National Asthma Education and Prevention Program 2020 Guidelines: What's Important for Primary Care

Kevin R. Murphy, MD; Joel Solis, MD

doi: 10.12788/jfp.0219

KEY TAKEAWAYS

- 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* provides updated recommendations for 6 topics related to the management of individuals with asthma.
  - For the primary care clinician, key important updated recommendations relate to the use of intermittent inhaled corticosteroids, the use of long-acting muscarinic antagonists in the treatment of patients age ≥12 years, and a more focused approach to indoor allergen mitigation.
- The classification of asthma severity and asthma control, as well as the concept of utilizing a stepwise approach to pharmacologic treatment, were not updated from the *Expert Panel Report 3*, released in 2007.
- However, important updates in preferred therapies for intermittent and persistent asthma at treatment steps 1 through 5 were suggested.
- Recommendations regarding biologic therapy were not included in the 2020 update, as only evidence and US Food and Drug Administration approvals through October 2018 were considered.
- The most recent 2021 Global Initiative for Asthma guidelines are not included in this review but can be used in a complementary manner to assist primary care clinicians to optimize decisions regarding the care of patients with asthma.

FACULTY

Kevin R. Murphy, MD, Director, Clinical Research, Allergy, Asthma and Pediatric Pulmonology, Boys Town National Research Hospital, Boys Town, Nebraska.

Joel Solis, MD, Valley Medical Arts Clinic, The University of Texas Rio Grande Valley, McAllen, Texas.

DISCLOSURES

Dr. Murphy discloses that he serves on the advisory board and/or speakers bureau for AstraZeneca, Genentech, GlaxoSmithKline, Novartis, Regeneron, and Sanofi. Dr. Solis and Gregory Scott, PharmD, have no disclosures to report.

ACKNOWLEDGMENT

Editorial support was provided by Gregory Scott, PharmD, RPh, at the Primary Care Education Consortium.

SPONSORSHIP

This activity is sponsored by Primary Care Education Consortium and the Primary Care Respiratory Group and supported by funding from AstraZeneca Pharmaceuticals LP.

HISTORICAL OVERVIEW OF NATIONAL ASTHMA EDUCATION AND PREVENTION PROGRAM

The National Heart, Lung, and Blood Institute (NHLBI) created the National Asthma Education and Prevention Program (NAEPP) in 1989 to address the burgeoning health and socioeconomic consequences related to asthma in the United States. From its inception, the focus of NAEPP has been to raise awareness and ensure appropriate diagnosis and management of asthma with the goal of reducing related morbidity and mortality and to improve the quality of life of individuals with asthma. To accomplish its goals, NAEPP has involved a wide variety of stakeholder groups and organizations. The first expert panel was published in 1991, the second expert panel report was published in 1997, and the third expert panel report (EPR-3) was published in 2007.[1]

In 2014, groups within NHLBI (which included members of EPR-3) determined that a focused update on 6 high-priority topics was needed.[2] The Agency for Healthcare Research and Quality (AHRQ) was tasked with performing systematic literature reviews on these 6 priority areas. Their findings were published in 2017 and 2018.[3-7] Later in 2018, the Expert Panel Working Group was convened and charged with using the systematic reviews to make recommendations on key questions that could be implemented by clinicians and individuals with asthma.

The Expert Panel Working Group updated the AHRQ systematic review through October 2018; thus, subsequent publications and US Food and Drug Administration (FDA) medication approvals were not included. The final report, published in December 2020, focused on 6 selected topics that closely aligned with the AHRQ systematic literature review findings[2]:

1. Intermittent inhaled corticosteroids
2. Long-acting muscarinic antagonists
3. Fractional exhaled nitric oxide for diagnosis and monitoring
4. Allergen reduction strategies
5. Subcutaneous and sublingual immunotherapy
6. Bronchial thermoplasty

