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NEONATAL BUSINESS RULE
COVER SHEET



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EXECUTIVE SPONSOR	Sally Wise, Nursing Co- Director Neonatal Services Srinivas Bolisetty, Medical Co- Director Neonatal Services
AUTHOR	G Barnett (ACNE/CNS), S Bolisetty (Medical Co- Director)
SUMMARY	To provide clinicians a guideline on the appropriate use, set up, application, feeding requirements and nursing considerations for neonates on Humidified High Flow Nasal Cannula Therapy in Newborn Care Centre.
Key Words	Humidified High flow nasal cannula, respiratory support, neonate

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1 BACKGROUND

Humidified High Flow Nasal Cannula (HHFNC) is a mode of 'non-invasive' respiratory support for neonates suffering from respiratory failure or respiratory distress syndrome (RDS). HHFNC is the delivery of heated, humidified, blended air and oxygen, via nasal cannula¹. HHFNC therapy has various modes of action, including washout of the nasopharyngeal dead space, distending airway pressure and reducing work of breathing (WOB)².

This CBR provides guidance for clinicians within Newborn Care Centre (NCC) to manage neonates receiving HHFNC therapy.

2 RESPONSIBILITIES

2.1 Staff

- 2.1.1 Medical- to determine neonates that require HHFNC therapy, to set appropriate settings based on clinical condition, to examine neonates receiving HHFNC twice daily at a minimum, to determine neonates that can commence oral feeding when safe to do so, to provide a weaning plan and to determine neonates who can have their HHFNC therapy ceased.
- 2.1.2 Nursing- to correctly set up the circuit and apply nasal prongs to neonate, to monitor the neonate and escalate concerns, to document clinical condition, to initiate and support oral feeding, to wean HHFNC and cease therapy as clinically indicated.

3 PROCEDURE

3.1 Equipment

- Fisher and Paykel (F & P) Humidifier Base (F&P 950)
- Neonatal Optiflow Junior Heated Circuit Kit (950N40)
- Fisher and Paykel Optiflow Nasal Cannulas (Select appropriate size)
- Caviion
- Equipment pole with wheels
- Neopuff™ and appropriately sized face mask
- Neopuff™ tubing
- Green gas tubing

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- 1000 mL water for injection bag
- Oxygen analyser
- Gas blender
- Optional:
 - Adhesive tape and scissors (if using pre-existing Nasogastric Tube [NGT])
 - F&P WigglewiNG (to secure NGT alongside Wigglepads).
 - F&P Neonatal Optiflow Junior Blender transition kit (appropriate size if applicable)

3.2 Clinical Practice

3.2.1 Indication for High Flow therapy

- HHFNC is used in two ways in NCC
 - Weaning from other forms of breathing support
 - Primary mode of respiratory support can be considered
- The recommended flow rates in NCC are 4-8 L/minute.
 - Flow rate is decided by the neonate's clinical condition and is at the discretion of the medical officer

3.2.2 Setting up Humidified High Flow Circuit

- Identify if the neonate requires HHFNC by medical team.
- Ensure neonate has alternative respiratory support if required while set up is assembled.
- Ensure resuscitation equipment is at the bedside, is checked and ready for use if required.
- RN to collect appropriate equipment (Picture 1).
- Attach metal bracket onto equipment pole. Humidifier base must always be positioned lower than the neonate (Picture 2).
- Slide Humidifier base downwards onto the metal bracket (Picture 3)



Picture 1

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Picture 2



Picture 3

- Plug humidifier base into wall power.
- Perform hand hygiene before opening circuit package.
- Open circuit packaging on a flat surface. Use packaging as a clean working surface whilst assembling.
- Remove water for irrigation bag from packaging ensuring the use by date is checked by two RN's. Hang onto the hook on the pole.
- Slide disposable humidity chamber into the humidifier base by pressing blue spring-loaded rim downwards. (Picture 4).
- Pull the yellow ring- pool spike upwards, removing the spike. Dispose of the spike, however, do not remove the yellow ring until it is time to 'wet' the circuit. Thus, ensuring sterility of the water spike. (Picture 5).



