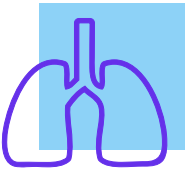
GUIDELINES + BEST PRACTICES

Mask-Free NIV™ for Spontaneously Breathing Patients

PEDIATRIC
POCKET GUIDE

VAPOTHERM®
Hi-VNI® Technology



PATIENT SELECTION

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:

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

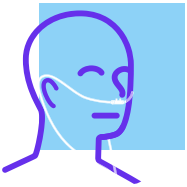
DIAGNOSES

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

FITTING THE PRECISION FLOW® CANNULA

- Make sure not to occlude greater than 50% of the internal diameter of each of the nares.
- The Precision Flow 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.



PRECISION FLOW CANNULA APPLICATION

- Only Precision Flow Cannulas should be used with any Vapotherm Precision Flow systems
- Select the appropriate Precision Flow Cannula based on the sizing chart below
- Place the Precision Flow 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 Precision Flow 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

PRECISION FLOW 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

PEDIATRIC PATIENTS < 20 KG

L/min

The recommended starting L/min rate is 2 L/min per kilogram of weight.[1] Titrate to clinical effect.

FiO_2

Start and titrate FiO_2 as needed to achieve target SpO_2.

Temperature

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

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.

WEANING PATIENTS BY L/MIN OR FIO_2

Vapotherm Hi-VNI Technology parameters (L/min & FiO_2) are independent of each other. Adjustment of L/min will impact work of breathing while adjustment of FiO_2 maintains patient 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 by L/min

1. Wean in 1 L/min increments as patient tolerates.
2. Consider further wean titrated on clinical assessment of work of breathing.
3. If at less than 10 L/min you see rainout, consider dropping temperature to no lower than 34°C.
4. Assess for further wean and/or discontinuation.
5. Conventional cannula or room air.

Weaning by FiO_2

1. Adjust FiO_2 to range acceptable for SpO_2 requirement.
2. Patient assessment of HR, RR, SpO_2.
3. Continue FiO_2 wean to maintain SpO_2 targets.

1. 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.

The Vapotherm Transfer Unit (VTU) fits seamlessly into the hospital workflow. Patients can be transferred to procedures or be allowed to move without compromising respiratory support.

WORKFLOW INTEGRATION – "3-STEP HOT SWAP" DISPOSABLE

Once patient is stabilized and ready for transfer:

- 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.
- Place DPC into the VTU Precision Flow.
- 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 ≤ 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 1 hour run time.

VAPOTHERM TRANSFER UNIT RUNTIME CHART

Duration of use blending from E-size oxygen and E-size air cylinders.

Total Flow	% Oxygen	Time Shown in Minutes							
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.

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

*Contact your Vapotherm representative for more information.

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