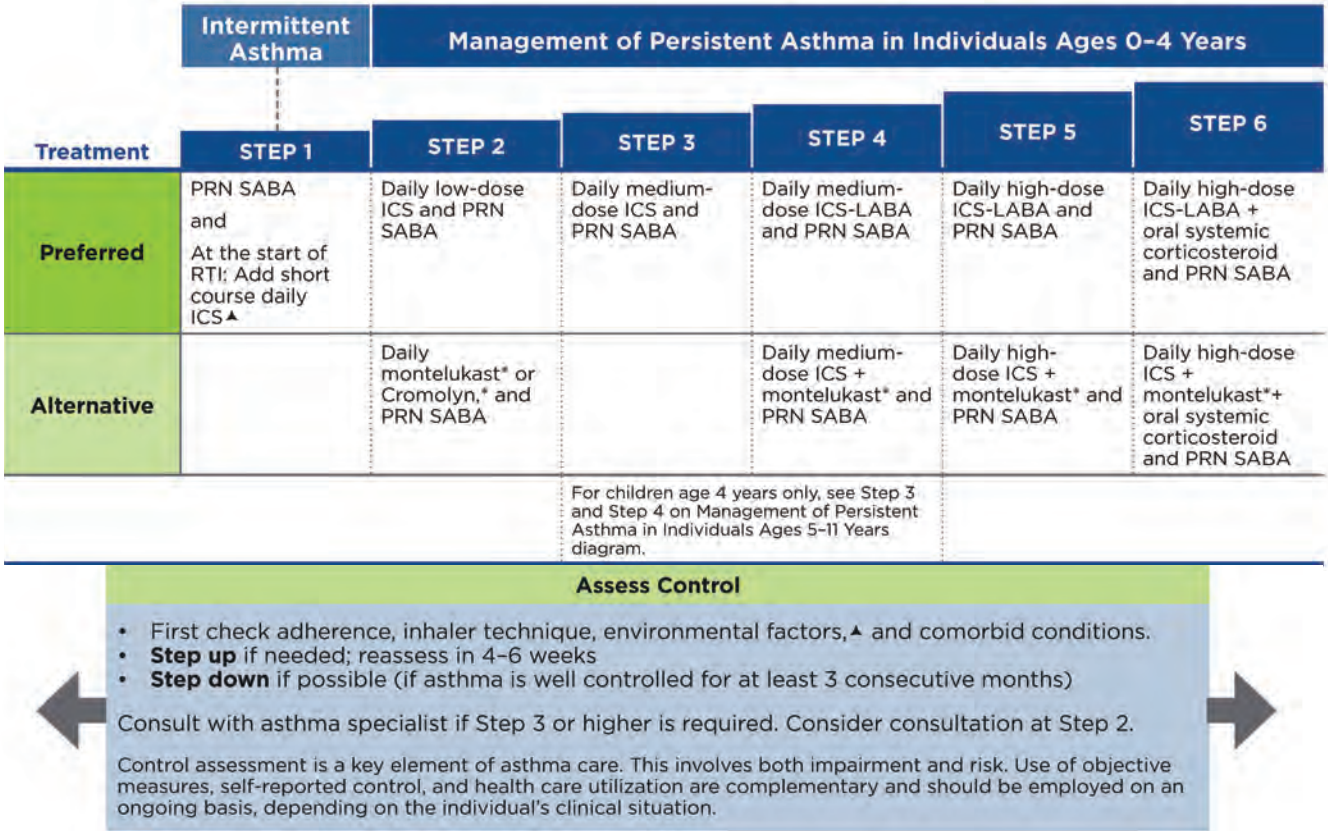
STEPWISE THERAPY

Because the *2020 Focused Updates to the Asthma Management Guidelines: A Report from the National Asthma Education and Prevention Program Coordinating Committee Expert Panel* (NAEPP 2020 Focused Updates) was not a full revision of the 2007 NAEPP EPR-3,[1] many of the definitions and recommendations described in EPR-3 remain relevant for the management of patients with asthma and are discussed below. Recommendations for pharmacologic therapy continue to be based on a stepwise approach using shared decision-making to achieve and maintain asthma control at the lowest effective therapeutic regimen **(FIGURE 1)**.[2]

Within the stepwise approach to treatment, the NAEPP 2020 Focused Updates guidelines provide some new recommendations for intermittent (step 1), mild persistent (step 2), and moderate-severe persistent (steps 3-5) asthma.[2] Many of these relate to new usages for as-needed dual therapy with a fast-acting bronchodilator combined with an inhaled corticosteroid (ICS), as well as the use of long-acting muscarinic antagonists and adjunctive subcutaneous immunotherapy.

FIGURE 1. **Stepwise approach for management of asthma**

A. Age 0-4 years



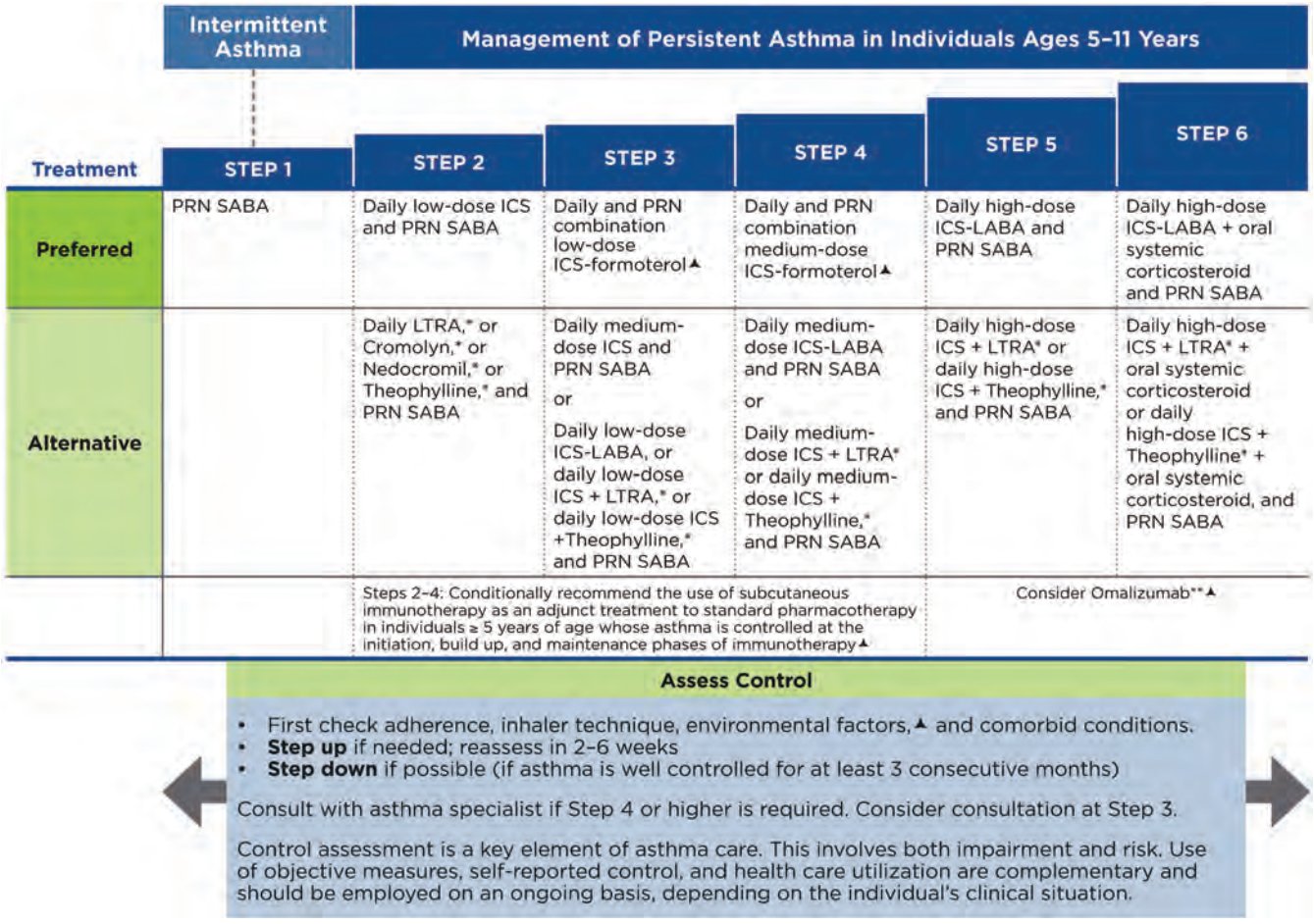
Abbreviations: ICS, inhaled corticosteroid; LABA, long-acting β_2-agonist; PRN, as needed; SABA, inhaled short-acting β_2-agonist; RTI, respiratory tract infection

▲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.

FIGURE 1. **Stepwise approach for management of asthma (cont'd)**

B. Age 5-11 years



Abbreviations: ICS, inhaled corticosteroid; LABA, long-acting β_2-agonist; LTRA, leukotriene receptor antagonist; SABA, inhaled short-acting β_2-agonist.

▲Updated based on the 2020 guidelines. Recommendations supporting the use of maintenance and reliever therapy in 1 inhaler consisting of ICS/formoterol are primarily based on clinical data with an ICS/formoterol dry powder inhaler product that is not approved or available in the United States.

*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. [Author's note: mepolizumab is a biologic now approved in the United States for patients with severe asthma aged 6 years and older.]

Classifying asthma severity

According to EPR-3, asthma severity is broadly categorized as intermittent or persistent. Individuals with intermittent asthma are treated with step 1 therapy, whereas individuals with persistent asthma are treated with steps 2 through 6 therapy, depending on whether they have mild, moderate, or severe persistent asthma.

