

**UNIT TO UNIT VARIABILITY IN RATE OF NEBULIZATION OF
COMMERCIALY AVAILABLE JET NEBULIZERS**

CR Lux RRT, RC Ahrens MD, University of Iowa, Department of Pediatrics, Iowa City, IA, USA.

We have recently demonstrated quality control problems on the part of some manufacturers of jet nebulizers (Chest 1991). This was manifested by wide unit to unit variability in nebulization rate, variability in aerosol particle size, and a high incidence of nebulizer malfunction. We proposed guidelines for evaluation of nebulizers being considered for purchase by the University of Iowa Hospitals and Clinics. In September 1991, we asked regional suppliers to submit samples of all nebulizer models they had available for purchase. In response to this request, we received for evaluation samples of 9 models of nebulizers produced by 4 manufacturers. Each unit was tested for rate of nebulization: Three mL of phosphated buffered saline was placed in the nebulizer reservoir. Each nebulizer was run for 3 minutes at the recommended air flow rate (8 L/min except for the Updraft II for which 6L/Min is recommended). Nebulization rates (mL/min) were determined at 1 min intervals by change in weight. Results follow:

MODEL	MEAN	SD	RANGE	%VAR	n	SUPPLIER
Raindrop	0.234	0.028	0.163.270	85.6	18	(Puritan-B.)
Downdraft	0.205	0.017	0.167.220	31.7	8	(Marquest)
Fanjet	0.248	0.079	0.113.427	277.8	18	(Marquest)
Weeneb	0.268	0.054	0.163.330	102.5	18	(Marquest)
Updraft II	0.199	0.049	0.117.270	130.8	18	(Hudson)
AVA	0.247	0.020	0.223.297	33.2	17	(Hudson)
Salter Neb.	0.373	0.016	0.337.390	15.7	18	(SalterLabs)
Whisper Jet	0.294	0.025	0.250.333	33.2	18	(Marquest)
Acorn II	0.191	0.014	0.163.220	35.0	18	(Marquest)

Only one unit malfunctioned (a Weeneb which leaked). Based on a guideline that % variability in nebulization rate must be <75%, the Fanjet, Weeneb, and Updraft II, were deemed unacceptable. In contrast, the Salter Lab nebulizer combined the most rapid nebulization rate with the least unit to unit variability. Aerosol particle size of acceptable nebulizers is under evaluation.