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Updated Evidence-Based Pediatric Asthma Management for the Urgent Care Provider

Urgent Message: Acute asthma exacerbations commonly present to urgent care, and providers must be well-equipped to recognize asthma exacerbations and be familiar with management recommendations.

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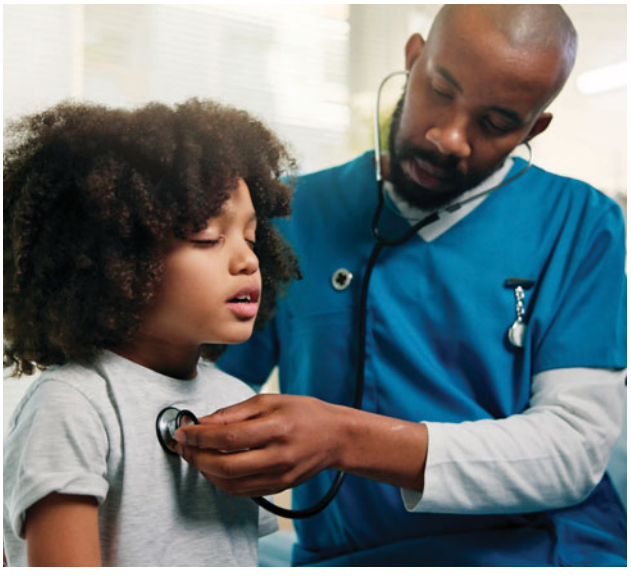
Abstract

Overview: Asthma affects nearly 10% of children globally, with an estimated 95.7 million cases reported in 2021. This review discusses updates from the 2025 Global Initiative for Asthma (GINA) guidelines, emphasizing diagnostic and management considerations relevant to the urgent care setting.

Diagnosis: In children under 5 years old, diagnosis remains primarily clinical, requiring recurrent wheezing episodes and symptomatic improvement with bronchodilator therapy. For children over age 6, spirometry or peak expiratory flow testing confirms variable airflow limitation in combination with symptoms. The 2025 GINA update highlights the emerging role of biomarkers, such as blood eosinophil count, fractional exhaled nitric oxide, and serum immunoglobulin E, in identifying type 2 inflammation.

Management: Patients with acute asthma exacerbations in the urgent care should be treated with repeated courses of short-acting beta-2-agonists and systemic corticosteroids. Adjunctive ipratropium is recommended for moderate to severe cases. Patients should be transferred to the nearest emergency department if they require advanced management and/or oxygen supplementation. Urgent care discharge planning should include reassessment of inhaler technique, initiation of controller therapy when indicated, education on asthma action plans, and prompt follow-up.



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Conclusion: To improve pediatric outcomes, urgent care providers can play a crucial role in acute asthma management, reinforcing adherence, optimizing inhaler technique, and initiating evidence-based therapy in alignment with the GINA 2025 recommendations.

Introduction

The global prevalence of asthma in children aged 1–21 years is approximately 10%.[1] In 2021, there were 95.7 million cases of childhood asthma worldwide.[2] This clinical review article aims to highlight the updates in care for pediatric asthma, as well as provide an overview of asthma management based on the most recent Global Initiative for Asthma (GINA) guidelines released in May of 2025.[3]

Pathophysiology

Asthma is a form of lung disease characterized by bronchial hyperresponsiveness and airflow obstruction, resulting from an overactive response to environmental triggers and allergens, which then leads to bronchoconstriction.[3] The GINA 2025 guidelines arrived at a consensus that asthma is a heterogeneous disease with chronic airway inflammation.[4] The asthma subtypes classified by GINA include:[3]

- Allergic asthma
- Non-allergic asthma
- Cough-variant asthma and cough-predominant asthma
- Adult-onset (late-onset) asthma
- Asthma with persistent airflow limitations
- Asthma with obesity