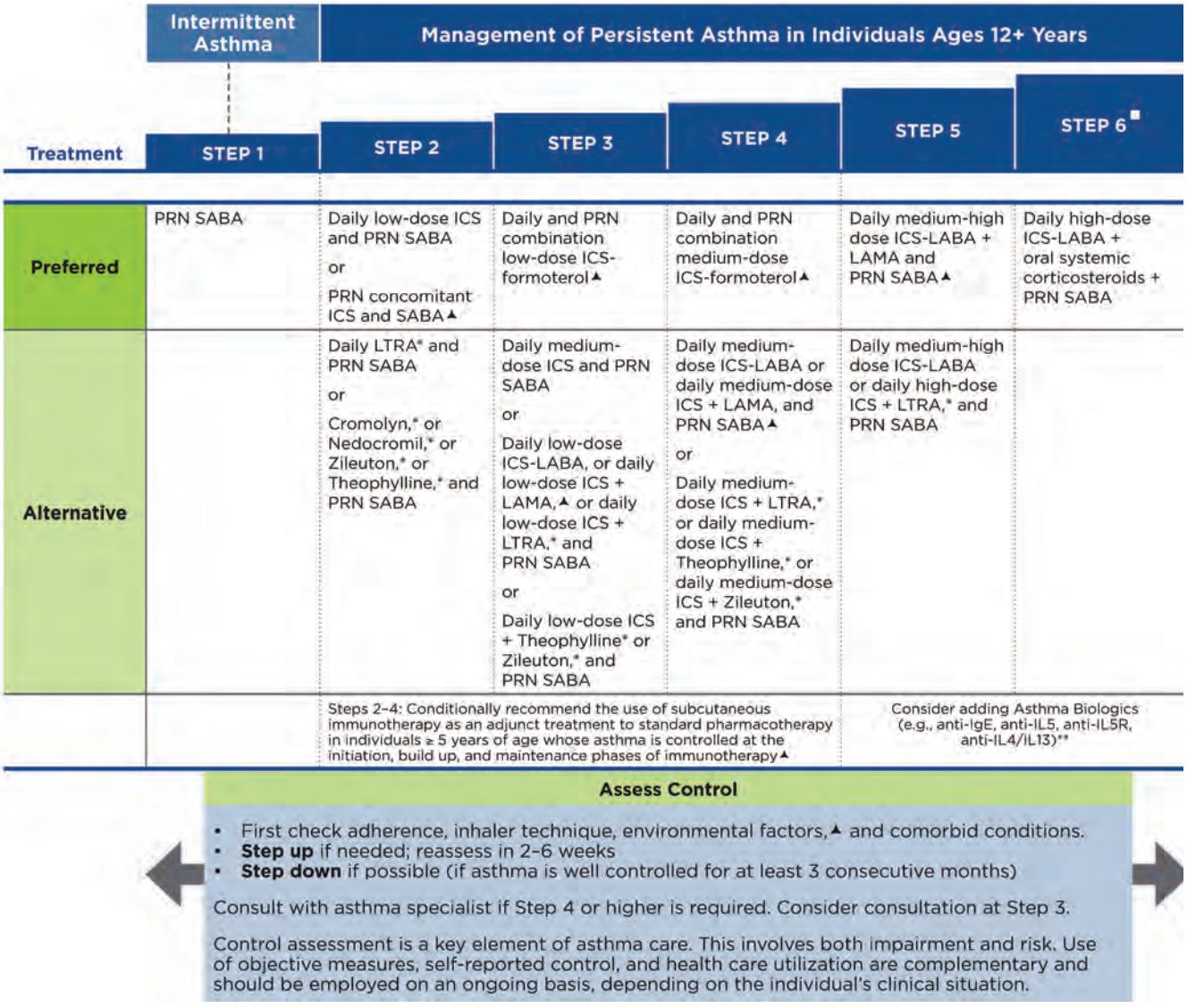
Asthma severity is the intrinsic intensity of disease and is based on the lowest level of therapy that allows the patient's asthma to remain controlled. Asthma control is based on impairment and future exacerbation risk criteria.[1] Impairment is ascertained by the patient's/caregiver's recall of symptoms and functioning during the previous 2 to 4 weeks, as well as spirometry findings. Risk is ascertained by the number and frequency of exacerbations requiring oral corticosteroids. Asthma severity is assigned to the most severe category in which any feature exists.

Assessing asthma control

Following initiation of treatment, assessing control is a key element of asthma care. EPR-3 classification of asthma control is based on similar—but not identical—impairment and risk criteria for categorizing asthma severity **(TABLE)**.[1] Clinical assessment of asthma control should be obtained through

FIGURE 1. **Stepwise approach for management of asthma (cont'd)**

C. Age ≥12 years



Abbreviations: ICS, inhaled corticosteroid; LABA, long-acting β_2-agonist; LAMA, long-acting muscarinic antagonist; LTRA, leukotriene receptor antagonist; SABA, inhaled short-acting β_2-agonist.

▲Updated based on the 2020 guidelines. Recommendations supporting the use of maintenance and reliever therapy in 1 inhaler consisting of ICS/formoterol are primarily based on clinical data with an ICS/formoterol dry powder inhaler product that is not approved or available in the United States.

*Cromolyn, nedocromil, LTRAs including zileuton and montelukast, and theophylline were not considered for 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.

**The AHRQ systematic reviews that informed this report did not include studies that examined the role of asthma biologics (eg, anti-IgE, anti-IL5, anti-IL5R, anti-IL4/IL13). Thus, this report does not contain specific recommendations for the use of biologics in asthma in steps 5 and 6.

▪Data on the use of LAMA therapy in individuals with severe persistent asthma (step 6) were not included in the AHRQ systematic review and thus no recommendation is made.

medical history, validated asthma control tools **(TABLE and FIGURE 2A)**, and, when appropriate, pulmonary function testing.

Many tools have been validated to assess asthma control. The Asthma Control Questionnaire (ACQ),[8] Asthma Control Test (ACT),[9,10] and Childhood Asthma Control Test[10] assess symptom control with no direct measure of future risk. Tools that assess both symptoms and future risk include the Asthma Control and Communication Instrument,[11,12] Asthma Impairment and Risk Questionnaire (AIRQ),[13] Composite Asthma Severity Index,[14] and Test for Respiratory and Asthma Control in Kids.[15]

TABLE. **Assessing asthma control in adolescents age ≥12 years and adults**[1]

Components of control		Well controlled	Not well controlled	Very poorly controlled
Impairment	Symptoms	≤2 d/wk	>2 d/wk	Throughout the day
	Nighttime awakening	≤2x/mo	1-3x/wk	≥4x/wk
	Interference with normal activity	None	Some limitation	Extremely limited
	SABA use for symptom control[a]	≤2 d/wk	>2 d/wk	Several times per day
	FEV_1 or peak flow	>80% predicted/ personal best	60%-80% predicted/ personal best	<60% predicted/personal best
	Validated questionnaires			
	ATAQ	0	1-2	3-4
	ACQ	≤0.75[b]	≥1.5	NA
	ACT	≥20	16-19	≤15
Risk	Exacerbations	0-1/y	≥2/y[c]	
		Consider severity and interval since last exacerbation		
	Progressive loss of lung function	Evaluation requires long-term follow-up care		
	Treatment-related adverse effects	Medication side effects can vary in intensity from none to very troublesome and worrisome. The level of intensity does not correlate to specific levels of control, but should be considered in the overall assessment of risk.		

