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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 – 2: Portable battery-compressor

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Body: RATIONALE: Treatments with home based compressor/nebulizer systems can offer very different delivery characteristics. We evaluated a new, reusable BAN (AeroEclipse-XL®, Trudell Medical International) in breath-actuated mode with its portable (Ombra®) battery-compressor. METHODS: The nebulizer-on-test (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 at minute intervals until onset of sputtering, defining run time. Recovery/assay of salbutamol was undertaken by HPLC-UV spectrophotometry. Fine droplet fraction (FDF<4.7µm) 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 MicroPlus® (Philips-Respironics, Germany) nebulizers using PARI BOY® Mobile S® and Inspiration Micro Elite® portable compressors respectively. RESULTS: See Table

MEAN ± SD	BAN	Sprint	Sidestream
FDF<4.7µm (%)	68.1 ± 0.9	52.0 ± 0.7	52.8 ± 2.8
MMD (µm)	3.53 ± 0.04	4.55 ± 0.05	4.46 ± 0.23
FDM<4.7µm (µg)	474 ± 32	344 ± 20	297 ± 20
Run Time (min)	12	9	11

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