

PEDIATRIC EMERGENCY DEPARTMENT OUTCOMES COMPARING LEVALBUTEROL VS. RACEMIC ALBUTEROL

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Background: Pediatric asthma is a chronic condition of childhood with increasing prevalence. Emergency Department (ED) treatment of asthma constitutes a failure in outpatient management. Frequently, ED asthma treatment is unsuccessful and patients are admitted. Our ED data the past 5 years yielded an average admission rate of approximately 41%. The purpose of this study was to determine if levalbuterol resulted in improved clinical outcomes compared to racemic albuterol. Specifically, we sought to observe a decrease in admission rate. **Methods:** An a priori analysis powered at 80% (p-value <0.05) indicated a need to randomize 532 children to detect a 10% decrease in admission rate. Patients who consented for participation were randomized in a double-blind fashion to receive either 2.5 mg albuterol or 1.25 mg levalbuterol delivered by a high-density Nebutech (Salter Labs, Irvine, Ca.) nebulizer. We utilized our assessment-driven ED Asthma Carepath (ED-ACP) to control for treatment standardization between groups. Our ED-ACP standardizes assessments & therapy (oxygen, albuterol aerosols, corticosteroids) at prescribed intervals. Assessments and /or treatments were delivered every 20 minutes. Intensification of therapy was provided with either subcutaneous epinephrine (SQ Epi) injection (initially) and/or Ipratropium (during therapy). Treatment was discontinued when discharge criteria were met: good air exchange, mild / absent end expiratory wheezing, no accessory muscle usage, SpO₂ > 93%, and respiratory rate < 40/min. Patients were observed for one hour after their last treatment then discharged. Patients not meeting discharge criteria after 6 aerosols or 1 hour of continuous aerosols were admitted or transferred. A chronic asthma severity was assigned based on history, symptoms, and therapeutic drug usage. Fisher Exact Tests were used to compare race, gender, and administration of SC Epi & Ipratropium. A Pearson chi - square was used to compare chronic severity & admit vs. discharge status. Unpaired t-tests were used to compare age, ED LOS, initial SpO₂ & aerosols delivered. Significance was set at p < 0.05. **Results:** This study randomized 552 children to treatment. Below are demographic and clinical outcome data reported as raw, mean (SD) or percentages with p-values.

Demographics	Levalbuterol	Racemic Albuterol	p - Value
Number	281	271	
Age	7.0 (4.0)	7.1 (4.2)	0.84
Caucasian Race (%)	12	15	0.27
Male Gender (%)	67	67	0.93
Severe Chronic Severity (%)	46	42	0.34
Outcome Data			
Admissions (%)	37	45	0.03
Aerosols delivered	3.8 (1.98)	4.1 (1.97)	0.05
LOS (in hours)	2.38 (0.84)	2.38 (0.86)	0.85
Administered SC Epi (%)	9	11	0.33
Administered Ipratropium (%)	23	30	0.10
Initial SpO ₂	94.8 (7.9)	95.5 (5.1)	0.25

Conclusion: Levalbuterol resulted in a clinical and statistical decrease in admission rate and treatments provided in our ED. An 8% decrease in hospital admission rate could result in a net savings of approximately \$200,000 per year at our institution.