

ASTHMA ASSESSMENT IN CHILDREN AND ANTICIPATORY GUIDANCE

RATIONALE

Asthma is a major cause of chronic morbidity and mortality in the world, and it is increasing, especially with children.¹ The Centers for Disease Control and Prevention (CDC) states that asthma is a leading chronic disease in the United States among children and adolescents, and one of the leading factors of school absenteeism. Asthma is identified in all social economic levels, but there is a higher prevalence of asthma in low-income populations, minorities, and children living in inner cities. This is evident by more emergency room visits, hospitalizations, and deaths due to asthma than in the general population.

Asthma often causes restriction of activities in which children participate play and physical activity. In addition, asthma affects sleep and can disrupt daily routines for both the child and their family.^{2, 4, 5, 8} According to the 2011 National Health Interview Survey, United States prevalence estimates, over 7.1 million children currently have asthma and 8.7 million children ages 5-17 have been diagnosed with asthma at some point in their lives. From 1980 to 1996, the overall prevalence of asthma in the United States increased. Asthma started to decrease in 1999 and continued until 2001. Since then, asthma has increased, with children 5-17 years-of-age demonstrating the highest prevalence rates (105.5 cases per 1,000 populations) in 2011.^{8 & 12}

The CDC National Center for Health Statistics, states that in 2009, 774,000 emergency room visits were children under the age of 15 with asthma-related complaints. In 2008, children ages 5-17 missed 10.5 million school days due to asthma related events. There were an additional 14.2 million missed days from work to take care of these children.^{2, 4, & 5} The annual health care cost for treating children with asthma has increased. Based on the [Medical Expenditure Panel Survey](#) in 2006, out of a total of \$98.8 billion spent for care and treatment of children, asthma costs ranked second, accounting for \$8 billion dollars. The study found that in 2006 more children were treated for asthma than for any other conditions in the study (almost 13 million children). California statistics show that there is an estimated 644,122 children with asthma (2008). Child lifetime asthma prevalence was 11.5% and the child current asthma prevalence was 7.1%.¹³

There are several studies, which show that 50 to 80 % of children develop symptoms of asthma before their fifth birthday. Diagnosis is difficult in ages 0-5 group due to frequent under diagnosis of asthma for other related respiratory infections such as chronic or wheezing bronchitis, reactive airway disease, pneumonia, and other recurring respiratory disease. The result of under diagnosis is children not receiving adequate therapy. Asthma diagnosis is difficult because wheezing does not always mean the child has asthma. It is also challenging for medical providers to obtain objective measurements of lung function in children 0-5 years of age.¹⁰

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There is no single underlying cause for developing asthma, but factors like genetics and the environment increases the likelihood of developing asthma. Factors that appear to be important to the increase of asthma are a family history of asthma and/or other related allergy conditions. Environmental exposures both indoor and outdoor that affect the air quality increase the risk of asthma. In addition, tobacco smoke exposure and maternal smoking during pregnancy are associated with childhood asthma. Indoor air allergens, such as animal dander, cockroaches, and house dust mites were also determined to cause asthma exacerbations.² [University of California Los Angeles Center for Health Policy Research](#) released their findings in December 10, 2010 that noted asthma is more prevalent in poor and minority children compared to those, who have a higher income. The Comparison of Health Care Utilization Outcomes has shown that low-income children have the lowest rates of utilization of asthma-related primary care services and pharmaceutical agents. This disparity in asthma care can be attributed to the decrease in accessibility of medical care in the U.S. and its impact on access to care among disadvantaged children.¹⁵

SCREENING REQUIREMENTS

In establishing an asthma diagnosis, a detailed medical history and physical examination focusing on the upper respiratory tract, lungs, and skin are performed to determine that the symptoms of recurrent episodes of airflow obstruction are present. To verify asthma diagnoses, all patients 5 years of age or older are tested using a spirometer to determine the degree of airway obstruction. One should consider alternative causes of airway obstruction before diagnosing the child with asthma.

The key symptom indicators for considering a diagnosis of asthma and performing a spirometry evaluation are listed below. These indicators are not diagnostic by themselves, but in the presence of multiple key indicators, increase the probability of an asthma diagnosis.

- Wheezing—high-pitched whistling sounds when breathing out – especially in children. A lack of wheezing and a normal chest examination do not exclude asthma.
- History of any of the following:
 1. Cough (worse particularly at night).
 2. Recurrent wheeze.
 3. Recurrent difficulty in breathing.
 4. Recurrent chest tightness.
- Symptoms occur or worsen in the presence of:
 1. Exercise.
 2. Viral infection.
 3. Inhalant allergens (e.g., animals with fur or hair, house-dust mites, mold and pollen).

