

1.05 ASTHMA

Introduction

Asthma is one of the most common, non-communicable, chronic childhood diseases. It is a leading cause of healthcare utilization resulting in a significant number of primary care visits, emergency room visits, and hospitalizations. It has direct impact on patient quality of life with a heavy financial burden to individuals and society. The prevalence of asthma continues to rise and is not equally distributed throughout the population, differing by sex, race, socioeconomic level, and geographic location. The Department of Health and Human Services (DHHS) recognizes the weight of asthma disease on our society, having directed the National Institute of Health to create evidence-based guidelines for asthma care. Additionally, the DHHS continues to recognize asthma as a key element of the Healthy People 2020 initiative with several specific health objectives related directly to inpatient management. Due to the chronic nature of this disease, pediatric hospitalists should not only treat acute exacerbations resulting in status asthmaticus, but also create or reaffirm long-term management plans.

Knowledge

Pediatric hospitalists should be able to:

- Discuss the pathophysiology of asthma addressing both bronchoconstrictive and inflammatory components, and state how each impact pharmacologic treatment choices.
- Compare and contrast the pathophysiology of asthma with other common small airway illnesses in children, such as bronchiolitis, viral pneumonia with bronchospasm, or chronic lung disease.
- Describe disparities in asthma prevalence by sex, race, socioeconomic level, and geographic location.
- Discuss the role psychosocial factors (such as housing, parental mental health, financial status, lack of health insurance, and others) play in the risk for exposure to allergens, non-compliance to medical regimens, and access to health care.
- List the differential diagnosis of wheezing for various age groups and delineate the defining features leading to a diagnosis of asthma.
- Define asthma groups by symptom severity and frequency based on current classification guidelines.
- Discuss the impact of risk factors, exacerbating factors, and chronic comorbidities on morbidity, treatment, and prognosis.
- List common asthma triggers and explain the importance of trigger avoidance and environmental controls in minimizing the frequency and severity of asthma exacerbations.
- State the basic pharmacology, safety profile, and potential adverse effects of commonly used medications, including bronchodilators, leukotriene modifiers, inhaled or systemic corticosteroids, and magnesium sulfate
- Compare and contrast indications for the use of high dose bronchodilator therapy via multiple meter dose inhaler or continuous nebulized albuterol.

- Describe the different formulations of systemic corticosteroids commonly used for treatment of acute asthma exacerbation and the indications for each.
- Describe the utility of alternate therapies such as magnesium sulfate for acute refractory asthma.
- Cite the common complications of asthma or asthma treatment, including pneumothorax, atelectasis, lobar collapse, respiratory failure, poor cardiac output, dysrhythmias, and others.
- Describe the utility of using asthma management plans to both monitor and treat asthma via early symptom recognition, pulmonary function testing (spirometry and/or peak flow), and proper use of controller and reliever medications.
- Discuss the goals of asthma management, including the maintenance of normal activity levels (including physical activity, uninterrupted sleep, and school attendance) and pulmonary function; the prevention of chronic symptoms, recurrent exacerbations, and hospitalizations; and the provision of optimal pharmacotherapy, while minimizing adverse events.
- List specific indications for referral to an asthma subspecialist.

Skills

Pediatric hospitalists should be able to:

- Diagnose and correctly classify asthma by efficiently performing an accurate history and physical examination.
- Assess clinical findings to determine the need for hospitalization and the appropriate level of care.
- Direct an evidence-based treatment plan for status asthmaticus.
- Identify and respond to side effects associated with asthma medications.
- Order and interpret objective measures of pulmonary function, including peak flow monitoring and spirometry.
- Order and interpret results of basic diagnostic tools, such as chest radiograph, blood gas, and others as indicated.
- Order appropriate monitoring and correctly interpret monitor data.
- Provide supplemental oxygen therapy and advanced airway management as necessary.
- Recognize signs and symptoms of serious complications of asthma, including pneumothorax or impending respiratory failure.
- Facilitate an effective transfer to a tertiary care center or intensive care setting when appropriate.
- Assess disease severity and modify the daily medication regimen based upon accurate assessment of changes in disease state, both for inpatient management and transition to home.
- Assess psychosocial factors that may impact care plans and provide appropriate interventions, including support, education, and referral to available resources.
- Initiate asthma education for patients and the family/caregivers as soon after admission as possible, as appropriate for the clinical context.
- Create a discharge plan that can be expediently activated when appropriate.

- Coordinate care with the primary care provider with a plan inclusive of discharge medications, home instructions, and follow-up plans.
- Complete a written asthma action plan and use it to educate patients and the family/caregivers on trigger avoidance, medication adherence, and disease control.

Attitudes

Pediatric hospitalists should be able to:

- Reinforce the role and responsibility of patients and the family/caregivers regarding self-care, recognition of symptoms, and disease management.
- Realize responsibility for effective communication with patients, the family/caregivers, and healthcare providers regarding care plans.
- Engage in a multi-disciplinary approach to the prevention, diagnosis, and treatment of asthma, involving when appropriate, social workers or case managers, respiratory therapists, and subspecialists.
- Collaborate with primary care providers and subspecialists to ensure coordinated longitudinal care for children with asthma.

Systems Organization and Improvement

In order to improve efficiency and quality within their organiza-

tions, pediatric hospitalists should:

- Lead, coordinate, or participate in local and national initiatives to further the development and implementation of evidence-based clinical guidelines to promote effective resource utilization and improve quality of care for hospitalized children with asthma.
- Work with hospital administrators to implement and utilize performance feedback and quality improvement measures to assess outcomes of instituted guidelines for the management of inpatient asthma.
- Collaborate with primary care providers, subspecialists, social workers, and case managers to ensure a smooth transition to the outpatient setting, and to minimize the need for readmission.

References

1. U.S. Department of Health and Human Services, National Institutes of Health. Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma (EPR-3). 2007 Edition. <http://www.nhlbi.nih.gov/health-pro/guidelines/current/asthma-guidelines>. Accessed August 22, 2019.
2. Jones BP, Fleming GM, Otilio JK, Asokan I, Arnold DH. Pediatric acute asthma exacerbations: Evaluation and management from emergency department to intensive care unit. *J Asthma*. 2016;53(6):607-617. <https://doi.org/10.3109/02770903.2015.1067323>.
3. Saglani S, Fleming L, Sonnappa S, and Bush A. Advances in the aetiology, management, and prevention of acute asthma attacks in children. *Lancet Child Adol Health*. 2019;3(5):354-364. [https://doi.org/10.1016/S2352-4642\(19\)30025-2](https://doi.org/10.1016/S2352-4642(19)30025-2).