Recent classifications also include T-helper type 2 (Th2)-high and Th2-low asthma. Th2-high asthma receives its name from Th2-cells which originate from CD4+ T-cells. Th2-high asthma is highly responsive to inhaled glucocorticoids. Testing of Th2-high type shows increased eosinophilia and fractional exhaled nitric oxide (FENO).[5] Importantly, several novel biologic therapies that target immunologic components such as immunoglobulin E (IgE) are being utilized more in recent years in the pediatric population with Th2-high asthma. The GINA 2025 guidelines recommend add-on biologic therapy for patients with Th2-high asthma who remain uncontrolled, despite optimizing all other therapies. This type of therapy can be recommended with referral upon discharge from urgent care clinics, depending on the clinical scenario.[4] On the other hand, Th2-low asthma is characterized by increased interleukin-17, which is not currently a target of available biologic therapies.[5]

Diagnosing Asthma in the Urgent Care Setting

The GINA 2025 guidelines include a dedicated section on the diagnosis of asthma in children ages 5 years and younger, emphasizing that diagnosis in this age group is primarily clinical.[3] For diagnosis in this age group, all 3 of the following criteria must be met:

1. At least 2 episodes of acute wheezing, or at least 1 episode of acute wheezing with dry cough, or post-exertion wheezing in between episodes
2. No other likely alternative that better explains the symptoms with the exception of known triggers such as viral infections
3. Clinical improvement with appropriate asthma treatment

The guidelines recognize that asthma may still be suspected in cases where all criteria were not met. In such cases, a therapeutic trial may be initiated with timely reassessment by a primary care provider focused on the effectiveness of the treatment to support or refute an asthma diagnosis.[3]

For children ages 6 and older, the diagnostic approach is the same as in adolescents and adults per the 2025 GINA guidelines and requires both of the following: characteristic respiratory symptoms of asthma; and objective evidence of expiratory airflow limitation.[3] Symptoms may include recurrent wheeze, cough, shortness of breath, or chest tightness that vary over time and are often triggered by exercise, viral infections, allergens, or cold air. Objective confirmation is commonly obtained by spirometry demonstrating significant bronchodilator reversibility or by excessive peak expiratory flow (PEF) variability. When spirometry is normal, variability may be demonstrated through repeat testing over time or exercise challenge testing.[3]

Across all age groups, the 2025 GINA guidelines continue to highlight the importance of assessing the history of the patient's typical asthma symptoms, regardless of the setting of presentation.[3]

In urgent care, history of symptoms and previous asthma treatment response, family history of atopy, and physical exam findings of wheezing, cough, and/or increased expiratory phase should increase suspicion for asthma.

The guidelines now suggest a role for biomarkers of type 2 inflammation in asthma evaluation, particularly when spirometry or PEF are unavailable or inconclusive. These labs could be coordinated through primary care physicians if feasible, as they may assist in guiding treatment decisions. These biomarkers include blood eosinophil count (BEC), elevated fractional exhaled nitric oxide (FeNO), serum total IgE, and allergen-specific IgE.

IgE-related markers are being used to identify allergic asthma in all ages. Confirmatory testing is a crucial aspect of diagnosing asthma to avoid unnecessary treatment and avoid overlooking critical differential diagnoses that may impact quality of life and increase healthcare utilization.[6]

Evaluation of asthma severity should be based on the level of treatment required to achieve and maintain symptom control, often referred to as the "difficulty to treat" approach.[3] This method is further supported by the American Thoracic Society/European Respiratory Society.[7] This shifts the paradigm from "how bad are the symptoms *now*?" to "what is the minimum treatment required to keep this patient controlled?" This approach also applies to acute exacerbations and can therefore be applied in urgent care medicine.

For example, if a patient arrives to the urgent care in distress and reports that they are managed with multiple controller medications yet still have frequent exacerbations, this signals a possible "difficult to treat" or severe asthma phenotype. This history should signal providers that these patients may require a high-intensity of therapy just to maintain control of their exacerbation. It is critical to identify other factors that may make control more difficult including the patient's inhaler technique and adherence, modifiable trigger exposure (eg, smoking, allergen/occupational exposures) and comorbidities (eg, obesity, sleep apnea, gastroesophageal reflux disease, smoking).

Conditions considered in the differential diagnosis **(Table 1)** highlight the importance of a detailed history, careful examination, and selective use of diagnostic tools when possible. Careful consideration of differential diagnoses helps avoid misdiagnosis of asthma and prevents unnecessary exposure to corticosteroids, while ensuring that appropriate management is directed toward the true underlying condition.

