

**RESERVOIR BAG IN MEDICATOR AEROSOL DELIVERY SYSTEM DOES NOT CONTAMINATE THE NEBULIZER OR THE PATIENT** – Michael McPeck  
BS RRT and Ross Potter CNMT. Healthline Aerosol Medicine, Baldwin Park CA.

**BACKGROUND:** The Healthline Medicator<sup>®</sup> 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. This results in system efficiency exceeding 50% and inhaled mass (drug delivery) of 25-30% or more. However, the inclusion of a reservoir device in any aerosol delivery system raises legitimate questions as to whether that reservoir might become contaminated.

**STUDY QUESTION:** Will any contamination that may be present in the bag contaminate the nebulizer or be inhaled by the patient? **METHODS:** We deliberately contaminated the reservoir bags of each of 6 new Medicator<sup>®</sup> aerosol delivery systems with a 3 mL unit dose of radiolabeled (~ 2 mCi <sup>99m</sup>Tc) albuterol. Unit dose albuterol without radioactivity was placed in the nebulizer which was operated at 7 L/min O<sub>2</sub>. A simulated human breathing pattern through the HEPA filter was produced by a ventilator set to create a tidal volume of 750 mL at a rate of 12 BPM with an inspiratory time fraction of approximately 20%. A HEPA filter was substituted for the patient mouthpiece so as to capture any radioactive particles that would have been inhaled. The system was run for 10-20 mins and the nebulizers, HEPA filters and bags were measured in a radioisotope calibrator afterwards. **RESULTS:** The results are summarized below.

			Radioactivity Measurements in mCi				
Run	Neb	Run Time	Bag, Initial	HEPA Filter	Neb	Bag, End	Bag Loss
1	3A	15 m	2.28	0	0	2.23	0.05
2	3A+	20 m	2.24	0	0	2.24	0.00
3	3A	15 m	2.14	0	0	2.11	0.03
4	3A+	20 m	2.38	0	0	2.33	0.05
5	3A	10 m	1.560	0	0	1.61	-0.05
6	3A+	10 m	1.631	0	0	1.64	-0.01
<b>Mean:</b>			2.039	0	0	2.027	0.011
<b>SD:</b>			0.352			0.319	0.038

**SUMMARY:** The most obvious finding was that no radioactivity was recovered from either the nebulizers or the HEPA filters. By mass balance, after correction for radioactive decay, there was no significant loss of radioactivity from the bags.

**CONCLUSION:** The Healthline Medicator<sup>®</sup> Plus Aerosol Maximizer, which depends upon a reservoir bag for high efficiency, does not pose a contamination risk to patients.