

Let's Talk Webinar

PA AAP

2020 Asthma Management Guide Update

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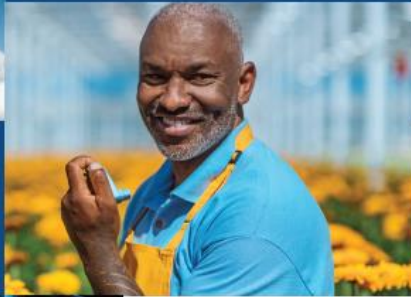
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Overview

- What's in the updated management guidelines?
- Three questions:
 - What do I need to know about PRN ICS use and PRN ICS/LABA and controller use?
 - How should I counsel patients with environmental allergies and asthma?
 - What do I need to know about allergen Immunotherapy?
- Thoughts on clinical care pathways

**2020 FOCUSED
UPDATES TO THE**
**Asthma
Management
Guidelines**



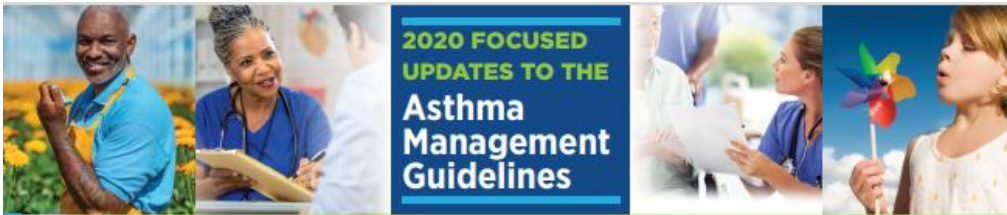
A Report from the National
Asthma Education and Prevention
Program Coordinating Committee
Expert Panel Working Group



U.S. Department of Health and Human Services
National Institutes of Health
National Heart, Lung, and Blood Institute

322 pages

EPR-1 1991, EPR-2 1997, EPR-2 Select topics 2002, EPR-3 2007



CLINICIAN'S GUIDE

PURPOSE

This Clinician's Guide summarizes the *2020 Focused Updates to the Asthma Management Guidelines: A Report from the National Asthma Education and Prevention Program Coordinating Committee Expert Panel Working Group* to help clinicians integrate the new recommendations into clinical care. The full 2020 Report, which is focused on selected topics rather than a complete revision of the 2007 Expert Panel Report 3: *Guidelines for the Diagnosis and Management of Asthma* (EPR-3), can be found at nhlbi.nih.gov/asthmaguidelines. This summary guide should be used in conjunction with the full report. The Guide is organized by the following topics:

-  **Intermittent Inhaled Corticosteroids**
-  **Long-Acting Muscarinic Antagonists**
-  **Indoor Allergen Mitigation**
-  **Immunotherapy in the Treatment of Allergic Asthma**
-  **Fractional Exhaled Nitric Oxide Testing**
-  **Bronchial Thermoplasty**

Multiple stakeholders contributed to the selection of topics for the update. The Agency for Healthcare Research and Quality's (AHRQ) Evidence-Based Practice Centers conducted systematic reviews on these topics, which were subsequently published and used by the Expert Panel Working Group (the Expert Panel) of the National Asthma Education and Prevention Program Coordinating Committee (NAEPPCC), coordinated by the National Heart, Lung, and Blood Institute, as a basis for the updates. The Expert Panel used GRADE (Grading of Recommendations Assessment, Development, and Evaluation), an internationally accepted framework, for determining the certainty of evidence and the direction and strength of recommendations based on the evidence. Each recommendation is described as either strong or conditional. For all recommendations, shared decision making should be used to help individuals with asthma make choices that are consistent with their risks, values, and preferences; this is especially important for conditional recommendations.

Diagrams showing the recommended approaches to care, including the new recommendations, for individuals with asthma based on age have been updated from EPR-3. Within a given step, the preferred options are the best management choices supported by the evidence reviewed by the Expert Panel. When the available evidence was insufficient or did not change a previous recommendation, the diagrams list the preferred options from EPR-3. The diagrams are meant to assist, and not replace, clinical judgment or decision making required for individual patient management with input from individuals with asthma about their preferences.



Report Sections



Intermittent Inhaled Corticosteroids

Long-Acting Muscarinic Antagonists

Indoor Allergen Mitigation

Immunotherapy in the Treatment of Allergic Asthma

Fractional Exhaled Nitric Oxide Testing

Bronchial Thermoplasty



U.S. Department of Health and Human Services
National Institutes of Health
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The NHLBAC Asthma Expert Working Group recommended that another 11 topics be acknowledged in the update but that no recommendations be developed for these topics because of the lack of sufficient new data for a systematic review of these topics at that time.¹² These emerging topics are as follows:

- Adherence
- Asthma action plans
- Asthma heterogeneity
- Biologic agents
- Biomarkers (other than FeNO)
- Classification of asthma severity
- Long-acting beta₂-agonist (LABA) safety
- Physiological assessments
- Prevention of asthma onset
- Role of community health workers in asthma management
- Step-down from maintenance therapy

2020 Focused Updates to the Asthma Management Guidelines: A Report from the National Asthma Education and Prevention Program Coordinating Committee Expert Panel Working Group



Expert Panel Working Group of the National Heart, Lung, and Blood Institute (NHLBI) administered and coordinated National Asthma Education and Prevention Program Coordinating Committee (NAEPPCC)* Bethesda, Md

TABLE IA. Systematic review key questions

Topic	Key question
FENO	<p>What is the diagnostic accuracy of FENO measurement(s) for making the diagnosis of asthma in individuals aged 5 y and older?</p> <p>What is the clinical utility of FENO measurements in monitoring disease activity and asthma outcomes in individuals with asthma aged 5 y and older?</p> <p>What is the clinical utility of FENO measurements to select medication options (including steroids) for individuals aged 5 y and older?</p> <p>What is the clinical utility of FENO measurements to monitor response to treatment in individuals aged 5 y and older?</p> <p>In children aged 0-4 years with recurrent wheezing, how accurate is FENO testing in predicting the future development of asthma at age 5 y and above?</p>
Allergen mitigation	Among individuals with asthma, what is the effectiveness of interventions to reduce or remove exposures to indoor inhalant allergens on asthma control, exacerbations, quality of life, and other relevant outcomes?
ICS	<p>What is the comparative effectiveness of intermittent ICS compared to no treatment, pharmacologic therapy, or nonpharmacologic therapy in children aged 0-4 y with recurrent wheezing?</p> <p>What is the comparative effectiveness of intermittent ICS compared to ICS controller therapy in individuals 5 y and older with persistent asthma?</p> <p>What is the comparative effectiveness of ICS with LABA used as both controller and quick-relief therapy compared to ICS with or without LABA used as controller therapy in individuals 5 y and older with persistent asthma?</p>
LAMA	<p>What is the comparative effectiveness of LAMA compared to other controller therapy as add-on to ICS in individuals aged 12 y and older with uncontrolled, persistent asthma?</p> <p>What is the comparative effectiveness of LAMA as add-on to ICS controller therapy compared to placebo or increased ICS dose in individuals aged 12 y and older with uncontrolled, persistent asthma?</p> <p>What is the comparative effectiveness of LAMA as add-on to ICS-LABA compared to ICS-LABA as controller therapy in individuals aged 12 y and older with uncontrolled, persistent asthma?</p>
Immunotherapy	<p>What is the evidence for the efficacy of SCIT in the treatment of asthma?</p> <p>What is the evidence for the safety of SCIT in the treatment of asthma?</p> <p>What is the evidence for the efficacy of SLIT, in tablet and aqueous form, for the treatment of asthma?</p> <p>What is the evidence for the safety of SLIT, in tablet and aqueous form, for the treatment of asthma?</p>
BT	What are the benefits and harms of using BT in addition to standard treatment for the treatment of individuals aged 18 y and older with asthma?

