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Dose Assurance with Nebulizer Therapy – A Laboratory Investigation into the Medication Delivery Performance of a Range of Different Nebulizers at Different Inspiratory/Expiratory Ratios

Rationale

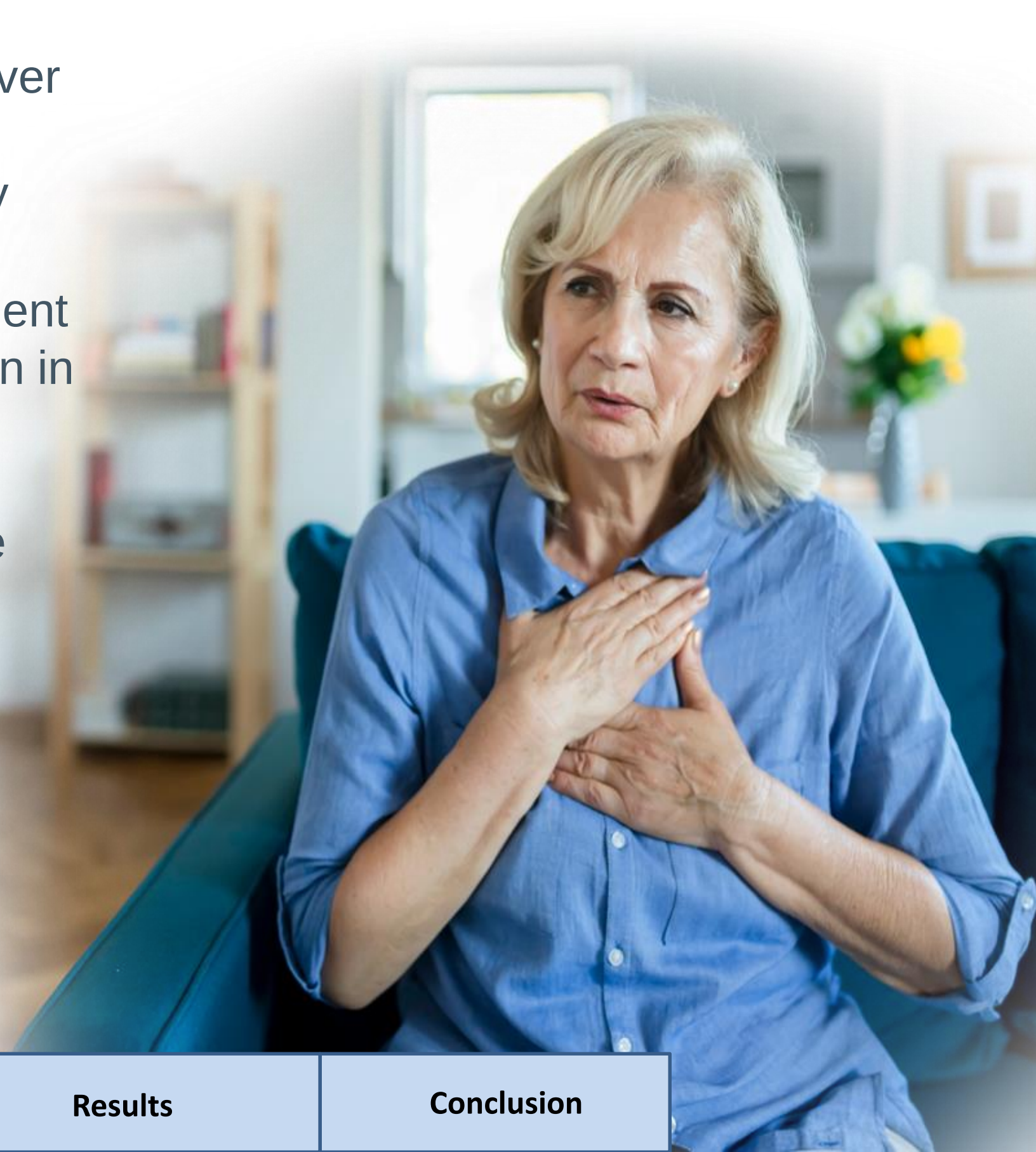
Methods

Results

Conclusion

RATIONALE

- Breath actuated nebulizers (BANs) only deliver medication during inhalation.
- Most nebulizers deliver aerosol continuously during inhalation and exhalation.
- The inspiratory/expiratory (I/E) ratio of a patient can change due to the lengthening expiration in obstructive lung disease, or as a result of distractions to the patient during treatment.
- These changes may consequently decrease the delivery efficiency by nebulization.
- This lab study compared the delivery of albuterol via a range of different types of nebulizers.



