Body System: Pediatrics		
Session Topic: Pediatric Asthma		
Educational Format		**Faculty Expertise Required**
REQUIRED	Interactive Lecture	Expertise in the field of study. Experience teaching in the field of study is desired. Preferred experience with audience response systems (ARS). Utilizing polling questions and engaging the learners in Q&A during the final 15 minutes of the session are required.
OPTIONAL	Problem-Based Learning (PBL)	Expertise teaching highly interactive, small group learning environments. Case-based, with experience developing and teaching case scenarios for simulation labs preferred. Other workshop-oriented designs may be accommodated. A typical PBL room is set for 50-100 participants, with 7-8 each per round table. Please describe your interest and plan for teaching a PBL on your proposal form.

Professional Practice Gap	**Learning Objective(s) that will close the gap and meet the need**	**Outcome Being Measured**
• Patients require assistance recognizing and avoiding environmental triggers for their asthma. • Family physicians need to understand the most appropriate diagnostic and treatment plans to help patients with long-term management of asthma. Management strategies should include consideration of pulmonary function tests (typically done through spirometry), assessment of asthma control and reasons for lack of control, assessment of allergic and non-allergic triggers, selection of effective quick relief and controller medications and development of an asthma management plan. • Family physicians need to be competent in managing asthma in both the inpatient and outpatient setting.	1. Use evidence-based criteria to diagnose and evaluate children with asthma to guide treatment options. 2. Determine the evidence-based criteria for inpatient versus outpatient management of asthma in children. 3. Prepare evidence-based treatment plans to help patients with acute or long-term management of asthma. 4. Develop collaborative care plans for pediatric patients with asthma plan that encourages adherence to prescribed therapies and avoidance of environmental triggers.	Learners will submit written commitment to change statements on the session evaluation, indicating how they plan to implement presented practice recommendations.

• In prescribing quick-relief and controller medications, family physicians need to carefully explain to patients and families the difference between therapies prescribed and which agents are most effective in the event of an asthma attack/exacerbation. • Family physicians may not be aware of the current updates to the Expert Panel Review's guidelines and recommendations within the National Asthma Education and Prevention Program or existence of the more recently updated GINA asthma guidelines.		

ACGME Core Competencies Addressed (select all that apply)

X	Medical Knowledge		Patient Care
X	Interpersonal and Communication Skills		Practice-Based Learning and Improvement
	Professionalism		Systems-Based Practice

Faculty Instructional Goals

Faculty play a vital role in assisting the AAFP to achieve its mission by providing high-quality, innovative education for physicians, residents and medical students that will encompass the art, science, evidence and socio-economics of family medicine and to support the pursuit of lifelong learning. By achieving the instructional goals provided, faculty will facilitate the application of new knowledge and skills gained by learners to practice, so that they may optimize care provided to their patients.

- Provide up to 3 evidence-based recommended practice changes that can be immediately implemented, at the conclusion of the session; including SORT taxonomy & reference citations
- Facilitate learner engagement during the session
- Address related practice barriers to foster optimal patient management
- Provide recommended journal resources and tools, during the session, from the American Family Physician (AFP), Family Practice Management (FPM), and Familydoctor.org patient resources; those listed in the References section below are a good place to start
    - Visit http://www.aafp.org/journals for additional resources
    - Visit http://familydoctor.org for patient eduction and resources
- Provide tools, resources, and strategies to foster the implementation of evidence-based asthma management guidelines into practice

- Provide specific strategies and resources to assist physician learners to develop collaborative care plans with asthma patients to develop an asthma action plan that encourages adherence

Needs Assessment

Asthma is one of the most common chronic health conditions; it is estimated that over 7 million children (9.5% of all children) are believed to currently have the condition.[1] It accounts for more than 1.3 million ambulatory visits to office-based physicians, and 1.8 million visits to the emergency room.[2] In 2008, asthma accounted for an estimated 14.4 million lost school days; therefore, once a child is diagnosed with asthma, the goal of therapy is to reduce wheeze and cough, reduce the risk and number of acute exacerbations, and minimize adverse effects of treatments, sleep disturbances, and absences from school.[3] Symptoms vary widely, therefore asthma must be distinguished from other causes of respiratory illness.

