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## Summary of the 2020 focused updates to U.S. Asthma Management Guidelines: What has changed and what hasn't?

Jennifer R. Mammen

Colleen M. McGovern

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**Summary of the 2020 focused updates to U.S. Asthma Management Guidelines: What has changed and what hasn't?**

Authors: Jennifer R. Mammen, PhD NP-BC,<sup>1</sup> Colleen M. McGovern, PhD MPH RN<sup>2</sup>

1. University of Rhode Island, College of Nursing, Kingston RI
2. University of North Carolina-Greensboro, Greensboro, NC

**Author contributions:**

Jennifer Mammen – drafting and revising of manuscript

Colleen McGovern – drafting and revising of manuscript

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**Corresponding Author:**

Jennifer Mammen

[jmammen@uri.edu](mailto:jmammen@uri.edu)

University of Rhode Island College of Nursing,  
350 Eddy Street,  
Providence RI

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Asthma is one of the most common, treatable, chronic respiratory conditions in the United States (US) and globally. Despite availability of effective treatment, the majority of pediatric and adult patients with persistent asthma have chronically uncontrolled symptoms (Center for Disease Control, 2016). This is often attributed to patient-level factors such as lack of adherence to prescribed treatment and poor self-management. However, increasing evidence indicates clinicians play a major role in national patterns of sub-optimal asthma management. In particular, it has been shown that clinicians often do not assess and manage asthma appropriately, and that lack of effective medication management (i.e., adherence to prescribing guidelines) subsequently decreases patient adherence to controller medications (Akinbami et al., 2019). Thus, improving patient outcomes requires improving asthma management by healthcare providers, including increasing familiarity with best-practice guidelines. Therefore, the purpose of this brief report is to (1) summarize key points of current guidelines for asthma management and (2) delineate important changes enacted by the recent 2020 Expert Panel Report-4 (EPR-4) updates.

The National Asthma Education and Prevention Program (NAEPP) developed the first set of U.S. asthma management guidelines in 1991. In 2007, the NAEPP Expert Panel Report-3 (EPR-3) released a comprehensive set of guidelines that summarized research-to-date and provided detailed "best practice" guidelines for clinical asthma management (National Asthma Education and Prevention Program, 2007). This included defining criteria for classification of asthma *severity* and *control* based on patterns of symptoms, medication use, exacerbation history, and spirometry, along with recommendations for selecting appropriate *stepwise therapy*

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### Abstract

Despite availability of effective medications, the majority of pediatric and adult patients with persistent asthma have uncontrolled symptoms. This has been attributed to patient non-adherence and poor self-management, but clinicians also contribute through inaccurate assessment of asthma and lack of familiarity with best practice guidelines for medication management. Thus, improving patient outcomes will require improving clinical management by healthcare providers, including utilization of evidence-based practice guidelines. In this report, we briefly summarize key points of the national guidelines for asthma management and delineate important changes enacted by 2020 Expert Panel Report-4 updates. These include revised recommendations on the use of fractional exhaled nitric oxide testing (FeNO), indoor allergen mitigation, bronchial thermoplasty, adjunctive immunotherapy, and important modifications to medication management that are likely to have wide-spread impact on prescribing throughout the United States. In particular, for all patients ages 5 and older taking Stepwise therapy levels 3-4, it is now recommend to use *single maintenance and reliever therapy* (SMART), whereas use of *intermittent* inhaled corticosteroids (ICS) administered at the same time as short-acting beta agonist (SABA) is recommended for Step 2 to reduce symptom burden, improve control, and minimize total ICS dose.

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24 (i.e., systematic, incremental increases in controller medication doses) corresponding with the  
25 level of severity and control (National Heart Lung and Blood Institutes, 2011).

26 From 2007 to 2020, no further updates were published. While the Global Initiative for  
27 Asthma (GINA) released annual updates reflecting a rapidly-evolving global science of asthma  
28 management, U.S. guidelines remained static (Global Initiative for Asthma, 2020). In December  
29 2020, the long-awaited EPR-4 released a number of selected updates to EPR-3 (National Heart  
30 Lung and Blood Institute, 2020). These are summarized below, along with core  
31 recommendations that remain unchanged from EPR-3.