Picture 4



Picture 5

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- Slide the grey end of the inspiratory tubing into the 'hood' of the base ensuring the microchip faces upwards. (Picture 6).
- Place white pressure manifold with spigot onto clear circular input on humidity chamber.
- Place one end of the green tubing onto the spigot whilst attaching the other end to the flow meter on the blender (Picture 7&8).
- Remove white cover plug off pressure manifold. Insert the oxygen analyser into porthole. Turn analyser on when commencing treatment. (Picture 9).
- Spike water for irrigation bag.
- Turn on humidifier base.



Picture 6



Picture 7



Picture 8



Picture 9

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NOTE:

If a High Flow (HF) circuit is being set up (not for patient use) do not 'wet' the circuit or turn on the humidifier base.

If the patient is transitioning from Continuous Positive Airway Pressure (CPAP) to HF, the same circuit may be used. However, the F&P Neonatal Optiflow Junior Blender transition kit is required. This provides the HF pressure manifold and clear adaptor for the inspiratory limb to attach to the nasal prongs.

3.2.3 Applying Nasal cannulas

- Perform hand hygiene.
- Choose appropriate size Nasal Cannula. (refer to F & P Nasal Interface fitting guide below).
- Attach Nasal cannula to blue inspiratory tubing. (Picture 10).
- Turn on flow meter (L/min) to the prescribed flow.
- Apply Cavilon to the neonate's face.
- Peel off the first sticker backing of the nasal prongs.
- Align the prongs comfortably in both nares. Ensuring they are not rubbing against the septum of the nose. (Picture 11).
 - Wigglepads should sit as close to the nare as possible without intruding on the eyes or mouth.
- Peel off the second sticker backing.
- Ensure nasal prong position is correct and then press onto the skin while applying light pressure. Ensure the prongs stick to the neonate's face. (Picture 12).
- Ensure that a gastric tube is inserted or remains in the correct position after HHFNC treatment is commenced.



Picture 10



Picture 11

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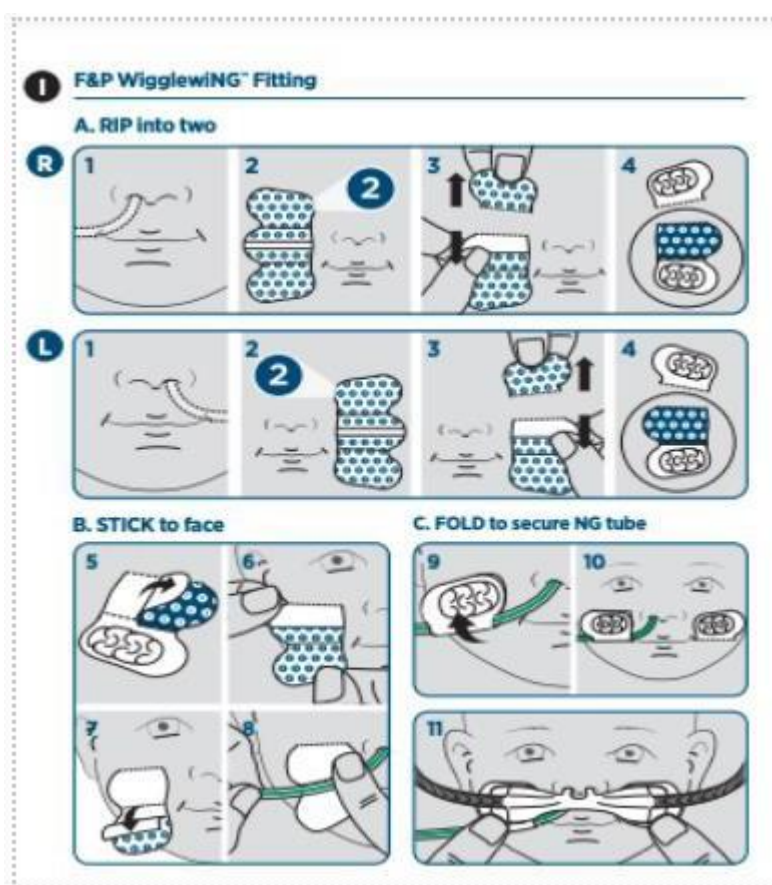
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F & P Nasal interface fitting guide¹⁰

XS	Blue Seahorse	For babies 500g – 2.5kg
S	Red Crab	For babies 900g - 4kg
M	Yellow Starfish	For babies 1-10kg
L	Purple Octopus	For babies 3-20kg
XL	Green Turtle	For babies 5-30kg

Note:

There is the option to use a WiggleWING, which allows you to secure an NGT under the wigglepads with a joint adhesive. If using the WiggleWING, then attach it to the neonate's cheek first. Then apply the nasal prongs as normal (Picture 12).