ACQ, Asthma Control Questionnaire; ACT, Asthma Control Test; ATAQ, Asthma Therapy Assessment Questionnaire; NA, not applicable; SABA, short-acting β_2-agonist.

[a]Not prevention of exercise-induced bronchoconstriction.

[b]ACQ values of 0.76-1.4 are indeterminate regarding well-controlled asthma.

[c]At present, there are inadequate data to correspond to frequencies of exacerbations with different levels of asthma control. In general, more frequent and intense exacerbations (eg, requiring urgent, unscheduled care, hospitalization, or intensive care unit admission) indicate poorer disease control. For treatment purposes, patients who had ≥2 exacerbations requiring oral systemic corticosteroids in the past year may be considered the same as patients who have not-well-controlled asthma, even in the absence of impairment levels consistent with not-well-controlled asthma.

- Asthma Control Test: for use with adults and adolescents 12 years of age and older with asthma (https://www.asthma.com/understanding-asthma/severe-asthma/asthma-control-test/)
- Childhood Asthma Control Test (CACT) /Asthma Control Test: for use with children 4 to 11 years of age with asthma (https://www.asthma.com/understanding-asthma/severe-asthma/asthma-control-test/)
- Asthma Impairment and Risk Questionnaire **(FIGURE 2A)**: for use with adults and adolescents 12 years of age and older with asthma (http://www.airqscore.com/)
- Test for Respiratory and Asthma Control in Kids: for use with children under 5 years of age who have a history of 2 or more episodes of wheezing, shortness of breath, or cough lasting more than 24 hours and have previously been prescribed quick-relief bronchodilator medications (https://getasthmahelp.org/documents/track.pdf)

For patients age ≥12 years, only the AIRQ is validated as a single instrument assessing both impairment and control. The questionnaire has numerically scored questions providing total scores and cut points for varying levels of asthma. AIRQ includes 10 dichotomous (yes or no) questions that evaluate symptoms, social and physical activities, exacerbations, related healthcare resource utilization, perception of asthma control, and use of rescue (reliever) medications. The AIRQ score ranges from 0 to 10. A score of 0 or 1 indicates asthma is well controlled, a score of 2 to 4 indicates asthma is not well controlled, and a score of 5 to 10 indicates asthma is very poorly controlled. AIRQ identifies patients with exacerbations requiring treatment with oral corticosteroids or emergency department/unplanned office visits or hospitalizations for asthma that are not assessed by many other asthma control tools. A companion brochure for patients, "AIRQ: Asthma Control and You" **(FIGURE 2B)**, explains the purpose of assessing asthma control and encourages patients to use their AIRQ results as part of a shared decision-making conversation with their healthcare providers.

Using an asthma management assessment checklist in conjunction with an asthma control questionnaire can facilitate a thorough investigation and optimization of asthma control. The Asthma Checklist **(FIGURE 3)** is an example of an asthma management assessment tool that includes factors such as medication adherence, use of an action plan, psychological issues, vaccinations, and suggestions for specialty care referral.

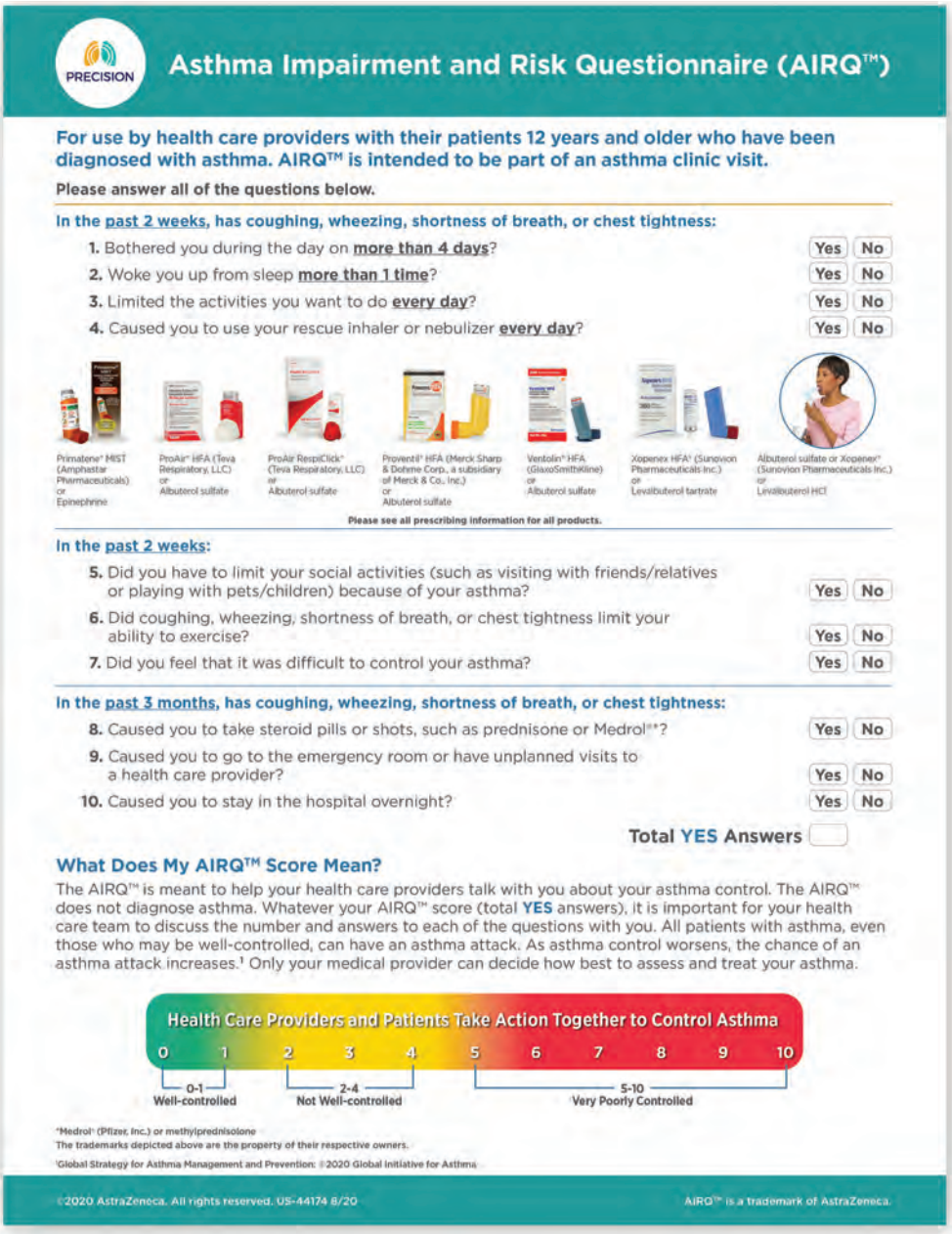
If asthma is well controlled, therapy should be maintained at the current step with regular follow-up every 1 to

