

**National Heart, Lung, and Blood  
Advisory Council Asthma Expert  
Working Group**

**Draft Needs Assessment Report for  
Potential Update of the Expert Panel  
Report-3 (2007):  
Guidelines for the Diagnosis and  
Management of Asthma  
January 2015**

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## **INTRODUCTION**

The National Heart, Lung, and Blood Advisory Council (NHLBAC) in 2012 issued a report recommending that NHLBI continue to participate in the production of clinical practice guidelines, primarily by partnering with professional societies, or by creating stand-alone guidelines if the need is great and there is no other sponsoring organization. NHLBAC further recommended that an assessment of need for a guideline, mechanisms for selecting guideline topics, and discussion of NHLBI's potential role be conducted before NHLBI gets involved in guideline /update activity.

This draft report presents the results of the NHLBAC Asthma Expert Working Group's needs assessment regarding a potential update to the 2007 National Asthma Education and Prevention Program's (NAEPP) Expert Panel Report-3: Guidelines for the Diagnosis and Management of Asthma, and the recommendation that the Guidelines be updated on selected topics, with the NHLBI continuing to support and coordinate the production of the Guidelines through the NAEPP. First, the draft report briefly describes the history of NAEPP guidelines in order to put the recommendation for an update in context. A description of the needs assessment methods and recommendations for selected topics and NAEPP roles in an update process follows.

## **NATIONAL ASTHMA EDUCATION AND PREVENTION PROGRAM (NAEPP) PROGRAM AND GUIDELINES**

The NAEPP is composed of over 37 national level organizations—professional societies, lay voluntary and patient groups, and federal agencies. It was established in 1989 to address the rising burden of asthma, reflected in increasing mortality and morbidity rates, by translating research advances in managing the disease into consistent messages about “best practices” for diverse stakeholders to give to their constituencies—primary health care physicians, specialists, nurses, pharmacists, respiratory therapists and educators, patients, government agencies, and the public. Further, the NAEPP provides a forum for NAEPP Coordinating Committee members to collaborate on educational programs. Essential to the NAEPP is that all members have participated in the guidelines process, coordinated by what was considered a neutral party—the NHLBI, and thus the guidelines have been perceived as “everyone’s guidelines.” Also important to the NAEPP members is that the guidelines are independent of commercial interests. An essential feature of guidelines for NHLBI is their dynamic interaction with research; in reviewing literature and developing recommendations, gaps in knowledge are identified and questions from clinicians are raised as they implement recommendations. This, in turn, helps set a research agenda, the results of which inform guidelines’ updates.

The first NAEPP Expert Panel Report was published in 1991, with subsequent updates in 1997, 2002 (on selected topics only), and 2007. Although the methodology used for the products increased in sophistication and rigor over time in line with evolving reports on standards for guidelines from the Institute of Medicine, the overall process used has been similar. The following is a brief outline of the key components of the process.

- The NAEPP convenes an Expert Panel that reports to all of NAEPP and is coordinated and staffed by NHLBI. The Panel is not selected on the basis of professional society affiliation; rather, the

panel is selected to ensure the right expertise for the questions being addressed and to include a broad perspective of expertise—i.e., multiple specialties—allergy, pulmonology, primary care, nursing, behavioral science, pharmacology.

- The Panel oversees systematic reviews; more recently, these have been contracted out, e.g., to an Agency for Healthcare Research and Quality (AHRQ) Evidence Practice Center or using a contracted methodologist working with the panel.
- The Panel reviews the evidence, including the evidence tables summarizing the weight of the evidence, and discusses the implications for clinical practice, and drafts its report over the course of several in-person meetings and multiple conference calls. After consensus among the Panel members, the report is sent to the NAEPP Coordinating Committee.
- The NAEPP Coordinating Committee members are representatives of their organizations; as such, they work with the appropriate committees within their organization to review and comment on the Expert Panel Report.
- The Panel makes revisions as appropriate and the report is submitted for public comment.
- The Panel reviews public comments and makes additional revisions as needed and sends the report back to the NAEPP Coordinating Committee for final review and endorsement.
- The NAEPP Expert Panel Report is released as a full report with evidence tables, an executive summary, and quick reference guide. NAEPP committees work together, or NAEPP member organizations on their own, prepare “satellite” products extracting the messages from the guidelines most relevant to their audience (e.g., a guide for nurses or respiratory therapists).
- In 2007, the NAEPP also established a Guidelines Implementation Panel to review implementation strategies and prepare recommendations for different clinical, public health, administrative, and government program officials to enhance dissemination and adoption of the guidelines. (National Heart, Lung, and Blood Institute, Guidelines Implementation Panel Report: Partners Putting Guidelines Into Action. 2008; NIH Publication Number 09-7147).

