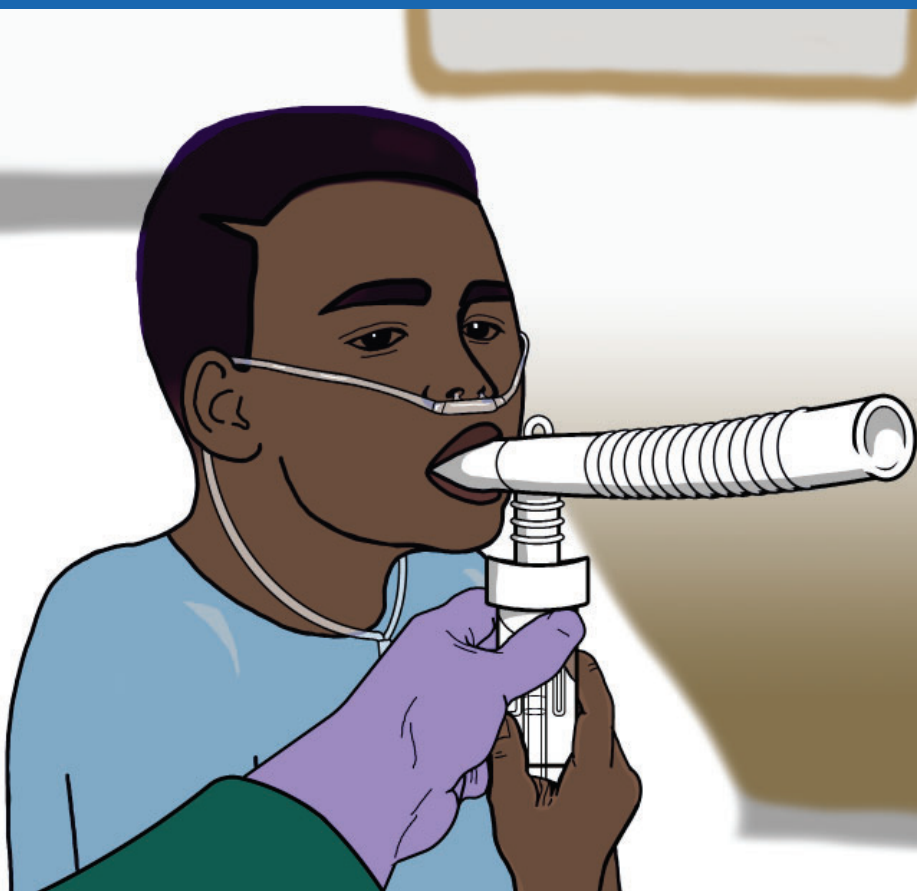
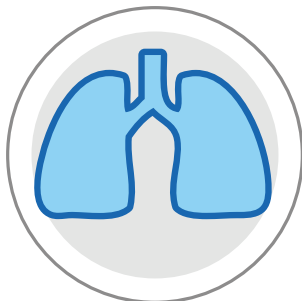


Guidelines and Best Practices for High Velocity Nasal Insufflation (HVNI)

Aerosol Delivery with HVNI Pocket Guide



Aerosol Medication Delivery with High Velocity Nasal Insufflation (HVNI)



Treating patients with respiratory disorders frequently requires combined use of high velocity nasal insufflation therapy (HVNI) with aerosolized medication delivery. As little definitive data exists to describe the use of nebulizers concurrently in patients receiving HVNI, a team of scientists, clinicians and biomedical engineers sought to identify current clinical methods used to provide aerosol therapy during HVNI with the goal to provide clinicians resource information to help them decide which methods are best to provide safe and effective aerosol therapy during HVNI in their institutions. This research is available in the VapoTherm White Paper **“Aerosol Delivery with High Velocity Nasal Insufflation: A Survey of Practice”**. This Pocket Guide provides practice considerations based on this research.*

*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.

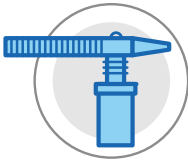
Aerosol Medication Delivery Fundamentals



Get medication deep into the lungs by inhalation.



Methods of delivery are patient age and situation dependent based on patient status, patient interface compliance and tolerance.



Aerosol should be delivered through a mouthpiece whenever possible, or a mask or the nasal cannula if the patient is unable to use a mouthpiece.



Infants are obligate nose breathers requiring use of a facemask or nasal cannula.



When HVNI therapy cannot be paused, the flow may be weaned as low as tolerated to reduce impactive drug losses so that aerosol deposition and delivered lung dose of medication can be optimized.