6 months to maintain control. Stepping down therapy should be considered if asthma is well controlled for ≥3 months. Once asthma becomes well controlled, treatment steps are used to classify a patient's asthma severity.[1]

If asthma is not well controlled, therapy should go up a step with reevaluation in 2 to 6 weeks. If asthma is very poorly controlled, therapy should go up 1 or 2 steps, and a short course of systemic corticosteroids should be considered, with reevaluation in 2 weeks. If adverse effects occur with intensified therapy, alternative treatment appropriate for the increased step level should be considered.

Although systemic corticosteroids are recommended in certain situations as they are very effective in resolving acute asthma symptoms and exacerbations, recent evidence provides a cautionary note. Although the adverse consequences of long-term use of systemic corticosteroids are widely recognized, growing evidence indicates that even frequent, brief dosing periods, ie, 3 to 7 days, in individuals with asthma are associated with a variety of negative health outcomes. These include significant increases in the risk of pneumonia, osteoporosis and osteoporotic fracture, heart failure, sleep apnea, myocardial infarction, cataracts, type 2 diabetes, hypertension, and other disorders, as well as higher healthcare costs.[16-19] Consequently, an important new consideration is the recommendation from some experts that the cumulative dose of systemic corticosteroids should be limited to the equivalent of <500 mg to 1000 mg of prednisone per year.[20]

FIGURE 2. **(A) Asthma Impairment and Risk Questionnaire (AIRQ) to assess control**



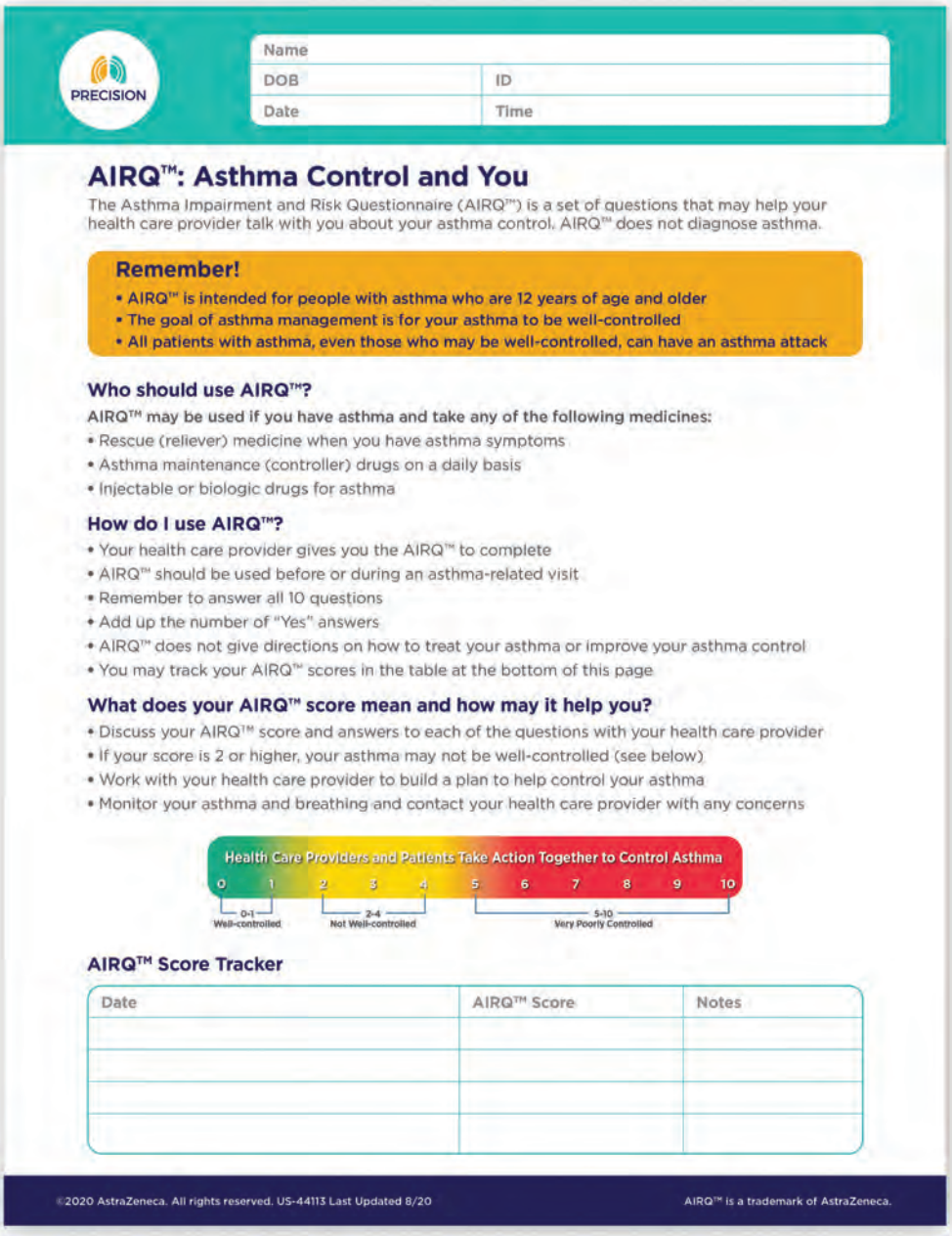
AIRQ® is a registered trademark of AstraZeneca. Information on the intended use and validation of the AIRQ® is available at http://www.airqscore.com. The AIRQ® is reproduced with permission from AstraZeneca. AstraZeneca is the copyright owner of the AIRQ®. However, third parties will be allowed to use the AIRQ® free of charge. The AIRQ® must always be used in its entirety. Except for limited reformatting, the AIRQ® may not be modified or combined with

CONT'D

1: INTERMITTENT INHALED CORTICOSTEROIDS

The NAEPP 2020 Focused Updates modify some of the recommendations made by EPR-3 regarding the use of ICS. Updated preferred recommendations include the following (**FIGURE 1**)[2]:

FIGURE 2. **(B) AIRQ: Asthma Control and You for patient education on asthma control (cont'd)**



PRECISION

Name	
DOB	ID
Date	Time

AIRQ™: Asthma Control and You

The Asthma Impairment and Risk Questionnaire (AIRQ™) is a set of questions that may help your health care provider talk with you about your asthma control. AIRQ™ does not diagnose asthma.