The cumulative impact of these NAEPP partner activities has likely contributed to the recent declines in asthma mortality and morbidity, with improvements in day-to-day control for people with asthma. For example, since the 1980’s, the number of people who have asthma has more than doubled, but since 1989, there have been about 23% fewer deaths due to asthma. Further, the guidelines have identified gaps in asthma knowledge and suggested priorities for research, which NHLBI’s clinical research networks have been addressing.

Because health care societies, patient organizations, and government agencies rely on guidelines to inform their decision making, many organizations and guidelines’ clearinghouses consider a guideline obsolete if it is not reviewed after five years and a determination made regarding whether it should be updated. Therefore, the NAEPP agreed a review of the guidelines should be conducted and it should focus on selected topics. The NAEPP envisioned the guidelines as a “living document” with updates on selected topics every two to three years rather than comprehensive reviews every five to seven years. A process was developed to identify priority topics. To align with the NHLBAC expectation for an overall needs assessment, a Working Group of NHLBAC was established to conduct a needs assessment, which is composed of 2007 NAEPP Expert Panel Report subcommittee chairs and members of NHLBAC and Board of External Experts (see roster in Appendix).

## NHLBAC ASTHMA EXPERT WORKING GROUP NEEDS ASSESSMENT FOR A GUIDELINES UPDATE

The Asthma Expert Working Group (Working Group) met on April 3-4, 2014 and on January 13, 2015 to assist the NHLBI in an assessment of the need for a potential update to the [Expert Panel Report-3: Guidelines for the Diagnosis and Management of Asthma](#) (hereinafter referred to as the Guidelines). The goal of the meetings was to answer three primary questions, based on a review of information from a variety of sources and the group members' respective scientific and clinical expertise and experience in developing and disseminating guidelines. The primary questions were:

1. Is an update to the Guidelines warranted at this time—have there been enough advances in science to merit update to the Guidelines?
2. If an update is warranted, what topics have the highest priority, and what specific question(s) should be asked for each topic?
3. How might an update best be organized relative to NHLBI and National Asthma Education and Prevention Program (NAEPP) member organizations' respective involvement?

### Information Sources

Working Group members were provided the information resources described below prior to the April 2014 and/or January 2015 meetings.

- **2007 Expert Panel Members**  
Twelve of the original 18 members of the 2007 Expert Panel completed worksheets (one is deceased, one relocated to private industry, two retired, and two did not respond), ranking each of the 187 recommendations in the current Guidelines on a scale of 1 to 4 (1=no update needed to 4=high priority) regarding its priority for a potential update. The NHLBI received 268 comments for 117 of the recommendations.
  - Working Group members reviewed all comments prior to the meeting and focused discussion at the meeting on those recommendations that received greater than 50 percent of respondents ranking it medium or high priority.
- **NAEPP Coordinating Committee, Guidelines Implementation Panel Members, Members of National Asthma Control Program Projects, Affiliated with the NAEPP Coordinating Committee**  
A teleconference was held as a listening session and the 37 participants were posed three questions to elicit their opinion on the need for and value of updating the Guidelines as well as their thoughts on the approach for organizing an update.
  - Working Group members reviewed the summary report.
- **NAEPP Coordinating Committee Representatives**  
The NHLBI made individual telephone conference calls to eight Coordinating Committee members who represent professional medical societies to gather the member organization's opinions about the range of involvement from the societies that might be feasible and desirable.
  - Working Group members reviewed the summary report.
- **Public (Request for Information)**  
The NHLBI issued a Request for Information (RFI) in the NIH Guide for Grants and Contracts for topics to be considered for a potential update to the Guidelines. The NHLBI received 95

responses from the scientific, medical, patient/public, and advocacy communities with an interest in asthma.