32 Unchanged core recommendations for all ages include:

- 33 (1) ***Classification of asthma severity*** quantitatively by frequency of daytime symptoms,  
34 nocturnal wakening, activity limitations, short-acting beta-agonist (SABA) use,  
35 exacerbations requiring oral corticosteroid (OCS) use, and FEV1%<sub>predicted</sub>;
- 36 (2) ***Classification of asthma control*** by preceding criteria but utilizing different  
37 thresholds;
- 38 (3) ***Use of stepwise therapy that corresponds with level of severity and control***, with  
39 recommendation to seek expert help for all patients at Step 4 and above;
- 40 (4) ***Treatment of non-life-threatening asthma exacerbations*** with one SABA treatment  
41 (range 2 to 6 puffs) every 20 minutes as needed based on severity, up to three times in  
42 one-hour prior to seeking emergency care, *and* consider short course of OCS;
- 43 (5) ***Emphasis on self-management training*** to be provided at each asthma-related visit;  
44 and
- 45 (6) ***Reevaluation of uncontrolled asthma*** every 2-6 weeks until controlled and every 3-6  
46 months thereafter.

47

48 EPR-4 changes to previous guidelines for management and treatment of asthma include  
49 modifications to several therapeutic areas (Cloutier et al., 2020).

50 (1) **Fractional exhaled nitric oxide testing (FeNO)** should not be used to assess severity  
51 of asthma exacerbations or to determine treatment. FeNO testing may be considered  
52 for the diagnosis of allergic asthma in conjunction with history and exam, particularly  
53 if spirometry results are unclear. FeNO may also be used as part of an ongoing  
54 management plan that includes regular FeNO testing.

55 (2) **Indoor allergen mitigation** (e.g., dust mite covers) is not routinely recommended,  
56 unless the patient has a history of atopic (allergic type) asthma. For those with atopic  
57 asthma, a multimodal approach to allergen mitigation should be used to increase  
58 efficacy.

59 (3) **Bronchial thermoplasty** (i.e., high heat directed at the bronchial walls to reduce  
60 hyperresponsiveness and bronchospasm), is no longer recommended based on  
61 procedural risk and limited evidence of efficacy.

62 (4) **Adjunctive subcutaneous immunotherapy (SCIT)** may be used in patients with  
63 moderate persistent atopic asthma, but should be avoided in patients with severe  
64 asthma. SCIT should not be administered during exacerbations due to increased risk  
65 of adverse events. Use of sublingual immunotherapy is not recommended, based on  
66 limited evidence of efficacy.

67 (5) **Changes to first-line medication management** of adults and children, will likely  
68 result in major shifts in prescribing practices across the United States.

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69           These important changes to medication management can be briefly summarized as  
70 follows:

- 71           (1) For children ages 0-4 years with recurrent wheezing, consider initiating a 7-10 day  
72           course of inhaled corticosteroids at onset of upper respiratory infection;
- 73           (2) For Step 2 (mild persistent asthma), consider use of *intermittent* low-dose inhaled  
74           corticosteroids (ICS) for adults and children ages 5+ years;
- 75           (3) For Steps 3 and 4 (moderate persistent asthma), use of low- to medium-dose *Single*  
76           *Maintenance and Reliever Therapy* (SMART) is strongly recommended as first-line  
77           treatment for patients ages 5 years and older;
- 78           (4) For Step 5 (severe persistent asthma), in adults and children over 12 years, consider  
79           adding long-acting muscarinic agonist (LAMA) to daily ICS and LABA;
- 80           (5) For patients with Type 2 allergic asthma, consider adjunct use of immunotherapy in  
81           patients with worsening symptoms following exposure to allergens.

