Nasal Flow blended oxygen/air therapy in Newborn Intensive Care Unit (NICU)

Procedure Responsibilities and Authorisation

Department Responsible for Procedure	NICU
Document Facilitator Name	Leanne Baker
Document Facilitator Title	Nurse Educator
Document Owner Name	Chantelle Hill
Document Owner Title	Clinical Nurse Manager
Target Audience	Neonatal nurses and Medical team
Disclaimer: This document has been developed by Waikato District Health Board specifically for its own use. Use of this document and any reliance on the information contained therein by any third party is at their own risk and Waikato District Health Board assumes no responsibility whatsoever.	

Procedure Review History

Version	Updated by	Date Updated	Summary of Changes
02	Leanne Baker	Jan 2019	Recent literature search and minor updates
01	Leanne Baker	Aug 2013	First version

Nasal Flow blended oxygen/air therapy in Newborn Intensive Care Unit (NICU)

Contents

Nasal Flow blended oxygen/air therapy in Newborn Intensive Care Unit (NICU)

1 Overview

1.1 Purpose

To facilitate nursing care of newborn infants requiring supplemental oxygen/air therapy via the Fisher and Paykel Optiflow™ Junior 2 respiratory therapy system.

1.2 Scope:

Waikato District Health Board staff working in NICU

1.3 Patient group: Neonates and infants in NICU

1.4 Definitions

Neonatal nasal flow therapy	A method for providing oxygen or blended air and oxygen.
F&P™	Fisher and Paykel
Heated humidified nasal flow	A mode of therapy that offers an alternative option for providing respiratory support to spontaneously breathing infants either as an initial treatment or following CPAP/ventilation therapy.
Blended gas	Optiflow™ Junior 2 nasal cannula uses a mixture of oxygen and air via a blender and humidifier, and can deliver gas flow at rates of 50ml/min - 25 L/min.
Humidification	Humidification of the oxygen/air mixture is to preserve the infants' mucociliary transport system by providing optimal humidity to the airways.

2 Clinical Management

2.1 Competency required

- Registered nurse who has completed Level 2 orientation
- Enrolled nurse who has completed Level orientation and is working under the direction and delegation of a registered nurse.
- Clinicians: Medical staff, Nurse Practitioners, Clinical Nurse Specialists

2.2 Equipment

- F & P™ MR 850 humidifier and heater cables
- F & P™ RT330 circuit or green tubing with white Optiflow connector (if infant on flow < 500ml/min)
- Oxygen / air blender
- 1L bag of water for injection (if infant on flow >500ml/min)
- Appropriate size nasal cannula (refer table below)
- Phillips™ cardio-respiratory monitor or Massimo™ saturation monitor

2.3 Procedure

1. Preparation

Ensure parents/family understand the need for nasal oxygen therapy and the procedure to be carried out to maintain family centred care in partnership with the infant's parents/caregivers.

Ensure the therapy is correctly prescribed according to NICU medical protocols: Oxygen Therapy *and Respiratory Support Guideline,* and *Premature Infants <36 weeks* (2769).

Oxygen is a drug which must be appropriately prescribed by a registered practitioner with prescribing rights.

2. Optiflow cannula

Assess infant size requirements (refer guide below) and collect equipment and assemble at the infant bedside.

The cannula should fit comfortably and fill no more than 50% of the diameter of the internal nares. Most infants in NICU will use red small (S) or yellow infant (M) size cannula.

If cannula is too large there is a risk of inadvertent delivery of high unmonitored distending pressures to infant airway. Cannula that is too small or tight increases risk of nasal injury and discomfort for the infant.

Cannula size	Weight	Age	Flow rates
S	< 2kg	Preterm - newborn	0.5 - 8 L/min
M	1-8kg	Newborn – 6 months	0.5 – 8 L/min
L	3-15kg	Newborn – 3.5 years	0.5 – 20 L/min

Note:
Blue (XS) and purple (L) are available in NICU but seldom required – please check with ACNM/Coordinator if you want to access these sizes**.**

Ensures nasal flow therapy is commenced quickly and comfortably and infant receives prescribed treatment.

3. Humidification

Perform hand hygiene to protect the infant from infection.

Spike water for injection bag and hang bag on pendant/ humidifier stand hook if infant using humidification. Ensure fluid bag is above humidifier to facilitate continuous passive filling of chamber and humidifier has water chamber filled prior to heating element being turned on

NB:
1. Humidification can be discontinued once flow is reduced to 500ml or less.