Management in the Urgent Care

Management of acute pediatric asthma exacerbations in the urgent care setting relies on 3 primary interventions: controlled oxygen supplementation; repetitive administration of rapid-acting inhaled bronchodilators; and early initiation of systemic corticosteroids. These interventions aim to reverse airway obstruction, reduce airway inflammation, and prevent progression to respiratory failure.

Oxygen Therapy

Oxygen therapy should be titrated based on continuous pulse oximetry, with target oxygen saturations according to GINA 2025 recommendations, using standard sea-level values, 94–98% for children under 11 years of age, and 93–95% for those aged 11 years and older.[3] Oxygen saturation targets should be adjusted for altitude where appropriate. Those with hypoxia will require transfer to the emergency department for escalation of care. Children receiving oxygen therapy should be observed for signs of deterioration, including somnolence or fatigue.[3] Of importance, in hypoxic conditions, the oxygen saturations of those with dark skin color may be overestimated by pulse oximeters.[26]

Bronchodilator Therapy

Inhaled short-acting beta-2-agonists remain the cornerstone of therapy during acute asthma exacerbations. Delivery through a metered-dose inhaler (MDI) with spacer provides similar efficacy to nebulizer therapy while being more cost-effective and having a lower side effect profile.[27,28] For children older than 6 years, albuterol should be administered in doses of 4–10 puffs via MDI with spacer every 20 minutes during the first hour of treatment. Beyond the first hour, doses may be repeated every 3–4 hours or increased to 6–10 puffs every 1–2 hours for persistent symptoms. In children younger than 6 years, recommended dosing is 2–6 puffs of albuterol via spacer, or 2.5 mg by nebulizer, every 20 minutes for the first hour. If symptoms persist or recur, 2–3 additional puffs per hour can be administered.[27,28]

Proper inhaler use is important to assess known asthmatics with recurrent visits to urgent care. Both witnessed administration of maintenance inhalers at school and telemedicine follow-ups are associated with decreased urgent care visits and increased symptom-free days.[29] This supports the notion that proper use of maintenance inhalers is crucial for reducing healthcare system burden and improving patient quality of life.[29] For those under 12 months of age or for those who cannot effectively utilize MDI inhalers, nebulizers are effective and remain appropriate for urgent care settings.

Anticholinergics

In moderate to severe cases, ipratropium bromide may be added in the first hour, at a dose of 1–2 puffs via inhaler or 250 mcg via nebulization every 20 minutes up to 3 doses, as it provides additional bronchodilation and reduces hospitalization rates.[3,30] Some research suggests that in certain age groups, MDI administration with mask is more effective, however, the consensus at this time is to provide the nebulized form for moderate to severe cases.[3,31]

