

# Combining Drug Delivery via Breath Actuated Nebulizer with Exhalation Through An Oscillating Positive Expiratory Pressure Device — The Potential For Optimal Combined Therapy

M. Nagel<sup>1</sup>, J. Suggett<sup>1</sup>, V. Kushnarev<sup>1</sup>, D. P. Coppolo<sup>2</sup>, A. Wesolowski<sup>3</sup>, T. E. Corcoran<sup>3</sup>

<sup>1</sup> Trudell Medical International, London, Canada. <sup>2</sup> Monaghan Medical Corp., Plattsburgh, NY, USA. <sup>3</sup> Division of Pulmonary, Allergy, and Critical Care Medicine, University of Pittsburgh School of Medicine, Pittsburgh, PA, USA.

## RATIONALE

- Pairing an Oscillating Positive Expiratory Pressure (OPEP) device with a Breath Actuated Nebulizer (BAN) offers the opportunity to deliver bronchodilator therapy during inhalation with secretion clearance during exhalation thereby reducing combined treatment time.
- Aerosol deposition scintigraphy was undertaken to assess *in vivo* pulmonary deposition from an **AEROECLIPSE**<sup>®</sup> II Breath Actuated Nebulizer (BAN) coupled to an **Aerobika**<sup>®</sup> OPEP device, compared to deposition from the nebulizer alone.

## METHODS

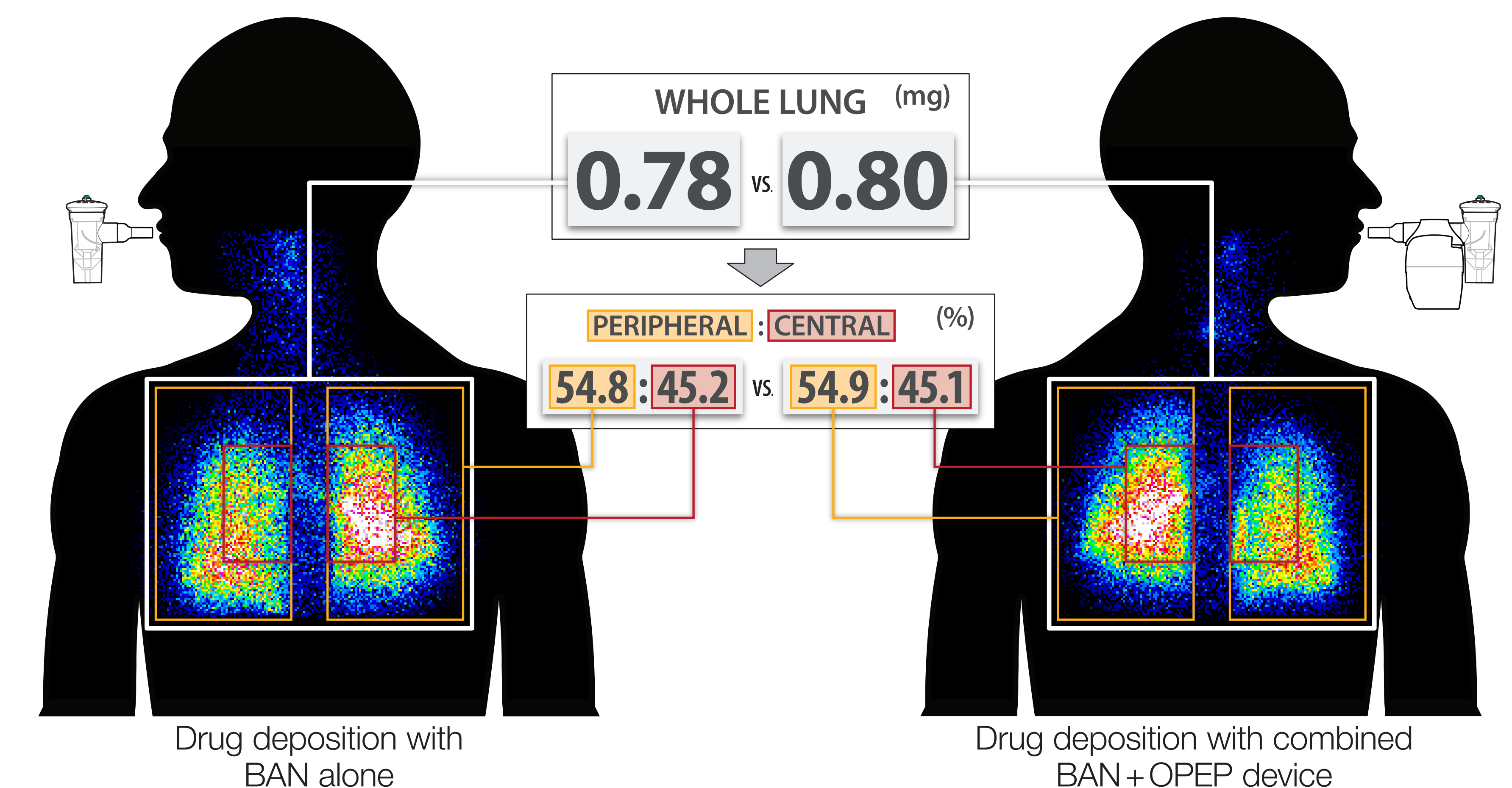
- Eight healthy subjects received albuterol (2.5 mg/3mL) admixed with 2 mCi of Tc-DTPA (Technetium-99m bound to diethylenetriaminepentaacetic acid) administered using the BAN alone and again when the BAN was combined with the OPEP device.
- Regional doses were then determined from anterior and posterior gamma camera images collected after delivery.
- Lung perimeters were defined using Cobalt-57 transmission scans and applied to Tc-DTPA deposition images.



## RESULTS

- Average age of all 8 subjects (4 male, 4 female) was 33 years.
- Results were expressed as milligrams (mg) ± one standard deviation of delivered albuterol.
- Whole lung deposition was, on average, **0.78 ± 0.20 mg** vs **0.80 ± 0.19 mg** for BAN alone and BAN + OPEP device respectively.
- Peripheral : Central deposition of the lung dose was found to be **54.8 % : 45.2 %** and **54.9 % : 45.1 %** for BAN alone and BAN + OPEP device respectively.

## Delivered Dose — Sample Scintigraphy Images



## CONCLUSIONS

- The delivery of medication from the **AEROECLIPSE**<sup>®</sup> II BAN to the lungs was not affected by the incorporation of the **Aerobika**<sup>®</sup> OPEP device. Aerosol deposition within the lung was unaltered by the addition of the OPEP device as evidenced by the near identical percentage of the dose being deposited in both the peripheral and central airways.
- BAN+OPEP therapy could offer the clinician the opportunity for combined treatment thereby reducing the time needed for the patient to take both nebulizer and OPEP treatments separately.