Picture 12

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3.2.4 Weaning High Flow therapy

- Weaning strategies vary between different conditions and each neonate is to be managed individually based on their clinical condition.
- Ensure HHNFC circuit remains at bedside for 24 hours post cessation.

NOTE:

Neonates with acute respiratory illness generally tolerate a faster weaning process:

- Commence weaning when WOB has subsided, and oxygen requirement is decreasing.
- Flow rates are recommended to be reduced at 1L/min every 24 hours. However, can be done at a faster rate at medical team discretion.
- HHFNC can be ceased at any flow rate if the neonate has appropriate work of breathing and oxygen requirement.

Neonates with Chronic Lung Disease (CLD) benefit from a prolonged period of high flow until their oxygen requirement has decreased and they have better growth and maturity

- Reduce flow by 1L/ min every few days. Some neonates will only tolerate weekly weaning of their flow.
- CLD neonates are more prone to atelectasis and apnoea's if their flow is weaned prematurely.
- Cease high flow once flow rate has reached 4L/min.
- Wean to low flow oxygen if neonate is still requiring oxygen.

3.2.5 Escalation of care while on high flow

- Neonates may require escalation of their breathing support at any time while receiving HHFNC
- Signs of concerns are
 - Increased work of breathing (tachypnoea, subcostal, or intercostal recessions)
 - Increased oxygen requirement
 - Increased frequency of apnoea's
 - Abnormal blood gases
- If a neonate fails the weaning process increase the flow rate to previous rate and observe closely.
 - If the neonate's oxygen requirement increases (generally >40%), consider the need for CPAP or greater support.

3.2.6 Commencing Oral feeding on High Flow therapy in NCC

- Neonates on high flow can have oral feeds based on their clinical condition and medical and nursing discretion.
- Neonates must be stable on their current rate of support (no flow rate increases in previous 24 hours, no signs of increasing WOB).
- Ensure flow rate remains the same during oral feeding. Do not reduce flow unless medically directed.

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- Neonates with acute respiratory illness (TTN, RDS):
 - Oral feeds can be introduced as soon as clinically stable. Ensure they have comfortable breathing efforts on current respiratory support settings and have not required an increase in flow or oxygen
 - One feed should be offered initially (breast or bottle depending on the mothers feeding preference)
 - Oral feeds may be increased in frequency based on clinical condition and neonate's feeding cues and physiological stability
 - Assess WOB during the feed. If the neonate shows any sign of increased WOB or distress, cease oral feed immediately
 - Use the modified latch score (MLS) to assess the neonates need for a top up post suck feed attempt
 - Seek guidance from lactation consultant if you have any concerns about the neonate's ability to feed or is at risk of aspiration
- Neonates with CLD:
 - Thorough assessment is needed to determine readiness to feed
 - Discuss with medical team if neonate is ready to introduce suck feeding.
 - Neonate readiness includes:
 - At least 32 weeks gestation
 - Comfortable WOB on current respiratory support
 - Able to maintain a wakeful state
 - Non-nutritive sucking should be present, rhythmical and maintained
 - Introduce oral feeds cautiously
 - When decision is made that the neonate is ready to feed (feeding cue and physiological stability assessment); begin breastfeeding on an 'empty breast' or a reduced amount in a bottle. Seek appropriate guidance from medical team or lactation consultant if necessary.
 - If there are any concerns about the neonate's ability to safely suck feed prior to commencing, notify lactation consultant and they can assist during the first oral feed.
 - Speech pathology referral might be needed if the neonate demonstrates an uncoordinated or unsafe suck on their first oral feed attempt.
 - Feeding attempts can be increased according to the neonate's clinical condition, medical and nursing discretion, and if involved lactation and speech pathology services.
 - Use the MLS to assess the breastfeed to provide guidance on the appropriate amount of NGT top up that may be required.