- Working Group members were provided a spreadsheet with the actual RFI responses as well as a summary tally of the responses categorized by broad topic.

- **Public (Public Comment)**

Following completion of a draft needs assessment report by the Working Group, the NHLBI offered an opportunity for the public to send written public comments on the report. The public comment period occurred November 20, 2014–January 05, 2015. The NHLBI received 20 public comment responses from a variety of sources including the scientific, medical, and patient/public communities, as well as professional organizations and industry groups with an interest in asthma.

- Working Group members were provided with a copy of all public comment responses as well as a summary tally of the responses categorized by broad topic.

## Working Group Approach

Working Group members discussed the reports from each of the information sources in addition to feedback obtained from the written public comments. While the original intent was to identify 5 high priority topics, the Working Group noted that many topics and questions were raised and it would be challenging to limit selection to five priorities. Ultimately, the group identified 6 high priority topics, as detailed in the narrative summary below. Critical in the Working Group’s consideration, as potential topics arose, was whether each potential topic met two objectives:

- There is sufficient new science to warrant a systematic literature review to inform a possible revision to the Guidelines.
- There is a potentially high significance or large impact of a revision of a topic on asthma management.

### Topic Selection

During their initial review of information at the April 2014 meeting and subsequently, at the January 2015 meeting, Working Group members ascertained that there were two distinct categories of topics raised by the information sources:

1. High priority topics to consider for immediate systematic review and guidelines update—those that met the two objectives listed above; and
2. Topics that should be acknowledged in an update but do not require systematic review because they are either:
  - a. Emerging topics for which there was strong interest expressed and there are some ongoing scientific investigations that merit mentioning the topic as an “up and coming” issue in asthma management, but for which there is not yet sufficient published literature to support a review; or
  - b. Topics that require a concise amendment to clarify an existing statement due to questions raised in the needs assessment.

At the April 2014 meeting, five preliminary high priority topics for systematic review and update and nine topics for acknowledgement but not systematic review were identified during the discussion of background information and assessment of public comments. The high priority topics were ranked individually by each of the Working Group members, with the total results scored in order to enumerate the five topics in priority order. Working Group members refined each topic by developing the specific

questions for review and update that would accompany each. They also reviewed the topics for acknowledgement, but not review, and the recommended action to be taken within a Guidelines update.

A draft needs assessment report (April 2014) was developed that summarized the findings and conclusions of the needs assessment and recommendations of the Working Group. The Workgroup draft report was presented to the NHLBAC at its June 11, 2014 meeting. The NHLBI then offered an opportunity for the public to send written comments on the draft needs assessment report. The public comment period occurred November 20, 2014–January 5, 2015. Public comments were received from individuals from the scientific, medical, and patient/public communities with an interest in asthma. Working Group members then reconvened on January 13, 2015, to assess the public comments. As a result of this assessment, one topic was elevated from among the original list of topics for acknowledgment to become the sixth high priority topic; similarly, three additional topics were added to the list for acknowledgment but not review, bringing that total to 11.

#### Specific Question Development

Working Group Members used an evidence-based decision-making process, PICO, to identify specific questions within each of the high priority topics, identifying the (P) patient population of interest; (I) intervention or variable of interest; (C) comparator/control; and (O) outcome of interest. Through this process the group further refined the selected priority topics.

### **Working Group Recommendations**

The Working Group unanimously agreed on their responses to the three primary questions posed at the beginning of the meeting:

#### **Have there been enough advances in science to merit update to the Guidelines?**

- An update is warranted at this time.
- The update should take the form of an electronic living document, such that the revisions are visibly marked on the current on-line version of the Guidelines (EPR-3). In addition, the Working Group thought it important to have a stand-alone summary document similar to that undertaken for the Guidelines Update 2002, which presented the question posed for the systematic review, the answer in the form of a recommendation to guide clinical decision making, and a brief rationale for the answer that reflected the literature review.
- An update should be accompanied by plans to promote implementation of the Guidelines and the update.