Remember!

- AIRQ™ is intended for people with asthma who are 12 years of age and older
- The goal of asthma management is for your asthma to be well-controlled
- All patients with asthma, even those who may be well-controlled, can have an asthma attack

Who should use AIRQ™?

AIRQ™ may be used if you have asthma and take any of the following medicines:

- Rescue (reliever) medicine when you have asthma symptoms
- Asthma maintenance (controller) drugs on a daily basis
- Injectable or biologic drugs for asthma

How do I use AIRQ™?

- Your health care provider gives you the AIRQ™ to complete
- AIRQ™ should be used before or during an asthma-related visit
- Remember to answer all 10 questions
- Add up the number of "Yes" answers
- AIRQ™ does not give directions on how to treat your asthma or improve your asthma control
- You may track your AIRQ™ scores in the table at the bottom of this page

What does your AIRQ™ score mean and how may it help you?

- Discuss your AIRQ™ score and answers to each of the questions with your health care provider
- If your score is 2 or higher, your asthma may not be well-controlled (see below)
- Work with your health care provider to build a plan to help control your asthma
- Monitor your asthma and breathing and contact your health care provider with any concerns

Health Care Providers and Patients Take Action Together to Control Asthma

0 1 2 3 4 5 6 7 8 9 10

0-1 Well-controlled | 2-4 Not Well-controlled | 5-10 Very Poorly Controlled

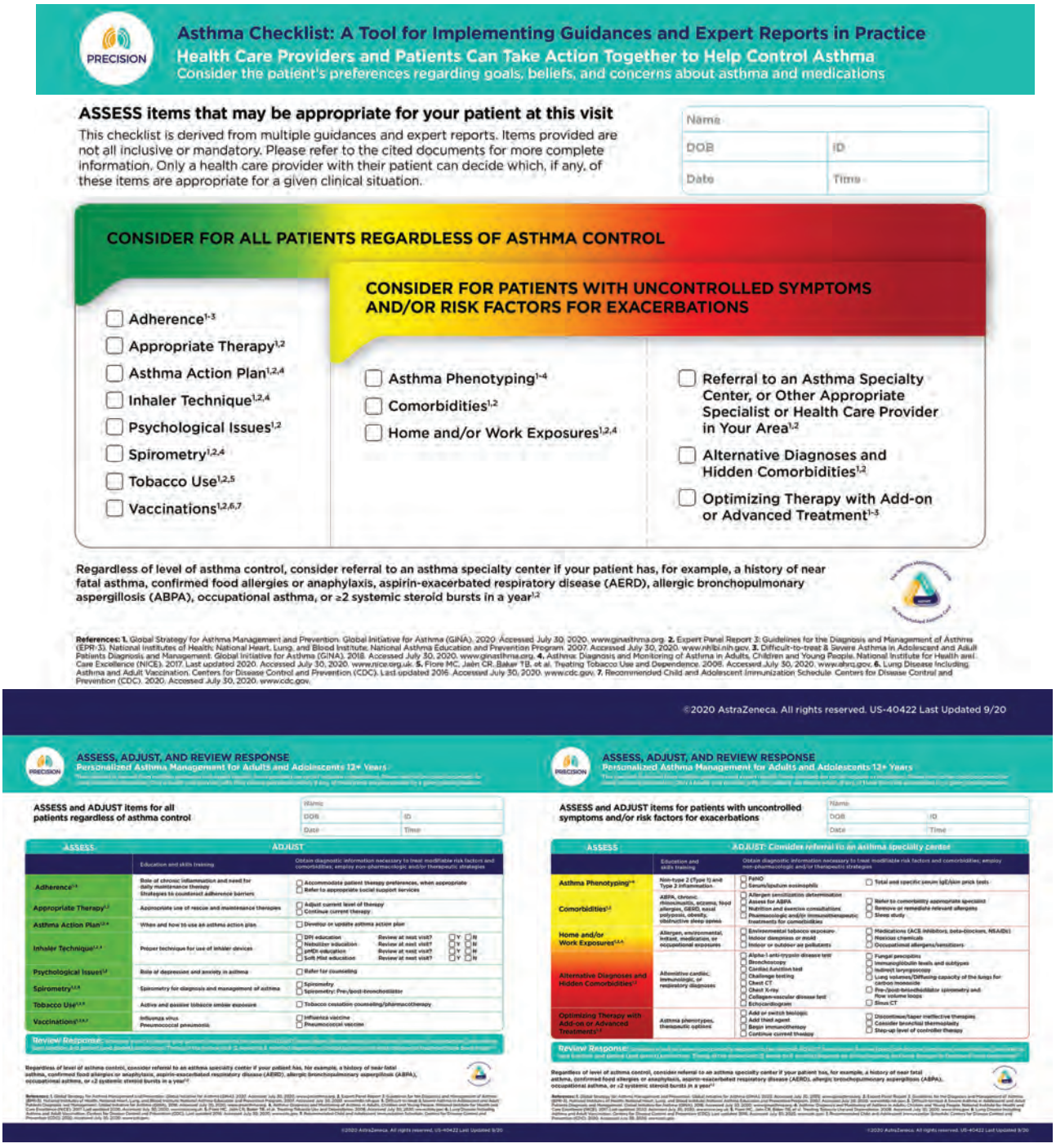
AIRQ™ Score Tracker

Date	AIRQ™ Score	Notes

other instruments without prior written approval. The 10 questions of the AIRQ® must appear verbatim, in order, and together as they are presented and not divided on separate pages. All copyright and trademark information must be maintained as it appears on the bottom of the AIRQ® and on all copies. The layout of the final authorized AIRQ® may differ slightly, but the item wording will not change.

- Individuals age 0 to 4 years:
  - Step 1: at the start of a respiratory tract infection, add a short course of ICS to as-needed short-acting β_2-agonist (SABA).
  - Step 3 or 4 for patients 4 years of age: see recommendations for patients 5 to 11 years of age below.
- Individuals age 5 to 11 years:
  - Step 3 or 4: for increased symptoms or decreased peak flow, do not treat with a short-term increase in ICS dose for patients who are already likely to be adherent to daily ICS.
  - Step 3 or 4: maintenance (medication taken daily for long-term control) and reliever (medication taken as needed for quick relief of shortness of breath) therapy in 1 inhaler consisting of low-dose ICS and formoterol (step 3) or medium-dose ICS and formoterol (step 4) given as 1 to 2 puffs once or twice daily as maintenance and 1 to 2 puffs as needed for symptoms. (Do not exceed 8 total puffs per day in children age 4 to 11 years.) [The use of ICS/formoterol in 1 inhaler for maintenance and reliever therapy is not approved in the United States for any patients.]
  - These steps 3 and 4 recommendations are preferred to either a higher-dose ICS as daily controller plus as-needed SABA for quick relief or single-inhaler dual same-dose ICS and long-acting β_2-agonist (LABA) as daily controller therapy plus SABA for quick relief.
- Individuals age ≥12 years:
  - Step 2: either a daily low-dose ICS plus as-needed SABA for quick relief or an as-needed ICS plus a SABA used concomitantly.
  - Step 3 or 4: as per children age 4 to 11 years, maintenance and reliever therapy in 1 inhaler consisting of low-dose ICS and formoterol (step 3) or medium-dose ICS and formoterol (step 4) given as 1 to 2 puffs once or