Table 1. Differential Diagnosis for Wheezing in Urgent Care

Primarily in Infants (<1 year)			
Diagnosis	**Key History**	**Physical Exam**	**Diagnostic Testing and Treatment**
Bronchiolitis[8]	Increased work of breathing, intermittent wheezing, minimal response to bronchodilators	Suprasternal or intercostal retractions, nasal flaring, head bobbing	Dx: Clinical Tx: Suctioning, oxygen support (HFNC preferred)
Bronchopulmonary dysplasia[9]	Prematurity, history of neonatal respiratory distress, history of prolonged oxygen or ventilator support	Tachypnea, retractions, grunting, hypoxia	Dx: CXR and history Tx: oxygen supplementation, inhaled bronchodilators, inhaled steroids
Primary ciliary dyskinesia[10]	Unexplained neonatal respiratory distress, early-onset persistent nasal congestion, early infancy onset of chronic wet cough	Wet cough, nasal congestion, dextrocardia	Dx: CXR with situs inversus Tx: Suction, antibiotics, oxygen supplementation, hospital transfer
Congenital heart disease[11]	Exertional dyspnea, growth failure	Tachypnea, cyanosis, murmur	Dx: Hospital evaluation Tx: Hospital transfer
Tracheomalacia and vascular rings[12]	Noisy breathing, minimal response to bronchodilators	Noisy breathing	Dx: Hospital evaluation Tx: Oxygen supplementation with HFNC, hospital transfer
Toddlers and Preschoolers (1–5 years)			
Diagnosis	**Key History**	**Physical Exam**	**Diagnostic Testing and Treatment**
Inhaled foreign body[13]	Sudden onset of cough, shortness of breath, wheezing, or inspiratory stridor	Unilateral wheezing, focally decreased air entry	Dx: CXR or low-dose CT Tx: Oxygen supplementation, hospital transfer for bronchoscopy
Viral respiratory tract infections[14]	History of recent upper respiratory infection	Nasal congestion, dry cough, wheezing	Dx: Clinical Tx: Bronchodilators; if influenza, consider antivirals
Pertussis[15]	Paroxysmal cough, post-tussive emesis, history of apneic events	Paroxysmal cough, facial petechiae or subconjunctival hemorrhages from forceful coughing	Dx: PCR test Tx: Macrolide antibiotics, supportive management
Gastroesophageal reflux disease[16]	Chronic cough, airway symptoms worse after feeding	Back arching, dry cough	Dx: Clinical Tx: Antiacids, reflux precautions, liquid thickeners
Tuberculosis[17]	History of TB exposure, weight loss, cough	Wet cough, fever, signs of extrapulmonary TB	Dx: CXR (hilar or mediastinal lymph node enlargement or consolidation in upper lobes) Tx: Contact public health, medication regimen (rifampin, isoniazid, pyrazinamide, ethambutol)
Cystic fibrosis[18]	Recurrent pulmonary infections, poor weight gain, steatorrhea, meconium ileus	Cough, nasal polyps	Dx: Sweat chloride testing Tx: Antibiotics for pneumonia (cover pseudomonas), referral to pulmonologist

α1A—alpha1-antitrypsin deficiency; CT—computed tomography; CXR—chest x-ray; Dx—diagnostic testing; HFNC—high-flow nasal cannula; PCR—polymerase chain reaction; TB—tuberculosis; Tx—treatment

Corticosteroids

Systemic corticosteroids should be introduced promptly in children who have clinical deterioration, have already escalated their reliever and controller therapy before presentation, or who fail to respond adequately to initial bronchodilator treatment. Oral prednisolone remains the preferred option due to its efficacy, rapid onset of action, non-invasive administration, and low cost.[32] It

Table 1. Differential Diagnosis for Wheezing in Urgent Care (continued)

School-Age Children (6–12 years)			
Diagnosis	**Key History**	**Physical Exam**	**Diagnostic Testing and Treatment**
Bacterial bronchitis[19]	Chronic wet cough	Rattling, wet cough	Dx: CXR normal or nonspecific findings Tx: Supportive or, if prolonged, antibiotics
Chronic upper airway cough syndrome[20]	Persistent cough >8 weeks, allergic rhinitis, postnasal drip	Edematous nasal turbinates, rhinorrhea, post nasal drip, no signs of lower airway obstruction	Dx: Clinical Tx: Supportive management
Bronchiectasis[21]	Productive cough, recurrent infections	Productive cough, coarse crackles	Dx: High-resolution CT scan Tx: Referral to pulmonologist
Adolescents and Young Adults (13+ years)			
Diagnosis	**Key History**	**Physical Exam**	**Diagnostic Testing and Treatment**
Pneumothorax[22]	Sudden onset pleuritic chest pain, shortness of breath	Unilateral decreased breath sounds, hyperresonance	Dx: CXR with absence of lung markings Tx: Oxygen via simple face mask, hospital transfer
Inducible laryngeal obstruction / vocal cord dysfunction[23]	Athletic patient, exercise-induced symptoms, does not respond to bronchodilators	Inspiratory stridor, dyspnea	Dx: Laryngoscopy Tx: Speech-language therapy
Hyperventilation / dysfunctional breathing[24]	Episodes related to anxiety or stress	Frequent sighing or yawning, accessory muscle use	Dx: Clinical Tx: Diaphragmatic breathing
Alpha1-antitrypsin deficiency[25]	Unexplained or difficult-to-control asthma symptoms, recurrent respiratory symptoms	Wheezing, respiratory distress	Dx: Reduced serum α1A levels Tx: Bronchodilators, inhaled corticosteroids, and antibiotics for infection

