

Local
Guideline

John Hunter
Children's Hospital
CHILDREN, YOUNG PEOPLE AND FAMILIES



Health
Hunter New England
Local Health District

Home Oxygen for Infants with Chronic Lung Disease (CLD) in NICU

Sites where Local Guideline applies	Neonatal Intensive Care Unit, JHCH
This Local Guideline applies to:	
1. Adults	No
2. Children up to 16 years	No
3. Neonates – less than 29 days	Yes
Target audience	All clinicians caring for infants in NICU with Chronic Lung Disease
Description	Provides guidance to clinicians when assessing suitability for infants to be discharged home on oxygen
National Standard	Standard 4: medication Safety

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Keywords	Chronic Lung Disease, CLD, hyperoxia, oxygen, Respiratory services, saturations, therapy, JHCH, NICU
Document registration number	JHCH_NICU_12.16
Replaces existing document?	No
Related Legislation, Australian Standard, NSW Ministry of Health Policy Directive or Guideline, National Safety and Quality Health Service Standard (NSQHSS) and/or other, HNE Health Document, Professional Guideline, Code of Practice or Ethics:	
<ul style="list-style-type: none"> • NSW health Policy Directive PD 2017_013 Infection Control and prevention Policy • NSW Health Policy Directive PD2017_032 Clinical Procedure Safety • Medication Safety in HNE Health PD2013_043:PCP31 	
Prerequisites (if required)	N/A
Local Guideline note	This document reflects what is currently regarded as safe and appropriate practice. The guideline section does not replace the need for the application of clinical judgment in respect to each individual patient but the procedure/s require mandatory compliance . If staff believe that the procedure/s should not apply in a particular clinical situation they must seek advice from their unit manager/delegate and document the variance in the patients' health record.
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Contact details	
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This document contains advice on therapeutics	No
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PURPOSE AND RISKS

This local clinical procedure has been developed to provide instruction to the health clinician and to ensure that the risks of harm to the infant associated with home oxygen delivery for CLD are prevented, identified and managed.

The risks are:

- *Hypoxia*
- *Hyperoxia*

The risks are minimised by:

- *Appropriate selection and screening of infants suitable to go home on oxygen therapy*
- *Clinicians seeking assistance if caring for infants is outside their scope of practice*
- *Following the instructions set out in the clinical procedure*
- *Notification and management of the complications/ risks to the patient*

Risk Category: *Clinical Care & Patient Safety*

GLOSSARY

Acronym or Term	Definition
BOOSTII, SUPPORT, STOP ROP	Trials for accepted oxygenation target levels
CLD	Chronic lung Disease
FBC, LFT & U&Es	Blood investigations: Full Blood Count, Liver Function Tests, Urea and Electrolytes
O&RP	Oxygen and related products
PMA	Post menstrual age
SpO ₂	Saturations of oxygen

GUIDELINE

Background

Preterm infants who require oxygen or respiratory support at or beyond 36 weeks postmenstrual age (PMA) are considered to have chronic neonatal lung disease (CLD).¹ Both, hypoxia and hyperoxia are harmful to neonates. Hypoxia in infants with CLD results in increased hospital readmission rates, suboptimal growth, impaired sleep quality, pulmonary hypertension with cor pulmonale, increased apparent life threatening events and has adverse effects on their long term neurodevelopment.^{2,3} On the other hand, hyperoxia leads to prolonged hospitalisation, more use of medications such as diuretics, increased frequency of exacerbations of CLD and chest infections post discharge probably secondary to toxic effect of oxygen on the alveolar epithelium.^{2,3}

In the neonatal unit, oxygen support for preterm neonates up to 36 weeks PMA is managed by the neonatal team based on the accepted oxygenation target levels as indicated by the BOOSTII,

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SUPPORT and STOP ROP trials. However, there is limited evidence to recommend lower safe limit of oxygen saturation in neonates with CLD.⁴⁻⁶

The position statements on chronic lung disease and home oxygen supplementation from the Thoracic Society of Australia and New Zealand, and the British Thoracic Society suggest to keep the mean oxygen saturation on 6-12 hour overnight pulse oximetry download between 92 and 97% to prevent a range of potential complications of hypoxia and unrestricted oxygen use.^{2,3} They also suggest that the lower limit target SpO₂ should be met for at least 95% of the stable recording period with the oximeter set 2 second interval averaging time.

