

## HOW ACCURATE ARE DISPOSABLE MANOMETERS?

Chuck Terhune, Heng Lee Tan, Students, Respiratory Therapy Program Indiana University, Jeffery A. Attwood, RRT, Equipment Specialist, Respiratory Care, Clarian Health, Linda Van Scoder, EdD, RRT, Respiratory Therapy Program, Schools of Allied Health Sciences and Medicine, Indiana University. **BACKGROUND** The use of manual resuscitation bags in neonates requires an inline manometer to measure the peak inspiratory pressure (PIP) delivered to them in order to prevent excessive pressure resulting in barotraumas and over-distension. **PURPOSE** This study was carried out to determine the accuracy of disposable manometers. **METHODS** This descriptive study included a convenience sample of thirty disposable manometers manufactured by three companies- Sims/Portex, EMS and Mercury. Ten manometers of each brand were tested at 20 cmH<sub>2</sub>O and 30 cmH<sub>2</sub>O. A mechanical device was designed to deliver consistent flow, rate and pressure throughout the testing. Ten readings for each of the thirty manometers were recorded at each pressure. The disposable manometer readings were compared to simultaneous pressure readings registered on a RT 200 calibration analyzer made by Timeter. The mean pressure, standard deviation and range for each brand were determined using Microsoft Excel descriptive statistics. **RESULTS** At 20 cmH<sub>2</sub>O, EMS had the smallest mean, 21.42 cmH<sub>2</sub>O and the smallest percent error, 7.12%, among the 3 brands of manometers. At 20 cmH<sub>2</sub>O, Mercury had the largest mean, 22.72 cmH<sub>2</sub>O and the largest percent error, 13.63%. At 30 cmH<sub>2</sub>O, Mercury had the smallest mean, 31.63 cmH<sub>2</sub>O and smallest percent error, 5.44%. At 30 cmH<sub>2</sub>O, Sims/Portex had the largest mean, 33.04 cmH<sub>2</sub>O and the largest percent error, 10.15%. **CONCLUSION** All 3 brands consistently underestimate the true PIP reading at 20 cmH<sub>2</sub>O and 30 cmH<sub>2</sub>O. At 20 cmH<sub>2</sub>O, EMS had the smallest percent error, standard deviation and range, hence it was the most accurate, reliable and consistent. At 30 cmH<sub>2</sub>O, Mercury had the smallest percent error, however, EMS had the smallest standard deviation and range, hence EMS was the most reliable and consistent but Mercury was the most accurate.

	20 cmH <sub>2</sub> O			30 cmH <sub>2</sub> O		
	Sims/Portex	EMS	Mercury	Sims/Portex	EMS	Mercury
Mean	21.53	21.42	22.72	33.04	32.07	31.63
Standard Error	0.072	0.044	0.082	0.15	0.032	0.15
Percent Error/%	7.69	7.12	13.63	10.15	6.92	5.44
Median	21.55	21.5	23	32.8	32.1	32
Mode	20.7	21.5	21.8	33.4	32	31
Standard Deviation	0.72	0.44	0.82	1.59	0.32	1.58
Range	2.3	1.6	2	6.2	1.1	4.2
Minimum	20.6	20.4	21.7	30.6	31.5	29
Maximum	22.9	22	23.7	36.8	32.6	33.2