

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

## Emergency Medicine Pocket Guide



## Patient Selection



### **SYMPTOMS:**

**When considering Vapotherm Hi-VNI Technology, the patient must be:**

- Spontaneously breathing
- Alert and oriented
- Able to protect airway

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

- Increased Work of Breathing
- Hypercapnia
- Hypoxemia
- NiPPV Intolerance
- Tachypnea
- Tachycardia
- Dyspnea

## Diagnoses



### **DIAGNOSES:**

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

- Acute Exacerbation of Chronic Obstructive Pulmonary Disease (COPD)
- Mild or Moderate Congestive Heart Failure (CHF)
- Asthma
- Pneumonia
- Bronchitis
- Influenza

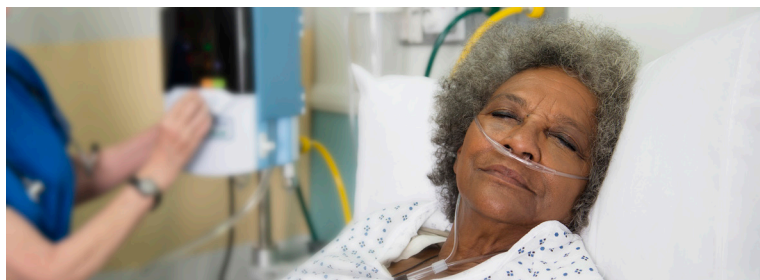
Vapotherm does not practice medicine or provide medical services. These guidelines are based on Vapotherm's assessment of peer-reviewed published literature, physician interviews, and physiological modeling. Providers should refer to the full indications for use, operating instructions, and/or prescribing information of any products referenced before exercising their independent medical judgment to use or otherwise prescribe the products.

## Hi-VNI Cannula Selection

### Fitting the Hi-VNI Cannula:

- Make sure not to occlude greater than 50% of the internal diameter of each of the nares.
- The Hi-VNI cannula prongs should be wide enough to not pinch the nasal septum (erosion risk).
- The SOLO is a single prong interface that can be used in neonates and infants. The single prong design ensures less than 50% nostril occlusion, and is as effective as a dual prong interface. The single prong also allows for placement of a NG tube.

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



### Hi-VNI Cannula Application:

- Only Hi-VNI cannulae should be used with any Vapotherm Precision Flow® systems
- 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 operational L/min range of Vapotherm's Hi-VNI Technology 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

## Clinical Use Guidelines

For acute COPD exacerbation, titrate  $\text{FiO}_2$  to target  $\text{SpO}_2$  88-92%.<sup>1</sup>

For non-COPD respiratory distress, start and titrate  $\text{FiO}_2$  to desired  $\text{SpO}_2$  target range.

### Adult Patients

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**L/min**

For maximum ventilatory support, start at 35-40 L/min. For less acute patients start at 25-30 L/min.



**Temperature**

Set temperature to 37°C and adjust to patient preference.

### Pediatric Patients Under 20 kg

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**L/min**

The recommended starting L/min rate is 2 L/min per kilogram of weight.<sup>2</sup> 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.



**$\text{FiO}_2$**

Titrate to maintain target  $\text{SpO}_2$ .



**Temperature**

Set temperature to 37°C and adjust to patient preference.

For additional guidelines on pediatric patients, consult Vapotherm's Pediatric Pocket Guide, which can be downloaded at: [www.vapotherm.com/guidelines-and-best-practices](http://www.vapotherm.com/guidelines-and-best-practices)

1. Austin MA, Wills KE, Blizzard L, Walters EH, Wood-Baker R. Effect of high flow oxygen on mortality in chronic obstructive pulmonary disease patients in prehospital setting: randomised controlled trial. *BMJ* 2010; 341: c5462.

2. Weiler et al, "The Relationship Between High Flow Nasal Cannula Rate and Effort of Breathing in Children", *The Journal of Pediatrics*. October 2017. Volume 189:66-71.

# Transferring Patients

## VapoTherm Transfer Unit (VTU)

The VapoTherm Transfer Unit fits seamlessly into the Emergency Department workflow. Patients can be transferred to procedures and out of the Emergency Department without compromising respiratory support.

### Workflow Integration – “3-Step Hot Swap” Disposable

Once patient is stabilized and ready for transfer:

1. Put Precision Flow unit in Standby, and remove Disposable Patient Circuit (DPC) and water bag from unit. Keep the DPC in an upright position until it is placed in the VTU.
2. Place DPC into the VTU Precision Flow.
3. Enter desired settings on the VTU Precision Flow and press the Run/Standby button to initiate therapy. Patient is now ready to be transferred.

Patient transferred to temporary location (i.e. procedures):

- Simply plug power and gas cables/hoses into wall outlets and close e-cylinders to conserve bottled gases.
- When patient is ready to be transferred again:
  - Unplug the VTU
  - Open e-cylinders
  - Disconnect wall hoses

Patient transferred to ICU/Step Down Unit/General Care Floor:

- Use above 3-Step Hot Swap instructions to transfer patient to new, stationary Precision Flow unit.
- Close the VTU e-cylinders and return the VTU to its designated storage location.

**WARNING: Do not attempt to transfer a patient with  $\leq$  250 PSI in either tank.**

VTU should remain plugged in when not in use, and whenever possible during use. The VTU battery takes 2 hours to fully charge for a two hour run time.



# Vapotherm Transfer Unit Runtime Chart

Duration of use blending from E-size oxygen and E-size air cylinders; times shown in minutes.

## Total Flow % Oxygen

L/min	21%	30%	35%	50%	60%	70%	80%	90%	100%
5	112	126	136	177	221	181	150	128	112
6	93	105	113	147	184	150	125	107	93
7	80	90	97	126	158	129	107	92	80
8	70	79	85	111	138	113	94	80	70
9	62	70	76	98	123	100	83	71	62
10	56	63	68	88	111	90	75	64	56
15	37	42	45	59	74	60	50	43	37
20	28	32	43	44	55	45	37	32	28
25	22	25	27	35	44	36	30	26	22
30	19	21	23	29	37	30	25	21	19
40	14	16	17	22	28	23	19	16	14

Above chart applicable for PF-DPC-HIGH Disposable only. For complete runtimes, set up and operation of the VTU, please refer to the VTU Quick Reference Guide.

# 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  $FiO_2$  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





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