

early childhood and suggests that prevention strategies are needed to impact long-term outcomes.

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### Diagnostic Value of Serum Baseline Tryptase Levels in Childhood Asthma and Its Correlation With Disease Severity

Gao S, Fan J, Wang Z. *Int Arch Allergy Immunol*. 2016;171(3-4):194-202

**PURPOSE OF THE STUDY.** To determine if the measurement of serum baseline tryptase (sBT) levels can accurately diagnose pediatric asthma and predict asthma severity.

**STUDY POPULATION.** The study included 114 asthmatic children between the ages of 5 and 12 years. Within the cohort, 36 children had mild intermittent asthma, 38 had mild persistent asthma, and 40 had moderate to severe persistent asthma. In addition, 34 age-matched healthy children were included as controls.

**METHODS.** Serum baseline tryptase levels were measured in all asthmatic children and healthy controls. Asthma severity was assessed for asthmatic children using asthma serum markers (total IgE, interleukin-13, interferon- $\gamma$ ), childhood asthma control tests (C-ACT), GINA guideline-based severity evaluations, and pulmonary function tests. The diagnostic accuracy of sBT levels was assessed by receiver operating characteristic (ROC) analysis. The correlation between sBT levels and asthma severity was assessed by Pearson and Spearman correlation tests.

**RESULTS.** Median sBT levels were significantly greater in the mild persistent (4.2  $\mu\text{g}$ ; range 1.6-6.0) and severe persistent (4.7  $\mu\text{g}$ ; range 1.8-7.8) asthma groups compared with those with mild intermittent asthma and healthy controls. ROC curve analysis showed that sBT levels are both sensitive (75.4%) and specific (88.2%) in discriminating asthmatic children from healthy controls at a cut-off value of 3.2  $\mu\text{g}$ . ROC curve analysis showed that sBT levels are considerably sensitive (85.9%) and specific (88.9%) in distinguishing patients with persistent asthma from intermittent asthma at a cut-off value of 3.6  $\mu\text{g}$ . Correlation analysis revealed that sBT levels strongly correlated with C-ACT scores, serum IgE levels, eosinophil counts, pulmonary function parameters, and IL-13 levels in all asthma subgroups.

**CONCLUSIONS.** Serum blood tryptase levels may help support the diagnosis of asthma in children and predict disease severity.

**REVIEWER COMMENTS.** Tryptase is a marker of human mast cell activation, and elevated levels have been associated with increased risk of insect venom hypersensitivity and ana-

phylaxis in children with food allergies. This is one of the first studies to suggest a role for serum blood tryptase levels in the diagnosis of asthma. This marker could support the diagnosis of asthma in pediatric patients who are too young for or are unable to complete pulmonary function tests.

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### Use of Management Pathways or Algorithms in Children With Chronic Cough: CHEST Guideline and Expert Panel Report

Chang AB, Oppenheimer JJ, Weinberger MM, et al. *Chest*. 2017;151(4):875-883

**PURPOSE OF THE STUDY.** Use of cough algorithms or pathways can potentially lead to earlier diagnosis and reduce morbidity, unnecessary costs, and medication use associated with chronic cough. The 2006 CHEST guidelines on chronic cough in children advocated use of a cough pathway based on limited data, and research in chronic cough has progressed in the past decade. This study looked at 10 years of systematic reviews to present the summary of evidence behind these CHEST recommendations.

**STUDY POPULATION.** The age cutoff for the CHEST cough guidelines is  $\leq 14$  years. Chronic cough is defined as the presence of daily cough for at least 4 weeks in duration.

**METHODS.** Data were collected from systemic reviews, existing guidelines, and primary studies published in English until August 2015. The study then examined various aspects in the approach to chronic cough management in children based on key questions (KQs) by using the Population, Intervention, Comparison, Outcome format. CHEST methodical guidelines and Grading of Recommendations Assessment, Development, and Evaluation framework were used to support the evidence-based graded recommendations. A consensus-based Delphi method was employed for the final grading.

**RESULTS.** There is high-quality evidence that the use of a systemic approach to pediatric-specific cough management improves clinical outcomes and that management should be based on cough characteristics and associated clinical history. Although there was evidence from several pathways, the highest evidence was from the use of the CHEST approach.

