Yorkshire & Humber Pan-Network Neonatal Clinical Guideline

Title: **Guideline for the Care of Infants requiring Long Term Oxygen Therapy for Chronic Neonatal Lung Disease**

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The review date for this guideline has been extended to a 5 year review **(April 2025)** as agreed by the Y&H Neonatal Executive Group at the Executive Meeting held 30 March 23

This clinical guideline has been developed to ensure appropriate evidence based standards of care throughout the Yorkshire & Humber Neonatal Operational Delivery Network. The appropriate use and interpretation of this guideline in providing clinical care remains the responsibility of the individual clinician. If there is any doubt discuss with a senior colleague.

A. Guideline summary

The aim of these guidelines is to provide consistent care within the Yorkshire and Humber Region in the delivery of home oxygen therapy in neonates and children.

1. Aims

Long Term Oxygen Therapy (LTOT) is the provision of oxygen for continuous use in the home. It is used by patients with chronic hypoxaemia to maintain their target saturations. It may be used continuously or during periods of sleep only.

Hypoxaemia causes Pulmonary Hypertension (PH). SpO2 levels >94% appear to reduce PH while levels <88% may cause PH.

Hypoxia may have adverse effects on cognition and behaviour at levels <85% but the effects of milder hypoxia are less clear.

In infants with Chronic Neonatal Lung Disease (CNLD) SpO2 <90% is associated with an increased risk of Brief Resolved Unexplained Events (BRUE) while SpO2>93% is not.

In infants with CNLD SpO2 <92% may be associated with sub optimal growth. SpO2 <90% impairs sleep quality but SpO2 >93% does not.

These are all indications of why supplementary oxygen should be given to infants with CNLD (1, 2)

2. Best Practice Recommendations

Preparing For Discharge

Infants going home on oxygen should be >36 week gestational age when the risks of ROP and PVL have disappeared.

In CNLD oxygen therapy should be given to maintain Spo2>93% (1)

Pulse oximetry over a period of 6-12 hours should be used to assess saturation levels and include periods of feeding and sleep. (1)

The SpO2 should not fall below 90% for more than 5% of artefact free recording time. (1)

Ideally Infants with CNLD should have an ECG or Echocardiogram prior to discharge to exclude PH

Suitability for home oxygen should be assessed by Neonatal or Paediatric specialists.

Equipment for the home and portable usage should be ordered by staff competent to complete the assessment forms and HOOF.

A combination of oxygen concentrators and cylinders can be used to give flexibility to the family. Low flow meters are available for the cylinders and there are low flow concentrators also. Micro flow meters are available allowing the flow to be reduced even further but these are unnecessary and may confuse carers. (1)

Discharge

The infant can be discharged when their oxygen requirement has been stable for at least a week with a median SpO2 of >92%, and without episodes of desaturation or apnoea. However maintaining a median of >94% ensures there is a safety buffer when they are first away from the hospital environment. (2, 3)

The infant must be medically stable with no other clinical conditions that stop discharge.
The infant should have a consistent weight gain.

Tolerating their feed, ideally responsive feeding.

The parents or carers should be competent in the infants care and the safe use of oxygen.

Discharge check list completed (see Appendix A).

A pre discharge meeting to take place ensuring a safe and smooth discharge. To include any local recommendations re direct access to Assessment Units.

MEASUREMENT	TARGET
Median SpO2	>94%
% time <90%	<5%
% time <94% (if PH)	<10%

Follow up after discharge

The Community Nurse should visit within 24 hours and perform a spot SpO2 check.

Overnight monitoring should be completed within a week. (1)

The oximetry should be reviewed by a practitioner competent in analysing the data within 24 hours. Recording log in appendix B.

If oxygen saturation are at or above median 95% with no more than 5% <90% of artefact free recorded time the infant can continue on current flow and retrace in a week.

If oxygen saturation are < median 95% +/- more than 5% <90% of artefact free recorded time, oxygen to be increased. Discuss with Home oxygen Nurse or Consultant.

Parents to be informed and a repeat oximetry to be performed within 48 hours.

If the infant is known to have PH aim for no more than 10% <94% to avoid increasing the hypertension. (1)

Subsequent visits should be at least weekly for the first month then as condition dictates but no less than monthly with an overnight oximetry.
Hospital follow up should be within 4-6 weeks of discharge with a consultant who ideally has experience of LTOT.

Withdrawal of Supplemental Oxygen

Following the initial oximetry a further oximetry will be obtained 1-2 weeks later. If oxygen saturation are at or above Median 95% with no more than 5% <90% of artefact free recorded time at both studies and the infant is clinically well weaning of oxygen can commence by 0.1l/pm until the infant is in air.

