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

Pediatric Pocket Guide
Patient Selection

SYMPTOMS:

Patient presents with one or more of the following:

- Respiratory distress
- Hypoxemia
- Hypercapnia
- Tachypnea
- Accessory muscle use
- Grunting
- Nasal flaring

Diagnoses

DIAGNOSES:

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

- Acute Respiratory Distress Syndrome (ARDS)
- Viral bronchiolitis
- Pneumonia
- Acute Asthma
- Congenital Heart Defects (CHD)
- Persistent Pulmonary Hypertension
- Bronchopulmonary Dysplasia (BPD)
- Ventilator Weaning
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 neonates and infants. The single prong design is as effective as a dual prong Hi-VNI cannula. The single prong simplifies NG tube placement.
- The recommended flow rates for infants and toddlers under 20 kg is 2 L/min per kilogram of weight.¹

Note: If the patient’s weight is significantly above the 95th percentile for age, use CDC 50th percentile weight for age to start initial L/min rate, and titrate to clinical effect.

- Hi-VNI Technology is a de-escalation therapy. It is safe to start with highest flows based on weight, and titrate down to clinical response (decreased WOB).

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

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

The recommended starting L/min rate is 2 L/min per kilogram of weight.\(^1\) Titrate to clinical effect.

**Note:** If the patient’s weight is significantly above the 95th percentile for age, use CDC 50th percentile weight for age to start initial flow rate.

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Monitoring Therapy

**Patient Parameters:**
- Indices of work of breathing (WOB)
- SpO$_2$
- PCO$_2$
- FiO$_2$
- Nasopharynx patency
- Feeding tolerance

**Documentation:**
**Patient**
- Heart rate
- Respiratory rate
- Work of breathing (WOB)
- SpO$_2$

**Device**
- Flow rate
- FiO$_2$
- Temperature
- Water level
- Hi-VNI cannula prongs must occlude no more than 50% of the nares
Weaning

**Weaning L/min**
- Wean in 1 L/min increments as patient tolerates
  - Consider further wean titrated on clinical assessment of work of breathing
  - If at less than 10 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

**Weaning FiO\textsubscript{2}**
- Return FiO\textsubscript{2} to range acceptable for SpO\textsubscript{2} requirement
  - Patient assessment of HR, RR, SpO\textsubscript{2}
  - Continue FiO\textsubscript{2} wean to maintain SpO\textsubscript{2} targets

Vapotherm Hi-VNI Technology parameters (L/min & FiO\textsubscript{2}) are independent of each other. Adjustment of L/min will impact work of breathing while adjustment of FiO\textsubscript{2} maintains patient SpO\textsubscript{2}. Monitoring patients’ response to each change requires continuous assessment of breath sounds, respiratory rate, physical characteristics (e.g. nasal flaring, grunting and retractions).
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 FiO₂ 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