**CONCLUSIONS.** CHEST pediatric chronic cough guidelines have been around for over a decade but were initially based on limited evidence. There are now more studies showing high-quality evidence for standardizing the management of cough  $>4$  weeks in children  $\leq 14$  years of age to improve our diagnosis of these children, manage them more appropriately, and improve quality

of life. In evaluating chronic cough in children, providers should base management on cough characteristics and clinical history, avoid or limit the time frame for empirical trials, and obtain a chest radiograph and spirometry (pre- and post- $\beta_2$  agonist) when appropriate. There are insufficient data to recommend the testing for airway hyperresponsiveness in all children with chronic cough and moderate-quality data to support AHR when spirometry is normal and asthma is suspected or symptoms are present.

**REVIEWER COMMENTS.** The evidence base supporting the 2006 CHEST Cough Guidelines approach has grown in the past decade. Protocolized approaches to managing pediatric chronic cough significantly improve clinical outcomes. In summary, it is important for providers to obtain a thorough history in children with chronic cough and then obtain a chest radiograph for all children and spirometry only for children ages  $\geq 6$  years. Other tests should not be routinely performed unless otherwise clinically indicated. In the meantime, we await more trials for data on some of the new recommendations that are consensus as opposed to evidence-based, particularly in primary care.

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### Effects of Childhood Asthma on the Development of Obesity Among School-Aged Children

Chen Z, Salam MT, Alderete TL, et al. *Am J Respir Crit Care Med.* 2017;195(9):1181–1188

**PURPOSE OF THE STUDY.** To determine what effect asthma has on the development of obesity.

**STUDY POPULATION.** A total of 3474 children from 8 different southern California communities were enrolled and followed prospectively. A total of 2706 of these children were nonobese at study entry and were included in the primary analysis.

**METHODS.** Nonobese children were followed and examined annually or biannually from kindergarten or first grade through high school. Questionnaires were completed periodically by parents until study year 5, then by the children until completion of the study. Children were classified as having asthma if they reported being diagnosed with asthma by a physician.

**RESULTS.** Children with asthma at baseline were 51% more likely to develop obesity than children without asthma (HR, 1.51; 95% CI, 1.08–2.10), even when controlling for multiple variables. However, new-onset asthma during the study was not found to be associated with increased risk of obesity (HR, 0.90; 95% CI, 0.52–

1.55). The use of asthma rescue medications at baseline was associated with a reduced risk of obesity (HR, 0.57; 95% CI, 0.33–0.96). Conversely, the use of any controller medications was not associated with incidence of obesity (inhaled corticosteroid: HR, 0.97; 95% CI, 0.49–1.93) (nonsteroid controller: HR, 1.34; 95% CI, 0.35–4.97).

**CONCLUSIONS.** Asthmatic children may be at increased risk of developing obesity. The use of asthma rescue medications may be helpful in reducing that risk.

**REVIEWER COMMENTS.** There are multiple studies that have suggested that obese children are more likely to have asthma and severe asthma symptoms. However, it is unclear whether children with asthma are at higher risk for obesity. This prospective study followed nonobese children for up to 10 years and found a higher incidence of obesity in asthmatics compared with nonasthmatics. This risk was found to be maintained even when controlling for physical activity level. The authors do acknowledge that details collected regarding physical activity were limited. A better understanding of the interplay between asthma and obesity as well as early identification and management of asthma and obesity risk may be helpful in reducing morbidity.

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### Perceived Exercise Limitations in Asthma: The Role of Disease Severity, Overweight, and Physical Activity in Children

Westergren T, Berntsen S, Lødrup Carlsen KC, et al. *Pediatr Allergy Immunol.* 2017;28(1):86–92

**PURPOSE OF THE STUDY.** To determine if perceived exercise limitation (EL) in asthmatic children was associated with lung function, demographic factors, and/or other medical comorbidities.

**STUDY POPULATION.** The study included 302 Norwegian children (64% male) with asthma from the Environment and Childhood Asthma birth cohort, evaluated at their 10-year follow-up.

**METHODS.** The 302 children selected from the cohort had no respiratory infection in the preceding 4 weeks and met 2 of 3 criteria for asthma: symptoms consistent with asthma, a physician's diagnosis of asthma, or use of asthma medications. These subjects underwent evaluation of exercise-induced bronchospasm (EIB, assessed by FEV<sub>1</sub> pre- and postexercise), bronchial hyperresponsiveness (BHR, assessed by methacholine challenge), a structured interview composed of demographic information and perceived exercise limitations, anthropometric data, and calculation of an

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