

Fast facts

- There is no age minimum for the diagnosis of asthma. If there is a clinical history consistent with asthma then it can be diagnosed, even in infancy, although other causes of wheezing should be considered in this age group.
- The clinical effectiveness of inhaled medications delivered by pressurized metered dose inhalers (pMDI's) is as good or better than medications delivered by nebulizer, even in infants and in children with respiratory distress, as long as parents and patients are instructed appropriately in their use.
- A spacer should be used with ALL pMDI's, no matter how old the child or adolescent. This maximizes medication delivery to the lower airways.
- Inhaled corticosteroids are the best treatment for persistent asthma
- In children on an asthma controller medication (inhaled corticosteroid) the most common reasons for treatment failure are incorrect inhalation technique and poor adherence.
- While inhaled corticosteroids are most effective when used consistently on a daily basis, their use as needed may be beneficial in selected circumstances.

Background

Asthma is a heterogeneous condition that is characterized by chronic airway inflammation resulting in respiratory symptoms that vary over time such as wheeze, chest tightness, difficulty breathing, and/or persistent cough. Symptoms are often, though not always, triggered by environmental exposures, including (most importantly) viral infections, change in weather, exposure to allergens or airway irritants (ie tobacco smoke), or exercise. The diagnosis of asthma is based on the clinical history and response to bronchodilators. There are various subtypes, or groups of clinical and/or pathophysiologic characteristics, referred to as "asthma phenotypes."

Assessment

- First determine if diagnosis is consistent with asthma by obtaining a clinical history, including response to albuterol and/or oral steroids. Pulmonary function testing can be helpful but is not necessary for a diagnosis of asthma. In fact, many children with asthma have normal pulmonary function testing.
- Trial of albuterol with onset of symptoms. We recommend using an albuterol pMDI with spacer as opposed to nebulizer for ALL ages (even infants). This is more efficient, easier, and equally effective. We recommend giving 2-4 puffs up to every 4 hours as needed for difficulty breathing, wheezing, or persistent cough.
- If consistent temporary improvement in cough, wheeze, or difficulty breathing with albuterol, this is sufficient for a tentative diagnosis of asthma.

Red flags

- Onset of wheezing shortly after birth or within first few months of life, especially if occurs on a daily basis (suspect chronic microaspiration, vascular ring, or tracheobronchomalacia)
- Sudden-onset wheeze (especially unilateral) or cough that persists despite trial of albuterol, particularly in a toddler (suspect foreign body aspiration)
- Chronic wet cough unresponsive to albuterol and/or steroids (suspect protracted bacterial bronchitis (PBB), cystic fibrosis, or primary ciliary dyskinesia)
- Weight loss, choking, vomiting, or other systemic symptoms

Management/treatment

- Once diagnosis is established providers can easily monitor symptom control by regularly giving patients 12 and older the Asthma Control Test (ACT) and patients under 12 the Childhood Asthma Control Test (CACT). This provides a quick inventory of symptoms and can help determine when stepping up controller therapy is necessary.
- Use the tables below from the NHLBI National Asthma Education Prevention Program (NAEPP) to determine step-up therapy based on age group
- Note that the 2020 Focused Update to the Asthma Management Guidelines recommend, for patients on ICS/formoterol, that these patients receive additional puffs of their controller medication as rescue. This is referred to by the acronym SMART (single maintenance and reliever therapy).
- More recent guidelines from the Global Initiative for Asthma (GINA) suggest prescribing ICS/formoterol as needed for adolescents and adults with mild asthma

	Intermittent Asthma	Management of Persistent Asthma in Individuals Ages 0–4 Years					
Treatment	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	
Preferred	PRN SABA and At the start of RTI: Add short course daily ICS▲	Daily low-dose ICS and PRN SABA	Daily low-dose ICS-LABA and PRN SABA▲ or Daily low-dose ICS + montelukast,* or daily medium-dose ICS, and PRN SABA	Daily medium-dose ICS-LABA and PRN SABA	Daily high-dose ICS-LABA and PRN SABA	Daily high-dose ICS-LABA + oral systemic corticosteroid and PRN SABA	

	Intermittent Asthma	Management of Persistent Asthma in Individuals Ages 5–11 Years					
Treatment	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	
Preferred	PRN SABA	Daily low-dose ICS and PRN SABA	Daily and PRN combination low-dose ICS-formoterol▲	Daily and PRN combination medium-dose ICS-formoterol▲	Daily high-dose ICS-LABA and PRN SABA	Daily high-dose ICS-LABA + oral systemic corticosteroid and PRN SABA	

	Intermittent Asthma	Management of Persistent Asthma in Individuals Ages 12+ Years					
Treatment	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6 [■]	
Preferred	PRN SABA	Daily low-dose ICS and PRN SABA or PRN concomitant ICS and SABA▲	Daily and PRN combination low-dose ICS-formoterol▲	Daily and PRN combination medium-dose ICS-formoterol▲	Daily medium-high dose ICS-LABA + LAMA and PRN SABA▲	Daily high-dose ICS-LABA + oral systemic corticosteroids + PRN SABA	

When to refer

- Persistent symptoms (>2 times per week), need for oral steroids, or hospitalization despite consistent use of a controller (see above)
- Failure to respond to a short course of oral steroids (1-2 mg/kg/day x5 days)

References

1. Capriotti, Don Theresa, Natalie Dawn, and Tabitha Ciocco. "Update on Asthma Management: the 2022 GINA Report." *Clinical Advisor* (2023): NA-NA.
2. Chatziparasidis, Grigorios, and Andrew Bush. "Enigma variations: The multi-faceted problems of pre-school wheeze." *Pediatric Pulmonology* 57.9 (2022): 1990-1997.
3. Morton, Robert W., et al. "Aerosol therapy in asthma—why we are failing our patients and how we can do better." *Frontiers in pediatrics* 8 (2020): 305.
4. Cloutier, Michelle M., et al. "2020 focused updates to the asthma management guidelines: a report from the National Asthma Education and Prevention Program Coordinating Committee Expert Panel Working Group." *Journal of Allergy and Clinical Immunology* 146.6 (2020): 1217-1270.