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Title: Comparative in vitro performance of a new re-usable breath-actuated nebulizer (BAN) with other high performance systems intended for domiciliary use – 1: Table-top compressors

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Body: RATIONALE: Treatments by portable compressor/nebulizer systems can offer very different delivery characteristics. We evaluated a new, reusable BAN (AeroEclipse-XL®, Trudell Medical International) optimized with its table-top (Ombra®) compressor. METHODS: Each nebulizer (n=5/group) was filled with 2.5-mL, 1.0-mg/mL albuterol (Ventolin®, GSK Canada Inc.), and connected to a breathing simulator (ASL5000, IngMar Medical, Pittsburgh, PA) mimicking adult tidal breathing (V_t= 600-mL; duty cycle = 33%; rate = 10 cycles/min). Emitted aerosol was captured on a filter at the mouthpiece, replaced every minute until onset of sputtering, defining run time. Recovery/assay of salbutamol was undertaken by HPLC-UV spectrophotometry. Fine droplet fraction ($FDF_{<4.7\mu m}$) and mass median droplet diameter (MMD) were determined by laser diffractometry. Total fine droplet mass ($FDM_{<4.7\mu m}$) was the product of total mass and $FDF_{<4.7\mu m}$. Comparative measurements were made with the Sprint® (PARI, Germany) and reusable Sidestream® (Philips-Respironics, Germany) air entrainment nebulizers using PARI BOY®SX® and Inspiration Elite® table-top compressors respectively. RESULTS: See Table.

Nebulizer/Table-top Compressor Performance Data

MEAN ± SD	BAN	Sprint	Sidestream
FDF<4.7µm (%)	70.8 ± 1.0	57.9 ± 3.1	68.6 ± 1.5
MMD (µm)	3.39 ± 0.05	4.13 ± 0.21	3.43 ± 0.11
FDM<4.7µm (µg)	530 ± 22	408 ± 22	233 ± 6
Run Time (min)	11	8	10

CONCLUSIONS: The BAN/Ombra system provided highly respirable aerosol with $FDM_{<4.7\mu m}$ greater than the benchmark systems. Its run time reflects the fact that aerosol is only delivered during inhalation and not

wasted to the environment.