Patients with Intact Upper Airway

INTERMITTENT DOSE



Adults or
Children ≥ 4 yrs



Children ≤ 3 yrs

Ⓜ HVNI

If clinically tolerated,
pause HVNI and:

Use mouthpiece with pMDI
with valve holding chamber or BAN.
SVN or VMN can also be used.



If mouthpiece not tolerated, use facemask.

*A hood is also acceptable.



Keep pause time to minimum.



▶ HVNI

If HVNI pause cannot be
tolerated by the patient:

**Use a mouthpiece with pMDI
with valve holding chamber or BAN.**
Above preferred, but SVN or VMN
can also be used.



Care must be exercised when using a jet nebulizer to deliver aerosol medication concurrently with HVNI because of the added gas flow driving the nebulizer.

**If mouthpiece not tolerated, use facemask
over HVNI nasal cannula or Vapotherm
Aeroneb Aerosol Adapter (AAA-1)
to deliver aerosol via the nasal cannula.**



**HVNI flow setting may be weaned
as low as reasonably tolerated.**



**Higher target doses, if clinically
appropriate, may be required
to accomplish the therapeutic goal.**



Patients with Intact Upper Airway

CONTINUOUS DOSE



Adults or
Children \geq 4 yrs



Children \leq 3 yrs



Use SVN or VMN with facemask over the HVNI nasal cannula or the AAA-1 to deliver aerosol via the nasal cannula.

Condensate must be managed when delivering via a nasal cannula with a vibrating mesh nebulizer.



Care must be exercised when using a jet nebulizer to deliver aerosol medication concurrently with HVNI because of the added gas flow driving the nebulizer.



HVNI flow setting may be weaned as low as reasonably tolerated.

Use of a mask may greatly limit aerosol drug delivery efficiency.



Higher target doses, if clinically appropriate, may be required to accomplish the therapeutic goal.



Consider switching to an alternative mode of ventilation (e.g. NiPPV or HFNC).

Abbreviations

BAN	Breath Actuated Nebulizer
HFNC	High Flow Nasal Cannula
NiPPV	Non-invasive positive pressure ventilation
pMDI	Pressure Metered Dose Inhaler
SVN	Small Volume (Jet) Nebulizer
VMN	Vibrating Mesh Nebulizer

Patients with Tracheostomy



VapoTherm TA-22
Tracheostomy Adapter



Adults or
Children \geq 4 yrs



Children \leq 3 yrs

Use a tracheostomy mask with AAA-1 and VapoTherm TA-22 adapter.

HVNI flow setting may be weaned as low as reasonably tolerated.

Higher target doses, if clinically appropriate, may be required to accomplish the therapeutic goal.

Individualized goals with appropriate monitoring should be considered for each patient.



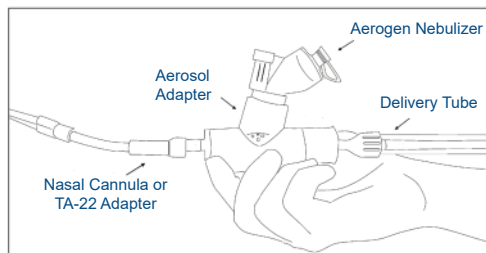
AAA-1 Adapter Fundamentals

Intended Use:

The Vapotherm Aeroneb Aerosol Adapter (AAA-1) is intended to facilitate the connection between Vapotherm Hi-VNI Technology and the Aerogen® PRO or SOLO Aeroneb nebulizers.

Instructions for Use:

Place the AAA-1 in line between the patient delivery tube and the nasal cannula or the Vapotherm TA-22 Tracheostomy Adapter. For enhanced patient comfort consider a momentary pause of the HVNI Therapy when placing the adapter in the circuit then quickly ramping flow up to the desired level prior to starting the aerosol treatment. Disconnect the patient interface from the delivery tube. Gently connect the adapter to the delivery tube to facilitate easy removal. Then, reconnect patient interface to the adapter. Once the adapter is in place, start the aerosol treatment. It is important to maintain proper upright and horizontally level orientation of the adapter and nebulizer unit during the drug administration process.



WARNINGS:

- The adapter must be removed between aerosol treatments, as condensate will accumulate if left in the circuit for extended periods.
- When used for continuous aerosol treatments, condensate must be emptied at 30 to 60-minute intervals if not more frequently depending on rate of accumulation. The interval required is a function of the gas flow and drug delivery rates.
- Lower flows and higher drug delivery rates require more frequent condensate drainage.
- Failure to drain condensate may result in condensate delivery to the patient.

Refer to the Aerogen® PRO or SOLO and Precision Flow®/Precision Flow Plus™ Instructions for Use for aerosol medication nebulization and HVNI Therapy delivery instructions.



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