82           The introduction of SMART therapy and intermittent use of inhaled corticosteroids for  
83 mild asthma are the most significant prescribing changes that have occurred with EPR-4.  
84 SMART is the use of ICS together with formoterol (LABA) for both daily (controller) *and* as  
85 needed (rescue), instead of SABA alone. Use of SMART has been shown to reduce  
86 exacerbation risk and improve asthma control and quality of life. For this reason, SMART has  
87 been the preferred treatment globally for several years, however is only recently being integrated  
88 into US standards of care. Similarly, *intermittent* use of ICS with LABA or SABA as needed for  
89 symptom relief in mild asthma has been shown to reduce total ICS exposure and improve  
90 symptom control, with equivalent or superior reduction in risk of acute exacerbation. Based on  
91 these changes, for patients with mild to moderate persistent asthma, it is no longer recommended

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92 to increase the daily dose of ICS during respiratory infection; those using SMART or as needed  
93 ICS will automatically receive additional ICS with increased rescue puffs.

94         Currently, Formoterol is the only LABA that is recommended for use in this manner, as  
95 the evidence for these changes was derived from formoterol-based studies. For children ages 5-  
96 11 years, up to 8 *total puffs* of ICS with formoterol can be administered (36 mcg); for adults and  
97 children older than 12 years, up to 12 total daily puffs may be administered (54 mcg). While  
98 SMART is now the recommended first-line treatment for Steps 3 and 4, it is actually off-label  
99 use, as these combination inhalers have not yet been FDA approved for use in this manner in the  
100 United States. The lack of policy concordance poses problems for clinicians who might attempt  
101 to utilize SMART, as many insurers currently cover only a single-month supply of these  
102 expensive medications. Thus, changes to insurance coverage will likely be needed to enable  
103 wide-spread access and adherence to this new evidence-based recommendation. Additionally,  
104 individuals with inaccurate symptom perception may be poor candidates for as needed ICS.

105         The changes implemented by EPR-4 correspond closely with current GINA guidelines,  
106 with the exception that GINA also advocates the *intermittent* use of ICS with LABA for all  
107 individuals older than 12 years at both Step 1 *and* 2 (mild asthma) and generally discourages use  
108 of any SABA monotherapy in this population (Global Initiative for Asthma, 2020). Thus, when  
109 managing teen and adult patients with asthma, nurse practitioners should consider prescribing  
110 low dose ICS, either intermittent or daily, based on level of symptoms.

111         A few helpful rules can help to simplify understanding of stepwise therapy. In general,  
112 for EPR3, EPR4, and GINA guidelines, use of *low dose* inhaled corticosteroids are  
113 recommended for Steps 1-3, *medium dose* for Steps 3-4, and *high dose* for Step 5-6, in both  
114 adults and children. Furthermore, the addition of any LABA, LAMA, or LTRA to ICS therapy

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115 generally increases the Stepwise therapy by one level. For example, an adult patient taking  
116 Budesonide 180 mcg, one puff twice daily, with albuterol as needed (SABA) would be classified  
117 as Step 2 (low dose ICS), whereas use of the same low dose Budesonide *plus* formoterol  
118 (LABA) twice daily would be classified as Step 3 therapy.

119 Prescribers should also be aware that ICS dosing is *non-equivalent* across different  
120 formulations (National Heart Lung and Blood Institutes, 2011). This point cannot be over-  
121 emphasized, and mistakes in this area contribute substantially to prescribing errors. For instance,  
122 an adult daily dose of fluticasone propionate 200 mcg (100 mcg given twice daily) is *low-dose*  
123 (Step 2), whereas fluticasone furoate 200 mcg (given once daily) is *high-dose* (Step 5). For this  
124 reason, prescribers should utilize comparative dosing tables (see online e-supplement A) to  
125 ensure that appropriate doses of ICS are prescribed, consistent with best-practices. Caution  
126 should be used when making insurance driven formulary changes, as evidence indicates that  
127 these changes might precede deterioration in lung function (Bickel, Nemer Eid, & Sayat, 2019).

128 Lastly, minimum standards for asthma-related visits should include assessment and  
129 documentation of severity, control, stepwise therapy, and comparative ICS dosing (**Box 1**).  
130 Printable, clinician-friendly pocket-guides are included in the reference list for ages 5-11 years  
131 (Mammen, 2021b) and ages 12 years to adult (Mammen, 2021a) to facilitate accurate assessment  
132 and classification of asthma, and appropriate step-wise medication management.