#### **What topics have the highest priority for a systematic literature review and Guidelines' update?**

The Working Group commented on the enthusiasm with which all information sources responded to the needs assessment. The RFI responses in particular included a wide range of topics to consider, although clear “clusters” of questions emerged. The Working Group acknowledged that not all questions could be addressed at once, and their charge was to prioritize. The Working Group members identified six high priority topics and accompanying questions that merit a systematic literature review to inform an update to the Guidelines. The topics, with a brief summary of key issues considered by the Working Group, are listed below. Refer to Table 1 for presentation of the associated PICO review questions for each topic.

- *Role of Adjustable Medication Dosing in Recurrent Wheezing and Asthma.* Many people from the information sources referred to this topic area as “Intermittent Therapy,” which encompasses several different methods for adjusting the dosing regimen for inhaled corticosteroids (ICSs), particularly the administration of ICSs intermittently on an as needed basis rather than, or in addition to, a daily dose given long term for asthma control. Thus, the Working Group developed specific review questions to reflect different methods for adjustable dosing. Very little literature was available on this topic in 2007, and, in the case of fast onset, long acting beta agonists, this medication was not yet available in the United States. Publication of numerous articles since 2007 has generated requests for guidance. A systematic review would be important to evaluate the quality and weight of the literature and whether a new recommendation should be developed in order to ensure sufficient justification for changing current recommendations. The potential impact of a recommendation on “intermittent” therapy in terms of cost savings, sparing potential side effects of ICSs, especially in children, and possibly reducing the need for oral corticosteroids also led to this being ranked a high priority.
- *Role of Long Acting Anti-Muscarinic Agents (LAMAs) in Asthma Management as Add-on to ICSs.* This medication was not mentioned as a therapeutic option in the EPR-3; since that time, it has been studied by several different investigators. Given the possibility that LAMAs might be used as an alternative to long-acting beta agonists (LABAs), for which there is currently an FDA black box warning, there were strong requests for guidance on the role of this agent in the step-wise care for asthma. Further, there was interest in reviewing the use of LAMAs as add-on to ICSs plus LABAs when control is not achieved with high dose ICS plus LABA (a group of patients with few therapeutic options).
- *Role of Bronchial Thermoplasty in Adult Severe Asthma.* This is a novel intervention for asthma that had not been sufficiently studied for mention in EPR-3; since that time there have been several studies and some Cochrane-level systematic reviews as well as FDA approval. Treating severe asthma is a puzzling and recurring question raised by clinicians and patients alike. A review of efficacy and safety data will help primary clinicians and patients understand if and when it might be appropriate to consider referral for this treatment.
- *Role of Fractional exhaled Nitric Oxide (FeNO) in Diagnosis, Medication Selection, and Monitoring Treatment Response in Asthma.* While a relatively new biomarker in 2007, numerous studies have been conducted on the application of FeNO in asthma management since then. Increasing interest in the use of biomarkers to advance “precision medicine” (e.g., tailor selection and monitoring of medication, coupled with the availability of literature on FeNO) led to a high ranking of this topic.
- *Role of Remediation of Indoor Allergens (House Dust Mites/Pets) in Asthma Management.* Interest in this topic took several forms from the information sources, in terms of requests for general update on information for the role of reducing exposures to allergens in the context of either comprehensive or single remediation efforts. The current Guidelines note that single efforts are seldom effective in and of themselves, but there is evidence on the efficacy of comprehensive, multi-component interventions aimed at reducing exposures to which the individual is sensitive. The Working Group’s proposal to the single interventions of carpet removal and pillow/mattress covers for remediation of indoor house dust mite and pet allergens as a priority topic, resulted from several considerations, including a lack of substantial new information on comprehensive remediation but some new evidence on single interventions that may lead to a change in the recommendation, coupled with specific questions regarding the clarity and strength of the recommendations in the current guidelines, as well as the potential impact of these recommendations on patient burden.