TABLE IF. Expert Panel recommendations

Topic	Recommendation number*	Recommendation	Strength of recommendation†	Certainty of evidence‡
FENO	1	In individuals aged 5 y and older for whom the diagnosis of asthma is uncertain using history, clinical findings, clinical course, and spirometry, including bronchodilator responsiveness testing, or in whom spirometry cannot be performed, the Expert Panel conditionally recommends the addition of FENO measurement as an adjunct to the evaluation process.	Conditional	Moderate
	2	In individuals aged 5 y and older with persistent allergic asthma, for whom there is uncertainty in choosing, monitoring, or adjusting anti-inflammatory therapies based on history, clinical findings, and spirometry, the Expert Panel conditionally recommends the addition of FENO measurement as part of an ongoing asthma monitoring and management strategy that includes frequent assessments.	Conditional	Low
	3	In individuals aged 5 y and older with asthma, the Expert Panel recommends against the use of FENO measurements in isolation to assess asthma control, predict future exacerbations, or assess exacerbation severity. If used, it should be as part of an ongoing monitoring and management strategy.	Strong	Low
	4	In children aged 0-4 y with recurrent wheezing, the Expert Panel recommends against FENO measurement to predict the future development of asthma.	Strong	Low
	5	In individuals with asthma who do not have sensitization to specific indoor allergens or who do not have symptoms related to exposure to specific indoor allergens, the Expert Panel conditionally recommends against allergen mitigation interventions as part of routine asthma management.	Conditional	Low
	6	In individuals with asthma who have symptoms related to exposure to identified indoor allergens, confirmed by history taking or allergy testing, the Expert Panel conditionally recommends a multicomponent allergen-specific mitigation intervention.	Conditional	Low
	7	In individuals with asthma who have sensitization or symptoms related to exposure to pests (cockroaches and rodents), the Expert Panel conditionally recommends the use of integrated pest management alone, or as part of a multicomponent allergen-specific mitigation intervention.	Conditional	Low
	8	In individuals with asthma who have sensitization or symptoms related to exposure to dust mites, the Expert Panel conditionally recommends impermeable pillow/mattress covers only as part of a multicomponent allergen mitigation intervention, not as a single-component intervention.	Conditional	Moderate
ICS	9	In children aged 0-4 y with recurrent wheezing triggered by respiratory tract infections and no wheezing between infections, the Expert Panel conditionally recommends starting a short course of daily ICS at the onset of a respiratory tract infection with as-needed SABA for quick-relief therapy compared to as-needed SABA for quick-relief therapy only.	Conditional	High
	10	In individuals aged 12 y and older with mild persistent asthma, the Expert Panel conditionally recommends either daily low-dose ICS and as-needed SABA for quick-relief therapy or as-needed ICS and SABA used concomitantly.	Conditional	Moderate
	11	In individuals aged 4 y and older with mild to moderate persistent asthma who are likely to be adherent to daily ICS treatment, the Expert Panel conditionally recommends against a short-term increase in the ICS dose for increased symptoms or decreased peak flow.	Conditional	Low
	12	In individuals aged 4 y and older with moderate to severe persistent asthma, the Expert Panel recommends ICS-formoterol in a single inhaler used as both daily controller and reliever therapy compared to either: ● Higher-dose ICS as daily controller therapy and SABA for quick-relief therapy or ● Same-dose ICS-LABA as daily controller therapy and SABA for quick-relief therapy.	Strong	High (ages ≥12 y) Moderate (ages 4-11 y)
	13	In individuals aged 12 y and older with moderate to severe persistent asthma, the Expert Panel conditionally recommends ICS-formoterol in a single inhaler used as both daily controller and reliever therapy compared to higher-dose ICS-LABA as daily controller therapy and SABA for quick-relief therapy.	Conditional	High

(Continued)

TABLE IF. (Continued)

Topic	Recommendation number*	Recommendation	Strength of recommendation†	Certainty of evidence‡
LAMA	14	In individuals aged 12 y and older with uncontrolled persistent asthma, the Expert Panel conditionally recommends against adding LAMA to ICS compared to adding LABA to ICS.	Conditional	Moderate
	15	If LABA is not used, in individuals aged 12 y and older with uncontrolled persistent asthma, the Expert Panel conditionally recommends adding LAMA to ICS controller therapy compared to continuing the same dose of ICS alone.	Conditional	Moderate
immunotherapy	16	In individuals aged 12 y and older with uncontrolled persistent asthma, the Expert Panel conditionally recommends adding LAMA to ICS-LABA compared to continuing the same dose of ICS-LABA.	Conditional	Moderate
	17	In individuals aged 5 y and older with mild to moderate allergic asthma, the Expert Panel conditionally recommends the use of SCIT as an adjunct treatment to standard pharmacotherapy in those individuals whose asthma is controlled at the initiation, build-up, and maintenance phases of immunotherapy.	Conditional	Moderate
	18	In individuals with persistent allergic asthma, the Expert Panel conditionally recommends against the use of SLIT in asthma treatment.	Conditional	Moderate
BT	19	In individuals aged 18 y and older with persistent asthma, the Expert Panel conditionally recommends against BT. Individuals aged 18 y and older with persistent asthma who place a low value on harms (short-term worsening symptoms and unknown long-term side effects) and a high value on potential benefits (improvement in quality of life, a small reduction in exacerbations) might consider BT.	Conditional	Low

*Recommendations are numbered throughout the document for ease of reference.

†See Table IE on page 1226 for definitions of the strength of recommendations.

‡See Table ID on page 1225 for definitions of the levels of certainty of evidence of effects.

19 recommendations in the report

We will address several

Users of these recommendations may be disappointed by the absence of many strong recommendations—that is, recommendations that clinicians should adhere to for almost all individuals with asthma as the standard of care. This is not, however, surprising given the variations in asthma phenotypes and endotypes and in the outcomes used in the studies reviewed to develop the recommendations. When the GRADE framework is used, randomized controlled trials are initially rated as offering a high certainty of evidence, but issues with study designs (e.g., lack of blinding or of a placebo control), heterogeneity of study results, or small numbers of events may result in downgrading the certainty of evidence. For most of the asthma recommendations, the overall certainty of the evidence was downgraded because of inconsistencies in study results, risk of bias, or absence of critical standardized outcome measures. The need to downgrade the evidence should be a clarion call to investigators to use standardized and validated outcome measures that were outlined in the Asthma Outcomes Workshop (2012).¹⁰ This single activity will create more robust evidence to support recommendations in the future.