3.2.7 Nursing Considerations

- F & P Circuits are to be changed every 14 days
 - Complete yellow sticker from circuit packet and place on humidifier base
 - Schedule a 'change ventilator tubing' task in eRIC
- Ensure there is a Neopuff™ set up at the bedside of any neonate nursed on HHFNC.
- Perform safety checks at the commencement of each shift
- Calibrate oxygen analysers at the start of each shift.

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- Replace the wigglepads pads ONLY if they are lifting off the skin or become soiled (spare wigglepads live in the level 3 storeroom).
- Monitor nasal prongs position in the nares. The prongs must not touch the septum or completely occlude the nares. Thus, helping prevent a pressure injury.
- **Document nasal septum condition with each cares**
- Use the white clip on the blue inspiratory limb to position the tubing in the neonate's bed or while they are having skin to skin, helping to reduce the drag on the neonate's head.
- When HHFNC is ceased. Leave the circuit and Neopuff™ set up at the bedside for 24 hours. If the neonate requires re-commencing of HHFNC, the same circuit may be used. However, if not used after 24 hours dispose of the set up.
- HHFNC can be used with **Nitric oxide gas**. Please refer to [Inhaled Nitric Oxide Therapy \(iNO\)](#) for set up and use.

3.3 Documentation

- eRIC

3.4 Education Notes

- Majority of evidence suggests that HHFNC is an appropriate form of support and weaning tool for neonates >28 weeks' gestation and > 1000g at birth.
- There are some advantages of using HHFNC instead of continuous positive airway pressure (CPAP) which has led to its rapid adoption in neonatal care. These are:
 - Reduced nasal trauma
 - Ease of use
 - Neonate comfort
 - Easier access for feeding and skin to skin
- Caution is needed in extreme preterm neonates (<28 weeks and <1000g) due to the lack of high- level evidence. Due to the respiratory demands of extreme preterm neonates HHFNC may provide insufficient support to their lungs therefore should not be a first line treatment option.

3.5 Abbreviations

HHFNC	Humidified high flow nasal cannula	RDS	Respiratory distress syndrome
WOB	Work of breathing	F & P	Fisher and Paykel
NGT	Nasogastric Feeding Tube	HF	High Flow
CPAP	Continuous Positive Airway Pressure	CLD	Chronic Lung Disease
TTN	Transient Tachypnoea of the Newborn	MLS	Modified Latch Score

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3.7 Related Policies/procedures

- RHW NCC Medical CBR- CPAP - Continuous Positive Airway Pressure Therapy
- RHW NCC Medical CBR- Inhaled Nitric Oxide Therapy (iNO)
- RHW NCC Nursing CBR- Intragastric Tube Insertion and Maintenance
- RHW NCC Nursing CBR- Immuno-Supportive Oral Care (ISOC)

3.8 References

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4. Wilkinson D, Andersen C, O'Donnell CPF, De Paoli AG, Manley BJ. High flow nasal cannula for respiratory support in preterm infants. Cochrane Database of Systematic Reviews 2016, Issue 2. Art. No.: CD006405. DOI:10.1002/14651858.CD006405.pub3.

4 ABORIGINAL HEALTH IMPACT STATEMENT DOCUMENTATION

- Considerations for culturally safe and appropriate care provision have been made in the development of this Business Rule and will be accounted for in its implementation.
- When clinical risks are identified for an Aboriginal and/or Torres Strait Islander woman or family, they may require additional supports. This may include Aboriginal health professionals such as Aboriginal liaison officers, health workers or other culturally specific services

5 CULTURAL SUPPORT

- For a Culturally and Linguistically Diverse CALD woman, notify the nominated cross-cultural health worker during Monday to Friday business hours
- If the woman is from a non-English speaking background, call the interpreter service: NSW Ministry of Health Policy Directive PD2017 044-Interpreters Standard Procedures for Working with Health Care Interpreters

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6 NATIONAL STANDARDS

- Standard 1 Clinical Governance
- Standard 5 Comprehensive Care
- Standard 8 Recognising and Responding to Acute Deterioration

7 REVISION AND APPROVAL HISTORY

Date	Revision No.	Author and Approval
6.10.2016	1	S Bolisetty (Staff Specialist). Neonatal Services Division Quality Committee
11.10.2024 28.11.2024	2	G. Barnett (ACNE/CNS), S Bolisetty (Medical Co-Director) Endorsed by NCC CBR Committee
16.12.24	2	Endorsed RHW BRGC