

# Commentary on Current Literature

Richard A. Johnson, MD

## Assessment of Severity Measures for Acute Asthma Outcomes: A First Step in Developing an Asthma Clinical Prediction Rule

Arnold DH, Gebretsadik T, Minton PA, et al.

*Am J Emerg Med.* 2008;26:473–479.

**Objective:** As a first step in the development of an asthma prediction rule, our primary objective was to assess the association of 8 candidate predictor variables with 2 clinically relevant asthma outcomes.

**Methods:** Among a cohort of 125 adults hospitalized with an asthma exacerbation, we examined models to identify clinical variables associated with length of stay (LOS) and clinically significant asthma exacerbations within 3 months after hospitalization (3-month exacerbation). Eight candidate predictor variables were chosen, including age, sex, race, pulsus paradoxus, prior endotracheal intubation for asthma, hospitalization within 5 years for asthma, and 2 chronic asthma severity scores.

**Results:** We found independent associations between LOS and pulsus paradoxus ( $P = .005$ ), prior intubation ( $P = .03$ ), sex ( $P = .03$ ), and prior hospitalization ( $P = .019$ ). Among men, 52% had a 3-month exacerbation in

comparison with 25% of women; and in multivariable analysis, male sex was independently associated with 3-month exacerbation (adjusted odds ratio = 5.1; 95% confidence interval = 1.37-18.9;  $P = .015$ ). Participants with 3-month exacerbation had higher Johns Hopkins Allergy and Asthma Composite (JHAAC) chronic severity scores (median = 77; interquartile range = 57-91) than those who did not (median = 54; interquartile range = 35-69;  $P < .001$ ) (for 40-unit increase, adjusted OR for 3-month exacerbation = 1.54; 95% confidence interval = 1.16-2.03;  $P = .003$ ). In multivariable analysis, male sex and the JHAAC severity score were independently associated with 3-month exacerbation.

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### COMMENTARY

This cohort prospective analysis of hospitalized asthma patients analyzed candidate predictor variables associated with length of stay and likelihood of an asthma exacerbation within the subsequent 3 months after discharge. It is interesting that age, sex, and concurrent asthma severity assessment measures were not highly predictive, but that 2 elements of the patient's asthma history (a history in endotracheal intubation and a prior hospitalization in the last 5 years) and 1 seldom-measured physical parameter (pulsus paradoxus of  $>20$  mm) were positively correlated with longer length of stay or a re-exacerbation within 3 months. This study helps to remind practicing clinicians that with asthma, as with many other medical problems, we should remember to learn as much as we can about a patient's history, rather than overemphasizing technological assessments. The study also highlights an infrequently assessed parameter of the physical exam, pulsus paradoxus, which is a helpful predictor of future disease severity in asthma patients who are experiencing an acute exacerbation.

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## Natural History of Asthma: Persistence Versus Progression— Does the Beginning Predict the End?

Panetteri RA, Covar R, Grant E, et al.

*J Allergy Clin Immunol.* 2008;121:607–613.

Environmental exposures during the early years and airway obstruction that develops during this time, in conjunction with genetic susceptibility, are important factors in the development of persistent asthma in childhood. Established risk factors for childhood asthma include frequent wheezing during the first 3 years, a parental history of asthma, a history of eczema, allergic rhinitis, wheezing apart from colds, and peripheral blood eosinophilia, as well as allergic sensitization to aeroallergens and certain foods. Risk factors for the development of asthma in adulthood remain ill defined. Moreover, reasons for variability in the clinical course of asthma—persistence in some individuals and progression in others—remain an enigma. The distinction between disease persistence and disease progression suggests that these are different entities or phenotypes. There is currently no consensus on whether disease progression requires either airway inflammation or

airway remodeling or the combination of the two. For patients with irreversible airway obstruction, inflammation might, in part, be necessary but perhaps not entirely sufficient to induce the irreversible component, some of which could be attributed to alterations in the structure of the bronchial wall. Intervening with intermittent or daily inhaled corticosteroids in high-risk infants and children does not prevent disease progression or impaired lung growth. These findings, however, might not apply to adults, and further study in adults is needed to determine the effect of inhaled corticosteroid therapy on disease progression.

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### COMMENTARY

**This extensively referenced review of the current knowledge of asthma development and disease progression by Panetteri et al provides the reader with the understanding that asthma is a highly complicated host reaction to external factors (ie, allergens, infections, and foods) coupled with individual host genetics. Our prior notion that this disease was simply about wheezing, inflammation, and airway mucus production has given way to a much more complex understanding of many external and internal factors affecting the pathophysiology of asthma. Clearly, much more needs to be elucidated before we are able to pharmacologically or environmentally successfully challenge the course of this chronic disease. Thus, it is not surprising that symptom control with inhaled corticosteroids and other symptom-controlling pharmacological agents, while critically important for patient management, do not seem to play much of a role in altering the ultimate course of the disease.**