2. Go to the store room and find the green tubing with a white Optiflow connector (in store room).

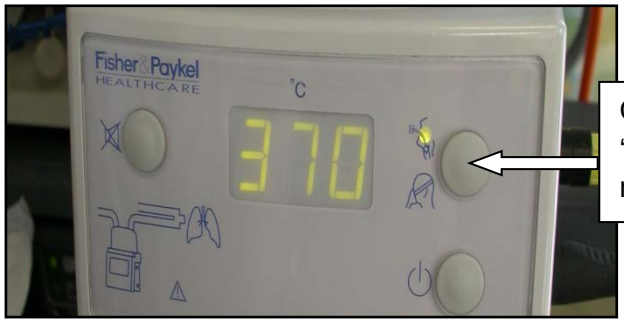
3. Connect Optiflow low flow tubing directly to the low flow meter (with orange label on top of the blender).

4. If the baby is using a blender, and wall (100%) oxygen is prescribed, turn the FiO_2 dial to 100% oxygen and attach a red label to the blender dial.

5. If the infant is ≥36/40, they can transfer can go to wall (100%) oxygen if on less than 500ml flow.

6. Setting up circuit

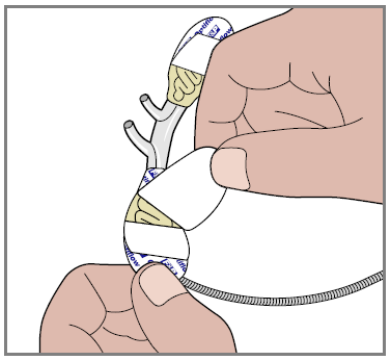
1. Turn on humidifier and allow 5 minutes for warming up before connecting to patient.
2. Ensure blender is connected to oxygen and air.
3. The F & P™ 850 humidifier temperature setting defaults to 'intubated' mode**.** This is the **correct** setting for this therapy providing optimal humidity to the infant airway.
4 Attach the nasal interface to the end of the blue RT330 tubing; secure circuit inspiratory tubing to bedding using attached clip.

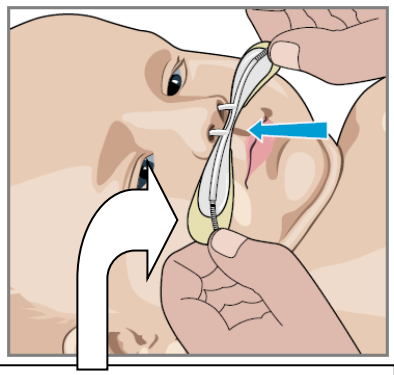


Check set to 'intubated' mode

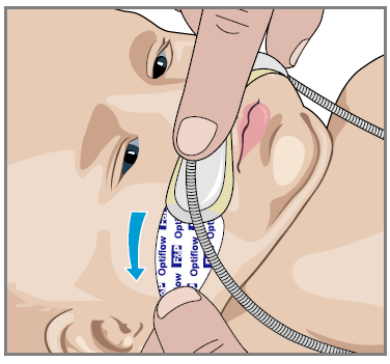
7. Application of cannula

- Remove inner adhesive backing from cannula wiggle pad and position cannula on the nares, ensuring a 2mm gap from base of prong to septum and stick to cheeks – reposition as needed to obtain optimal position.
- Once cannula is attached in the correct position remove second tab and secure to the face.





Place wiggle pad on this upper curve of the cheek



Ensure cannula **is not** "stretched" during application

8. Oxygen target

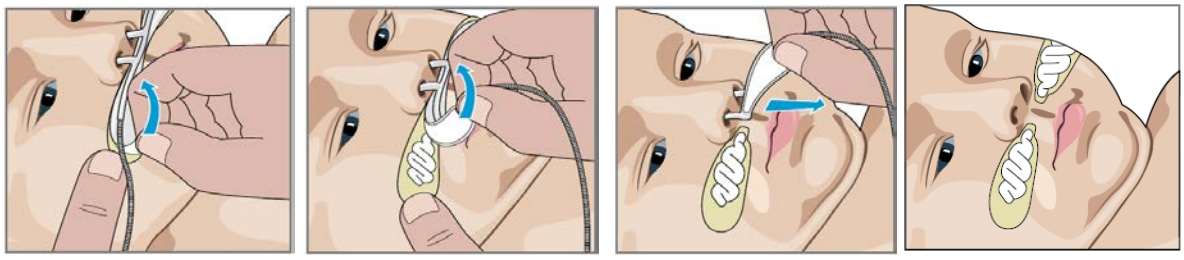
Ensure infant has pulse oximetry on with alarms are set to appropriate prescribed parameters for gestation and adjust $Fi0_2$ as necessary to maintain saturations within limits according the NICU medical protocol: *Oxygen Therapy* (2769).