FIGURE 3. **Management Assessments (Asthma Checklist)**



The Asthma Checklist is available at www.asthmaresourcecenter.com. The Asthma Resource Center contains point-of-care and self-directed educational resources for healthcare providers and their patients that are available free of charge. These materials were developed to include a wide range of topics suggested by multiple guidelines and expert reports as pertinent to asthma care.

twice daily as maintenance and 1 to 2 puffs as needed for symptoms. (Do not exceed 12 total puffs per day in patients age ≥12 years.)

- This recommendation is preferred to single-inhaler dual higher-dose ICS and LABA as daily controller therapy plus SABA for quick relief.

- Recommendations supporting the use of maintenance and reliever therapy in 1 inhaler consisting of ICS/formoterol are

primarily based on clinical data with an ICS/formoterol dry powder inhaler product that is not approved or available in the United States. Consequently, differences in ICS/formoterol devices as well as doses must be considered when applying these recommendations in clinical practice.

2: USE OF LONG-ACTING MUSCARINIC ANTAGONISTS AS ADD-ON THERAPY

The use of long-acting muscarinic antagonist (LAMA) therapy was included for the first time in the NAEPP 2020 Focused Updates.[2] LAMAs can be used for long-term asthma control but not for quick relief to treat acute symptoms. LAMAs should not be used in individuals with or at risk of urinary retention or glaucoma.

Specific recommendations include the following in individuals age ≥12 years[2]:

- Step 3: uncontrolled on ICS maintenance therapy alone, addition of a LABA to the same dose of ICS is recommended over addition of a LAMA since 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 asthma-related hospitalization.
- Step 3: addition of a LAMA to low-dose ICS is recommended as alternative therapy if the individual cannot use a LABA.
- Step 4: addition of a LAMA to medium-dose ICS is recommended as alternative therapy for patients who cannot use a LABA.
- Step 5: for patients uncontrolled with the combination of medium-dose ICS and LABA, adding a LAMA to medium- to high-dose ICS/LABA is recommended for many individuals because its use is associated with an improvement in asthma control and quality of life with no change in exacerbations.
- Step 6: if uncontrolled on step 5 therapy that utilizes an ICS and a LABA and a LAMA, discontinue LAMA therapy.

3: FRACTIONAL EXHALED NITRIC OXIDE TESTING

Fractional exhaled nitric oxide (FeNO) testing is a biomarker for type 2, or eosinophilic, inflammation of the airway. The NAEPP 2020 Focused Updates recommend its use only in limited situations, in part because FeNO lacks specificity for asthma. FeNO is not recommended in isolation to assess asthma control, predict future exacerbations, or assess exacerbation severity, nor should it be used to predict future development of asthma.[2]

According to the NAEPP 2020 Focused Updates, FeNO testing can be used adjunctively to diagnose asthma if there is uncertainty based on history, physical examination, and spirometry, including bronchodilator responsiveness. FeNO is also recommended as part of an ongoing asthma monitoring and management strategy in individuals with persistent allergic asthma for whom there is uncertainty in choosing, monitoring, or adjusting anti-inflammatory therapy. Monitoring FeNO every 2 to 3 months has the potential benefit of reducing the incidence of asthma exacerbations.

4: ALLERGEN REDUCTION STRATEGIES IN ASTHMA MANAGEMENT

The identification of environmental factors that contribute to asthma is a cornerstone of asthma management, as described in EPR-3.[1] The EPR-3 recommended that all individuals with asthma, regardless of severity, should be assessed for exposure to allergens at home and work, for symptoms on exposure, and for sensitization either by allergy skin testing or allergen-specific immunoglobulin E (IgE). This recommendation was reiterated in the NAEPP 2020 Focused Updates.[2]

The NAEPP 2020 Focused Updates recommendations for allergen mitigation are more focused than the EPR-3 recommendations, indicating that there is no need to eliminate all potential allergens.[2] Allergen mitigation interventions are not recommended in individuals who have no history of exposure and in whom there is no evidence of sensitization and/or symptoms with exposure.

For individuals who are both exposed to and either sensitized to or develop symptoms on exposure to specific allergens, single-component allergen-specific interventions are not recommended except for pests (cockroaches and rodents).[2] Multicomponent interventions are recommended for the following:

- Exposure to cockroaches and rodents: integrated pest management to block infestation and abatement, either alone or as part of a multicomponent allergen-specific mitigation intervention
- Exposure to dust mites: impermeable pillow/mattress covers; HEPA filter–equipped vacuum, carpet/curtain removal; cleaning products only as part of a multicomponent allergen mitigation intervention, not as single-component intervention
- Mold: HEPA purifiers and mold abatement

Otherwise, individuals with symptoms related to exposure to specific indoor allergens (eg, dust mites or cat dander) should be treated using multicomponent mitigation strategies because such interventions have been shown to improve symptoms (but not individual measures of exacerbations). Multicomponent mitigation strategies to be used in combination include dust mite–impermeable pillow and mattress covers, HEPA vacuums (for children), integrated pest management, and mold mitigation.[2]

5: ROLE OF SUBCUTANEOUS AND SUBLINGUAL IMMUNOTHERAPY IN TREATMENT OF ALLERGIC ASTHMA

Immunotherapy, delivered either subcutaneously or sublin-

gually, refers to treatments used to attenuate the IgE-mediated allergic clinical response associated with asthma. Before initiating immunotherapy, individuals with asthma need to demonstrate allergic sensitization by either immediate hypersensitivity testing followed by an assessment 15 to 20 minutes later for a wheal-and-flare reaction or laboratory testing to measure the blood level of antigen-specific IgE antibody.

In the NAEPP 2020 Focused Updates, subcutaneous immunotherapy (SCIT) is recommended as adjunctive treatment for individuals aged ≥5 years with mild-moderate persistent asthma who have allergic sensitization and worsening symptoms after acute exposure on a seasonal basis. The benefit of SCIT, particularly if marginal, must be weighed against the potential for systemic reactions.

Although not recommended as a treatment specifically for asthma, sublingual immunotherapy (SLIT) has the potential to reduce the symptoms of some comorbidities such as allergic rhinitis and allergic conjunctivitis.

