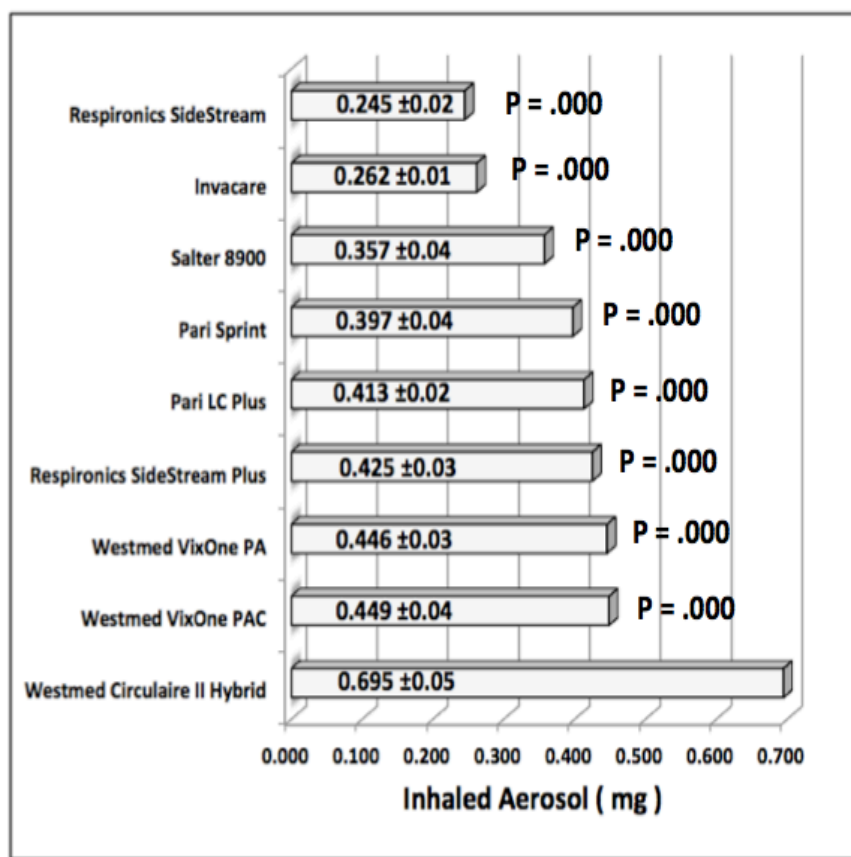


**IMPROVED AEROSOL DELIVERY WITH A CONSERVER-TYPE NEBULIZER SYSTEM POWERED BY 6 COMMON HOME AIR COMPRESSORS.** Douglas S. Gardenhire, EdD RRT-NPS FAARC. Division of Respiratory Therapy, Georgia State University, Atlanta GA.

**BACKGROUND:** Small Volume Nebulizers (SVNs) are operated optimally in the hospital using a 50-psig gas source with a backpressure-compensated flowmeter to guarantee proper pressure and flow. Patients receiving home aerosol therapy typically use portable air compressors that are often regarded as less-than-optimal compared to a hospital gas source. **PURPOSE:** This study was designed and conducted to determine if a conserver-type SVN (Westmed Circulaire II *Hybrid* High-Efficiency Aerosol Drug Delivery System) would improve the mass of medication (Inhaled Aerosol, IA) delivered by home air compressors. The *Hybrid* uses a 350 mL elastomeric sphere as an aerosol-conserving reservoir, while the other SVNs are either “tee-type” or breath-enhanced devices. **METHOD:** 9 different SVNs, including the *Hybrid*, were operated on 6 different new air compressors (DeVilbiss Pulmo-Aide, Pulmo-Aide Compact, Salter Aire Plus, Pari Vios, Respironics Inspiration Elite and Invacare Select) that were selected based on their availability. SVNs were charged with 3 mL of 0.083% albuterol unit dose solution and operated for 6 mins each. Aerosol was captured on a filter at the “mouth” of an Ingmar ASL5000 breathing simulator (f=15, VT=500ml, I:E=1:3). Filters were washed to elute albuterol, which was measured via spectrophotometer. Each SVN was washed and dried before first use and in-between test runs. Tests were done in triplicate and averaged.

**RESULTS:** A repeated measure Analysis of Variance (ANOVA) showed a difference between nebulizers when used with the compressors tested,  $F(40,108)= 5.22$ ,  $p=.000$ . Tukey *post hoc* testing was completed for each of the nebulizers. Mean ( $\pm$ SD) IA and significance of nebulizers are shown in Figure 1.

**CONCLUSION:** Optimal function of an SVN is dependent on proper driving pressure and flow, which apparently cannot be uniformly achieved by some air compressor and nebulizer combinations. The conserving effect of the *Hybrid* appears to compensate for marginally performing home air compressors and outperforms other SVNs tested. The



The Circulaire II *Hybrid* delivered from 1.6 to 2.8 times more medication than other nebulizers operated with the same air compressors, which was statistically significant.