- *Role of Immunotherapy in the treatment of asthma.* Immunotherapy is an evolving topic area and questions remain about issues such as administration of subcutaneous extracts at home and the use of sublingual immunotherapy. This topic is of substantial interest, both to patients and in practice. A number of new studies have been published since the 2007 guidelines that warrant a more thorough review.

In addition to the priority topics outlined above, the Working Group ultimately identified 11 topics for acknowledgement but that are not ready for a systematic update. They warrant some mention in an update because: 1) there is active interest in this area and ongoing research, but not likely to be sufficient published literature to support a systematic review or specific clinical recommendation; however the topic area should be acknowledged as an “up and coming” area of clinical research; or 2) the topic requires a concise amendment of an existing recommendation but does not need a systematic literature review to support it. Refer to Table 2 for a complete list of these topics for acknowledgement and the key points the Working Group recommended be addressed in the acknowledgement within a Guidelines update.

**How might an update best be organized relative to NHLBI and NAEPP member organizations’ respective involvement?**

Working group members agreed that:

- The NHLBI should continue its role of coordination of the Guidelines to ensure the impartiality, credibility, and widespread acceptance of the product. The Working Group affirmed the strongly voiced opinions by NAEPP Coordinating Committee members that a major strength of the NAEPP Guidelines is that multiple organizations, including primary care and multiple sub-specialties as well as educational organizations and lay voluntary groups participated in their development and consider these “everyone’s guidelines.” These are not one sub-specialty “telling everyone else how to manage asthma.” Even those medical societies who expressed willingness and resources to take leadership on one particular topic, but not all, conveyed concerns about how the rest of the asthma community would accept the product coming from just one or two organizations. These individuals expressed the need for some central, neutral coordination of multiple topics. NAEPP is unique in that over 37 organizations participate, and it should have a central, neutral party to organize and convene the group and coordinate its activities. There was endorsement of the model used previously in which an Expert Panel convened by the NAEPP would use results of systematic literature reviews to draft clinical recommendations for an update; the draft would be peer reviewed by each NAEPP Coordinating Committee organization and presented for public comment, with subsequent revisions and final NAEPP Coordinating Committee approval.
- To further ensure active partnerships among NAEPP members, it was suggested that before an Update is undertaken, each NAEPP organization should submit a specific plan indicating commitment and strategies for implementing the final report within its organization.
- There are no other organizations in the United States that develop comprehensive guidelines for asthma management. Several sub-specialty societies in the U.S. occasionally prepare independent statements on particular topics of interest to their sub-specialty (e.g., American Thoracic Society/European Respiratory Society joint statements on definitions of severe asthma, or Joint Council of Allergy and Immunology practice parameters for allergists). However, these are not intended to be clinical practice guidelines for diverse or widespread adoption. A number of professional societies have developed educational products based on the NAEPP guidelines that are geared to and “branded” for their sub-specialty (e.g., “Promoting Best Practices:

Pediatric Asthma,") but these products carefully maintain fidelity to the NAEPP Guidelines' recommendations. On an International basis, there are several separate guidelines developed by individual organizations within a country to be suitable to that country's health care delivery system (e.g., United Kingdom, Australia, Canada, and Denmark). The Global Initiative for Asthma (GINA) is an international consensus program that presents recommendations for comprehensive asthma management strategies and educational materials to help countries, with a particular interest in developing countries, adapt the recommendations to their local health care and cultural circumstances. GINA advisors are from all over the world, with predominance from Europe and Canada, and often include a few advisors from the U.S. who have also served on NAEPP expert panels. The GINA effort is funded by a consortium of pharmaceutical companies and sales of GINA materials, the long-term sustainability is not known, and the literature reviews and drafting processes do not incorporate all guidelines development methods promulgated by the Institute of Medicine. These factors preclude expectation that the GINA report would be a substitute for NAEPP.