133 *Conclusion.* Clinical management of asthma requires increasing precision in assessment  
134 and medication management. Greater familiarity with asthma management guidelines will  
135 promote delivery of high-quality evidence-based care, and will help to improve patient outcomes  
136 and quality of life.

137

## References

- Akinbami, L. J., Salo, P. M., Cloutier, M. M., Wilkerson, J. C., Elward, K. S., Mazurek, J. M., . . . Zeldin, D. C. (2019). Primary care clinician adherence with asthma guidelines: the National Asthma Survey of Physicians. *J Asthma*, 1-13. doi:10.1080/02770903.2019.1579831
- Bickel, S., Nemer Eid, C., & Sayat, J. (2019). Do inhaled corticosteroids formulary changes impact control in pediatric asthma? *Chest*, 156(4). Retrieved from [https://journal.chestnet.org/article/S0012-3692\(19\)32307-4/fulltext](https://journal.chestnet.org/article/S0012-3692(19)32307-4/fulltext)
- Center for Disease Control. (2016). Uncontrolled asthma among persons with current asthma. *AsthmaStats*. Retrieved from [https://www.cdc.gov/asthma/asthma\\_stats/uncontrolled-asthma-adults.htm](https://www.cdc.gov/asthma/asthma_stats/uncontrolled-asthma-adults.htm)
- Cloutier, M. M., Dixon, A. E., Krishnan, J. A., Lemanske, R. F., Jr., Pace, W., & Schatz, M. (2020). Managing Asthma in Adolescents and Adults: 2020 Asthma Guideline Update From the National Asthma Education and Prevention Program. *JAMA*, 324(22), 2301-2317. doi:10.1001/jama.2020.21974
- Global Initiative for Asthma. (2020). *Pocket guide for asthma management and prevention (Adults and children older than 5 years)*. Retrieved from <https://ginasthma.org/pocket-guide-for-asthma-management-and-prevention/>
- Mammen, J. R. (2021a). Focused summary of updated guidelines for asthma management of adults and children ages 12+: Pocket guide for clinicians. Retrieved from <https://digitalcommons.uri.edu/oer-healthcare-asthma/1/>
- Mammen, J. R. (2021b). Focused summary of updated guidelines for asthma management of children ages 5 to 11 years: Pocket guide for clinicians. Retrieved from <https://digitalcommons.uri.edu/oer-healthcare-asthma/3/>
- National Asthma Education and Prevention Program. (2007). *Expert Panel Report 3: Guidelines for the diagnosis and management of asthma*. Bethesda, Md.: National Heart Lung and Blood Institutes, National Institutes of Health, Publication No. 08-5846.
- National Heart Lung and Blood Institutes. (2011). *Asthma care quick reference*. Bethesda, Md.: National Asthma Education and Prevention Program Retrieved from [https://www.nhlbi.nih.gov/files/docs/guidelines/asthma\\_qrg.pdf](https://www.nhlbi.nih.gov/files/docs/guidelines/asthma_qrg.pdf)
- National Heart Lung and Blood Institute. (2020). *2020 Focused Updates to the Asthma Management Guidelines: Clinician's Guide*. (NIH Publication No. 20-HL-8141). National Institutes of Health Retrieved from <https://www.chicagoasthma.org/resources/Documents/Data%20and%20Reports/AsthmaCliniciansGuideDesign-508.pdf>

**Box 1.** Checklist to promote clinician compliance with U.S. National guidelines for asthma care

**For all asthma related visits, assess and document:**

- Asthma severity
- Asthma control (document all core criteria)\*
- Stepwise therapy level
- Daily dose of ICS (intermittent, low, medium, high)
- Self-management training provided
- Follow up plan for uncontrolled asthma (2-6 weeks)

Core criteria: \*frequency of day time symptoms, nocturnal wakening due to asthma, activity limitations, SABA use, systemic corticosteroid use, *and* FEV1%<sub>predicted</sub> Or Peak expiratory flow % of personal best if available.