

Evaluation of Several Small Volume Nebulizer (SVN) Kits Intended for Aerosol Treatments in the Home

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RATIONALE

- In order to provide aerosol therapy in the home an SVN and compressor are sold together as a DME (durable medical equipment) kit.
- These kits are packaged with a mix of reusable and disposable devices which can deliver significantly different aerosol performance.
- This laboratory study sought to compare the output of different nebulizers kits under a simulated adult breathing pattern.

METHODS

- 6 different DME nebulizer kits ($n=5$ per group)

- MC 300® Reusable Nebulizer with **OMBRA**® Compressor



- PARI LC⁺ Sprint Reusable Nebulizer with PARI Vios⁺ Compressor



- VixOne⁺ Small Volume Nebulizer with PARI Vios⁺ Compressor



- SideStream⁺ Disposable Nebulizer with InnoSpire Elegance⁺ Compressor



- SideStream⁺ Reusable Nebulizer with Willis The Whale Compressor



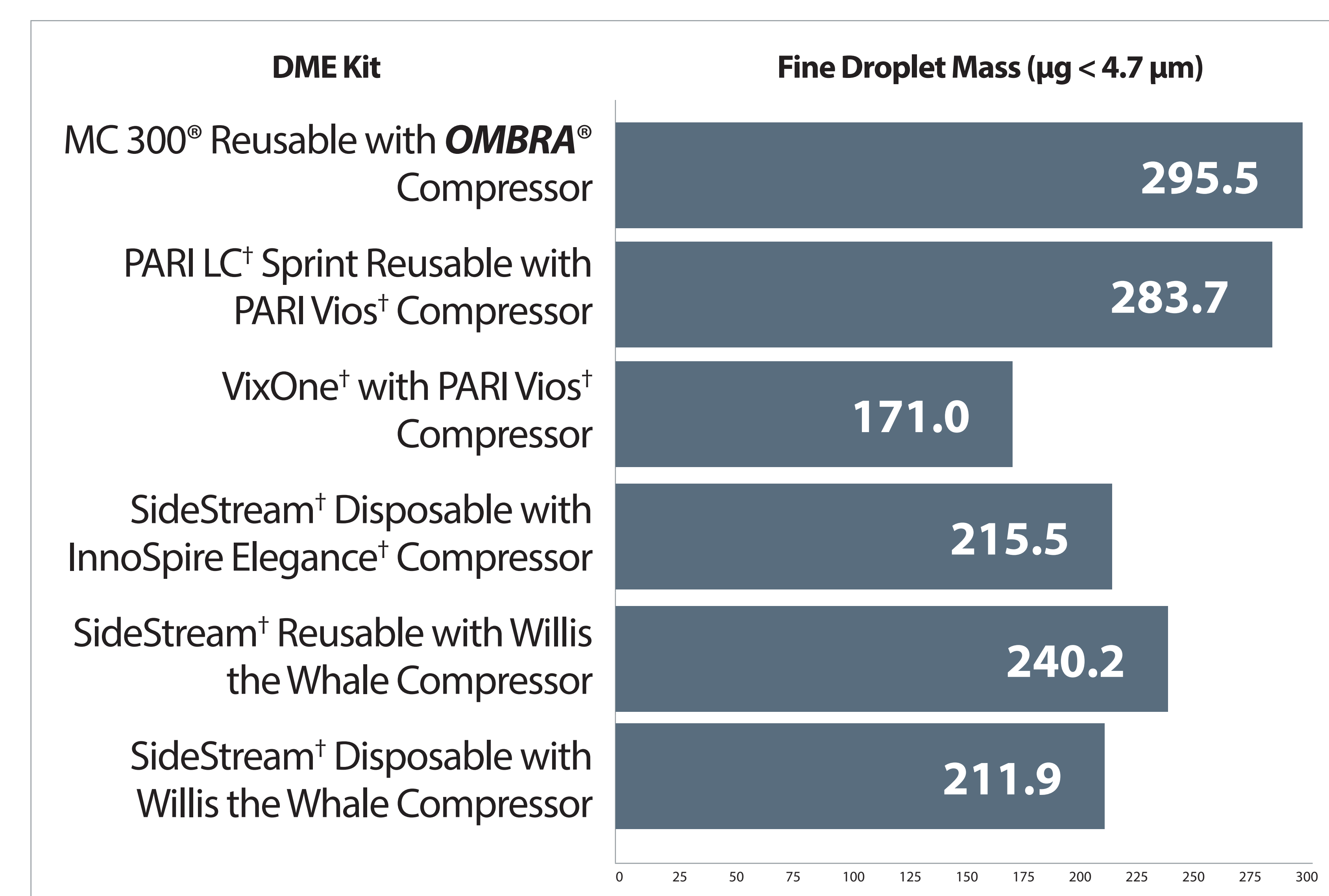
- SideStream⁺ Disposable Nebulizer with Willis The Whale Compressor

- Kits were evaluated with 2.5mg/3.0mL of albuterol and connected to a simulator mimicking adult tidal breathing ($V_t = 600\text{-mL}$; duty cycle = 33%; rate = 10 cycles/min).
- An inspiratory filter was connected to the mouthpiece of the device on test and the Total Emitted Mass (TEM) of albuterol was determined on a minute-by-minute basis to sputter.

- Albuterol assay was undertaken by HPLC-UV spectrophotometry.
- In parallel experiments, Fine Droplet Fraction $<4.7\mu\text{m}$ diameter ($\text{FDF}_{<4.7\mu\text{m}}$) was determined for each nebulizer-compressor combination by laser diffractometry (Spraytec).
- Fine Droplet Mass (FDM) was determined from the product of TEM and $\text{FDF}_{<4.7\mu\text{m}}$

RESULTS

- For the 6 DME nebulizer kits the FDM of albuterol was determined to be:



CONCLUSIONS

- Although many of these nebulizer kits are similar in form they can have entirely different drug delivery characteristics which may affect outcomes.
- These differences will be further compounded since patients may continue to use disposable devices in place of reusable for longer term use.