Change



Expectations



Three questions

- 1. What do I need to know about PRN ICS use and PRN ICS/LABA and controller use?**
- 2. How should I counsel patients with environmental allergies and asthma?**
- 3. What do I need to know about allergen Immunotherapy?**

Components of Severity		Intermittent			Persistent								
					Mild			Moderate			Severe		
		Ages 0-4 years	Ages 5-11 years	Ages ≥12 years	Ages 0-4 years	Ages 5-11 years	Ages ≥12 years	Ages 0-4 years	Ages 5-11 years	Ages ≥12 years	Ages 0-4 years	Ages 5-11 years	Ages ≥12 years
Impairment	Symptoms	≤2 days/week			>2 days/week but not daily			Daily			Throughout the day		
	Nighttime awakenings	0	≤2x/month		1-2x/month	3-4x/month		3-4x/month	>1x/week but not nightly		>1x/week	Often 7x/week	
	SABA* use for symptom control (not to prevent EIB*)	≤2 days/week			>2 days/week but not daily			Daily			Several times per day		
	Interference with normal activity	None			Minor limitation			Some limitation			Extremely limited		
	Lung function		Normal FEV ₁ between exacerbations	Normal FEV ₁ between exacerbations									
	→ FEV ₁ * (% predicted)	Not applicable	>80%	>80%	Not applicable	>80%	>80%	Not applicable	60-80%	60-80%	Not applicable	<60%	<60%
	→ FEV ₁ /FVC*		>85%	Normal [†]		>80%	Normal [†]		75-80%	Reduced 5% [†]		<75%	Reduced >5% [†]
Risk	Asthma exacerbations requiring oral systemic corticosteroids [‡]	0-1/year			≥2 exacerb. in 6 months, or wheezing ≥4x per year lasting >1 day AND risk factors for persistent asthma			Generally, more frequent and intense events indicate greater severity. →					
					≥2/year			Generally, more frequent and intense events indicate greater severity. →					
		Consider severity and interval since last asthma exacerbation. Frequency and severity may fluctuate over time for patients in any severity category.											
		Relative annual risk of exacerbations may be related to FEV ₁ *.											
Recommended Step for Initiating Therapy		Step 1			Step 2			Step 3	Step 3 medium-dose ICS* option	Step 3	Step 3	Step 3 medium-dose ICS* option or Step 4	Step 4 or 5
(See "Stepwise Approach for Managing Asthma Long Term," page 7)													
The stepwise approach is meant to help, not replace, the clinical decisionmaking needed to meet individual patient needs.		Consider short course of oral systemic corticosteroids.											
		In 2-6 weeks, depending on severity, assess level of asthma control achieved and adjust therapy as needed.											
		For children 0-4 years old, if no clear benefit is observed in 4-6 weeks, consider adjusting therapy or alternate diagnoses.											

AGES 0-4 YEARS: STEPWISE APPROACH FOR MANAGEMENT OF 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 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
Alternative		Daily montelukast* or Cromolyn,* and PRN SABA		Daily medium-dose ICS + montelukast* and PRN SABA	Daily high-dose ICS + montelukast* and PRN SABA	Daily high-dose ICS + montelukast* + oral systemic corticosteroid and PRN SABA
For children age 4 years only, see Step 3 and Step 4 on Management of Persistent Asthma in Individuals Ages 5-11 Years diagram.						

Assess Control

- First check adherence, inhaler technique, environmental factors,[▲] and comorbid conditions.
- **Step up** if needed; reassess in 4-6 weeks
- **Step down** if possible (if asthma is well controlled for at least 3 consecutive months)

Consult with asthma specialist if Step 3 or higher is required. Consider consultation at Step 2.

Control assessment is a key element of asthma care. This involves both impairment and risk. Use of objective measures, self-reported control, and health care utilization are complementary and should be employed on an ongoing basis, depending on the individual's clinical situation.

Abbreviations: ICS, inhaled corticosteroid; LABA, long-acting beta₂-agonist; SABA, inhaled short-acting beta₂-agonist; RTI, respiratory tract infection; PRN, as needed

[▲] Updated based on the 2020 guidelines.

* Cromolyn and montelukast were not considered for this update and/or have limited availability for use in the United States. The FDA issued a Boxed Warning for montelukast in March 2020.

Intermittent ICS 0-4

Recommendation 9: In children ages 0–4 years with recurrent wheezing triggered by respiratory tract infections and no wheezing between infections, the Expert Panel conditionally recommends starting a short course of daily ICS at the onset of a respiratory tract infection with as-needed SABA for quick-relief therapy compared to as-needed SABA for quick-relief therapy only.

Conditional recommendation, high certainty of evidence

•Recurrent wheezing is defined as 3+ episodes of wheezing triggered by a respiratory tract infections in their lifetime **OR** pts who have had two such episodes in the past year and are asymptomatic between respiratory tract infections.

Potential benefits: The main benefit during respiratory tract infections is a reduction in exacerbations requiring systemic corticosteroids.

Clinical Scenario

- Child presents for 24 month well child check
 - 20 months had fever, cough and wheezed and got better with albuterol
 - 12 months had a URI with an acute otitis media and got albuterol and prednisone
 - In between these episodes, this child is well
- Can offer BID ICS for 7-10 days in addition to PRN albuterol with next URI

AGES 5-11 YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA

	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
Alternative		Daily LTRA,* or Cromolyn,* or Nedocromil,* or Theophylline,* and PRN SABA	Daily medium-dose ICS and PRN SABA or Daily low-dose ICS-LABA, or daily low-dose ICS + LTRA,* or daily low-dose ICS + theophylline,* and PRN SABA	Daily medium-dose ICS-LABA and PRN SABA or Daily medium-dose ICS + LTRA* or daily medium-dose ICS + Theophylline,* and PRN SABA	Daily high-dose ICS + LTRA* or daily high-dose ICS + Theophylline,* and PRN SABA	Daily high-dose ICS + LTRA* + oral systemic corticosteroid or daily high-dose ICS + Theophylline* + oral systemic corticosteroid, and PRN SABA
		Steps 2-4: Conditionally recommend the use of subcutaneous immunotherapy as an adjunct treatment to standard pharmacotherapy in individuals ≥ 5 years of age who asthma is controlled at the initiation, build up, and maintenance phases of immunotherapy [▲]			Consider Omalizumab ^{**▲}	

Assess Control

- First check adherence, inhaler technique, environmental factors,[▲] and comorbid conditions.
- **Step up** if needed; reassess in 2-6 weeks
- **Step down** if possible (if asthma is well controlled for at least 3 consecutive months)

Consult with asthma specialist if Step 4 or higher is required. Consider consultation at Step 3.

Control assessment is a key element of asthma care. This involves both impairment and risk. Use of objective measures, self-reported control, and health care utilization are complementary and should be employed on an ongoing basis, depending on the individual's clinical situation.

Abbreviations: ICS, inhaled corticosteroid; LABA, long-acting beta₂-agonist; LTRA, leukotriene receptor antagonist; SABA, inhaled short-acting beta₂-agonist

[▲] Updated based on the 2020 guidelines.

* Cromolyn, Nedocromil, LTRAs including montelukast, and Theophylline were not considered in this update and/or have limited availability for use in the United States, and/or have an increased risk of adverse consequences and need for monitoring that make their use less desirable. The FDA issued a Boxed Warning for montelukast in March 2020.

** Omalizumab is the only asthma biologic currently FDA-approved for this age range.

Recommendation 11: In individuals ages 4 years and older with mild to moderate persistent asthma who are likely to be adherent to daily ICS treatment, the Expert Panel conditionally recommends against a short-term increase in the ICS dose for increased symptoms or decreased peak flow.