Data from a recent American Academy of Family Physicians (AAFP) CME Needs Assessment survey suggests that family physicians have knowledge gaps with regard to asthma management.[4] More specifically, CME outcomes data from 2012, 2013 and 2015 AAFP FMX (formerly Assembly): *Pediatric Asthma* sessions indicates that physicians have knowledge and practice gaps related to asthma clinical decision making tools (e.g. asthma APGAR); using spirometry to confirm asthma; the identification of asthma triggers; teaching and reviewing proper inhaler use; the use of asthma action plans; new treatment options, including treatment dosing; and use of inhaler spacers.[5-7]

Family physicians are faced with several barriers to providing optimal management of the pediatric patient with asthma. Frequently, when pediatric patients seek medical care in a general emergency room for asthma exacerbations, there is a lack of follow up with their primary care provider.[8] This is particularly concerning because general emergency departments under-prescribe corticosteroids (as measured by current NIH treatment guidelines).[9] Additionally, data from some studies suggest that primary care physicians inconsistently follow national guidelines for influenza vaccination of children with asthma, and should refer to recommendations of the National Asthma Education and Prevention Program (NAEPP).[10]

Physicians should also be aware that Black populations may be disproportionately affected by LABA risks.[11] The primary outcome from the BELT Randomized Clinical Trial study was time to asthma exacerbation, defined as a worsening asthma event requiring oral or parenteral corticosteroids. Among black adults with asthma treated with ICS, adding a LABA did not improve time to asthma exacerbation compared with adding tiotropium. These findings were not affected by polymorphisms at the Arg16Gly locus of ADRB2. These findings do not support the superiority of LABA + ICS compared with tiotropium + ICS for black patients with asthma.[11]

The differential diagnosis of wheezing must be carefully considered, particularly in infants and young children, for whom testing for reversible airflow obstruction is technically difficult. Pulmonary function tests are a critical component of assessing and diagnosing asthma patients. Practice profile data report that 66% of family physicians conduct spirometry tests.[12] Initial assessing asthma severity and then monitory asthma control is fundamental to effective asthma

management. However, management of asthma often fails due to non-adherence to tis portion on the evidence-based guidelines.[13] Physicians need training to properly use asthma assessment tools such as the Asthma APGAR, the Asthma Control Test (ACTTM) or the Asthma Control Questionnaire (ACQ).[13,14] Additionally, some studies suggest that the use of spirometry in primary care settings for pediatric patients with asthma does not conform to national guidelines.[15] Most infants and children with recurrent wheezing or chronic cough are most likely to suffer from asthma; however, family physicians should consider other causes in the differential diagnosis.[16,17]

Treatment for asthma consists of medications for both quick relief of symptoms and control of long term inflammation and bronchoconstriction, generally in the formed of inhaled medicines. The mainstay of treatment for asthma are anti-inflammatory drugs, inhaled corticosteroids and leukotriene modifiers with the addition of long acting bronchodilators when anti-inflammatory therapy alone is inadequate to gain and maintain asthma control and prevent recurrent asthma exacerbations. Treatment of acute asthma exacerbations includes short acting bronchodialtors which can be administered via a metered-dose inhaler or a nebulizer and for prolonged or severe exacerbations, oral corticosteroids.[18] Treatment of acute asthma exacerbations includes short acting bronchodialtors which can be administered via a metered-dose inhaler or a nebulizer and for prolonged or severe exacerbations, oral corticosteroids. [18-20] In 2010, the U.S. Food and Drug Administration (FDA) required Risk Evaluation and Mitigation Strategies (REMs) and class-labeling changes be instituted to improve the safety and use of LABAs.[21] New REMS have been published since 2011 for fluticasone propionate and salmeterol xinafoate, arformoterol tartrate, and inhalation powder.[22] LABAs appear to be safe when used with inhaled corticosteroids. LABA monotherapy is associated with an increase in asthma-related mortality and nonfatal serious adverse events, but not in all-cause mortality.[23] Family physicians must ensure that they receive education related to pharmacologic changes and post-marketing changes for certain drugs. They must have appropriate resources and systems set up to search for adverse reactions and possible drug interactions in their patients. Physicians must be kept up to date on new treatments as they become available, and be prepared to counsel patients regarding efficacy, safety, contraindications, and costs/benefits relative to existing treatments. For example, physicians should be familiar with recently FDA approved biologic treatments for severe asthma such as Cinqair (reslizumab), approved in March 2016; and Nucala (mepolizumab), approved November 2015.[24]