α1A—alpha1-antitrypsin deficiency; CT—computed tomography; CXR—chest x-ray; Dx—diagnostic testing; HFNC—high-flow nasal cannula; PCR—polymerase chain reaction; TB—tuberculosis; Tx—treatment

is given at 1–2 mg/kg/day: for children ages 6 to 11 years, a maximum dose of 40 mg/day, for children ages 2–5 years, a maximum dose of 30 mg/day, for children less than 2 years, a maximum dose of 20 mg/day. Corticosteroid therapy is typically continued for 3–5 days. Dexamethasone is another steroid recommended due to its long duration of action of 48 hours. Dosing is typically 0.6 mg/kg via intramuscular, oral, or intravenous routes (maximum dose 16 mg/day). In situations where oral therapy is not tolerated due to dyspnea or vomiting, intravenous methylprednisolone may be administered at 1 mg/kg prior to transfer to ED, and then continued there if necessary.[3]

Disposition and Escalation of Care

Children who present with signs of severe or life-threatening exacerbation, or fail to respond to treatment, require transfer to an emergency department or inpatient unit. Severe signs at presentation include altered mental status, oxygen saturation <92%, inability to speak more than single-word sentences, respiratory rate >40 breaths/minute, central cyanosis, or a "quiet chest."[3] Additional criteria for transfer also include a lack of monitoring capabilities at home or at the urgent care center, recurrence within 48 hours, concerns for dehydration, or prior severe exacerbations in combination with their current clinical presentation.

Criteria for Discharge

For safe discharge, patients should have improved respiratory effort and stable oxygenation on room air. Patients should also demonstrate independent ambulation and an ability to tolerate oral intake, especially for those under 5 years old. Before leaving the urgent care center, families should be counseled on early warning signs of recurrence, and inhaler technique should be reviewed and corrected if necessary. A follow-up visit with the primary care provider should be arranged within 1–2 days.[3]

"For safe discharge, patients should have improved respiratory effort and stable oxygenation on room air. Patients should also demonstrate independent ambulation and an ability to tolerate oral intake, especially for those under 5 years old."

Medications at Discharge

For most children over 4 years of age, albuterol delivered via MDI with a spacer is generally preferred, as it is as effective as nebulized therapy for acute exacerbations, providing comparable improvements in lung function and symptoms, shorter treatment times, and fewer side effects.[33] For younger children, particularly those under 4 years who may be unable to coordinate inhalation through a spacer, nebulized delivery remains appropriate to ensure adequate drug delivery. Controller therapy with inhaled corticosteroids (fluticasone or budesonide) should be initiated in children of any age with recurrent symptoms or frequent exacerbations, defined as 3 or more wheezing episodes in a season, or in those with uncontrolled symptoms between episodes. For adolescents, the preferred regimen is maintenance-and-reliever therapy (MART) with inhaled corticosteroid formoterol.[3]

Referral and Specialist Consultation

Referral to pediatric pulmonology is indicated from urgent care providers for children with persistent or severely uncontrolled asthma, frequent exacerbations, or risk factors for asthma-related mortality, including a history of intensive care admission or mechanical ventilation. Additional referral indications include significant treatment-related side effects, poor control despite medium-dose inhaled corticosteroids with correct technique and adherence, and suspected occupational or unusual triggers.[3]

Asthma Action Plan

Patients should receive a personalized asthma action plan upon discharge from the urgent care clinic. It should be tailored to the child's age, current treatment regimen, reliever inhaler, level of asthma control, and the family's health literacy. Providing clear, written instructions enables patients and caregivers to recognize early signs of deterioration and respond appropriately, thereby reducing the risk of future severe exacerbations.[4,34]

Takeaway Points

- Pediatric asthma is characterized by variable, reversible airway obstruction and airway hyperresponsiveness, with significant morbidity worldwide.
- Diagnosis relies on a combination of clinical history, physical examination, and diagnostic tests (spirometry, biomarkers)
- Acute exacerbation management requires oxygen if the patient is hypoxic, bronchodilator treatment, and systemic corticosteroids.
- Chronic management is centered on inhaled corticosteroids as first-line controller therapy, with stepwise escalation. ■

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