Weaning Procedure

Contact parents and ask them to reduce oxygen by 0.1l/pm 1-2 hours prior to visit. This allows most infants with CNLD to reach their lowest saturations. If there are any concerns with breathing prior to the visit then they are to increase oxygen back to usual flow.

Respiratory assessment and spot check SpO2 to be performed.

If SpO2 >94% can stay on reduced oxygen and trace overnight. (4)

If any change in breathing, activity or SpO2 <90% when settled then oxygen to be increased back to usual flow.

The oximetry should cover periods of activity i.e. feeding and sleep over 8-12 hours.

The oximetry should be downloaded and analysed the following day and parents informed of result.

If this can't be achieved then the parents will put the oxygen back up until the results are available.

If oxygen saturation are at or above Median 95% with no more than 5% <90% of artefact free recorded time the infant can continue on current flow and retrace within 2 weeks. If previous or active PH no more than 10% should be <94%.

If clinically well weaning can continue monthly by 0.1l/pm until on 0.1l/pm.

Wean into air following the same procedure and target saturations, aiming for 24hr period in air from outset. (5)

Retrace within a week of being in air. Then repeat oximetry after a month.

The oxygen equipment can be removed from the home after 3 months if not required. If this is in a winter period it is usually left until the end of winter.

Other Considerations

Eligibility should be considered for Palivizimab (see National guidance).

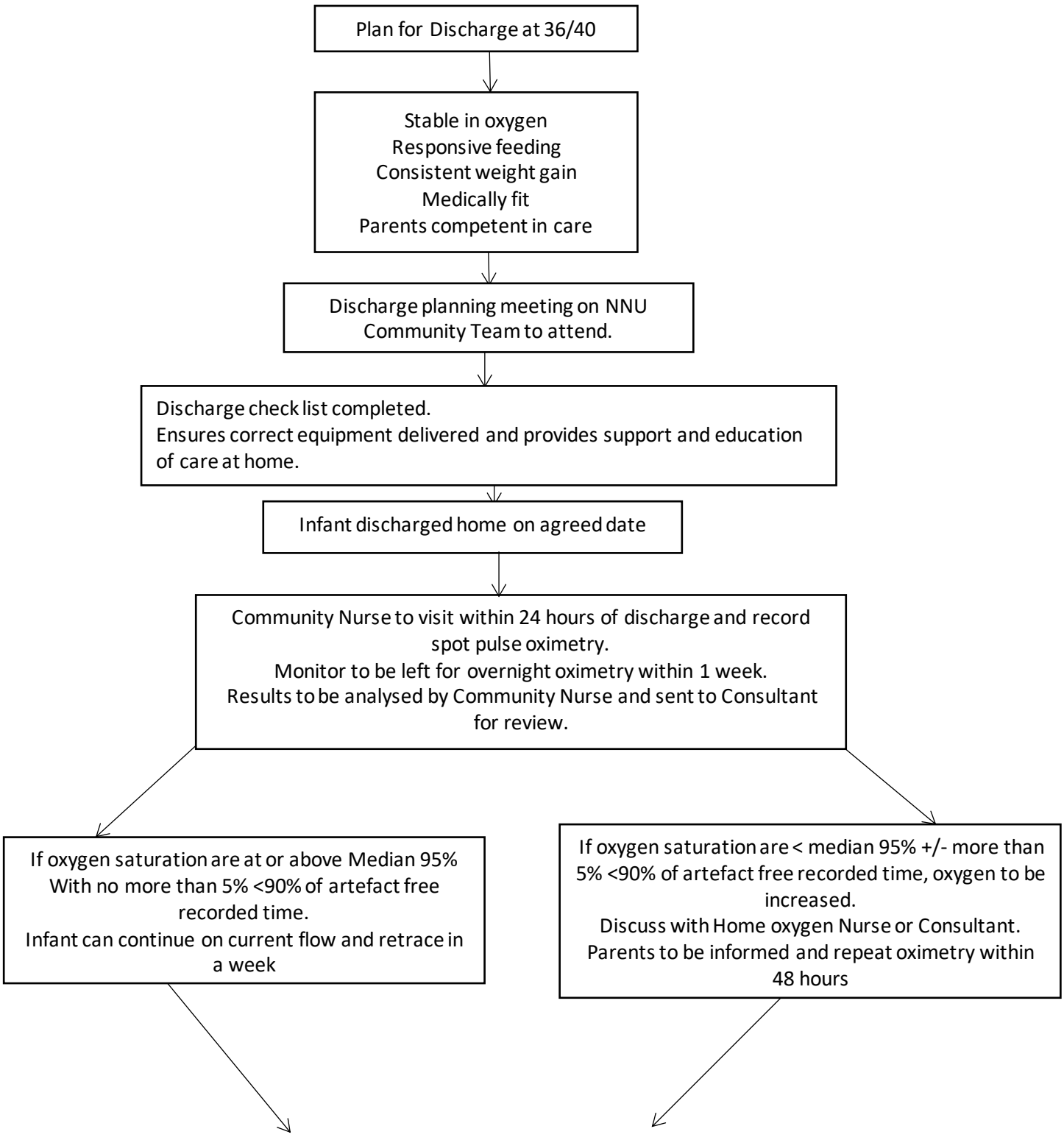
Infants with CNLD should not fly within 6 months of stopping supplemental oxygen as cabin pressure provides FiO2 equivalent to 15% at sea level.
They will need a Fit to Fly test within a year of stopping oxygen. These can be arranged by contacting nearest tertiary centre.

