

Risk Factors and Predictive Clinical Scores for Asthma Exacerbation in Childhood

Forno E, Fuhlbrigge A, Soto-Quirós ME, et al. *Chest*. 2010;138(5):1156–1165

PURPOSE OF THE STUDY. To develop and verify a clinical score to be used by primary care providers to identify children at high risk of exacerbation.

STUDY POPULATION. The clinical score was developed and validated by using 615 unrelated Costa Rican children (6–14 years old) from a family-based study of asthma genetics. The score was then evaluated by using a second group of children, a cohort of North American children from the Childhood Asthma Management Program (CAMP) (5–12 years old).

METHODS. Severe asthma exacerbation, defined as any hospitalization, urgent visit, or systemic steroid course for asthma in the previous year, was the primary outcome. A scoring questionnaire was developed and verified in the initial cohort. On the basis of their clinical score, children were categorized into 1 of 3 groups: low risk (score ≤ 5); average risk (score 6–8); and high risk (score ≥ 9). Effectiveness of the scoring system was then evaluated in the Costa Rican validation set and in the CAMP cohort.

RESULTS. Multivariate analysis in the validation set showed that each 1-point increment in the clinical score was associated with a 1.6-fold increase in the risk for an exacerbation. Relative to children at average risk, the odds ratio for an exacerbation was 0.2 (95% confidence interval [CI]: 0.1–0.4) among children in the low-risk group and 5.4 (95% CI: 1.5–19.2) among children in the high-risk group. Comparable results were obtained from the CAMP cohort. Compared with children at average risk for an exacerbation, the hazard ratios for exacerbations among children in the low- and high-risk groups were 0.6 (95% CI: 0.5–0.7) and 1.9 (95% CI: 1.4–2.4), respectively, at 1-year follow-up, and there were similar results at 2 years.

CONCLUSIONS. The asthma clinical score yielded consistent results in the exploratory and validation sets, which indicates good reproducibility. The scoring system shows potential as a simple diagnostic tool that can easily be used in primary care settings worldwide.

REVIEWER COMMENTS. Although the exclusion of pulmonary-function data might seem like a limiting factor of the study, many primary care providers do not have access to pulmonary-function testing results. The goal of this study was to create a useful clinical tool that could predict exacerbations in the absence of pulmonary-function or laboratory data. The practical usefulness of the proposed scoring system depends on its simplicity and clarity. The results of this study demonstrate the development of a simple clinical score that effectively identi-

fies children at high risk for exacerbations. Additional studies among different cohorts are needed to fine-tune the score and evaluate its practical usefulness as a diagnostic tool in primary care settings.

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Differences in Prevalence, Treatment, and Outcomes of Asthma Among a Diverse Population of Children With Equal Access to Care: Findings From a Study in the Military Health System

Stewart KA, Higgins PC, McLaughlin CG, Williams TV, Granger E, Croghan TW. *Arch Pediatr Adolesc Med*. 2010;164(8):720–726

PURPOSE OF THE STUDY. To assess possible racial and ethnic differences in asthma prevalence, treatment patterns, and outcomes among a diverse population of children with equal access to health care.

STUDY POPULATION. In the Military Health System (MHS), children 2 to 17 years of age were enrolled throughout 2007 in TRICARE Prime, a voluntary health maintenance organization–type benefit provided by the US Department of Defense. More than 75% of children in the MHS are enrolled in TRICARE Prime.

METHODS. This was a retrospective cohort analysis. The sponsor parent's race and ethnicity were used as a proxy for the child's race and ethnicity. Outcome measures included the prevalence of diagnosed asthma (using *International Classification of Diseases, Ninth Revision* [ICD-9] codes), "potentially avoidable" asthma hospitalizations, asthma-related emergency department visits, visits to asthma specialists, and use of asthma medications among children 2 to 4, 5 to 10, and 11 to 17 years of age.

RESULTS. The cohort in the final analysis included 822 900 children aged 2 through 17 years. After adjusting for differences in demographic characteristics and socioeconomic status, black and Hispanic children of all ages were more likely to have an asthma diagnosis than white children (ranging from an odds ratio [OR] of 1.16 [95% confidence interval (CI): 1.09–1.24] to 2.00 [95% CI: 1.93–2.07]). Black children of all ages and Hispanic children aged 5 to 10 years were more likely to have any asthma hospitalization or asthma-related emergency department visit (ranging from an OR of 1.24 [95% CI: 1.1–1.37] to 1.99 [95% CI: 1.37–2.88]) and were less likely to visit a specialist (ranging from an OR of 0.71 [95% CI: 0.61–0.82] to 0.88 [95% CI: 0.79–

0.98]) compared with white children. Black children in all age categories were more likely to have filled any prescription for inhaled corticosteroids compared with white children (ranging from an OR of 1.11 [95% CI: 1.02–1.21] to 1.11 [95% CI: 1.04–1.19]).

