

### **Evaluation of a New High-Flow Gas Humidification Device**

J.B. Waugh<sup>1</sup>, D.C. Lain<sup>2</sup>. <sup>1</sup>University of Alabama at Birmingham, Birmingham, AL; <sup>2</sup>Sleep Safe, Murrysville, PA.

**BACKGROUND:** Appliances used to deliver supplemental oxygen such as the nasal cannula have been labeled low-flow devices because of their inability to meet a patient's inspiratory flow demand. The low flows must be used because of the limited ability to heat and humidify gas delivered through the devices. A new high flow humidifier (Vapotherm™ 2000i) uses a disposable humidifier cartridge to achieve flow rates as high as 40 L/min at 37° C (saturated) for appliances such as the nasal cannula. The purpose of this study was to verify if the device could provide saturated body temperature gas for its stated flow range. **METHODS:** Gas (F<sub>I</sub>O<sub>2</sub> 0.21) flow rates of 5, 10, 20, 30, 40 L/min were channeled through five different new humidifier cartridges with the Vapotherm device set at 37° C and measurements taken from a small sampling chamber submerged in a 38° C water bath to prevent condensation. Humidity and temperature measurements were made using a calibrated digital psychrometer/thermohygrometer (accuracy: temperature ±1° C, relative humidity ±4% at >90%). **RESULTS:** A relative humidity of >99% was measured at all flow rates with all cartridges with the following temperatures (°C mean±SD): 36.5±0.1 at 5 L/min, 36.6±0.1 at 10 L/min, 36.7±0.2 at 20 L/min, 37.0±0.2 at 30 L/min, and 37.1±0.3 at 40 L/min. **CONCLUSIONS:** Nasal cannulas and oxygen masks delivering saturated gas at body temperature at up to 40 L/min may no longer fit the low flow definition and therefore may offer new treatment options. The ability to set F<sub>I</sub>O<sub>2</sub> (0.21-1.0) and lessen mucosal irritation may allow more complex/invasive modalities to be avoided and improve patient comfort and compliance.

This Abstract is Funded by: Vapotherm, Inc.