

REVIEWER COMMENTS. This was a large study encompassing >17 000 pairs of patients, and while there was a statistically significant difference between Medicaid and non-Medicaid patient hospitalization costs, the differences were insignificant from the clinical and economic perspectives. While some studies report that hospital length of stay is greater for Medicaid patients, this study did not find this to be the case, concluding that insurance status does not significantly impact expenses, length of stay, or ICU use.

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Parental Decision-Making Associated With Pediatric Emergency Department Use for Asthma

Mudd SS, Ogborn CJ, Bollinger ME, et al. *Ann Allergy Asthma Immunol.* 2016;117(5):490-494

PURPOSE OF THE STUDY. To identify common caregiver factors contributing to emergency department (ED) utilization for asthma care among inner city children.

STUDY POPULATION. One hundred and fifty children aged 3 to 12 years were recruited during an ED visit for acute asthma care. Inclusion criteria were physician-diagnosed persistent and uncontrolled asthma, 2 or more ED visits or 1 or more hospitalizations for asthma during the past year, and living in the Baltimore metropolitan area. Children were primarily African American (95%) with male predominance (64%) and a mean age of 6.4 years (SD 2.7 years), and the majority of caregivers were single mothers (85.2%).

METHODS. After obtaining institutional review board approval, surveys were administered to caregivers during the initial ED visit to collect sociodemographic information, health characteristics including the child's asthma symptoms, inhaler use, and perceived asthma control, as well as recent health care visits for asthma. Additionally, caregivers were asked to rank 11 items regarding their decision to use the ED for their child's asthma care. Correlations among factors were identified by using cluster analysis.

RESULTS. Three clusters were identified in caregiver decision-making factors: urgency, preference for use of ED, and access to care issues. Urgency, primarily because of parental anxiety, was reported by 91% of caregivers. Urgent reasons were correlated with low controller medication use ($P < .05$). Thirty-seven percent reported preference for the ED based on trust and confidence in ED doctors, with a second ED visit within 3 months significantly more likely to occur in this cluster (odds ratio [OR] 3.7; $P \leq .5$). Access to care issues were identified as significant factors in 31% of caregivers, notably the inability to get a same-day appointment with their primary care physician (PCP). Lack of health

insurance was insignificant in caregiver decision-making, as 99% of the children reported insurance coverage.

CONCLUSIONS. The majority of caregivers indicated urgency as the most important reason in their decision to use the ED for asthma care, but preference for ED physicians and lack of same-day appointments with their PCP also played a significant role.

REVIEWER COMMENTS. Asthma disproportionately affects low-income minority children, a population with high frequency ED use for asthma care. This study highlights important caregiver factors in this population that contribute to ED utilization and points to opportunities for targeted interventions. The correlation between both low income and low controller medication use with ED visits because of caregiver anxiety demonstrates the importance of providing resources and education to improve controller medication use leading to better asthma control and decreased reliance on ED visits for nonurgent care. Additionally, improved access and positive relationships with PCPs could play an important role in reducing ED visits.

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MEDICAL THERAPIES

Has Asthma Medication Use Caught Up With the Evidence?: A 12-Year Population-Based Study of Trends

Sadatsafavi M, Tavakoli H, Lynd L, FitzGerald JM. *Chest.* 2017;151(3):612-618

PURPOSE OF THE STUDY. Both national and international guidelines on the treatment of asthma emphasize the use of controller medications in persistent asthma and discuss the role of controller versus rescue medications. This study looked at 12 years of data to study the extent and trends of inappropriate or excessive use of SABAs.

STUDY POPULATION. The study used a health database in British Columbia (population 4.67 million). They created a cohort of patients with asthma, aged 15-55 years. Asthma was defined as meeting at least 1 of 3 criteria over 12 months: (1) use of 3 asthma-related medications, (2) two outpatient visits, or (3) one hospitalization with the primary code for asthma.

METHODS. Data were collected from 2002-2013. Three metrics were defined: (1) inappropriate prescriptions of SABAs (>2 puffs of a SABA per week if no ICS was used and ≥ 9 canisters of SABA and no more than 100 μg [beclomethasone equivalent] per day of ICS), (2) excessive prescription of SABAs (filling prescriptions for ≥ 12 canisters during a year regardless of ICS use), and (3) the ratio of ICS to total asthma-related prescriptions.

This ratio is negatively associated with adverse asthma outcomes. A cutoff of 50% each patient-year was selected as a satisfactory ratio.

