

# Evaluation of Continuous Albuterol Practices in the Pediatric Emergency Department

**Authors:** Kaylee Poole, PharmD • Maria Whitmore, PharmD

**Affiliations:** Peyton Manning Children's Hospital at Ascension St. Vincent

*The authors have no conflict of interest.*

## Background:

Asthma is a chronic disorder of the airways. An asthma exacerbation is characterized by worsening shortness of breath, coughing, wheezing, and/or chest tightness accompanied by decreases in expiratory airflow. For the management of an acute asthma exacerbation, continuous nebulized albuterol may be utilized as part of a multimodal approach as specified by the institutional pediatric emergency department asthma management pathway. The 2007 National Heart, Lung, and Blood Institute asthma guidelines recommends use of continuous albuterol; however, debate continues regarding optimal dosing.

## Methods:

- Quality improvement retrospective chart review study
- Objective: Describe adherence to the institutional pediatric emergency department asthma management pathway.
- Inclusion:
  - Under 18 years of age
  - Received a dose of continuous albuterol in the pediatric ED for an asthma exacerbation
  - Admitted for inpatient management
- Exclusion:
  - Acute illness other than asthma exacerbation (e.g. pneumonia, bronchiolitis, croup)
  - Chronic illness (e.g. chronic lung disease, heart disease, medically complex)

## Results:

ED = Emergency Department; PICU = Pediatric Intensive Care Unit; Gen Peds =General Pediatrics Unit; LOS = Length of Stay

Table 1: Baseline Characteristics (N = 23)		
Mean Age (years)		7.4 ± 4.8
Mean Weight (kg)		32.5 ± 22.6
Sex (n, % male)		18, 78.3%
Race (%)	White	9, 39.1%
	Black or African American	12, 52.2%
	Asian	1, 4.3%
	American Indian or Alaska Native	1, 4.3%

Table 2: Admission, Transfer, Discharge Status (N = 23)	
Admitted from ED to PICU (n, %)	5 (21.7%)
Transferred from Gen Peds to PICU (n, %)	1 (4.3%)
Discharged from PICU (n, %)	1 (4.3%)
Admitted from ED to Gen Peds (n, %)	18 (78.3%)
Transferred from PICU to Gen Peds (n, %)	4 (17.4%)
Discharged from Gen Peds (n, %)	22 (95.7%)

Table 3: Mean Length of Stay (days)	
PICU mean LOS	0.83
Gen Peds mean LOS	2.4
Total hospitalization mean LOS among patients admitted or transferred to PICU	2.7
Total hospitalization mean LOS among patients admitted only to Gen Peds	1.4
Total hospitalization mean LOS among all patients	1.7

Figure 1: Respiratory Score Documentation Rate

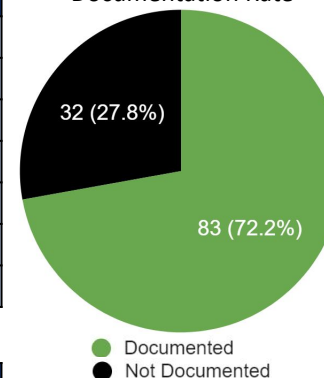


Figure 2: Appropriateness of Regimen

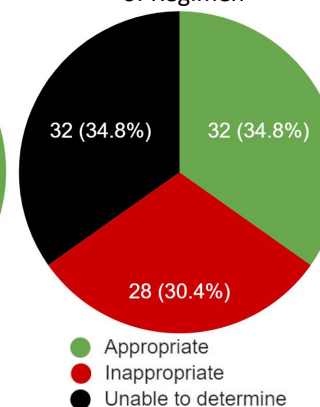
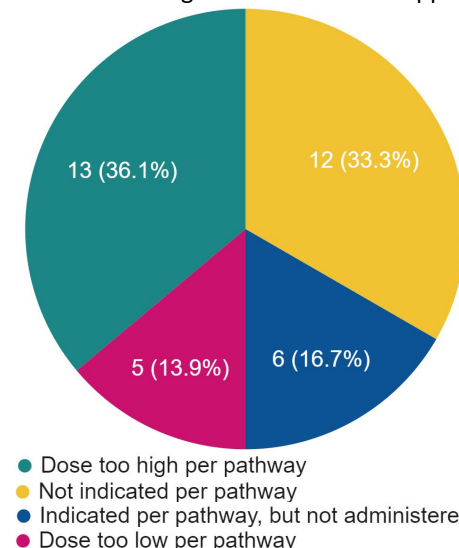


Figure 3: Reasons Regimen Considered Inappropriate



## Discussion:

Respiratory score documentation was missing in 27.8% of instances overall. As a result, the appropriateness of the continuous albuterol regimen per the pathway was unable to be determined in 34.8% of instances. Discrepancies were also present in documented respiratory scores and physician documentation, which likely led to additional inaccuracy in assessing the appropriateness of the regimens as well as reasons for inappropriate regimens. The dose administered was considered too high per the pathway in 36.1% of instances. This was identified as a potential area of improvement for the pathway as the maximum dose varied based on the hour of treatment and respiratory score severity. Limitations of this study include retrospective single-center study design, small sample size and limited study period, respiratory score documentation discrepancies limiting assessment, inclusion of children less than 2 years of age, and lack of safety endpoints.

## Conclusion:

Several areas of opportunity were identified by this quality improvement study including educational opportunities regarding the respiratory score and adjustment of the institutional pediatric emergency department asthma management pathway to a standard 20 mg/hr maximum dose regardless of hour of treatment or severity. The recommended dose remains at 0.5 mg/kg/hour rounded to the nearest 2.5 to 5 mg increment per institutional policy.