

Vapotherm

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Vapotherm

High Flow Nasal Cannula respiratory support (HFNC – e.g. “Vapotherm”¹) refers to the delivery of humidified, heated and blended oxygen/air at flow rates between 2 and 8L/min via nasal cannula.

Embrace use HFNC and so do other NIC / LNUs in the region. SCBUs do not use routinely (Bassetlaw, Harrogate, Scarborough) and this needs to be considered when preparing babies for transfer to other units – check with Embrace if in doubt.

USES:

- Respiratory support for infants with:
 - hyaline membrane disease (RDS) - post-extubation in larger babies
 - chronic lung disease
 - other conditions requiring respiratory support – as directed by consultant
- Babies with nasal trauma from nCPAP
- As an alternative to CPAP in some babies – benefits of comfort, noise and accessibility

CONTRAINDICATIONS:

Discuss with senior but caution if - upper airway abnormalities, ventilatory failure, severe cardiovascular instability, frequent apnoeas (despite caffeine in preterms)

EVIDENCE:

As primary non-invasive support, CPAP is probably more effective than HFNC in babies ≥ 28 weeks gestation and ≥ 1000 g birth.

A RCT² showed higher oxygen requirement / respiratory acidosis in HFNC babies (although requirement for intubation at 72 hours did not differ)

As post-extubation support, the evidence shows that HFNC has similar rates of efficacy to other forms of non-invasive respiratory support (typically nCPAP).

HFNC is associated with lower rates of nasal trauma and a small reduction in pneumothoraces (NNT 50) compared with nasal CPAP. There is no difference in other adverse outcomes³⁻⁵.

There is currently not sufficient evidence specifically for premature babies < 28 weeks gestation and < 1000 g birth weight. The choice of using nCPAP or HFNC for these babies should be made on an individual basis with consultant input.

References:

1. Vapotherm NICU pocket guide. (28/02/1013). <http://cdn.vtherm.com/public/246/documents/Version-20131001065716-Documents-246-9880-1.pdf>
2. Roberts et al. Nasal High-Flow Therapy for Primary Respiratory Support in Preterm Infants. *N Engl J Med* 2013; 375 (12): 1142-1151
3. Yoder A et al. Heated, humidified high-flow nasal cannula versus nasal CPAP for respiratory support in neonates. *Paediatrics* 2013;131:e1482
4. Wilkinson D, Andersen C, O'Donnell CPF, De Paoli AG. High flow nasal cannula for respiratory support in preterm infants. *Cochrane Database of Systematic Reviews* 2016, Art. No.: CD006405.
5. Manley BJ et al. High Flow Nasal Cannulae in very Preterm Infants after Extubation. *N Engl J Med* 2013; 369:1425-1433

SETTINGS:

Keep in mind that although flow rates can be controlled, we are unable to monitor the PEEP delivered by HFNC.

- Use the appropriately sized nasal cannula. The cannula should not obstruct or be larger than 50% the diameter of the nares.

Weight	Cannula type	Outside tip diameter (mm)	Inter-prong space (mm)
<700g	Premature	1.5	5.59
700-1100g	Neonatal	1.5	6.60
>1100g	Infant	1.9	7.62

- For standard 2 prong nasal cannula, use a orogastric tube instead of nasogastric tube to prevent occlusion of the nares.
- Single prong nasal cannula are available (allows use of NG tube in other nostril) but use is normally only for babies >1000g.
- Operating temperature set at 34°C for flow rate ≤ 4 L/min and 36-37°C at >4 L/min. Allow system to reach set temperature before connecting delivery tube to cannula.
- Place cannula on baby before attaching delivery tube.
- Start at a flow rate of 4-6 L/min (flow rates >6 L/min in infants <1 kg should be discussed with the consultant on call).
- Use up to 8 L/min in infants >1 kg, but if the baby is requiring $FiO_2 > 60\%$ or has CO_2 retention, acidosis or apnoea they are likely to need alternative support.
- There should be continuous monitoring of heart rate, respiratory rate and SaO_2 . Blood gases should be done in babies on supplemental oxygen or on clinical grounds.
- Weaning flow rates:
 - Wean FiO_2 to <40% before you consider reducing the flow
 - Attempt to reduce by 1.0L/min 24 hourly if FiO_2 0.21 - 0.3 in babies >1.5Kg
 - Attempt to reduce by 0.5L/min 24 hourly if FiO_2 0.21 - 0.3 in babies <1.5Kg
 - Wean flow rate slowly by 0.5L/min every other day if $FiO_2 > 0.3$
 - Attempt to stop if in air and requiring 2.5L/min or less
 - Attempt switch to Low Flow Oxygen if in oxygen and requiring 2.0L/min
 - Clinical instability, increased work of breathing or a significant increase in FiO_2 : consider pneumothorax (thought to be rare).

When not in use:

- Vapotherm units have a short battery life (15 minutes) even when fully charged.
- Vapotherms **do not** recharge their battery when in use
- Therefore when not in use, please remember to **turn off the unit and plug it into mains power supply** – this will maximise limited battery back-up in the event of power failure.