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4. Irritants (tobacco or wood smoke, airborne chemicals).
 5. Changes in weather.
 6. Strong emotional expression (laughing or crying hard).
 7. Stress.
 8. Menstrual cycles.
- Symptoms occur or worsen at night, awakening the patient.¹⁰

Identify the precipitating factors during the initial assessment of asthma. These factors include the comorbid conditions that may aggravate asthma. Assess the patient's knowledge and skills for self-management, and classify the severity of the asthma. In screening children for asthma and determining follow-up care, there are four components of care to be assessed.

- Assessment and Monitoring:
 1. Assess asthma severity to initiate therapy.
 2. Assess asthma control to monitor and adjust therapy.
 3. Schedule follow-up care.
- Education:
 1. Provide self-management education.
 2. Develop a written asthma action plan in partnership with patient.
 3. Integrate education into all points of care where health professionals interact with patients.
- Control Environmental factors and comorbid conditions:
 1. Recommend measures to control exposures to allergens and pollutants or irritants that make and exacerbate asthma symptoms.
 2. Treat comorbid conditions.
- Medications:
 1. Select medication and delivery devices to meet patient's needs and circumstances.¹⁰

Further information regarding assessing medical history and the initial assessments, education, the control of environmental factors and medications are available in the [“Expert Panel Report 3:\(EPR3\) Guidelines on Asthma, Section 3, Component 1: Measures of Assessment and Monitoring, Component 2: Education, Component 3: Control of Environment Factors, and Component 4 Medications”](#).

Specific medical history assessment charts for reference are located in section 3 component 1 of the EPR3.

- Suggested Items for Medical History, Figure 3-1 (page 69)

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- Sample Questions for the Diagnosis and Initial Assessment of Asthma, Figure 3-2 (page 70)

Once assessed, children will be classified within their age groups for severity of asthma, control, and treatment. The age groups for classification and treatment are “Children 0-4 years of age”, “Children 5-11 years of age”, and “Youth greater than 12 years of age”. There are sample questions that are recommended for assessing and monitoring asthma control. Further information regarding classifying asthma severity in children per age group is available in the [“Expert Panel Report 3, Guidelines on Asthma, Section 3 Component 1 and Section 4: Managing Asthma Long Term”](#).

Classifying asthma Severity is referenced in both sections 3 and 4. Information listed below is located in section 3 component 1 of the EPR3.

- Classifying Asthma Severity in Children 0–4 years of age, Figure 3-4a (page 72)
- Classifying Asthma Severity in Children 5- 11 years of age, Figure 3-4b (page 73)
- Classifying Asthma Severity in Youth >12 years of age, Figure 3-4c (page 74)
- Assessing Asthma Control in Children 0–4 years of age, Figure 3-5a (page 75)
- Assessing Asthma Control in Children 5-11 years of age, Figure 3-5b (page 76)
- Assessing Asthma Control in Youth >12 years of age, Figure 3-5c (page 77)
- Sample Questions for Assessing and Monitoring Asthma Control, Figure 3- 6 (page78)
- Components of the Clinician’s Follow-up Assessment, Sample Routine Clinical Assessment Questions, Figure 3-7 (page 79)
- Validated Instruments for Assessment and Monitoring of Asthma, Figure 3-8 (page 80)
- Sample Patient Self-assessment Sheet for Follow-up visits, Figure 3-9 (page 81)

Bright Futures*

Bright Futures, [3rd Edition Guidelines, Pocket Guide, Tool & Resource Kit](#)

Bright Futures [Asthma Anticipatory Guidance for Physical Exercise](#) and [Physical Activity Resources](#).

For asthma anticipatory guidance related to smoking in the home refer to the Health Assessment Guidelines Tobacco section.

CONSIDERATIONS FOR REFERRAL TREATMENT AND/OR FOLLOW-UP

Asthma control focuses on two domains, reducing the impairment and reducing the risk of asthma with children. In focusing on these two domains, achieving and maintaining asthma control requires providing appropriate medication, addressing environmental factors, helping patients learn self-management skills by creating an action plan,

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monitoring adequate asthma control, and making therapy adjustments accordingly. The recommended key clinical activities for management of asthma follows the age groups previously mentioned. Within each age group there is a step of care approach called “StepWise Approach”. To gain control of the asthma, care moves up the steps. As control is maintained, the care moves to the lowest step possible for asthma control.

Further information regarding the “Stepwise Approach” per age group is available in the [“Expert Panel Report 3, Section 4, Managing Asthma Long Term”](#).

- StepWise Approach for Managing Asthma in Children 0–4 years of age, Figure 4-1a (page 305)
- StepWise Approach for Managing Asthma in Children 5–11 years of age, Figure 4-1b (page 306)
- StepWise Approach for managing Asthma in Youth \geq 12 years of age, Figure 4-5 (page 343)

There are difficulties achieving or maintaining control of asthma with children in all age groups. The Child Health and Disability Prevention Program referral recommendations are the recommendations per age group as stated in the Expert Panel Report 3 Guidelines on Asthma.

