Why It Matters That Not All High Flow Systems Are the Same

As the name says, all high flow systems deliver high liter flows of conditioned medical gas. Most systems on the market cap out between 40 to 60 L/min. But the amount of liters per minute a system can deliver isn't the only variable determining the value it can bring to your hospital and your patients. The delivery method makes a difference in patient management and potentially in outcomes.

What is the difference between Vapotherm® high velocity therapy and generic high flow?

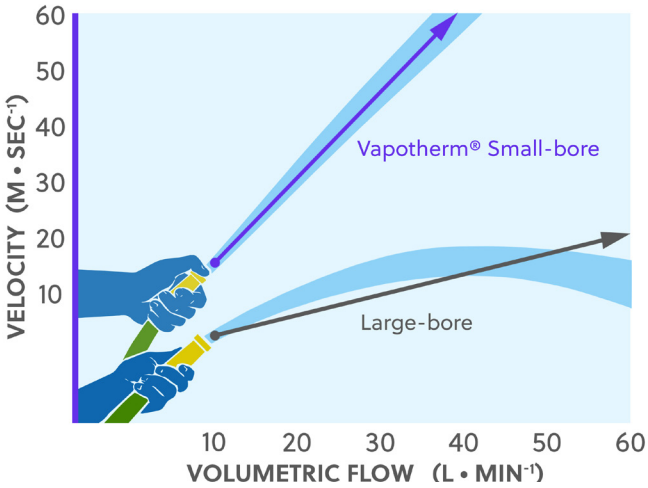

Figure 1. Small-bore vs large-bore cannula

Generic high flow reaches the patient via a large bore nasal cannula. Let's say the patient is receiving 40 L/min. This volume of flow flushes the upper airway and helps deliver oxygen-rich gas into the upper airway dead space.

Let's say this same patient is put on high velocity therapy which is delivered through a small bore nasal cannula. Because the prongs are narrower, the 40 L/min volume of gas flushes the patient's upper airway dead space more quickly. Figure 1 shows that at 40 L/min high velocity therapy has approximately 5x the velocity of generic high flow. So what?

Flush Time Makes a Clinical Difference

Whenever we exhale, there is some CO_2-rich gas left in the upper airway dead space and has to be re-breathed. For healthy individuals breathing at normal respiratory rates, this residue is no detriment. But for tachypneic patients in respiratory distress, the CO_2-rich dead space becomes a problem. The faster a patient breathes, the less time there is between breaths to flush this CO_2 out and fill it with oxygen-rich gas to help them meet their needs. This is where the difference between generic high flow and Vapotherm high velocity therapy becomes apparent. At lower respiratory rates, both systems are likely to flush the upper airway dead space and replace it with oxygenated gas, but as seen in Figure 2[1], when the patient's respiratory rate is acute, high velocity therapy still manages to provide the patient with a greater proportion of oxygenated gas to help their respiratory distress. Therefore, Vapotherm high velocity therapy is able to support more acute patients than generic high flow.

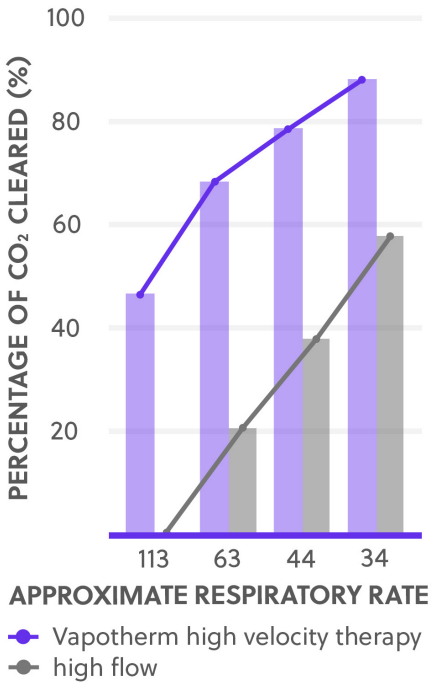

Figure 2. Represents approximate respiratory rate based on interpretation of data from Miller et al. 2016. Miller (2016) used a computer simulation of CO_2 clearance in a human model at 20L/min.

Rethinking the Continuum of Care with Vapotherm High Velocity Therapy

Safe. Effective. User-friendly.

One Tool for Treating Hypoxemia and Hypercapnia

Clinical studies have shown that Vapotherm high velocity therapy has similar efficacy to non-invasive positive pressure ventilation for treating respiratory distress in adults, including hypoxemia, hypercapnia, and dyspnea.[2,3,4,5]

Designed to Keep Your Patients Safe

- Nurse Call and EMR connectivity to improve hospital workflows and efficiency
- Patient-centric alarms let you know of therapy disruption
- Highly visual display of parameters gives you confidence your patients are receiving the intended therapy

Helping COVID-19 Patients World-Wide

Vapotherm high velocity therapy has been a front-line tool since the start of the pandemic, giving respiratory support to COVID-19 patients, including those with asthma, COPD and other challenging co-morbidities. Our expert team is here to help train, implement, and educate so that you can get the most value out of this advanced form of high flow during and after the pandemic.

1. *Miller TL, Saberi B, Saberi S (2016) Computational Fluid Dynamics Modeling of Extrathoracic Airway Flush: Evaluation of High Flow Nasal Cannula Design Elements. J Pulm Respir Med 6:376. doi: 10.4172/2161-105X.1000376. (Bench, Prospective, Not Randomized)*
2. *Doshi P, Whittle JS, Bublewicz M, et al. High-Velocity Nasal Insufflation in the Treatment of Respiratory Failure: A Randomized Clinical Trial. Ann Emerg Med 2018;72:73-83 e5.*
3. *Haywood, Steven T, Jessica S. Whittle, Leonithas I. Volakis, George Dungan II, Michael Bublewicz, Joseph Kearney, Terrell Ashe, Thomas L. Miller, Pratik Doshi. "HVNI vs NIPPV in the treatment of acute decompensated heart failure: Subgroup analysis of a multi-center trial in the ED." The American Journal of Emergency Medicine, 2019. https://doi.org/10.1016/j.ajem.2019.03.002*
4. *Doshi P, Whittle JS, Dungan G et al, The ventilatory effect of high velocity nasal insufflation compared to noninvasive positive-pressure ventilation in the treatment of hypercapneic respiratory failure: A subgroup analysisLung. 2020 Apr 6. https://doi.org/10.1016/j.hrtlng.2020.03.008*
5. *Plotnikow, Gustavo, Accoce, Matias, Fredes, Sebastián, Tiribelli, Norberto, Setten, Mariano, Dorado, Javier, Guaymas, Maria, Ilutovich, Santiago, Rodriguez, Pablo O., Cesio, Cristian E., Scapellato, Jose L., Vasquez, Daniela N. High-Flow Oxygen Therapy Application in Chronic Obstructive Pulmonary Disease Patients With Acute Hypercapnic Respiratory Failure: A Multicenter Study. Critical Care Explorations: February 2021 - Volume 3 -Issue 2 - p e0337 doi: 10.1097/CCE.0000000000000337*