6: BRONCHIAL THERMOPLASTY

Bronchial thermoplasty is a physical modality used as part of a bronchoscopy that uses radio waves to reduce airway smooth muscle mass. The NAEPP 2020 Focused Updates recommend against the use of bronchial thermoplasty in adults with persistent asthma.[2] Individuals with forced expiratory volume in 1 second (FEV_1) of <50% to 60% or life-threatening asthma are not candidates. Bronchial thermoplasty may be considered for adults, eg, those with poorly controlled asthma who place a high value on potential benefits and low value on potential harms. Potential benefits include improved health-related quality of life and a small reduction in number of exacerbations. Potential harms include short-term symptom worsening and unknown long-term adverse effects.

SHARED DECISION-MAKING AND SPECIALIST REFERRAL

Important in the care of patients with asthma is a shared decision-making discussion including recommending referral for specialist assessment depending on the severity step and experience and training of the healthcare provider. This is especially important in patients with uncontrolled or difficult-to-control asthma, particularly in patients with an AIRQ score of ≥5 or ACT or CACT score of ≤15.

RESOURCES

A wide variety of resources for managing individuals with asthma are available.

- Asthma Resource Center (www.AsthmaResourceCenter.com)
  - Patient education brochures and animations in English and Spanish
  - Comparisons of NAEPP 2020 Focused Updates and Global Initiative for Asthma report
  - Asthma Checklist and asthma action plans
- Centers for Disease Control and Prevention (https://www.cdc.gov/asthma/default.htm)

REFERENCES

1. National Heart, Lung, and Blood Institute. *National Asthma Education and Prevention Program: Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma*. Published 2007. Accessed September 5, 2018. https://www.nhlbi.nih.gov/sites/default/files/media/docs/asthgdln_1.pdf
2. National Heart, Lung, and Blood Institute. *2020 Focused Updates to the Asthma Management Guidelines: A Report from the National Asthma Education and Prevention Program Coordinating Committee Expert Panel Working Group*. Published December 2020. Accessed May 5, 2021. https://www.nhlbi.nih.gov/health-topics/asthma-management-guidelines-2020-updates
3. Wang Z, Pianosi P, Keogh K, et al. *The Clinical Utility of Fractional Exhaled Nitric Oxide (FeNO) in Asthma Management*. Comparative effectiveness review no. 197. Published December 2017. Accessed May 28, 2021. https://effectivehealthcare.ahrq.gov/sites/default/files/pdf/cer-197-fractional-exhaled-nitric-oxide.pdf
4. D'Anci KE, Lynch MP, Leas BF, et al. *Effectiveness and Safety of Bronchial Thermoplasty in Management of Asthma*. Comparative effectiveness review no. 22. Published December 2017. Accessed May 28, 2021. https://effectivehealthcare.ahrq.gov/sites/default/files/pdf/cer-202-thermoplasty-final_0.pdf
5. Leas BF, D'Anci KE, Apter AJ, Bryant-Stephens T, Schoelles K, Umscheid CA. *Effectiveness of Indoor Allergen Reduction in Management of Asthma*. Comparative effectiveness review no. 201. Published February 2018. Accessed May 28, 2021. https://effectivehealthcare.ahrq.gov/sites/default/files/pdf/cer-201-indoor-allergen-reduction-asthma_3.pdf
6. Sobieraj DM, Baker WL, Weeda ER, et al. *Intermittent Inhaled Corticosteroids and Long-Acting Muscarinic Antagonists for Asthma*. Comparative effectiveness review no. 194. Published March 2018. Accessed May 28, 2021. https://effectivehealthcare.ahrq.gov/sites/default/files/pdf/cer-194-final-corticosteroids-asthma.pdf
7. Lin SY, Azar A, Suarez-Cuervo C, et al. *The Role of Immunotherapy in the Treatment of Asthma*. Comparative effectiveness review no. 196. Published March 2018. Accessed May 28, 2021. https://effectivehealthcare.ahrq.gov/sites/default/files/pdf/cer-196-full-immunotherapy-asthma.pdf
8. Juniper EF, Bousquet J, Abetz L, Bateman ED, GOAL Committee. Identifying 'well-controlled' and 'not well-controlled' asthma using the Asthma Control Questionnaire. *Respir Med*. 2006;100(4):616-621.
9. Nathan RA, Sorkness CA, Kosinski M, et al. Development of the Asthma Control Test: a survey for assessing asthma control. *J Allergy Clin Immunol*. 2004;113(1):59-65.
10. Liu AH, Zeiger R, Sorkness C, et al. Development and cross-sectional validation of the Childhood Asthma Control Test. *J Allergy Clin Immunol*. 2007;119(4):817-825.
11. Patino CM, Okelo SO, Rand CS, et al. The Asthma Control and Communication Instrument: a clinical tool developed for ethnically diverse populations. *J Allergy Clin Immunol*. 2008;122(5):936-943.e6.
12. Okelo SO, Eakin MN, Patino CM, et al. The Pediatric Asthma Control and Communication Instrument asthma questionnaire: for use in diverse children of all ages. *J Allergy Clin Immunol*. 2013;132(1):55-62.
13. Murphy KR, Chipps B, Beuther DA, et al; US PRECISION Advisory Board. Development of the Asthma Impairment and Risk Questionnaire (AIRQ): a composite control measure. *J Allergy Clin Immunol Pract*. 2020;8(7):2263-2274.e5.
14. Wildfire JJ, Gergen PJ, Sorkness CA, et al. Development and validation of the Composite Asthma Severity Index—an outcome measure for use in children and adolescents. *J Allergy Clin Immunol*. 2012;129(3):694-701.
15. Murphy KR, Zeiger RS, Kosinski M, et al. Test for Respiratory and Asthma Control in Kids (TRACK): a caregiver-completed questionnaire for preschool-aged children. *J Allergy Clin Immunol*. 2009;123(4):833-839.e9.
16. Price DB, Trudo F, Voorham J, et al. Adverse outcomes from initiation of systemic corticosteroids for asthma: long-term observational study. *J Asthma Allergy*. 2018;11:193-204.
17. Waljee AK, Rogers MA, Lin P, et al. Short term use of oral corticosteroids and related harms among adults in the United States: population based cohort study. *BMJ*. 2017;357:j1415.
18. Sullivan PW, Ghushchyan VH, Globe G, Schatz M. Oral corticosteroid exposure and adverse effects in asthmatic patients. *J Allergy Clin Immunol*. 2018;141(1):110-116.e7.
19. Zeiger R, Sullivan P, Chung Y, Kreindler JL, Zimmerman NM, Tkacz J. Systemic corticosteroid-related complications and costs in adults with persistent asthma. *J Allergy Clin Immunol Pract*. 2020;8(10):3455-3465.e13.
20. Price D, Castro M, Bourdin A, Fucile S, Altman P. Short-course systemic corticosteroids in asthma: striking the balance between efficacy and safety. *Eur Respir Rev*. 2020;29(155):190151.