Most CNLD infants will be off oxygen by 6 months corrected age if not a discussion with a Respiratory Consultant should take place.
If a CNLD infant is still in oxygen at a year of age other conditions should be considered and a referral to a tertiary centre made.

4. Guideline Summary

LONG TERM OXYGEN THERAPY FOR INFANTS WITH CHRONIC NEONATAL LUNG DISEASE

Babies who are discharged home should have regular monitoring of their oxygen levels to ensure they don't suffer from hypoxia and an appropriate weaning plan to enable them to come off oxygen in a safe and planned regime.



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NHS

Visit at least weekly for the 1st month
Continue to visit at least monthly and obtain oximetry

When infant is clinically well weaning of oxygen can commence

Reduce oxygen by 0.1l/pm 1-2 hours prior to visit.
If spot SpO2 >94% stay on reduced oxygen and trace overnight

If oxygen saturation are at or above Median 95% With no more than 5% <90% of artefact free recorded time.
Infant can continue on reduced flow and retrace within 2 weeks

If unable to wean by 1 year Referral to Tertiary Centre to be made

If clinically well weaning can continue monthly by 0.l/pm following procedure until in air.
Retrace within a week of being in air

Repeat oximetry after a month.
Remove oxygen equipment after 3 months

B Full guideline and evidence

1. Background

Recognised varied practices throughout the Yorkshire and Humber Region in the delivery of home oxygen therapy.

2. Aim

Consistent best practice throughout the Yorkshire and Humber Neonatal Network, in the delivery of home oxygen therapy for Neonates and Children.

References

1. BTS Guidelines for home oxygen in children *Thorax* 2009,**64** (Suppl 11)
2. Primhak R Oxygen Titration Strategies in Chronic Neonatal Lung Disease *Paediatric Respiratory Reviews* **11** ;2010 154-157
3. American Thoracic Society Documents Statement on the care of the child with Chronic Lung Disease of Infancy and Childhood *American Journal of Critical Care Medicine* 2003; vol **168** 356-396
4. Primhak R Discharge and aftercare in chronic lung disease of the newborn *Seminars in Neonatology* 2003; **8** 117-118
5. Sykes S, Kingshott R, Primhak R Awake and asleep oxygen saturations in infants with chronic neonatal lung disease *Acta Paediatrica* 2011 **100** 1087-1091

Appendix A **HOME OXYGEN CHECK LIST**

NAME: **Hospital Number:**
DOB: **NHS Number:**
ADDRESS:

Planned discharge date:
Discharge Oxygen flow rate:

Date

TOPICS	**HEALTH CARE**	**CARER**
1.Referral to Outreach Team Other referrals		
Reasons for Home Oxygen discussed HOOF initiated		
Signs of illness and recognition of respiratory difficulty.		
Use of nasal cannulas, including skin care and use of creams		
Discuss monitoring if requested by medical staff		
BLS		
Medication- how to administer How to order at home		
Prevention of respiratory infections. Immunisations		
Safe storage and handling of oxygen equipment. Fire safety in the home. Safe use of oxygen Use of different equipment demonstrated Insurance – car and house Electricity repayment Holidays		
Portable oxygen. Travelling with pram/car/bus.		
Supplies and ordering of oxygen		
Problem solving and who to contact		
Ongoing oxygen use, monitoring and weaning process		
Information leaflets		
DLA and Family Fund		

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Appendix B Oxygen Log (home saturation recording)

HOME SATURATION RECORDING

Name	Date of Birth	NHS Number
Date of study	Flow Rate	

Please make a note of any alarms and what is happening at the time e.g crying, nappy change, probe off or cannulas out.
Thank you

TIME	EVENT (AWAKE /ASLEEP, FEEDS ETC)

References

1. BTS Guidelines for home oxygen in children *Thorax* 2009,**64** (Suppl 11)
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