

# **ASSESSING TIDAL VOLUMES DELIVERED BY AN ADULT AND PEDIATRIC BVMS WHEN USING CHEST RISE AS AN END-POINT**

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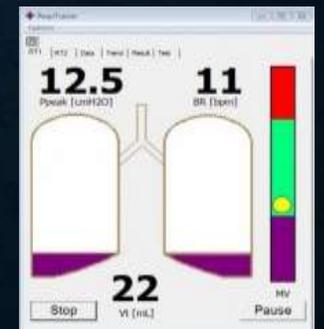
# BACKGROUND / HYPOTHESIS

- Lung-protective ventilation reduces morbidity and mortality in adult patients requiring positive-pressure ventilation.
- In a previous study, EMS professionals delivered median tidal volumes of greater than 800 ml with the adult-sized BVM and over 600 mL with the pediatric-sized BVM when allowed to ventilate without restriction for 1 minute sessions.
- **Primary Hypothesis:** What were the volumes delivered by the adult and pediatric BVM when the provider was instructed to use chest rise as an end-point?
- **Secondary Hypothesis:** How likely were the adult- and pediatric-sized BVMs able to provide appropriate lung-protective ventilation on an adult-sized ventilation simulator?

# METHODS / PARTICIPANTS

- Conveniently recruited at Abbott Ambulance in St. Louis, MO.
- Utilize the Respitainer Advance from Ingmar Medical.
- Instructions for Participants:
  - Flip a coin to determine start with adult vs pediatric BVM.
  - Stop squeezing when chest rest initiated on simulator.
  - Ventilate for 1 minute.

Characteristic	Value
<b>Sex, number (%)</b>	
Male	39 (78)
Female	11 (22)
<b>Provider levels, number (%)</b>	
EMT	37 (74)
Paramedics	13 (26)
<b>Median age (range)</b>	28 (18 to 64)
<b>Median years of experience (range)</b>	4 (1 to 41)



# RESULTS

- Reduction in median tidal volumes was statistically significant ( $p < 0.05$ ).

BVM size	Tidal volume (ml)	
	Median	95% CI
<b>Adult BVM</b>	614	607.5 – 633.5
<b>Pediatric BVM</b>	476	475.5 – 486.0

- The difference in lung protective tidal volume percents delivered between adult and pediatric BVMs was statistically significant ( $p < 0.05$ ).

Tidal volume range (ml)	Breaths delivered, count (%)	
	Adult BVM	Pediatric BVM
<b>&lt; 420</b>	7 (2.1)	60 (19.0)
<b>420 - 560</b>	<b>114 (34.9)</b>	<b>219 (69.3)</b>
<b>&gt; 560</b>	206 (63.0)	37 (11.7)
<b>Total</b>	327	316

# CONCLUSIONS

- We feel that the pediatric-sized BVM provides safer tidal volumes to a patient in the era of lung-protective ventilation.
- Even when being told to stop squeezing the BVM at chest rise, EMS providers are still delivering excessive tidal volumes with the adult BVM as compared to the lung-protective ventilation strategy.