Conditional recommendation, low certainty of evidence

Clinical Scenario:

- 7 year on low dose Flovent
- Needs albuterol a few times in the winter in the setting of a URI
- Starts to need more albuterol in the spring
- Family says “can the child take higher doses of Flovent for a few days
- **Would not recommend this**

**SINGLE MAINTENANCE AND RELIEVER THERAPY (SMART)
IMPLEMENTATION GUIDANCE AND CONSIDERATIONS FOR
SHARED DECISION MAKING**

- **Target population:** Individuals 4 years and older with a severe exacerbation in the prior year are particularly good candidates for SMART to reduce exacerbations.
- **Who should not receive this treatment:** Do not use ICS-formoterol as reliever therapy in individuals taking ICS-salmeterol as maintenance therapy.
- **Treatment:** Inhaled ICS-formoterol in a single inhaler. This form of therapy has only been studied with formoterol as the long-acting beta₂-agonist (LABA).
 - ✓ SMART is appropriate for Step 3 (low-dose ICS) and Step 4 (medium-dose ICS) treatment.
 - ✓ Individuals whose asthma is uncontrolled on maintenance ICS-LABA with SABA as quick-relief therapy should receive the preferred SMART if possible before moving to a higher step of therapy.
 - ✓ ICS-formoterol should be administered as maintenance therapy with 1-2 puffs once or twice daily (depending on age, asthma severity, and ICS dose in the ICS-formoterol preparation) and 1-2 puffs as needed for asthma symptoms.
 - ✓ Maximum number of puffs per day is 8 (36 mcg formoterol) for children ages 4-11 years and 12 (54 mcg formoterol) for individuals ages 12 years and older.
 - ✓ Advise individuals to contact their physician if they need to exceed maximum number of puffs.
 - ✓ Dose of formoterol was based on 4.5 mcg/inhalation, the most common preparation used in the studies reviewed.





Combination medications contain both inhaled corticosteroid and long-acting beta₂-agonist (LABA)

<p>Advair Diskus® 100/50, 250/50, 500/50 fluticasone propionate and salmeterol inhalation powder</p>  <p>123 A C</p>	<p>Advair® HFA 45/21, 115/21, 230/21 fluticasone propionate and salmeterol xinafoate</p>  <p>123 A</p>	<p>Breo® Ellipta® 100/25 mcg, 200/25 mcg fluticasone furoate and vilanterol inhalation powder</p>  <p>123 A C</p>	<p>Dulera® 100/5, 200/5 mometasone furoate and formoterol fumarate dihydrate</p>  <p>123 A</p>	<p>Symbicort® (HFA) 80/4.5, 160/4.5 budesonide and formoterol fumarate dihydrate</p>  <p>123 A C</p>
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(anticholinergic) bronchodilators relieve cough, sputum production, wheeze and ch...

Single Maintenance and Reliever Therapy SMART

Potential benefits: In studies this treatment consistently reduced asthma exacerbations requiring unscheduled medical visits or systemic corticosteroids and in some studies improved asthma control and quality of life. Reduced exposure to oral corticosteroids and to ICS treatment suggest that the intervention might reduce future corticosteroid-associated harms.

Potential risks: Studies found no difference in documented harms between this type of therapy and daily ICS, or ICS-LABA, with SABA as quick relief therapy.

Recommendation 12: In individuals ages 4 years and older with moderate to severe persistent asthma, the Expert Panel recommends ICS-formoterol in a single inhaler used as both daily controller and reliever therapy compared to either a higher-dose ICS as daily controller therapy and SABA for quick-relief therapy or the same-dose ICS-LABA as daily controller therapy and SABA for quick-relief therapy.

Strong recommendation, high certainty of evidence for ages 12 years and older, moderate certainty of evidence for ages 4-11 years

Clinical Scenario:

- 9 year on medium dose Flovent
- Admitted in November for asthma
- You need to make a plan at hospital discharge
- Offer medium dose ICS/LABA with SMART use

AGES 12+ YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA

	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
Alternative		Daily LTRA* and PRN SABA or Cromolyn,* or Nedocromil,* or Zileuton,* or Theophylline,* and PRN SABA	Daily medium-dose ICS and PRN SABA or Daily low-dose ICS-LABA, or daily low-dose ICS + LAMA,▲ or daily low-dose ICS + LTRA,* and PRN SABA or Daily low-dose ICS + theophylline* or Zileuton,* and PRN SABA	Daily medium-dose ICS-LABA or daily medium-dose ICS + LAMA, and PRN SABA▲ or Daily medium-dose ICS + LTRA,* or daily medium-dose ICS + Theophylline,* or daily medium-dose ICS + Zileuton,* and PRN SABA	Daily medium-high dose ICS-LABA or daily high-dose ICS + LTRA,* and PRN SABA	
		Steps 2-4: Conditionally recommend the use of subcutaneous immunotherapy as an adjunct treatment to standard pharmacotherapy in individuals ≥ 5 years of age whose asthma is controlled at the initiation, build up, and maintenance phases of immunotherapy▲			Consider adding Asthma Biologics (e.g., anti-IgE, anti-IL5, anti-IL5R, anti-IL4/IL13)**	

Assess Control

- First check adherence, inhaler technique, environmental factors,▲ and comorbid conditions.
- **Step up** if needed; reassess in 2-6 weeks
- **Step down** if possible (if asthma is well controlled for at least 3 consecutive months)

Consult with asthma specialist if Step 4 or higher is required. Consider consultation at Step 3.

Control assessment is a key element of asthma care. This involves both impairment and risk. Use of objective measures, self-reported control, and health care utilization are complementary and should be employed on an ongoing basis, depending on the individual's clinical situation.

Recommendation 10: In individuals ages 12 years and older with mild persistent asthma, the Expert Panel conditionally recommends either daily low-dose ICS and as-needed SABA for quick-relief therapy or as-needed ICS and SABA used concomitantly.

Conditional recommendation, moderate certainty of evidence

Clinical Scenario:

- 13 year old on no controller therapy without hospitalizations or prednisone courses
- Wheezed a few times over the year in the cold weather when outside, with a URI and in the Spring
- Can offer ICS plus SABA on a PRN basis (80-250mcg of beclomethasone equivalent every 4 hours PRN)

Recommendation 13: In individuals ages 12 years and older with moderate to severe persistent asthma, the Expert Panel conditionally recommends ICS-formoterol in a single inhaler used as both daily controller and reliever therapy compared to higher-dose ICS-LABA as daily controller therapy and SABA for quick-relief therapy.

Conditional recommendation, high certainty of evidence

Clinical Scenario:

- 15 year old medium dose ICS/LABA needed two courses of oral steroids this year
- You might consider stepping up to high dose ICS/LABA
- WAIT! USE SMART
- Can offer medium dose ICS/LABA on a daily and PRN basis

Recommendation 14: In individuals ages 12 years and older with uncontrolled persistent asthma, the Expert Panel conditionally recommends against adding LAMA to ICS compared to adding LABA to ICS.

Conditional recommendation, moderate certainty of evidence

Recommendation 15: If LABA is not used, in individuals ages 12 years and older with uncontrolled persistent asthma, the Expert Panel conditionally recommends adding LAMA to ICS controller therapy compared to continuing the same dose of ICS alone.