O2 Saturation Target Levels – Waikato NICU	
< 36 weeks	**90 – 94%**
> 36 weeks	**93 – 97%**

9. Monitoring and observation

- Developmentally appropriate positioning
- Frequent (at least hourly) observation and checking of cannula placement
- Monitor skin integrity of face and behind ears with cares / PRN
- Suction PRN if indicated (refer diagram below)

Removing cannula from wiggle pad for suction:



Hold duoderm end of wigglepad down while separating velcro

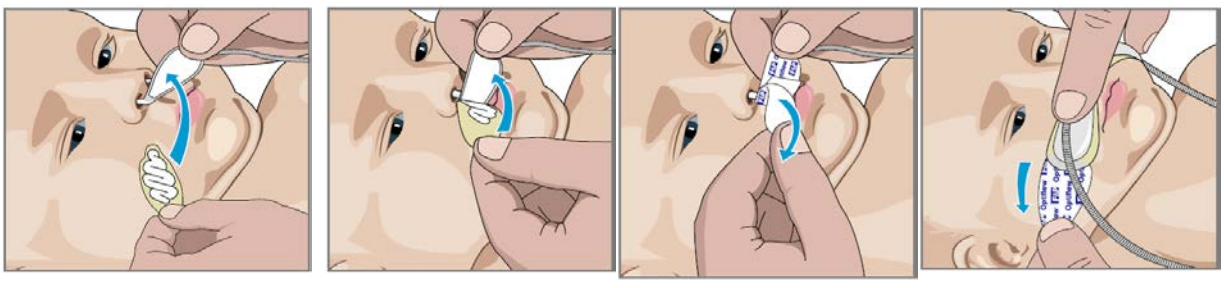
Gently pull cannula away from wigglepad

- Assessment of size and position of nasal cannula each shift
- Appropriate documentation as per NICU protocol (includes hourly SpO_2, FiO_2, flow, humidifier temperature)
- Observe patient for changes in work of breathing and signs of respiratory distress

10. Replacing wiggle pads

Replace wiggle pads when soiled or loose (spare wiggle pads on CPAP trolleys and in the equipment store-room) **Refer diagrams below:**

Replacing wiggle pads:



11. Discontinuation of Nasal flow therapy

When infant is deemed ready to trial off nasal flow therapy, remove the Optiflow cannula from the nares, clean with sterile water and dry, place in a plastic bag at the bedside for up to 8 hours in case of treatment needing to be resumed.

- Leave wiggle-pads insitu for 24 hours, then remove if baby stable.
- Discard RT330 circuit and Optiflow cannula in rubbish bin as they are single use disposable units.
- A new RT330 circuit will be required if therapy restarted.

2.4 Potential complications

- Nasal or skin injury due to misplaced/malpositioned interface or wiggle pad
- Interruption to therapy if cannula not placed in nares correctly

3 Evidence base

3.1 References

- Manley BJ, Dold SK, Davis PG, Roehr CC. (2012). High-flow nasal cannulae for respiratory support of preterm infants: a review of the evidence. *Neonatology* 102(4):300-8. doi: 10.1159/000341754. Epub, 2012 Sep 6.
- De Jongh BE, Locke R, Mackley A, Emberger J, Bostick D, Stefano J, Rodriguez E, Shaffer TH (2014) 34(1):27-32. doi: 10.1038/jp.2013.120. Epub 2013 Sep 26.
- Wilkinson D, Andersen C, O'Donnell CP, De Paoli AG, Manley BJ. (2016) High flow nasal Cannula for respiratory support in preterm infants. *Cochrane Database Systematic Review* (2016), 22;2:CD006405. doi: 10.1002/14651858.CD006405.pub3.
- Chikata Y, Ohnishi S, Nishimura M (2017 May) Humidity and Inspired Concentration During High-Flow Nasal Cannula Therapy in Neonatal and Infant Lung Models. *Respiratory Care*, 62(5):532-537. doi: 10.4187/respcare.05319. Epub 2017 Feb 7.

3.2 Associated Waikato DHB Documents

- Waikato DHB NICU medical protocol: Oxygen therapy (2769)
- Waikato DHBNICU medical protocol: Respiratory Support Guideline, and Premature Infants <36 weeks (2760)