**Table 1: Priority Topics and Associated Questions, in Rank Order  
(Priority Questions within Each Topic Are in Bold)**

	<b>P: Population of Interest</b>	<b>I: Intervention/ Variable of Interest</b>	<b>C: Comparator/ Control</b>	<b>O: Outcome(s) of Interest</b>
<b>1-Role of Adjustable Medication Dosing in Recurrent Wheezing and Asthma</b>				
<b>Episodic ICS treatment</b>	Ages 0-4 years; Recurrent wheezing; Step 1	Episodic ICS treatment	Usual care/other controller therapies	Systemic corticosteroid requirement
<b>Regular vs. as needed ICS (+SABA) in mild persistent asthma</b>	Ages 5 and older; Step 2	ICS as needed with and without concomitant short- acting beta agonists (SABA)	Daily ICS	Asthma control*
<b>Use of ICS/LABA therapy for maintenance and reliever compared with higher dose maintenance therapy</b>	Ages 5 and older; Step 3 and above	As needed ICS/LABA	Higher ICS maintenance	Asthma control*
<b>2-Role of LAMA in Asthma Management as Add-on to ICS</b>				
<b>LAMA vs. placebo</b>	Adults; Uncontrolled Step 2 OR Step 3 and above	LAMA	Placebo	Asthma control*
<b>LAMA vs. LABA</b>	Adults; Uncontrolled Step 2 OR Step 3 and above	LAMA	LABA	Asthma control*
<b>Triple therapy</b>	Adults; Step 4 and above	LABA plus LAMA	LABA	Asthma control*
<b>3-Role of Bronchial Thermoplasty in Adult Severe Asthma</b>				
<b>Role in severe asthma</b>	Adults, ages 18 and over; Uncontrolled Step 4 OR Steps 5 and 6	Bronchial Thermoplasty	Standard treatment (no thermoplasty)	Asthma control* and safety

	<b>P: Population of Interest</b>	<b>I: Intervention/ Variable of Interest</b>	<b>C: Comparator/ Control</b>	<b>O: Outcome(s) of Interest</b>
<b>4-Role of Fractional Exhaled Nitric Oxide (FeNO) in Diagnosis, Medication Selection, and Monitoring Treatment Response in Asthma (priority of questions is in parenthesis)</b>				
(3) Role in diagnosis of asthma	All ages (divided into 3 EPR3 age groups)	FeNO	Standard approach (clinical, school settings, etc.)	Improved accuracy of diagnosis
(4) Role as predictor of future asthma (cohort study)	Ages 0 to 4 years; Recurrent wheezing	FeNO (cohort study)	Not applicable	Incident asthma age 6 and above
<b>(1) Role in selection of medication (effect modification in RCT)</b> a. ICS b. Omalizumab	Ages 5 and older a. Step 2 and 3 therapy b. Steps 4, 5, 6	FeNO (effect modifier)	Not applicable	Effectiveness of medication on asthma control
<b>(2) Role in monitoring response to ICS therapy</b>	Ages 5 and older; Step 2 and above	FeNO (with algorithm)	Absence of FeNO (with algorithm)	Asthma control*
<b>5-Role of Remediation of Indoor Allergens (House Dust Mites/Pets) in Asthma Management</b>				
Does carpet removal contribute to asthma control a. In patients sensitive to house dust mites b. In patients sensitive to animal dander	All ages; Steps 1-6	Carpet removal	No carpet removal	Asthma control* and reduced allergen levels
Does encasing of mattresses and/or pillows in impermeable covers contribute to asthma control in patients sensitive to house dust mites	All ages; Steps 1-6	Encasement of mattresses and/or pillows in impermeable covers	No encasement of mattresses and/or pillows in impermeable covers	Asthma control* and reduced allergen levels

	<b>P: Population of Interest</b>	<b>I: Intervention/ Variable of Interest</b>	<b>C: Comparator/ Control</b>	<b>O: Outcome(s) of Interest</b>
<b>6-Role of Immunotherapy in Treatment of Asthma</b>				
Subcutaneous Immunotherapy as effective and safe in the treatment of asthma	Ages 5 and older; allergic asthma; Steps 2, 3, 4	Subcutaneous Immunotherapy	Placebo; also usual care	Asthma control* and safety
Sublingual Immunotherapy as effective and safe in the treatment of asthma	Ages 5 and older; allergic asthma; Steps 2, 3, 4	Sublingual Immunotherapy	Placebo; also usual care	Asthma control* and safety

\* Asthma Control as defined by EPR-3 plus quality of life.

