygen saturation monitoring (SaO<sub>2</sub>):
  - Infants requiring resuscitation
  - Infants with signs of respiratory distress, such as grunting, recession, tachypnoea or nasal flaring  
(Refer to the 'Guideline for the 'Examination of the newborn infant'. Register number 04225)
  - Infants following a 'dusky episode'
  - Infants with a history of meconium liquor  
(Refer to the 'Guideline for the postnatal observations of babies born with prolonged rupture of membranes and meconium stained liquor and Infants of GBS Mothers who receive antibiotics in labour '. Register number 08074)
  - Infants who appear pale or cyanosed
  - Infants with an identified cardiac murmur

## **4.0 Equipment Required**

- 4.1 The following equipment should be used:
  - SaO<sub>2</sub> monitor
  - Appropriate sensor (may be either single patient use or multiple use sensor)
  - Appropriate adhesive tape (should not be coban or micropore tape)

## **5.0 Procedure**

- 5.1 Saturation monitors provide continuous measurement of haemoglobin-oxygen saturation with a high level of accuracy ( $\pm 3\%$ ). They work by the measuring of absorption of specific wavelengths of light as they pass through tissue with pulsatile blood flow.
- 5.2 Turn on the SaO<sub>2</sub> monitor; it can take 60 seconds for the correct reading to be displayed. If the signal is poor re-position the probe.
- 5.3 During resuscitation and on infants with suspected cardiac murmurs the probe should be attached to the right wrist, with the light part of the sensor placed on the inside of the wrist. Later the foot may be used unless it is cold or blue.

5.4 Acceptable pre ductal saturations are variable and are dependant on age. Oxygen should not routinely be given during this time.

2 mins	60%
3 mins	70%
4 mins	80%
5 mins	85%
10 mins	90%

5.5 After this initial period of adaptation if oxygen saturation levels are constantly below 92%, give oxygen and request medical assessment.

5.6 If postnatal infants whose oxygen saturation levels are normal i.e. >95% and whom continue to grunt, check blood glucose level (BM) (normal level >2.6 mmol), check temperature (normal level >36.5), feed and warm infant as necessary. (Refer to the 'Guideline for the management of hypoglycaemia'. Register number 12038)

5.7 If baby is still grunting after the above actions, or is giving cause for concern inform the paediatric team for further management.

5.8 Facial oxygen may be commenced using the oxygen/air mixer on the resuscitaire using an appropriate sized mask while waiting for the paediatric team to attend.

5.9 In suspected congenital cardiac lesions, saturation monitoring may be required both pre and post ductally. Right arm = pre ductal, left arm or either leg = post ductal

## 6.0 Alarm Settings

6.1 The following chart illustrates the saturation range and alarm limits for infants/ gestation:

Infants	Saturation range	Alarm limits
Preterm < 37 weeks,	91 – 95%	90 – 96%
Term Infant > 37 weeks	>93%	92 – 99%
Risk of PPHN	>95%	95 - 100%

6.2 Risk factors for PPHN in Term or Near Term Infants

- Meconium Aspiration
- GBS Sepsis or congenital Pneumonia
- Severe perinatal Hypoxic Ischaemic Encephalopathy (HIE)
- Maternal Factors – Aspirin/Non-steroidal Anti-Inflammatory Drugs (NSAID)  
 Selective Serotonin Receptor inhibitor (SSRI)  
 Ill health – asthma/diabetes mellitus/raised BMI

## **7.0 Benefits of Saturation Monitoring**

- Is non-invasive
- Enables continuous monitoring

## **8.0 Limitations and Pitfalls of Saturation Monitoring**

- 8.1 Pulse oximetry is only as useful as the accuracy of the reported saturations. In fact, acting on an inaccurate trace will lead to either unnecessary therapeutic action or inaction and subsequent detriment to the infant.
- 8.2 Pulse Oximetry is liable to inaccuracy in the following instances:
- Movement artefact
  - Cool/poorly perfused peripheries
  - Ambient light (Causing interference with the probe's spectrophotometer)
  - Infants with high total carboxyhaemoglobin levels (CarboxyHb has a similar absorbance to oxyhaemoglobin and may falsely elevate pulse oximeter readings)
- 8.3 Furthermore, it must be considered that pulse oximeters saturations only represent a percentage of the haemoglobin-bound oxygen content of blood.
- 8.4 Pulse oximeter saturations do not reflect an absolute value for the haemoglobin-bound oxygen content of an infant's blood. i.e. an anaemic infant's total oxygen content of blood, or total oxygen-carrying capacity, will be much less than a polycythaemic infant, even if their pulse oximeter saturations are identical
- 8.5 An infant's total oxygen content is also dependent on their PaO<sub>2</sub> and the absolute value of circulating haemoglobin

## **9.0 Infection Prevention**

- 9.1 All staff should follow Trust guidelines on infection prevention by ensuring that they effectively 'decontaminate their hands' before and after undertaking any patient contact.
- 9.2 All staff and visitors to the neonatal unit must gel their hands prior to admission and remove their outside coats.
- 9.3 All staff should ensure that they follow Trust guidelines on infection prevention, using Aseptic Non-Touch Technique (ANTT) when carrying out procedures i.e. when obtaining blood samples.

