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"Variations in Management of Acute Pediatric Respiratory Emergencies Within a Single Health System"

Background: Acute respiratory emergencies are among the highest reasons for pediatric emergency department (ED) visits. Of these are conditions affecting the airways due to inflammation or hyperresponsiveness, such as croup, asthma, and associated respiratory conditions. Diagnosis in younger pediatric patients can be difficult due to overlapping clinical presentations. Many academic institutions have clinical pathways and guidelines based on standardized assessment scores specific to these conditions. However, only 15% of United States children's hospitals' clinical practice guidelines recommend using standardized croup scores, and geographic variations exist in the recommendation of using clinical asthma scores. Other scores such as the Clinical Respiratory Score (CRS) have been studied to predict severity of respiratory distress and likelihood of critical care admissions but were used to guide clinical management. There may be practice variability among ED providers within a single health system depending on site of ED or specialty of provider within each site, despite having access to those guidelines. This study analyzes variations in management between ED sites and provider training to help guide quality improvement plans and optimize management.

Methods: We conducted a retrospective chart review of deidentified patients aged five years and younger who presented with respiratory complaints to EDs within a single health system to control for access to academic institutional guidelines. Descriptive statistics were used for demographic data, and inferential statistics, including odds ratios, correlation analyses, and MANOVA with logistic regression, were used to assess variability among ED sites (academic, satellite, and community) and specialty of the provider. Statistical significance will be defined as $p < .05$.

Results: We analyzed 1141 ED patient encounters between November 2022 and July 2025. Significant correlation was observed between ED type and attending provider type ($r=0.55$, $s^2 \sim 0$) and between clinical severity and ordered disposition ($r = 0.38$, CI: 0.31 to 0.44). Ordinal and multinomial regression stratified by age demonstrated significance of clinical severity on ordered disposition (Wald=92.38, $p < .001$), as did time from triage to first administered bronchodilator (Wald=4.57, $p = .033$). Age and race did not independently predict disposition after adjusting for covariates. However, age consistently predicted 72-hour revisits on multiple binomial regression models (Wald=11.7, $p = .003$) and the prescription of steroids for home. Younger children had significantly higher odds of being discharged with steroids ($p < .001$, Nagelkerke $R^2 = 0.052$). Other variables, such as sex, race, and ED location, were not significantly associated with outcomes.

Conclusion: Clinical severity and timeliness of initial bronchodilator therapy are key determinants of disposition in pediatric emergency encounters. Younger age is a consistent predictor of both bounce back risk and outpatient steroid prescribing, emphasizing the importance of age-specific management strategies and discharge planning in pediatric respiratory care.