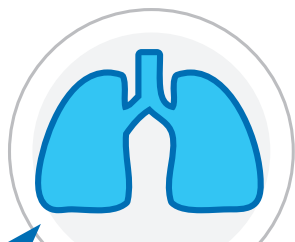


# Guidelines and Best Practices for Mask-Free NIV™ for Spontaneously Breathing Patients

## NICU Pocket Guide



## Patient Selection



### **SYMPTOMS:**

**Patient presents with one or more of the following symptoms:**

- Hypoxemia
- Retractions
- Tachypnea
- Mild apnea and bradycardia
- Grunting
- Nasal flaring
- Difficulty weaning from Nasal CPAP
- Difficulty weaning from mechanical ventilation

## Diagnoses



### **DIAGNOSES:**

**These symptoms are indicative of but not solely attributed to:**

- Infant Respiratory Distress Syndrome (RDS)\*
- Bronchopulmonary Dysplasia (BPD)
- Prematurity
- Congenital Heart Defects
- Congenital diaphragmatic hernia (CDH)
- Transient Tachypnea of the Newborn (TTN)
- Meconium aspiration
- Persistent Pulmonary Hypertension (PPHN)









**\*Randomized Clinical Trials show efficacy equivalent to nCPAP and NiPPV for primary support of RDS<sup>1,2</sup>**

1. Kugleman et al, "A randomized pilot study comparing heated humidified high-flow nasal cannulae with NiPPV for RDS", *Pediatric Pulmonology*, 2014 Mar 12; 50(6) 576-83. (Clinical Trial, Prospective, Randomized, Single Site, n=76).  
2. Lavizzari et al, "Heated, humidified high-flow nasal cannula vs nasal continuous positive airway pressure for respiratory distress syndrome of prematurity – a randomized clinical noninferiority trial", *JAMA Pediatrics*. 2016 Aug 8. (Clinical Trial, Prospective, Randomized, Single Site, n=316).

## Hi-VNI Cannula Selection

### Fitting the Hi-VNI Cannula:

- Make sure **NOT** to occlude greater than 50% of the nares.
- Hi-VNI cannula prongs should be wide enough not to pinch the nasal septum (erosion risk).
- The SOLO is a single prong Hi-VNI cannula that can be used in premature, neonatal, and infant. The single prong design is as effective as a dual prong Hi-VNI cannula. The single prong simplifies NG tube placement.
- Flow rates in neonates are 1-8 L/min.

	Hi-VNI Cannula Sizes	Flow Range	Tip OD
	<b>Premature</b>	1-8 L/min	1.5 mm
	<b>Neonatal</b>	1-8 L/min	1.5 mm
	<b>SOLO (single prong)</b>	1-8 L/min	1.9 mm
	<b>Infant</b>	1-8 L/min	1.9 mm
	<b>Intermediate Infant</b>	1-8 L/min	1.9 mm
	<b>Pediatric Small</b>	1-20 L/min	1.9 mm
	<b>Pediatric/Adult Small</b>	5-40 L/min	2.7 mm
	<b>Adult</b>	5-40 L/min	4.8 mm

### Hi-VNI Cannula Application:

- Only Vapotherm Hi-VNI cannulae should be used with the Vapotherm Precision Flow®
- Select the appropriate Hi-VNI cannula based on the above sizing chart
- Place the Hi-VNI cannula on the patient before attaching the delivery tube
- Allow the system to reach the set point (temperature display will stop flashing) before connecting delivery tube to the Hi-VNI cannula
- The Precision Flow's operational L/min range is locked depending on the disposable patient circuit (DPC) selected:
  - PF-DPC-HIGH (Blue packaging): 5-40 L/min
  - PF-DPC-LOW (Red packaging): 1-8 L/min



## Therapy Implementation and Maintenance



### STARTING L/MIN

The recommended starting flow rate is 4-6 L/min, even in VLBW infants<sup>3,4</sup>. Titrate to clinical effect to maximum of 8 L/min as needed.



### TEMPERATURE

Set temperature to 36-37°C.



### FiO<sub>2</sub>

Start and titrate FiO<sub>2</sub> as needed to achieve target SpO<sub>2</sub>.