Rationale

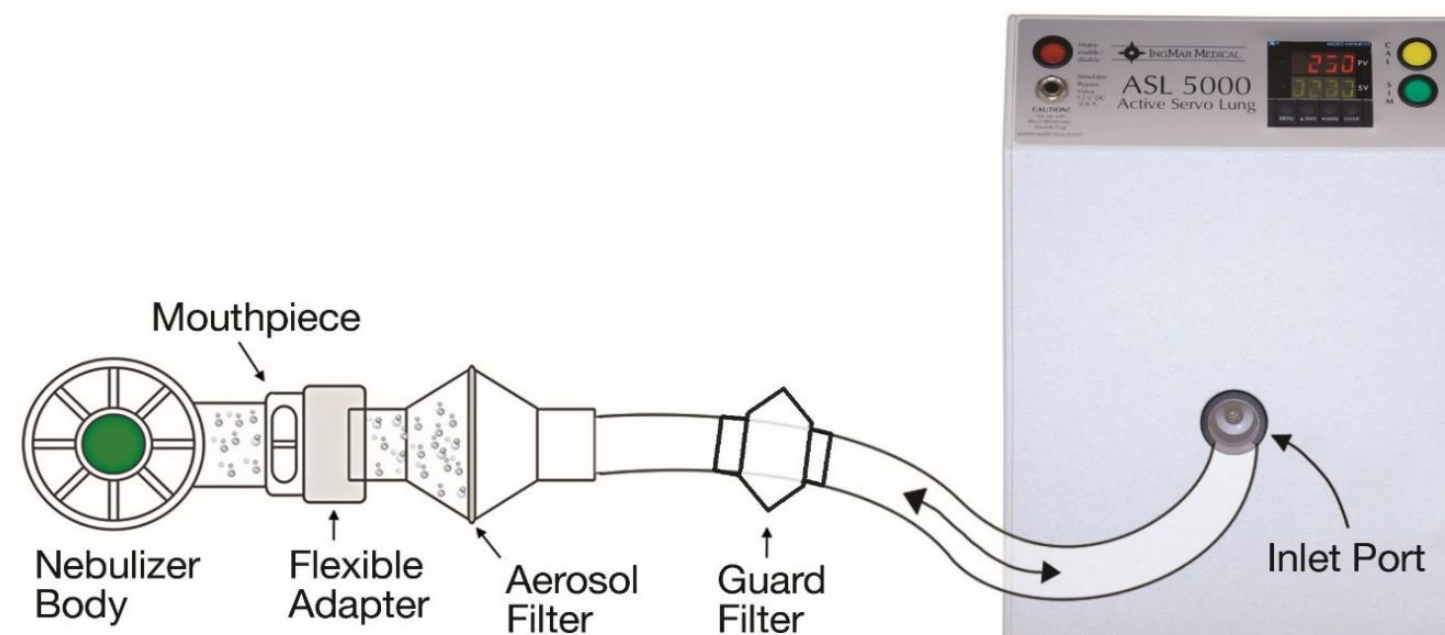
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METHODS