Further information regarding “StepWise Approach” referral recommendations to an asthma specialist for a consultation or co-management, is available at the [“Expert Panel Report 3, Section 4, Managing Asthma Long Term”](#).

Referral recommendations for children 0-4 years of age

- A child 0–4 years of age requires step 3 care or higher to achieve and maintain control or if additional education is indicated to improve the patients’ management skills or adherence
- Referral may be considered if a child 0–4 years of age requires step 2 care
- The patient has had an exacerbation requiring hospitalization
- Immunotherapy or other immunomodulators are considered or additional tests are indicated, to determine the role of allergy.¹⁰

Referral recommendations for children 5-11 years of age

- A child 5-11 years of age requires step 4 care or higher to achieve and maintain control or if additional education is indicated to improve the patients’ management skills or adherence
- Referral may be considered if a child 5-11 years of age requires step 3 care
- The patient has had an exacerbation requiring hospitalization
- Immunotherapy or other immunomodulators are considered or additional tests are indicated, to determine the role of allergy.¹⁰

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Referral recommendations for children > 12 years of age

- If the patient requires step 4 care or higher
- If immunotherapy or other immunomodulators is considered
- If the patient has had an exacerbation requiring hospitalization
- Consider referral if the patient requires step 3 care.¹⁰

Child Health and Disability Prevention Program asthma education recommendations

- Understanding asthma, asthma symptoms, and symptom patterns.
- Identifying triggers of asthma symptoms and assisting with their avoidance.
- Addressing tobacco smoking in the home and smoke from fireplace.
- Addressing other home environmental issues such as:
 - Vacuuming, mopping, and damp dusting frequently to reduce dust
 - Covering mattresses/pillows with plastic covers
 - Using synthetic fiber blankets, clothing, carpets
 - Treating fixtures subject to dampness for mold

Additional asthma education for asthma therapy and medications

- Addressing goals of asthma therapy.
- Understand maintenance, medications, and emergent treatments.
- Suggesting community resources to parents or caregivers for their children with asthma.

Further information regarding asthma education including asthma symptoms, triggers, asthma therapy, and medications are available at the [“Expert Panel Report 3, Guidelines on Asthma Section 3, Component 2, Education, Component 3, Control of Environmental factors, and Component 4, Medications”](#).

Patient educational handouts are available in Section 3 Component 2. Examples are:

- How to Use Your Peak Flow Meter, Figure 3-11 (pages 122-123)
- Delivery of Asthma Education by Clinicians during Patient Care Visits, Figure 3 - 13 (pages 126 -127)
- How to Use Your Metered-Dose inhaler, Figure 3-14, (page 128)
- How to Control things that make your Asthma worse, Figure 3-15, (pages 129-130)

Further information regarding self-management action plans; refer to the [“Expert Panel Report 3, Guidelines on Asthma Section 3, Component 2, Education.”](#)

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Sample Asthma Action Plan, Figure 3-10 a, b, and c (pages 117-119)

- Delivery of Asthma education by Clinicians during Patient Care Visits, Figures 3-13 to 3-15 (pages 126 – 130)
- School Asthma Action Plan, Figure 3-16 a and b (pages 137 -139)

Additional information for self-management and developing an action plan are available.

- For asthma care and management refer to the [Asthma Care Quick Reference](#).
 - For Guidelines and Management refer to page 2.
 - For Classifying Asthma Severity refer to page 5.
 - For the Stepwise Approach for Managing Asthma Long Term refer to the table on page 7.
 - For the comparative daily dosages: Inhaled Corticosteroids for Long-term Asthma Control refer to pages 8 and 9.
 - For Usual dosages for other Long Term Control Medications refer to page 10.

Resources

[Asthma Action Plan, Publication Item No.: 07-5251](#), US Department of Health and Human Services, National Institutes of Health, National Heart, Lung and Blood Institute, Date of Publication: 2007. Accessed August 28, 2014.

Department of Health and Human Services United States, Center of Disease Control and Prevention Center [Asthma Actions Plans](#). Accessed August 28, 2014

[Living a Healthy Life with Chronic Conditions; 4th Edition](#). Kate Lorig RN DrPH, Halsted Holman MD, David Sobel MD MPH, Diana Laurent MPH, Virginia González MPH, and Marian Minor RPT PhD. Bull Publishing. Accessed August 28, 2014.

[Asthma Care Quick Reference Publication No. : 12-5075](#), US Department of Health and Human Services, National Institutes of Health, National Heart, Lung and Blood Institute. Originally printed June 2002, Revised September 2012. Accessed August 28, 2014.