RESULTS. A total of 343 520 individuals met the case definition of asthma. In 7.6% of patient-years, SABAs were prescribed inappropriately. When patient-years with no prescriptions filled were removed, this number increased to 11.9%. In 0.9% of patient years, SABAs were prescribed excessively. In 29.6% of patient-years, the ratio of ICS to total prescriptions was >50%.

CONCLUSIONS. Inappropriate prescriptions of SABAs are still prevalent but halved from 2002 to 2013, and excessive SABA prescriptions declined by more than 60%. Excessive SABA use declined over the study period but increased over the time course of asthma. Excessive SABA use was most notable in older patients and might explain higher mortality in this group.

REVIEWER COMMENTS. Asthma guidelines have been around for over 2 decades and emphasize the use of ICS as first-line treatment to control chronic inflammation in persistent asthma. This study shows that inappropriate and excessive prescriptions of SABAs are still prevalent but appear to be decreasing in this population. The major limitation in this study is use of pharmacy data to reflect actual medication usage. Patients frequently want prescriptions for multiple SABAs to have in various locations or to replace lost medications. In addition, filling a prescription does not equate to medication use. So, the number of prescriptions for SABAs is likely higher than actual usage. Devices that measure the actual number of puffs accentuated from a device are available and may more acutely reflect patient medication usage. Preparation, distribution, and implementation of guidelines is no small task. It is refreshing to see data showing the benefits of guideline usage.

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Spacers Versus Nebulizers in Treatment of Acute Asthma - A Prospective Randomized Study in Preschool Children

Mitselou N, Hedlin G, Hederos CA. *J Asthma*. 2016; 53(10):1059-1062

PURPOSE OF THE STUDY. To compare administration of bronchodilators by nebulizers with delivery by metered dose inhalers (MDIs) with spacers and to evaluate the clinical effect of the treatment of acute asthma in preschool children.

STUDY POPULATION. Children 0-6 years of age who presented to the emergency department with viral infection-associated wheezing or acute asthma flares.

METHODS. A prospective randomized clinical trial in a pediatric emergency department (PED). Preschool children who were admitted for virus-induced wheezing or acute asthma exacerbation were randomly allocated to receive bronchodilator treatment by nebulizer or by MDI. Parents completed a questionnaire during the PED visit.

RESULTS. Baseline data were similar for both groups, except for family history of asthma and atopic disease being more frequently reported in the nebulizer group. The length of stay in the PED and rate of hospitalization were similar. No significant differences were seen in heart rate, respiratory rate, and oxygen saturation at baseline and after the treatment. No difference was seen in the parents' view of ease of use and device acceptance. According to the parents, 40% of the participants had asthma diagnosis, but up to 66% were previously prescribed some kind of asthma medication.

CONCLUSIONS. The results suggest that MDIs with spacers are at least as effective as nebulizers in the delivery of β agonists to treat preschool children with virus-induced wheezing or acute exacerbations of asthma in the PED. It is important to provide adequate information to the staff and parents to treat pediatric acute asthma successfully.

COMMENTS. There are numerous studies that have addressed the efficacy of MDIs versus nebulized medication delivery in children. Despite evidence that either method is suitable for medication delivery, there remains the perception that nebulization is superior to MDI/spacer use, particularly in younger children. The authors highlight parents' perceptions in an acute setting that both methods achieve acceptance if presented correctly. This information should encourage clinicians to distribute appropriate MDIs/spacer devices to preschool-aged children without hesitation.

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The Effect of a Holding Chamber on Albuterol Metered-Dose Inhaler Product Differences

Johnson JL, Guthrie D, Hyde J, Hanson T, Karlage K, Myrdal PB. *Ann Allergy Asthma Immunol*. 2016; 117(3):246-250

PURPOSE OF THE STUDY. To investigate the differences in 3 albuterol sulfate metered-dose inhaler (MDI) products and their particle size. The study also evaluated if use of a valved holding chamber (VHC) would impact drug delivery and/or diminish systemic adverse effects.

STUDY POPULATION. The study did not use human subjects, but rather examined Ventolin hydrofluoroalkane (HFA), Proventil HFA, and ProAir HFA, the 3 racemic albuterol sulfate pressurized MDI products available in the United States.

**Has Asthma Medication Use Caught Up With the Evidence?: A 12-Year
Population-Based Study of Trends**

Melinda M. Rathkopf

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