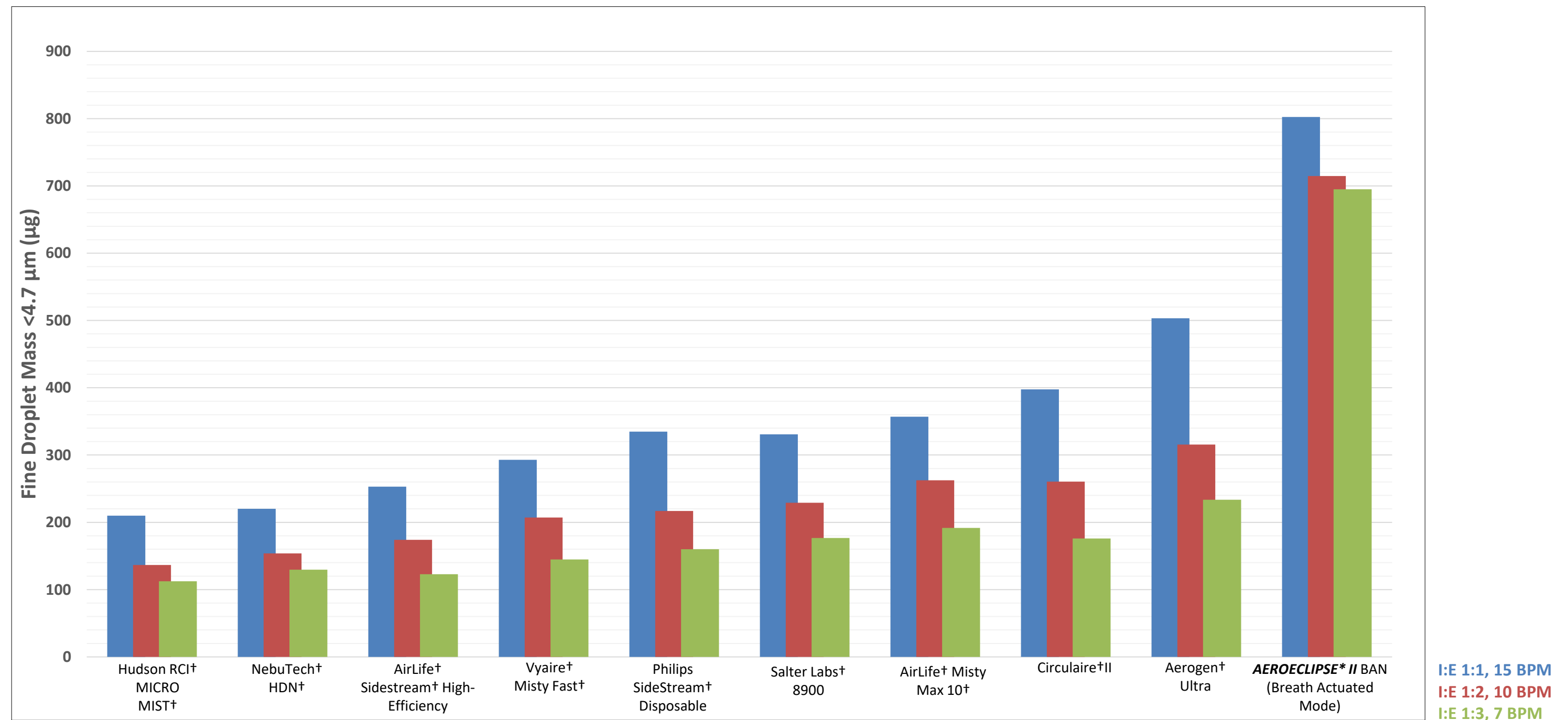
- Nebulizers ($n=5/\text{group}$) were evaluated with 3-mL fill of 2.5 mg albuterol solution.
- The nebulizer was connected to a simulator (ASL5000, IngMar Medical) mimicking adult (tidal volume=500-mL) tidal breathing, with I/E ratios of 1:1, 1:2 and 1:3.
- Emitted aerosol was captured by filter at 1-minute intervals until sputtering to determine total mass of drug delivered.
- Albuterol assay was undertaken by HPLC-UV spectrophotometry. Fine droplet mass ($\mu\text{g}<4.7\mu\text{m}$) was determined by laser diffractometry as the product of total mass and fine droplet fraction ($\%<4.7\mu\text{m}$).



Rationale	Methods	Results	Conclusion
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RESULTS

- Average fine droplet albuterol mass at extended I/E ratios are shown in the chart.



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CONCLUSIONS

- Higher and more consistent dose delivery was achieved by the ***AEROECLIPSE* II*** Breath Actuated Nebulizer across the range of I:E ratios tested compared to all other types of nebulizers.
- Clinicians should be aware of the opportunity to deliver effective and consistent doses more assuredly without the risk of potential under-dosing as disease progresses or if patient pauses during treatment.



AEROECLIPSE* II BAN

Rationale	Methods	Results	Conclusion
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