Conditional recommendation, moderate certainty of evidence

Clinical Scenario:

- 14 year old on medium dose ICS poorly controlled
- don't add LAMA as your step up
- change to ICS/LABA first
- if you can't use a LABA (can't tolerate or unavailable), than ok to add LAMA

Clinical Scenario:

- 14 year old on ICS/LABA who is poorly controlled
- Can consider adding LAMA

LAMA

Potential benefits: The addition of a LAMA to ICS-LABA may improve asthma control and quality of life. The addition of a LAMA to an ICS provides a small potential benefit compared to continuing the same ICS dose if an individual cannot use a LABA for any reason.

Potential risks: Adding a LAMA to ICS controller therapy provides no more benefit than adding a LABA to ICS controller therapy and may increase the risk of harm, based on a single real-world study in Blacks.

Original Investigation

Anticholinergic vs Long-Acting β -Agonist in Combination With Inhaled Corticosteroids in Black Adults With Asthma The BELT Randomized Clinical Trial

Michael E. Wechsler, MD, MSc; Barbara P. Yawn, MD, MSc; Anne L. Fuhlbrigge, MD, MS; Wilson D. Pace, MD; Michael J. Pencina, PhD; Gheorghe Doros, PhD; Shamsah Kazani, MD; Benjamin A. Raby, MD, MPH; Jane Lanzillotti, MS; Suzanne Madison, PhD; Elliot Israel, MD; for the BELT Investigators

There were 19 asthma-related hospitalizations in the tiotropium + ICS group vs 10 in the LABA + ICS group.

There were a total of 67 hospitalizations in the tiotropium + ICS group and 58 in the LABA + ICS group.

Three deaths occurred, all in the tiotropium + ICS group ($P = .12$); 2 of those deaths were asthma-related

AGES 0-4 YEARS: STEPWISE APPROACH FOR MANAGEMENT OF 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 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
Alternative		Daily montelukast* or Cromolyn,* and PRN SABA		Daily medium-dose ICS + montelukast* and PRN SABA	Daily high-dose ICS + montelukast* and PRN SABA	Daily high-dose ICS + montelukast* + oral systemic corticosteroid and PRN SABA
For children age 4 years only, see Step 3 and Step 4 on Management of Persistent Asthma in Individuals Ages 5-11 Years diagram.						

Assess Control

- First check adherence, inhaler technique, environmental factors,[▲] and comorbid conditions.
- **Step up** if needed; reassess in 4-6 weeks
- **Step down** if possible (if asthma is well controlled for at least 3 consecutive months)

Consult with asthma specialist if Step 3 or higher is required. Consider consultation at Step 2.

Control assessment is a key element of asthma care. This involves both impairment and risk. Use of objective measures, self-reported control, and health care utilization are complementary and should be employed on an ongoing basis, depending on the individual's clinical situation.

Abbreviations: ICS, inhaled corticosteroid; LABA, long-acting beta₂-agonist; SABA, inhaled short-acting beta₂-agonist; RTI, respiratory tract infection; PRN, as needed

[▲] Updated based on the 2020 guidelines.

* Cromolyn and montelukast were not considered for this update and/or have limited availability for use in the United States. The FDA issued a Boxed Warning for montelukast in March 2020.

AGES 5-11 YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA

	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
Alternative		Daily LTRA,* or Cromolyn,* or Nedocromil,* or Theophylline,* and PRN SABA	Daily medium-dose ICS and PRN SABA or Daily low-dose ICS-LABA, or daily low-dose ICS + LTRA,* or daily low-dose ICS + theophylline,* and PRN SABA	Daily medium-dose ICS-LABA and PRN SABA or Daily medium-dose ICS + LTRA* or daily medium-dose ICS + Theophylline,* and PRN SABA	Daily high-dose ICS + LTRA* or daily high-dose ICS + Theophylline,* and PRN SABA	Daily high-dose ICS + LTRA* + oral systemic corticosteroid or daily high-dose ICS + Theophylline* + oral systemic corticosteroid, and PRN SABA
		Steps 2-4: Conditionally recommend the use of subcutaneous immunotherapy as an adjunct treatment to standard pharmacotherapy in individuals ≥ 5 years of age who have asthma that is controlled on the initiation, build up, and maintenance phases of immunotherapy [▲]			Consider Omalizumab ^{**▲}	

Assess Control

- First check adherence, inhaler technique, environmental factors,[▲] and comorbid conditions.
- **Step up** if needed; reassess in 2-6 weeks
- **Step down** if possible (if asthma is well controlled for at least 3 consecutive months)

Consult with asthma specialist if Step 4 or higher is required. Consider consultation at Step 3.

Control assessment is a key element of asthma care. This involves both impairment and risk. Use of objective measures, self-reported control, and health care utilization are complementary and should be employed on an ongoing basis, depending on the individual's clinical situation.

Abbreviations: ICS, inhaled corticosteroid; LABA, long-acting beta₂-agonist; LTRA, leukotriene receptor antagonist; SABA, inhaled short-acting beta₂-agonist

[▲] Updated based on the 2020 guidelines.

* Cromolyn, Nedocromil, LTRAs including montelukast, and Theophylline were not considered in this update and/or have limited availability for use in the United States, and/or have an increased risk of adverse consequences and need for monitoring that make their use less desirable. The FDA issued a Boxed Warning for montelukast in March 2020.

** Omalizumab is the only asthma biologic currently FDA-approved for this age range.

AGES 12+ YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA

	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
Alternative		Daily LTRA* and PRN SABA or Cromolyn,* or Nedocromil,* or Zileuton,* or Theophylline,* and PRN SABA	Daily medium-dose ICS and PRN SABA or Daily low-dose ICS-LABA, or daily low-dose ICS + LAMA,▲ or daily low-dose ICS + LTRA,* and PRN SABA or Daily low-dose ICS + Theophylline* or Zileuton,* and PRN SABA	Daily medium-dose ICS-LABA or daily medium-dose ICS + LAMA, and PRN SABA▲ or Daily medium-dose ICS + LTRA,* or daily medium-dose ICS + Theophylline,* or daily medium-dose ICS + Zileuton,* and PRN SABA	Daily medium-high dose ICS-LABA or daily high-dose ICS + LTRA,* and PRN SABA	
		Steps 2-4: Conditionally recommend the use of subcutaneous immunotherapy as an adjunct treatment to standard pharmacotherapy in individuals ≥ 5 years of age whose asthma is controlled at the initiation, build up, and maintenance phases of immunotherapy▲			Consider adding Asthma Biologics (e.g., anti-IgE, anti-IL5, anti-IL5R, anti-IL4/IL13)**	

Assess Control

- First check adherence, inhaler technique, environmental factors,▲ and comorbid conditions.
- **Step up** if needed; reassess in 2-6 weeks
- **Step down** if possible (if asthma is well controlled for at least 3 consecutive months)

Consult with asthma specialist if Step 4 or higher is required. Consider consultation at Step 3.

Control assessment is a key element of asthma care. This involves both impairment and risk. Use of objective measures, self-reported control, and health care utilization are complementary and should be employed on an ongoing basis, depending on the individual's clinical situation.