## **10.0 Staff and Training**

- 10.1 All medical and midwifery staff will be informed of the criteria for admission to the NNU. (Refer to the 'Guideline for admission to the neonatal unit'. Register number 04255A)
- 10.2 The reasons for admission are included in the postnatal handbook available on each ward.
- 10.3 Teaching sessions on the identification of the at risk neonate will be available on a monthly basis to all midwifery staff.

## **11.0 Professional Maternity Advocate**

11.1 Professional maternity advocates provides a mechanism for support and guidance to every midwife practising in the MEHT. The purpose of supervision is to protect women and babies, while supporting midwives to be fit for practice'. Maternity Advocates are experienced practising midwives who have undertaken further education in order to supervise midwifery services. A 24 hour on call rota operates to ensure that a Professional Maternity Advocate is available to advise and support midwives and women in their care choices

## **12.0 Audit and Monitoring**

12.1 Audit of compliance with this guideline will be considered on an annual audit basis in accordance with the Clinical Audit Strategy and Policy (register number 08076), the Corporate Clinical Audit and Quality Improvement Project Plan and the Maternity annual audit work plan; to encompass national and local audit and clinical governance identifying key harm themes. The Women's and Children's Clinical Audit Group will identify a lead for the audit.

12.2 The findings of the audit will be reported to and approved by the Multi-disciplinary Risk Management Group (MRMG) and an action plan with named leads and timescales will be developed to address any identified deficiencies. Performance against the action plan will be monitored by this group at subsequent meetings.

12.3 The audit report will be reported to the monthly Directorate Governance Meeting (DGM) and significant concerns relating to compliance will be entered on the local Risk Assurance Framework.

12.4 Key findings and learning points from the audit will be submitted to the Patient Safety Group within the integrated learning report.

## **13.0 Guideline Management**

11.1 As an integral part of the knowledge, skills framework, staff are appraised annually to ensure competency in computer skills and the ability to access the current approved guidelines via the Trust's intranet site.

11.2 Quarterly memos are sent to line managers to disseminate to their staff the most currently approved guidelines available via the intranet and clinical guideline folders, located in each designated clinical area.

11.3 Guideline monitors have been nominated to each clinical area to ensure a system whereby obsolete guidelines are archived and newly approved guidelines are now downloaded from the intranet and filed appropriately in the guideline folders. 'Spot checks' are performed on all clinical guidelines quarterly.

11.4 Quarterly Clinical Practices group meetings are held to discuss 'guidelines'. During this meeting the practice development midwife can highlight any areas for further training; possibly involving 'workshops' or to be included in future 'skills and drills' mandatory training sessions

## 14.0 Communication

- 12.1 A quarterly 'maternity newsletter' is issued and available to all staff including an update on the latest 'guidelines' information such as a list of newly approved guidelines for staff to acknowledge and familiarise themselves with and practice accordingly.
- 12.2 Approved guidelines are published monthly in the Trust's Staff Focus that is sent via email to all staff.
- 12.3 Approved guidelines will be disseminated to appropriate staff quarterly via email.
- 12.4 Regular memos are posted on the Guideline and Audit notice boards in each clinical area to notify staff of the latest revised guidelines and how to access guidelines via the intranet or clinical guideline folders.

## 15.0 References

Askie L M, Henderson-Smart D J, Irwig L, Simpson J M(2003) Oxygen-saturation targets and outcomes in extremely preterm infants. N Engl J Med ;349:959-67  
Auckland District Health Board clinical guidelines (2009) [www.adhb.health.nz](http://www.adhb.health.nz)

Gomella TL (2013) Neonatology management, procedures, on-call problems, diseases and drugs. 7<sup>th</sup> Edition. Philadelphia. McGraw Hill Education.

BOOST II Trial. United Kingdom, Collaborative Group et al (2013). Oxygen Saturation and Outcomes in Preterm Infants. New England Journal of Medicine; 368:2094-2104 |

Resuscitation Council (2016) Newborn Life Support - Resuscitation at Birth (4th edition). London. Resuscitation Council UK.

O'Brien L.M., Stebbens L.M., Poets C.F., Heycock E.G., Southall D.P (2000) Oxygen saturation during the first 24 hours of life. Arch Dis Child Fetal Neonatal Ed; 83:F35-F38

Delaney C., Cornfield D.N. (2012) Risk factors for persistent pulmonary hypertension of the newborn. Pulmonary Circulation : 2(1):15 – 20

Neonatal Saturation Targeting Working Group (2016) Clinical Guideline. Saturation targeting in the Infant admitted to the Neonatal Unit , Cambridge; East of England Neonatal ODN [Available at: <https://www.networks.nhs.uk/nhs-networks/eoe-neonatal-odn/guidelines/test-2/saturation-targeting>]