It is imperative that patients (and parents) understand the difference between quick-relief medications (such as short-acting $beta_2$ agonists) and long-term medications, and which to use in the event of an asthma attack. Patients should also be counseled about the importance of always having a "rescue inhaler" to treat the sudden onset of asthma symptoms and understanding the warning signs of acute asthma symptoms or an asthma attack as directed in an asthma management or asthma action plan.

As asthma is a complex disorder characterized by variable and recurrent symptoms, airflow obstruction, bronchial hyperresponsiveness and underlying inflammation, treatment plans should include patient-specific approaches and long-term management to gain control of the disease. The National Asthma Education and Prevention Program (NAEPP), an expert panel convened by the National Institutes of Health, has a series of recommendations for addressing asthma in

specific age groups.[25] For children, recommendations include evaluations of dust-mite mitigation in homes; the use of inactivated influenza vaccination for children over the age of 6 months who have asthma; evaluate for viral respiratory infections; evaluate for medication sensitivities. Physicians should also not shy away from prescribing physical training for patients with asthma. Physical training lasting for at least 20 to 30 minutes, two to three times a week for at least six weeks, improves physical fitness in patients with asthma; and is not associated with worsening of asthma symptoms.[26] However, if exercise-induced bronchoconstriction is suspected in the asthmatic patient athlete, refer to the diagnosis and management recommendations presented in the 2011 AFP issue, *Exercise-Induced Bronchoconstriction: Diagnosis and Management*.[27]

In order to curb health-care costs and improve patient care, physicians should consider the following *Choosing Wisely* recommendation from the American Thoracic Society (ATS) and the American College of Chest Physicians (ACCP):[28]

- Do not routinely administer IV steroids, use oral corticosteroids whenever feasible for patients hospitalized for asthma exacerbations.

General principles established by the NAEPP Expert Panel Report 3 (EPR-3) in 2007, include the following clinical activities: including medications, patient education, environmental control measures and management of comorbidities at each step of asthma treatment; initiating therapy based on asthma severity; and adjusting therapy based on asthma control. Patients also benefit from systematic chronic care plans and support for self-management of their condition, which family physicians are uniquely positioned to provide. Written asthma action plans, for instance, are an integral tool used to help improve health outcomes for pediatric patients who have asthma.[20] While standard patient education, in theory, increases their knowledge enough to make behavioral change that leads to improved outcomes, self-management strategies aim to build patients' confidence in their abilities to manage their symptoms and treatment and make necessary lifestyle changes.[29] Physicians should consider utilizing a guidelines-based management plan that considers the developmental age of the pediatric patient.[30] The NAEPP supports self-management programs as an approach to control factors and conditions that affect asthma.[20] There is also some evidence that using a mailed asthma control questionnaire (ACQ) is an effective approach for tracing asthma patients who need medical attention, as well as tracing patients who would otherwise not have consulted their family physician.[31] Family physicians can improve quality of care for asthma patients by utilizing tools that foster the implementation of current guidelines, such as the asthma APGAR clinical decision making tool.[32,33]

Physicians may improve their care of pediatric patients with asthma by engaging in continuing medical education that provides practical integration of current evidence-based guidelines and recommendations into their standards of care, including, but not limited to the following:[16,17,34-37]

- Asthma is the most likely cause of recurrent wheezing in children younger than five years.
- The most common causes of wheezing in young children are asthma, allergies, gastroesophageal reflux disease, infections, and obstructive sleep apnea.
- Response to bronchodilators may help differentiate asthma from other causes of wheezing.