Three questions

1. What do I need to know about PRN ICS use and PRN ICS/LABA and controller use?

2. How should I counsel patients with environmental allergies and asthma?

3. What do I need to know about allergen Immunotherapy?

SECTION III

Recommendations for Indoor Allergen Mitigation in Management of Asthma



KEY POINTS

- Overall, the studies reviewed provided little evidence that allergen mitigation strategies are beneficial for improving asthma outcomes.
- For individuals with asthma with an allergy to a specific indoor substance (e.g., dust mites), using multiple strategies to reduce the allergen is recommended, since using only one strategy often does not improve asthma outcomes.
- Integrated pest management in the home is recommended for individuals with asthma who are allergic and exposed to cockroaches or rodents (e.g., mice).
- For individuals with asthma who do not have allergies to indoor substances, environmental interventions in the home are not recommended.

IMPLEMENTATION GUIDANCE AND CONSIDERATIONS FOR SHARED DECISION-MAKING

- Consider allergen testing, when appropriate (based on clinical history and exposures) and feasible, before committing individuals to specific allergen mitigation strategies that may be burdensome.
- Consider the severity of an individual's asthma, the small benefit, and the extent of previous symptoms and exacerbations when recommending allergen mitigation interventions.
- Allergen mitigation interventions may be expensive or difficult for individuals to use or maintain.

TABLE IIIA. Examples of allergen mitigation interventions and their targeted allergens

Intervention assessed in studies in the SR	Allergen			
	Animal dander	Dust mites	Cockroaches	Mold
Acaricide		++		
Air filtration systems and air purifiers	++	+	+	++
Carpet removal	++	++		+
Cleaning products (eg, bleach)				++
HEPA vacuum cleaners	++	+	+	++
Impermeable pillow and mattress covers		++		
Integrated pest management	+*		++	
Mold mitigation				++
Pet removal	++			

SR, Systematic review.

++Primary target allergen(s) for the intervention.

+Secondary target allergen(s) for the intervention.

*Dander from rodents.

Working group report

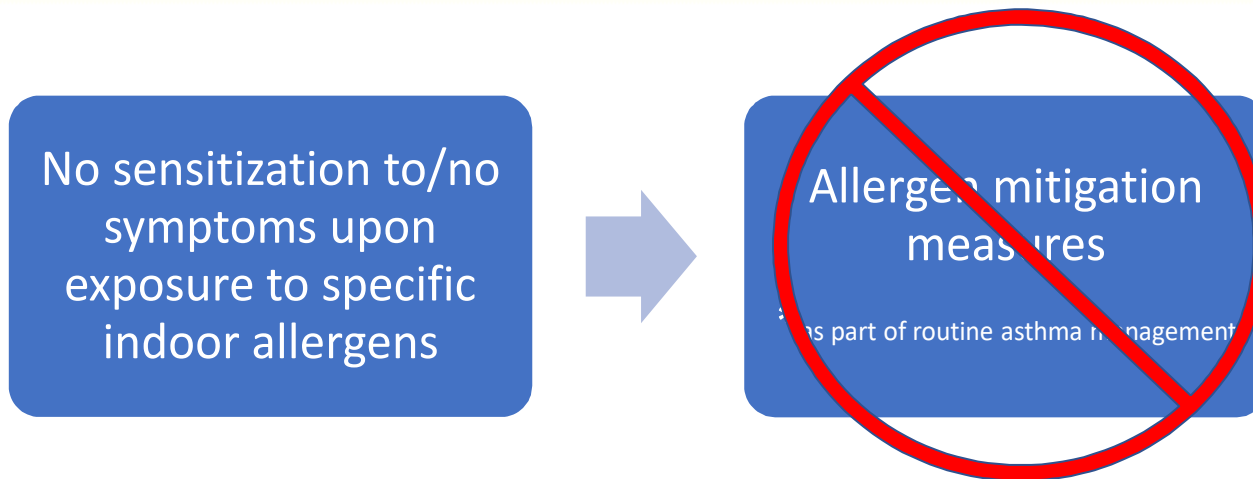
2020 Focused Updates to the Asthma Management Guidelines: A Report from the National Asthma Education and Prevention Program Coordinating Committee Expert Panel Working Group

 Check for updates

Expert Panel Working Group of the National Heart, Lung, and Blood Institute (NHLBI) administered and coordinated National Asthma Education and Prevention Program Coordinating Committee (NAEPCC)* *Bethesda, Md*

Recommendation 5: In individuals with asthma who do not have sensitization to specific indoor allergens or who do not have symptoms related to exposure to specific indoor allergens, the Expert Panel conditionally recommends against allergen mitigation interventions as part of routine asthma management.

Conditional recommendation, low certainty of evidence



Recommendation 6: In individuals with asthma who have symptoms related to exposure to specific indoor allergens, confirmed by history taking or allergy testing, the Expert Panel conditionally recommends a multicomponent allergen-specific mitigation intervention.

Conditional recommendation, low certainty of evidence

Symptoms related
to exposure to
indoor allergens



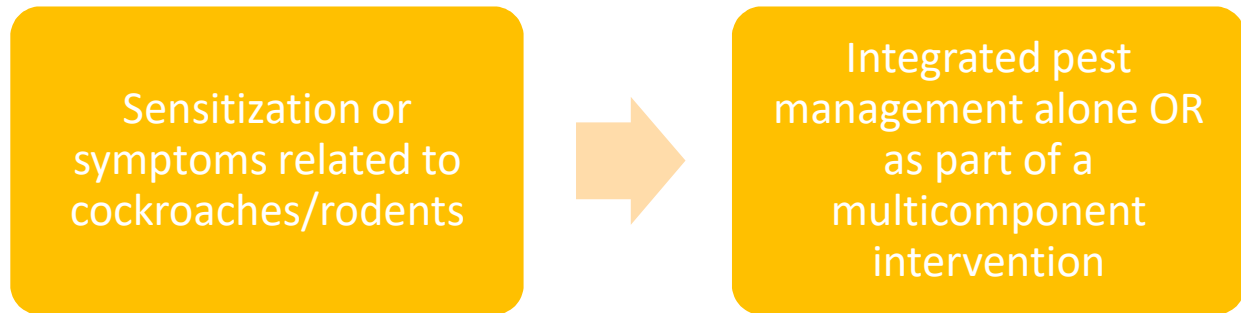
Multicomponent
allergen-specific
mitigation
intervention

- Acaricide
- HEPA filter
- Carpet removal
- Cleaning Products

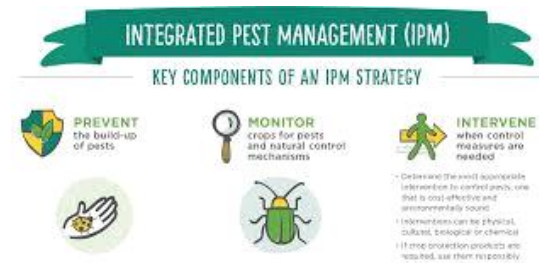
- HEPA Vacuum
- Mattress and Pillow covers
- Integrated Pest Management
- Mold Mitigation
- Pet removal

Recommendation 7: In individuals with asthma who have sensitization or symptoms related to exposure to pests (cockroaches and rodents), the Expert Panel conditionally recommends the use of integrated pest management alone, or as part of a multicomponent allergen-specific mitigation intervention.

Conditional recommendation, low certainty of evidence



- Acaricide
- HEPA filter
- Carpet removal
- Cleaning Products



- HEPA Vacuum
- Mattress and Pillow covers
- Integrated Pest Management
- Mold Mitigation
- Pet removal

Recommendation 8: In individuals with asthma who have sensitization or symptoms related to exposure to dust mites, the Expert Panel conditionally recommends impermeable pillow/mattress covers only as part of a multicomponent allergen mitigation intervention, not as a single-component intervention.

