Abstract:
Asthma is responsible for significant disease burden and health care cost. A heterogeneous disease with significant environmental, genetic, and economic risk factors, asthma disproportionally affects the most vulnerable children. Effective strategies to improve individual asthma control rely on a multidisciplinary, cross-sector approach. The emergency department (ED) is a critical resource to identify children at risk for high morbidity and mortality from asthma. It is imperative to identify barriers to asthma control in the ED while being mindful of transitions and care coordination, especially as the United States moves to value-based reimbursement of health care. We review recent literature on ED-based interventions, present data on the importance of addressing housing and involving schools, and conceptualize an ideal medical home for asthma. We also provide examples of how our own institution has developed programs across sectors to improve asthma outcomes in children.

Keywords:
asthma; community; interventions; outcomes; pediatric

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Improving Asthma Outcomes in Children: From the Emergency Department and Into the Community

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In the United States, 7 million children suffer from asthma, accounting for approximately 10 billion dollars in health care costs each year.[1-3] As a leading cause of pediatric emergency department (ED) visits, asthma contributes to almost 700,000 visits each year.[1,2] A heterogeneous disease with significant environmental, genetic, and economic risk factors, asthma varies in its presentation, disproportionally burdening children in poverty and minorities. Black children have the highest asthma morbidity and mortality of any US group, twice that of white children.[1]

The National Institutes of Health guidelines for acute asthma exacerbations recommend that "patients at high risk of asthma-related death require special attention—particularly intensive education, monitoring, and care." The guidelines also stress the importance of early treatment and in-home management, citing the importance of a written asthma action plan, early recognition and treatment of exacerbations with adjustments in controller medications, and removal or withdrawal from allergens or irritants in their environment.[4]

Improving asthma outcomes, especially in high-risk groups, begins in the ED. It is crucial to seize the ED visit as a time to provide access to high-risk patients with asthma. Children who present to the ED with asthma exacerbations are more likely to be impoverished, exposed to allergens, lack insurance or have public insurance, not use controller medication, have poor housing, suffer from more severe disease, or overall have a poor understanding of asthma.[2,5-7] Unfortunately, an ED visit is limited in time and resources to address these complex issues. Moreover, rates of follow-up to primary care following an ED visit are low even when an explicit recommendation for follow-up is made at the time of ED discharge.[8] Creative solutions to facilitate identification and mitigation of barriers to asthma control in the ED are necessary. Additionally, an intervention that starts in the ED must demonstrate reach into the community and include the medical home. Multidisciplinary care that effectively crosses transitions and sectors is imperative to narrow the health disparities in asthma.[9,10]

We review recent literature on ED-based interventions, present data on the importance of addressing housing and involving schools, and conceptualize an ideal medical home for asthma. We also provide examples of how our own institution has developed programs across sectors to improve asthma outcomes in children.

PEDIATRIC ASTHMA AND THE ED

The ED presents a unique opportunity to connect with children and their families at the time of greatest need. Many have seized the post-ED visit as a "teachable moment" as it represents a time when a family may be most motivated and amenable to be a part of change, especially if it results in preventing a future ED visit. Innovative ED-based interventions in the area of substance abuse, assault, and asthma have all had great success.[11,12]

A visit to the ED is a marker of poor asthma control and for many families is disruptive to daily life.[4] One program that has effectively capitalized on the "teachable moment" while accounting for limited time while in the ED is Improving Pediatric Asthma Care in the District of Columbia (IMPACT DC).[12] The IMPACT DC Asthma Clinic model of care was studied and validated in a randomized clinical trial by Teach et al. A single visit to the IMPACT DC Asthma Clinic, occurring 1-2 weeks postdischarge from the ED or inpatient unit, was associated with improved outcomes in multiple domains, including lowered subsequent unscheduled health care utilization for acute asthma care (including ED visits), reduction of exposure to harmful environmental triggers (like tobacco smoke), and increased use of daily controller medications to prevent symptoms. Patients in the intervention group had 40% fewer unscheduled visits (to urgent care or EDs) than patients in the control group over the 6-month follow-up period. At 1-month follow-up, more than 80% of school-aged participants in the intervention group reported no missed school days in the prior 2 weeks. The intervention group also showed more symptom-free periods and decreased asthma severity, with improvements in several measures of quality of life.[12]

A recent review summarized a few care transition interventions originating in the ED for children with uncontrolled asthma.[13] Most of the interventions focused on care coordination and asthma management. However, they found that a majority of these interventions did not improve attendance at a primary care setting, nor did they improve asthma control or reduce health care utilization after an ED visit.

Another potential success story is The CHIGAGO Plan, a recently completed multicenter randomized pragmatic trial of children ages 5 to 11 years presenting to the ED with uncontrolled asthma. The trial is comparing the effect of an ED-focused intervention to improve the quality of care at the time of discharge with and without a community home health worker, comparing it to standard care practices. It will be interesting to see how a model that starts in the ED compares to one that continues and follows the patient into the community compares.[14]

Improving discharge communication, starting or providing medications at the time of the ED visit,[15] and bringing families back within a week of care to investigate causes of poor control and propose solutions[12] are ED-based asthma interventions that are effective. The ED represents an important opportunity to engage families in asthma care and management. That engagement can yield benefits in a child's overall health and educational status. (Table 1)

PEDIATRIC ASTHMA AND THE SCHOOL SYSTEM

Asthma significantly impacts a child's education. According to the Centers for Disease Control and Prevention, children with asthma missed 13.8