[Asthma in California CDC's National Asthma Control Program](#). August 28, 2014

[Asthma Facts, CDC's National Control Program](#), Department of Health and Human Services United States, Center of Disease Control and Prevention Center, July 2013. Accessed August 28, 2014.

[Asthma the Impact on the Nation, CS232840](#), CDC's National Control Program, Department of Health and Human Services United States, Center of Disease Control and Prevention Center, July 2013. Accessed August 28, 2014.

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[Asthma and Physical Activity in the School, Publication No.: 12-3651](#) US Department of Health and Human Services, National Institutes of Health, National Heart, Lung and Blood Institute. Revised April 2012. Accessed August 28, 2014.

[Attaining optimal asthma control: A practice parameter](#), James T. Li, MD, PhD, John Oppenheimer, MD, I. Leonard Bernstein, MD, and Richard A. Nicklas, MD, Published practice parameters of the Joint Task Force on Practice Parameters for Allergy & Immunology. Accessed August 28, 2014

[EQUIPP, Helping You Improve Care for Children](#), American Academy of Pediatrics asthma training available through January 25, 2016. Accessed August 28, 2014.

[Making Sense of Childhood Asthma](#), Marla MCDaniel, Susan J. Popkin, Judy Berman, Paola Barahona, Priya Saxena, Deborah Quint, Stephen J. Teach, Urban Institute, April 2014. Accessed August 28, 2014.

[So you have Asthma, Publication Item No.: 07-5248](#), US Department of Health and Human Services, National Institutes of Health, National Heart Lung and Blood Institute. March 2007. Accessed August 28, 2014.

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- ¹ Akinbami LJ. [The State of Childhood Asthma, United States, 1980-2005](#). Advance Data from Vital and Health Statistics: No. 381, December 12, 2006, Revised December 29, 2006. Hyattsville, MD: National Center for Health Statistics, 2006. Accessed October 1, 2014
- ² [Asthma in California](#), Center of Disease Control and Prevention Center National Center for Environmental Health, Division of Environment Hazards and Health Effects. Accessed October 1, 2014.
- ³ [Asthma & Children Fact Sheet](#), American Lung Association, Website, October 2012. Assessed October 1, 2014.
- ⁴ [Asthma Facts](#), Center of Disease Control and Prevention Center National Asthma Control Program Grantees, United States Department of Health and Human Services, Centers for Disease Control and Prevention. July 2013 Accessed October 1, 2014
- ⁵ [Asthma's Impact on the Nation Fact Sheet](#), Center of Disease Control and Prevention Center, National Center of Environmental Health Division of Environmental Hazards and Health Effects CS232840. Accessed October 1, 2014.
- ⁶ [Asthma Overview](#), Asthma and Allergy Foundation of America. Accessed October 28, 2014.
- ⁷ [Asthma Fact Sheet](#), Centers for Disease Control and Prevention: National Center for Health Statistics, National Hospital Ambulatory Medical Care Survey, 2009.

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Analysis by the American Lung Association Research and Health Education Division. Accessed October 27, 2014.

- 8 [Measuring Childhood Asthma Prevalence Before and After the 1997 Redesign of the National Health Interview Survey—United States](#), MMWR, October 13, 2000, 49(40);908-911, Centers for Disease Control and Prevention, US government Health and Human Services. Accessed October 26, 2014
- 9 [National Health Interview Survey Data](#), Centers for Disease Control and Prevention. Accessed October 30, 2014.
- 10 [Comparisons of Health Care Utilization Outcomes in Children with Asthma Enrolled in Private Insurance Plans Versus Medicaid](#). Chang, Jongwha PhD, Gary L. Freed, MD, MPH, Lisa A. Prosser, PhD, Isha Patel, MS, Steven R. Erickson, PharmD, Richard P. Bagozzi, PhD, & Rajesh Balkrishnan, PhD, January 10, 2013, 72 Volume 28 _ Number 1 Journal of Pediatric Health Care. Accessed October 30, 2014.
- 11 [Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma](#). National Asthma Education and Prevention Program, National Heart, Lung, and Blood Institute; 2007. Accessed October 28, 2014.
- 12 [Global Initiative for Asthma children under the age of 5, A Pocket Guide for Physicians and Nurses](#), 2009. Accessed October 1, 2014.
- 13 [Global Initiative for Asthma Adults and Children over the age of 5, A Pocket Guide for Physicians and Nurses](#), 2011, Accessed October 1, 2014.
- 14 [Medical Expenditure Panel Survey, Statistical Brief # 242](#), April 2009, pages 1-3. Accessed October 1, 2014
- 15 [Trends in Asthma Morbidity and Mortality](#), American Lung Association, page 2. Assessed October 29, 2014.
- 16 [Asthma Disproportionately affects low-income populations](#), Press Release University of California – Los Angeles Center for Health Policy Research, December 16, 2010. Accessed October 30, 2014.

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