Conditional recommendation, moderate certainty of evidence

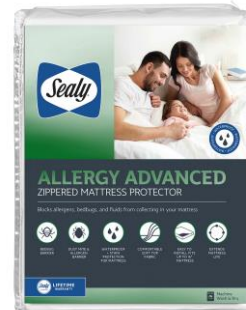
Sensitization or symptoms related to dust mites



Impermeable pillow/mattress covers ONLY as part of a multicomponent regimen



- Acaricide
- HEPA filter
- Carpet removal
- Cleaning Products



+ more

- HEPA Vacuum
- Mattress and Pillow covers
- Integrated Pest Management
- Mold Mitigation
- Pet removal

Three questions

- 1. What do I need to know about PRN ICS use and PRN ICS/LABA and controller use?**
- 2. How should I counsel patients with environmental allergies and asthma?**
- 3. What do I need to know about allergen Immunotherapy?**

SECTION VI

The Role of Subcutaneous & Sublingual Immunotherapy in the Treatment of Allergic Asthma



Subcutaneous Immunotherapy

KEY POINTS

- SCIT is recommended as an adjunct treatment for individuals who have demonstrated allergic sensitization and evidence of worsening asthma symptoms after exposure to the relevant antigen or antigens.
- Do not initiate, increase, or administer maintenance SCIT doses while individuals have asthma symptoms or to individuals with severe asthma.

IMPLEMENTATION GUIDANCE AND CONSIDERATIONS FOR SHARED DECISION MAKING

- Administer SCIT in a clinical setting and provide direct supervision and observation for at least 30 minutes because of the risk of systemic reactions. Individuals with asthma should not administer SCIT at home.
- Delayed systemic reactions (those occurring more than 30 minutes after injection) occur in approximately 15 percent of individuals after injection.
- Individuals who have had previous clinically significant reactions to immunotherapy should bring injectable epinephrine to and from the clinic on the day of their injection.

Sublingual Immunotherapy

KEY POINT

The evidence reviewed did not support the use of SLIT specifically for the treatment of allergic asthma.

Immunotherapy

- **SCIT: Subcutaneous immunotherapy**
- SLIT tabs: Sublingual immunotherapy
- SLIT liquid: not FDA approved

FDA-APPROVED FORMS OF SLIT



- Ragweed
- ≥ 18 years old



- Dust mites
- ≥ 18 years old



- Grass pollen
- ≥ 5 years old

Recommendation 17: In individuals ages 5 years and older with mild to moderate allergic asthma, the Expert Panel conditionally recommends the use of subcutaneous immunotherapy as an adjunct treatment to standard pharmacotherapy in those individuals whose asthma is controlled at the initiation, build up, and maintenance phases of immunotherapy.

Conditional recommendation, moderate certainty of evidence

Recommendation 18: In individuals with persistent allergic asthma, the Expert Panel conditionally recommends against the use of sublingual immunotherapy in asthma treatment.

Conditional recommendation, moderate certainty of evidence

FeNO Testing in the Management of Asthma in Individuals Ages 5 Years and Older

KEY POINTS

- FeNO testing should not be used in isolation to assess asthma control, predict a future asthma exacerbation, or assess the severity of an exacerbation.
- FeNO measurement may be used in conjunction with an individual's history, clinical findings, and spirometry as part of an ongoing asthma monitoring and management strategy which includes frequent FeNO assessments.

IMPLEMENTATION GUIDANCE AND CONSIDERATIONS FOR SHARED DECISION MAKING

- Interpret FeNO levels in conjunction with other clinical data because these levels are affected by comorbid conditions, including allergic rhinitis and atopy, or behaviors such as smoking.
- Cutpoints for adjusting therapy to reduce the risk of exacerbation have not been established.

BRONCHIAL THERMOPLASTY

Bronchial thermoplasty (BT), a procedure that uses heat to remove muscle tissue from the airways of adults with moderate to severe asthma, was developed over the last decade.

KEY POINTS

- Most individuals ages 18 years and older with uncontrolled, moderate to severe, persistent asthma should not undergo BT to treat asthma because the benefits are small, the risks are moderate, and the long-term outcomes are uncertain.
- Some individuals with moderate to severe persistent asthma who have troublesome symptoms may be willing to accept the risks of BT and, therefore, might choose this intervention after shared decision making with their health care provider.

IMPLEMENTATION GUIDANCE AND CONSIDERATIONS FOR SHARED DECISION MAKING

- BT may reduce severe asthma exacerbations compared with standard care after treatment. Although the benefits could last 5 years or more, only limited data demonstrate that this treatment improves long-term asthma outcomes.
- The risks of BT include asthma exacerbations, hemoptysis, and atelectasis during the treatment period. In addition, severe, delayed-onset complications could occur that have not yet been recognized because of the small numbers of individuals who have undergone the procedure.
- Offer the procedure in the setting of a clinical trial or a registry study to enable the collection of long-term data on the use of BT for asthma.
- For individuals who decide to undergo BT, an experienced specialist (e.g., a pulmonologist with training in BT administration) should provide this treatment in a center that has appropriate expertise.
- BT has not been studied in individuals younger than age 18 years.

How are we going to do this?

Primary Care Office

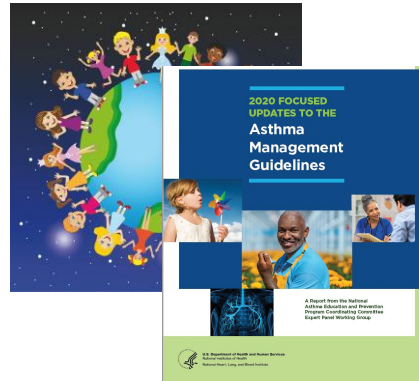
School Nurses

Emergency Room

Home

Pulm and Allergy Clinics

Inpatient Care



AGES 0-4 YEARS: STEPWISE APPROACH FOR MANAGEMENT OF 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 RT: Add short course daily ICS*	Daily low-dose ICS and PRN SABA	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
Alternative		Daily montelukast* or Cromolyn,* and PRN SABA		Daily medium-dose ICS + montelukast* and PRN SABA	Daily high-dose ICS + montelukast* and PRN SABA	Daily high-dose ICS + montelukast* + oral systemic corticosteroid and PRN SABA

*For children age 4 years only, see Step 3 and Step 4 on Management of Persistent Asthma in Individuals Ages 5-11 Years diagram.