3. Yoder et al, "Consensus approach to nasal high-flow therapy in neonates", *Journal of Perinatology*. (2017) 00, 1-5.

4. McQueen et al, "Safety and long term outcomes with high flow nasal cannula therapy in neonatology: a large retrospective cohort study", *Journal of Pulmonary Respiratory Medicine*. 2014 Dec; 4(6): 216. (Clinical Trial, Retrospective, Not Randomized, Multicenter, Cohort Analysis, n=1363).

## Monitoring Therapy



### PATIENT PARAMETERS

#### Patient Parameters:

- Indices of work of breathing (WOB)
- SpO<sub>2</sub>
- PCO<sub>2</sub>
- FiO<sub>2</sub>
- Nasopharynx patency
- Feeding tolerance



### DOCUMENTATION

#### Documentation:

##### Patient

- Heart rate
- Respiratory rate
- Work of breathing (WOB)
- SpO<sub>2</sub>

##### Device

- Flow rate
- FiO<sub>2</sub>
- Temperature
- Water level
- Cannula size

# Weaning

## Weaning L/min

Wean in 0.5-1 L/min increments as patient tolerates



Consider further wean titrated on clinical assessment of work of breathing



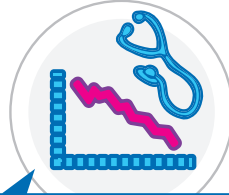
If at less than 4 L/min you see rainout, consider dropping temperature to no lower than 34°C



Assess for further wean and/or discontinuation



Conventional cannula or room air



**WEAN BY L/MIN OR  $\text{FiO}_2$**

Vapotherm Hi-VNI Technology parameters (L/min &  $\text{FiO}_2$ ) are independent of each other. Adjustment of L/min will impact work of breathing while adjustment of  $\text{FiO}_2$  maintains patient  $\text{SpO}_2$ . Monitoring patients' response to each change requires continuous assessment of breath sounds, respiratory rate, physical characteristics (e.g nasal flaring, grunting and retractions).

## Weaning $\text{FiO}_2$

Return  $\text{FiO}_2$  to range acceptable for  $\text{SpO}_2$  requirement



Patient assessment of HR, RR,  $\text{SpO}_2$



Continue  $\text{FiO}_2$  wean to maintain  $\text{SpO}_2$  targets

# Aerosol Medication and Specialty Gases

## Use with Aerosol Medication

Treating patients with respiratory disorders frequently requires combined use of Hi-VNI Technology with aerosolized medication. For practice considerations to do so, refer to the "Aerosol Delivery with HVNI Pocket Guide" and the "Aerosol Medication Delivery with HVNI Therapy Practice Summary."

## Use with Nitric Oxide



- Vapotherm Hi-VNI Technology is verified for use with multiple nitric oxide delivery systems. To confirm your system is compatible with Vapotherm, contact your local representative.
- Vapotherm Nitric Oxide Disposable Patient Circuits (DPCs):  
PF-NODPC-LOW 1-8 L/min  
PF-NODPC-HIGH 5-40 L/min
- Note: Refer to the Instructions for Use provided with your nitric oxide system and with the Nitric Oxide circuit.

## Use with Precision Flow Heliox®

- Vapotherm offers an ideal solution for convenient delivery of conditioned helium-oxygen gas mixtures (Heliox).
- Heliox has a significantly lower density than typical air/oxygen mixtures.
- The lower gas density reduces the work of breathing by reducing the force needed to move gas through the airways.
- Heliox is commonly used on patients with diseases of increased airway resistance, such as bronchiolitis, asthma, post-extubation stridor, airway compression, intra and extrathoracic airway obstruction.
- Precision Flow Heliox strategies follow the same general clinical guidelines for air-oxygen mixtures, except  $\text{FiO}_2$  should be titrated between 0.21 and 0.4 since higher oxygen concentrations (and lower helium concentrations) would result in a less significant clinical effect.
- Standard Vapotherm Disposable Patient Circuits (DPCs) may be used with the Precision Flow Heliox.

PF-DPC-LOW 1-8 L/min  
PF-DPC-HIGH 5-40 L/min





Vapotherm, Inc. • 100 Domain Drive • Exeter, NH 03833 • 603.658.0011 • [www.vapotherm.com](http://www.vapotherm.com)

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