

**VALIDATION OF THE MEDICATOR® PLUS “AEROSOL MAXIMIZER:”  
COMPARISON TO A COMMERCIAL RESERVOIR-TYPE DELIVERY  
SYSTEM AND A STANDARD “TEE” SYSTEM – Michael McPeck BS RRT, Ross  
Potter CNMT, Glenn Samford CNMT. Healthline Aerosol Medicine, Baldwin Park CA.**

**BACKGROUND:** The Healthline Medicator® Plus Aerosol Maximizer uses a special manifold, unidirectional flow control valve and 1 L latex-free reservoir bag that stores most of the aerosol generated during the patient’s exhalation phase, which would otherwise be wasted, and directs it to the patient on the subsequent inhalation thereby enhancing aerosol delivery. **STUDY QUESTION:** How does the Medicator® Plus compare to other commercially available aerosol delivery systems? **METHODS:** We performed bench testing with the Medicator® Plus, Westmed Circulaire® and Allegiance AirLife™ MistyNeb™ “tee” using new Westmed Vixone™ nebulizers from the same lot for all 3 systems in order to eliminate any variability caused by nebulizer brand. Differences in results would therefore reflect performance of the delivery systems and not the specific nebulizer. Each nebulizer was loaded with radiolabeled (<sup>99m</sup>Tc) unit-dose albuterol (2.5 mg in 3 mL 0.9% NaCl). A ventilator was used to create a simulated adult breathing pattern ( $V_T = 500$  mL;  $f = 12$  BPM) to draw aerosol during inspiration into a HEPA filter representing the mouth. Each setup was run in duplicate for 15 minutes, then filters were measured in a radioisotope counter and the Inhaled Mass fraction (radioactivity on filter / radioactivity of initial nebulizer charge) was determined. Mass of albuterol (mg) delivered to the HEPA filter was determined by multiplying the Inhaled Mass fraction by 2.5 mg (the mass of albuterol initially placed in the nebulizer). **RESULTS:** The Inhaled Mass results, shown graphically, depict the amount of aerosolized albuterol “inhaled” against time. The Inhaled Mass (as a % of nebulizer charge) was 24.8%, 18% and 14.6%, respectively, for the Medicator, “tee” and Circulaire®, resulting in total albuterol inhaled of 0.62, 0.45 and 0.36 mg, respectively. **SUMMARY:** The Medicator®, used with the same nebulizer as the other 2 systems, delivered 2.1 times as much albuterol as the Circulaire® and 1.4 times as much as the “tee.” Further, the Medicator® delivered 1.8 times as much albuterol in 6 minutes as the Circulaire® and “tee.” **CONCLUSION:** Albuterol delivery with the Medicator® exceeds that of already established commercial devices and should be a useful device to enhance drug delivery to patients and/or reduce treatment time.