- Chest radiography should be performed in children with recurrent wheezing or a single episode of unexplained wheezing that does not respond to bronchodilators.
- Evaluation of children with chronic cough should include, at minimum, chest radiography and spirometry.
- Physicians should use the American Thoracic Society criteria (FEV1/FVC ratio less than the lower limit of normal) to diagnose obstructive lung disease in patients younger than 65 years (regardless of smoking status) and in nonsmokers 65 years and older.
- If an obstructive defect is present, the physician should determine if it is reversible based on the increase in FEV1 or FVC after bronchodilator treatment (i.e., increase of more than 12% in patients five to 18 years of age, or more than 12% and more than 200 mL in adults).
- If pulmonary function test results are normal but the physician still suspects exercise- or allergen-induced asthma, bronchoprovocation (e.g., methacholine challenge, mannitol inhalation challenge, exercise testing) should be performed.
- Intermittent inhaled corticosteroid therapy reduces the risk of asthma exacerbations in children and adults with mild persistent asthma. Intermittent use appears to be safe in these patients. (Strength of Recommendation: B, based on limited-quality evidence from randomized controlled trials.)
- Inhaled corticosteroids improve asthma control and quality of life and reduce asthma symptom severity, systemic steroid use, emergency department visits and hospitalizations, and deaths.
- Long-acting beta2 agonists are effective for control of persistent asthma symptoms and are the preferred agents to add to inhaled corticosteroids in patients 12 years and older, but they are not recommended for use as monotherapy.
- Leukotriene receptor antagonists can be used as adjunctive therapy with inhaled corticosteroids, but they are less effective than long-acting beta2 agonists in patients 12 years and older.
- If adequate symptom control is not attained with low-dose inhaled corticosteroids, either increasing the inhaled steroid dosage or adding a long-acting beta2 agonist to therapy is appropriate according to current guideline recommendations.

The American Medical Association's Physician Consortium for Performance Improvement has published the "Asthma Physician Performance Measurement Set," which sets forth clinical recommendations for physicians to use in their practices, as well as clinical performance measures for each recommendation.[38] These clinical performance measures include the following:

- Whether patients were evaluated during at least one office visit during the reporting year for the frequency of daytime and nocturnal asthma symptoms, as well as the percentage of patients who were so evaluated.
- Whether patients with mild, moderate or severe persistent asthma were prescribed either the preferred long-term control medication or an acceptable alternative treatment, as well as the percentage of all patients who received such a prescription, and the distribution of long-term control therapy by category of medication, severity classification and age range.

Finally, family physicians should consult the American Academy of Allergy, Asthma, & Immunology (AAAAI) referral guidelines as part of the routine clinical decision making process.[39] This guideline presents referral guidelines for 14 categories of allergic diseases, including several specific considerations for asthma patients.

These recommendations are provided only as assistance for physicians making clinical decisions regarding the care of their patients. As such, they cannot substitute for the individual judgment brought to each clinical situation by the patient's family physician. As with all clinical reference resources, they reflect the best understanding of the science of medicine at the time of publication, but they should be used with the clear understanding that continued research may result in new knowledge and recommendations. These recommendations are only one element in the complex process of improving the health of America. To be effective, the recommendations must be implemented. As such, physicians require continuing medical education to assist them with making decisions about specific clinical considerations.

Resources: Evidence-Based Practice Recommendations/Guidelines/Performance Measures

- The diagnosis of wheezing in children[16]
- Acute asthma and other recurrent wheezing disorders in children[37]
- A Stepwise Approach to the Interpretation of Pulmonary Function Tests[35]
- Evaluation of the patient with chronic cough[17]
- Management of Acute Asthma Exacerbations[18]
- Childhood Asthma: Treatment Update[3]
- Medications for Chronic Asthma[36]
- Chochrane Briefs: Addition of Long-Acting Beta Agonists for Asthma in Children[40]
- Medical Therapy for Asthma: Updates from the NAEPP Guidelines[20]
- Exercise-induced bronchoconstriction: diagnosis and management[27]
- Supporting self-management in patients with chronic illness[29]
- Tracing Uncontrolled Asthma in Family Practice Using a Mailed Asthma Control Questionnaire[31]
- Tools and strategies for improving asthma management[32]
- PCPI Approved Quality Measures: Asthma[38]
- Consultation and referral guidelines citing the evidence: how the allergist/immunologist can help[39]
- Asthma APGAR clinical decision making tools[33]
- National Asthma Control Initiative (NACI)[41]
- FamilyDoctor.org. Asthma | Overview (patient resource)[42]

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