Key to Acronyms: ICS: Inhaled Corticosteroids; LABA: Long Acting Beta Agonist; LAMA: Long Acting Anti-Muscarinic; RCT: randomized controlled trial; SABA: Short Acting Beta Agonist

**Table 2: Topics for Acknowledgement in an Update, but Not Systematic Review**

Emerging Topic	Key Points
Prevention of Asthma Onset	Note that this is an emerging area of study, and add a reference to the NHLBI Prevention workshop which outlines the state of the field and recommendations for clinical trials. ( <i>Ann Am Thorac Soc</i> 2014 Apr; 11 Suppl 3, multiple articles).
Biomarkers (Other than FeNO)	Acknowledge that biomarkers other than FeNO, e.g., periostin, eosinophils, and IgE, are under active investigation, and show promise for future clinical application, but are not yet ready for review.
Classifying Asthma Severity	Acknowledge the potential confusion over classification of asthma severity—for characterizing the chronic condition as well as classifying exacerbations in order to tailor acute treatments. Reaffirm that the Guidelines emphasize that once a person’s asthma is under control, the level of severity is determined by the amount of medication required to maintain control and this is a useful patient characterization for clinical and research purposes. Also note the ongoing research efforts dedicated to developing more precise characterization of chronic, severe asthma that may inform future guidelines.
Physiological Assessments	Impulse oscillometry, and methods of bronchial provocation, are under active investigation, and show promise for future clinical applications.
Biologics	Acknowledge emerging research on certain biologics, such as anti-interleukin-5 (IL-5) and anti-IL-13-specific drugs, and their potential in the near future to contribute to asthma management.
Asthma Action Plans	Asthma action plans are an integral part of the asthma care paradigm. Their effectiveness has not been fully assessed and there is a need to continue to monitor the emerging literature. There is not a sufficient body of literature (since 2007) to support an evidence review at this time.
Role of Community Health Workers in Asthma Management	Interest in this topic was expressed in several topic categories, and included questions regarding the effectiveness of home visits (to assess environmental exposures and ways to reduce exposure for patients who are sensitive to specific allergens or irritants) in improving asthma control, and questions about the role of community health workers in providing home visits (compared to nurses, social workers, or other providers), and the integration of such visits with medical care. There is not a sufficient body of literature to date that can help separate these questions and adequately address each. This is an important area for further studies, given emerging changes in health care delivery with emphasis on integrated health care teams and increasing number of public health incorporating home visits for preventive care for a number of conditions

Asthma Heterogeneity	Acknowledge the ongoing research on various phenotypes (e.g., Th2-high, Th2-low, and the overlap syndrome) and endotypes in asthma, which is advancing the understanding of the complexity and heterogeneity of the disease and may be moving the field closer, along with genotype studies, to applying principles of personalized medicine to asthma treatment.
Adherence	Acknowledge that strong interest was raised about how to identify non-adherent patients and how to improve adherence, which is an ongoing clinical problem. There is an emerging body of literature regarding the use of electronic technologies to boost adherence, and more may be forthcoming to warrant a systematic review in the future.
LABA Safety	The issue of LABA safety is the subject of several large scale, ongoing studies scheduled for completion in 2016–2017 and a systematic review of literature might best wait until then.
Step-down from Maintenance Therapy	This is an important topic area with new literature emerging yet there is limited information at this time to recommend changes.
<b>TOPICS FOR CONCISE AMENDMENT</b>	<b>Key Points</b>
Medication Charts—Removal	Remove drugs from medication charts that are no longer available (e.g., cromolyn, nedocromil).
Medication Charts—Addition	Add dexamethasone to all medication charts where systemic corticosteroids are listed, since it is widely available and now commonly used in practice.
Step-wise Approach – Clarification	Clarify that other medications should be tried within a Step prior to moving up to the next Step.

## Appendix: NHLBAC Asthma Expert Panel Working Group Roster

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