For JHCH, NICU, the consensus decision is to follow parameters outlined below when trying to wean from low flow oxygen OR when assessing adequacy for home oxygen.

1. Download over 8-12 hours (preferably overnight)
2. 2-second interval averaging time
3. Mean SpO₂ > 92%
4. 90% of time SpO₂ > 90%
5. Also, assess top 40 episodes of desaturation and bradycardia in the detailed printout if there is any specific concerning pattern

Suitability of home oxygen therapy

Decision about discharge of a baby on home oxygen therapy should be multidisciplinary involving the neonatal clinician, respiratory physician, social worker, liaison nurse and allied health teams as required. Issues such as feeding, weight gain, amount of oxygen required, unresolved social issues, parent capability, housing, etc. play a central role in deciding suitability for home oxygen therapy. No specific exclusion criteria for home oxygen can be set but parents expressed or judged inability to cope with home oxygen may necessitate infant's stay in hospital until off oxygen. Poor housing (e.g. caravan), single parenting, transport difficulties, no phone and smoking are undesirable but are not absolute contraindications to home oxygen.

Assessment of infants

1. Clinical condition
2. Overnight oximetry with printout at 35-36 weeks for adequacy of supplemental oxygen.
3. A recent capillary gas (at 35-36 weeks) and previously (within the last 1-2 weeks) satisfactory FBC, UEC, LFT
4. Growth chart.
5. Echocardiograph to rule out co-existing cardiovascular condition and significant pulmonary hypertension.
6. Interim summary of neonatal course.

Referral to the Respiratory Service

The JHCH Respiratory Service should be involved from 36 weeks PMA when

1. The infant is expected to be discharged home on supplemental oxygen therapy.
2. The infant is being discharged home on caffeine therapy for apnoea.

Referral

A referral is made to the on call respiratory paediatrician after 36 weeks CGA or pre discharge/transfer if sooner.

Arranging Discharge

1. If it is agreed the infant will go home on oxygen, the oxygen flow rate is set between 100-250 mL/min as required. Infants are not ready for discharge home if their supplemental oxygen needs are >500mL/min.
2. Infants should have had 7 days of stability in NICU off the oximeter before going home.
3. A prescription needs to be written by neonatologist or respiratory paediatrician for the oxygen on the form from the Oxygen Related Products (O&RP) programme coordinator. The prescription is faxed to the "Oxygen Related Products Dept" on the form.
4. Medications should be prescribed by the neonatal team and made available prior to discharge.
5. Parents and carer (ideally both parents and 1 other person) attend education re home oxygen carried out by the liaison nurse consultant. This covers routine care at home with oxygen and care in an emergency, including resuscitation.
6. The neonatal team should complete a Carers Allowance Form after the parents have filled out their section, as provided by the social worker.
7. An oximetry run should be done prior to discharge to ensure the oxygenation is adequate on the home equipment, (some gauges seem to deliver slightly different flow rates).
8. Education about the Flu immunisation for the family.
9. Reinforce the importance of stopping smoking for all members of the family and provide advice, quit packs and patches if suitable
10. Care by parents for minimum of 2 nights prior to discharge lets the mother become familiar with the equipment she will use at home and provides an opportunity to sort out any final issues.

Outpatient Follow-Up for the Infant on Oxygen

1. Neonatologist/Paediatrician –1st visit within 1 week of discharge – subsequent visits as per need determined by clinician.
2. Respiratory Paediatrician – Polysomnography (sleep study) is booked for 6-12 weeks corrected age with an outpatient clinic review prior to the study (usually the same day)
3. Referral to Child & Family Health Nurse to visit.
4. The Paediatric Community Nurse may be asked to visit the child at home.
5. Oxygen is usually weaned by the Respiratory physician based on the infant's clinical condition, growth and sleep study results.