CONCLUSIONS. Despite universal health insurance coverage offered through the MHS, the authors found evidence of racial and ethnic differences in asthma prevalence, treatment, and outcomes.

REVIEWER COMMENTS. This study corroborates the presence of racial and ethnic disparities in asthma within a cohort offered universal health care coverage. Black children were not only more likely to be diagnosed with asthma, but they were also found to have poorer control of asthma. It was surprising that black children were also more likely to have filled prescriptions for inhaled steroids compared with white children. The authors suggested that the higher rates of filled prescriptions might be attributed to the higher likelihood of receiving these prescriptions for asthma medications during and after emergency department visits and/or hospitalizations. Actual use and administration of these medications were not evaluated. The study's findings suggest that eliminating racial and ethnic disparities in health care likely requires a multifaceted approach beyond universal health insurance coverage.

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Status of Asthma Control in Pediatric Primary Care: Results From the Pediatric Asthma Control Characteristics and Prevalence Survey Study (ACCESS)

Liu AH, Gilesenan AW, Stanford R, Lincourt W, Ziemiecki R, Ortega H. *J Pediatr.* 2010;157(2):276–281

PURPOSE OF THE STUDY. To determine the prevalence of uncontrolled asthma by using validated instruments in a representative sample of pediatric primary care offices.

STUDY POPULATION. Patients were recruited from pediatric outpatient offices across the United States. Eligible patients for this study included children who were between the ages of 4 and 17 years, had a history of asthma as diagnosed by a health care provider, used an asthma medication in the previous year, and were able to read, write, and comprehend English.

METHODS. This was a multisite cross-sectional study of patients with asthma who visited a pediatric health care provider for any reason between January and May 2008. The questionnaires given to the patients included the

Childhood Asthma Control Test (C-ACT) for those between the ages of 4 and 11 years and the Asthma Control Test (ACT) for those between the ages of 12 and 17 years. Uncontrolled asthma was defined as a C-ACT or ACT score of <19. Each visit was also classified as either respiratory- or non-respiratory-related.

RESULTS. The overall prevalence of uncontrolled asthma was 46% (35% in patients with nonrespiratory complaints and 54% among those seen for a respiratory complaint). For patients evaluated for respiratory reasons, more children with uncontrolled asthma had missed ≥ 1 school day in the previous 4 weeks because of asthma (67% vs 29%; $P < .0001$). For patients seen for nonrespiratory reasons, more children with uncontrolled asthma had missed ≥ 1 day of school in the previous 4 weeks (53% vs 24%; $P < .0001$).

CONCLUSIONS. The number of missed school and work days resulting from uncontrolled asthma was not only greater for patients seen in a pediatric office for respiratory-related issues but also for non-respiratory-related reasons. This result highlights the burden and impact of uncontrolled asthma seen in all patients in pediatric clinics. Providers should consider evaluating asthma control on a regular basis regardless of the reason for the visit.

REVIEWER COMMENTS. The ACT and C-ACT tools were designed to use only for children already diagnosed with asthma. The cutoff score of ≤ 19 is not an absolute indicator of uncontrolled asthma but should serve to alert the provider that asthma might not be well controlled. A report of using C-ACT scores to identify children with very poorly controlled asthma has been published previously (*J Allergy Clin Immunol.* 2010;126[2]:267–273).

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Translation of a Pediatric Asthma-Management Program Into a Community in Connecticut

Cloutier MM, Wakefield DB. *Pediatrics.* 2011;127(1):11–18

PURPOSE OF THE STUDY. National Asthma Education and Prevention Program (NAEPP) guidelines have been widely disseminated, but their adoption by primary care clinicians has been problematic. This study evaluated an asthma-management program based on NAEPP guidelines.

STUDY POPULATION. Children aged 6 months or older in Connecticut were enrolled in community pediatric offices by trained community personnel.

Differences in Prevalence, Treatment, and Outcomes of Asthma Among a Diverse Population of Children With Equal Access to Care: Findings From a Study in the Military Health System

Faith Huang and Jennifer S. Kim

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