- Child has had >3 lifetime episodes of wheezing triggered by URI *or*
- Child has had ≥2 episodes in the past year;
- AND**
- Asymptomatic in between *and*
- **NOT** on controller therapy

ONSET OF URI

START:
 Age 0-2: 2 puffs twice daily of Flovent 110 mcg
 Age 2-4: 3 puffs twice daily of Flovent 110 mcg
 Use for 7-10 days

Risk/Issues
 Could affect growth
 Need to monitor growth when using this path

Conditional recommendation because of this

Benefits
 Up to 33% reduction in exacerbations requiring oral steroids

This recommendation actually starts at age 4 for persistent asthma (unlike classification which is for age 25)

AGES 5-11 YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA

	Management of Persistent Asthma in Individuals Ages 5-11 Years					
	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
Alternative		Daily LTRA,* or Cromolyn,* or Nedocromil,* or Theophylline,* and PRN SABA	Daily medium-dose ICS and PRN SABA or Daily low-dose ICS/LABA or daily low-dose ICS + LTRA,* or daily low-dose ICS + Theophylline,* and PRN SABA	Daily medium-dose ICS-LABA and PRN SABA or Daily medium-dose ICS + LTRA,* or daily medium-dose ICS + Theophylline,* and PRN SABA	Daily high-dose ICS + LTRA,* or daily high-dose ICS + Theophylline,* and PRN SABA	Daily high-dose ICS + LTRA,* and systemic corticosteroid or daily high-dose ICS + Theophylline,* and systemic corticosteroid, and PRN SABA
		Steps 2-4: Conditionally recommend the use of adjuvant immunotherapy as an adjunct treatment to standard pharmacotherapy in individuals > 5 years of age whose asthma is controlled at the initiation, build up, and maintenance phases of immunotherapy.			Consider Omalizumab**	

- Child has moderate persistent asthma and is adherent to therapy (NOTE: there is **NO RECOMENDATION** for PRN increases to daily ICS treatment in step 2 in this age group)
- Taking low or medium dose ICS already
- If patient is well, ok to use ICS/LABA and SABA but if not well, use SMART before stepping up
- Use in age 4 with persistent asthma

Risk/Issues
 Cost
 Formulary
 Don't use with salmeterol

PREFERRED TX
Moderate to Severe
 Single Maintenance and Reliever Therapy (SMART) with ICS/formoterol
 Use PRN

Benefits
 Reduced exacerbations (especially if there was a severe one in the year prior)
 Improve asthma control
 Improve QOL
 Lower risk of growth suppression

	For children 4-11 years old Formoterol max daily dosing 36mcg									
	Dulera 50/5 Max dose 7 puffs		Dulera 100/5 Max dose 7 puffs		Dulera 200/5 Max dose 7 puffs		Symbicort 80/4.5 Max dose 8 puffs		Symbicort 160/4.5 Max dose 8 puffs	
Daily controller dose	1 puff BID	2 puffs BID	1 puff BID	2 puffs BID	1 puff BID	2 puffs BID	1 puff BID	2 puffs BID	1 puff BID	2 puffs BID
Daily ICS dose	100 mcg	200 mcg	200 mcg	400 mcg	400 mcg	800 mcg	160 mcg	320 mcg	320 mcg	640 mcg
Dosing categorization	Low		Medium (100)		High (200)		No dosing strength in GINA nor NAEPF. If using budesonide DPI per GINA, 100-200=low, >200-400=medium, >400 high			
# possible rescue puffs	5	3	5	3	5	3	6	4	6	4
Rescue doses	1 puff every 4-6 hr	1 puff every 4-6hr	1 puff every 4-6hr	1 puff every 4-6hr	1 puff every 4 hr	1 puff every 4-6hr	1 puff every 4 hr	1 puff every 4 hr	1 puff every 4 hr	1 puff every 4 hr
Total possible daily ICS	350 mcg	350 mcg	700 mcg	700 mcg	1,400 mcg	1,400 mcg	640 mcg	640 mcg	1,280 mcg	1,280 mcg
Total possible daily LABA	36mcg	36mcg	36mcg	36mcg	36mcg	36mcg	36 mcg	36 mcg	36 mcg	36 mcg

AGES 12+ YEARS: STEPWISE APPROACH FOR MANAGEMENT OF 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	Daily and PRN combination low-dose ICS-formoterol*	Daily and PRN combination medium-dose ICS-formoterol*	Daily medium-high dose ICS/LABA,† or PRN SABA,†	Daily high-dose ICS/LABA,† or† systemic corticosteroids + PRN SABA
Alternative		Daily SABA and PRN SABA, or Cromolyn,† or Nedocromil,† or Zileuton,† or Theophylline,† and PRN SABA	Daily medium-dose ICS and PRN SABA, or Daily low-dose ICS/LABA, or daily low-dose ICS + LABA,† or daily low-dose ICS + LAMA,† and PRN SABA, or Daily low-dose ICS + Theophylline,† or Zileuton,† and PRN SABA	Daily medium-dose ICS/LABA, or daily medium-dose ICS + LABA,† and PRN SABA,† or Daily medium-dose ICS + LABA,† or daily medium-dose ICS + SABA,† and PRN SABA	Daily medium-high dose ICS/LABA,† or daily high-dose ICS + LABA,† and PRN SABA	
		Steps 2-4. Conditionally recommended the use of subcutaneous omalizumab as an add-on treatment for children ages 6-17 years with severe asthma in combination with the preferred, SABA, or combination preferred or alternative therapy.			Consider adding Asthma Therapy's (ie, LABA,† and ICS,† and LABA,† and LABA,†).	

STEP 2: MILD PERSISTENT

Daily low dose ICS and PRN SABA or PRN ICS and SABA

2-4 puffs of albuterol followed by 80-250 mcg beclomethasone equivalent q4 hours

Risk/Issues
Cost
Formulary
Don't use with salmeterol

PREFERRED TX Moderate to Severe (Steps 3 and 4)
Single Maintenance and Reliever Therapy (SMART)
ICS-formoterol

Benefits

- Reduced exacerbations (especially if there was a severe one in the year prior)
- Improve asthma control
- Improve QOL
- Lower risk of growth
- Reduction in systemic steroids

For children >=12 years old Formoterol max daily dosing 54mcg											
	Dulera 50/5 Max dose 10 puffs		Dulera 100/5 Max dose 10 puffs		Dulera 200/5 Max dose 10 puffs		Symbicort 80/4.5 Max dose 12 puffs		Symbicort 160/4.5 Max dose 12 puffs		
Daily controller dose	1 puff BID	2 puffs BID	1 puff BID	2 puffs BID	1 puff BID	2 puffs BID	1 puff BID	2 puffs BID	1 puff BID	2 puffs BID	
Daily ICS dose	100 mcg	200 mcg	200 mcg	400 mcg	400 mcg	800 mcg	160 mcg	320 mcg	320 mcg	640 mcg	
Dosing categorization	Low-Medium (200-400)						High (>400)		Low (200-400)		High (>400-800)
# possible rescue puffs	8	6	8	6	8	6	10	8	10	8	
Rescue doses	1-2 puffs every 4 hr	1 puffs every 4 hr*	1-2 puffs every 4 hr	1 puffs every 4 hr*	1-2 puffs every 4 hr	1 puffs every 4 hr*	1-2 puffs every 4 hr	1-2 puffs every 4 hr	1-2 puffs every 4 hr	1-2 puffs every 4 hr	
Total possible daily ICS	500 mcg	500 mcg	1,000 mcg	1,000 mcg	2,000 mcg	2,000 mcg	800 mcg	800 mcg	1,600 mcg	1,600 mcg	
Total possible daily LABA	50mcg	50mcg	50mcg	50mcg	50mcg	50mcg	54mcg	54mcg	54mcg	54mcg	

LAMA: Step 5- only use if using ICS/LABA controller (ie switch to ICS/LABA before adding LAMA), don't use in patients with urinary retention or glaucoma

Conclusion

- What's in the updated management guidelines?
- Three questions:
 - What do I need to know about PRN ICS use and PRN ICS/LABA and controller use?
 - How should I counsel patients with environmental allergies and asthma?
 - What do I need to know about allergen Immunotherapy?
- Thoughts on clinical care pathways