References

1. Australian and New Zealand Neonatal Network, Definitions for audit, December 2014.
2. Thoracic Society of Australia and New Zealand, Fitzgerald D, Massie R, Nixon G, et al. Med J Aust. 2008 Nov 17;189(10):578-82.
3. Balfour-Lynn IM, Field D, Gringras P, et al. Paediatric Section of the Home Oxygen Guideline Development Group of the BTS Standards of Care Committee. BTS guidelines for home oxygen in children. Thorax. 2009 Aug; 64 Suppl 2:ii1-26.
4. Tarnow-Mordi WO, Darlow B, Doyle L. Target ranges of oxygen saturation in extremely preterm infants. N Engl J Med. 2010 Sep 23; 363(13):1285.
5. Finer N, Walsh M, Rich W, et al. Ranges of Oxygen Saturation in Extremely Preterm Infants. N Engl J Med. 2010 May 27; 362(21):1959-69.
6. The STOP-ROP Multicenter Study Group. Supplemental Therapeutic Oxygen for Pre-threshold Retinopathy of Prematurity (STOP-ROP), a randomized, controlled trial: I primary outcomes. *Pediatrics* 2000; 105: 295-310.

Appendix

Home oxygen pathway

PMA	Steps
35W	<ol style="list-style-type: none"> 1. Oxygen requirement < 100 ml/min continue to wean off oxygen until in air or baby 38 weeks PMA → repeat download in air prior to discharge 2. Oxygen requirement \geq 100 ml/min assess for home oxygen suitability <ul style="list-style-type: none"> • Stable clinically for 1-2 weeks • No apnoea • Stable oxygen saturations • Needs < 0.5 L/Min oxygen • Satisfactory weight gain • Suitable psychosocial condition • Multidisciplinary agreement 3. Stop full monitoring (sat monitoring only)
36W	<ol style="list-style-type: none"> 1. Refer to respiratory physician 2. Request chest X-ray and a blood gas 3. Echocardiograph <p>Final decision about discharge home on oxygen</p> <p>If yes</p> <ul style="list-style-type: none"> • Adjust the oxygen flow to 120-125 ml/min (higher if needed) • Parental education <p>If no</p> <p>Keep weaning oxygen until in air → repeat oximetry download</p>
37-38W	<ol style="list-style-type: none"> 1. Repeat download with adjusted oxygen delivery → stop monitoring if satisfactory 2. Arrange home oxygen delivery and installation 3. Prescribe and get discharge medications 4. Decision about Palivizumab, involvement of general paediatrician as appropriate
	Care by parents (2-3 days)
	Discharge day

This Guideline does not replace the need for the application of clinical judgment in respect to each individual patient.

Staff Preparation

It is mandatory for staff to follow relevant: “Five moments of hand hygiene”, infection control, moving safely/safe manual handling, documentation practices and to use HAIDET for patient/carer communication: **H**and hygiene **A**cknowledge, **I**ntroduce, **D**uration, **E**xplanation, **T**hank you or closing comment.

Implementation, monitoring compliance

1. Approved clinical guideline will be uploaded to the PPG and communication of updated ‘Managing Babies with Chronic Lung Disease in NICU’ clinical guideline to NICU staff will be via email and message on the HUB.
2. Incident investigations associated with this Guideline and Procedure will include a review of process.
3. The Guideline and Procedure will be amended in line with the recommendations.
4. The person or leadership team who has approved the Guideline and Procedure is responsible for ensuring timely and effective review of the Guideline and Procedure.
5. Evaluation will include a review of the most current evidence as well as a consideration of the experience of Neonatal staff at JHCH in the implementation of the Guideline and Procedure.

Feedback

Any feedback on this document should be sent to the Contact Officer listed on the front page.

Reviewers

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Approved

NICU Operational, Planning & Management Committee 06/06/18
JHCH CQ&PCC 26/06/2018