

Raising the Bar for Asthma Care in the Emergency Department

Chu-Lin Tsai, MD, ScD *Houston, Tex*

Asthma remains a significant public health problem in the United States. The most recent national estimates indicate that there were 1.8 million asthma-related emergency department (ED) visits and 439,000 asthma hospitalizations in 2010.¹ These persistently high morbidity figures may reflect trends in increasing asthma prevalence as well as inadequate control of chronic asthma.^{2,3} To reduce the societal burden, clearly we need to do a better job of preventing and managing asthma exacerbations. EDs are an important venue for asthma care because they provide around-the-clock care and are often the last resort for minority and uninsured patients with asthma. But how well are patients with asthma exacerbations managed in the ED?

As outlined in the National Asthma Education and Prevention Program Expert Panel Report 3 (NAEPP EPR3) guidelines sponsored by the National Institutes of Health (NIH),⁴ management of asthma exacerbation in the ED includes several key components, such as peak expiratory flow (PEF) measurement, inhaled short-acting β -agonists, anticholinergics, and systemic corticosteroids. The extent to which these guideline-recommended care processes are followed in the real world is of great interest to many stakeholders, including patients, clinicians, health insurers, quality improvement organizations, researchers, and policy makers. In fact, tracking the real-world effectiveness of interventions is one of the central goals of comparative effectiveness research in asthma.⁵ In this context, 2 studies have examined the quality of care for adults with asthma exacerbations and found that, overall, patients received approximately 50%-70% of recommended care processes in the outpatient⁶ or ED setting.⁷ The adherence to guidelines seems to be better (>80%) among children with asthma exacerbations in acute care settings.^{8,9}

In this issue of the *JACI: In Practice*, Hasegawa et al¹⁰ examined the quality of care in 1380 adults who presented to 23 Japanese EDs with acute asthma.¹⁰ By abstracting available data from medical records, they showed that overall concordance with NIH asthma guidelines was approximately 72%, with low use of PEF measurement (9%), anticholinergics (2%), and systemic

corticosteroids in the ED (56%) and at discharge (36%). This study has numerous strengths, including multiple sites, a large sample size, clearly defined quality measures, an assessment of reliability of chart abstraction, and a well-executed analysis. It appears that there was much room for improvement in asthma care in Japanese EDs, particularly in the aforementioned 3 areas. The study's US counterpart showed much higher use of PEF measurement (52%), anticholinergics (77%), and systemic corticosteroids in the ED (78%) and at discharge (66%) in 63 EDs.⁷ In the Japanese study, only 13 of 23 EDs had peak flow meters available, which may have contributed to the underutilization of PEF in the study. As indicated in the NIH asthma guidelines, objective assessments of pulmonary function are central to acute asthma diagnosis and risk stratification.⁴ PEF measurements should be used more frequently because they are safe and inexpensive, take less than 1 minute to perform, and can be used to monitor a patient's response to treatment. Another target area for improvement is use of systemic corticosteroids, both in the ED and at discharge. Systemic corticosteroids should be administered early in the ED course to patients with moderate-to-severe exacerbations to speed the resolution of airflow obstruction and reduce the rate of post-ED relapse.⁴ Finally, because the Japanese study spanned from 2009 to 2011, the study would have been more complete if the researchers examined the uptake of new treatment recommendations in the 2007 NIH guidelines, such as intravenous magnesium sulfate, heliox, and inhaled corticosteroids at discharge. Given the low concordance of EDs with well-established recommendations, I suspect that concordance with these more novel recommendations was extremely low.

As with any chart review study, the major challenge is missing data on the chart. With this in mind, some of the study results should be interpreted with caution. For example, the lack of PEF in most patients would have made it difficult to correctly identify patients with a moderate or severe exacerbation who should receive anticholinergics or systemic corticosteroids in the ED. Because of missing data, the true proportion of eligible patients who receive these medications may be higher or lower. Furthermore, because of smaller numbers of eligible patients for these 2 measures, they carry less weight when calculating the overall concordance score. This results in an overall concordance score of 72% despite the low performance on these 2 measures. In quality-of-care research, the derivation and calculation of quality measures are complex processes, and, often, the devil is in the details. In this study, perhaps the quality measures should be modified to accommodate the substantial missing data on key asthma severity variables such as PEF and respiratory rate.

Despite the potential measurement errors, the researchers were able to demonstrate that higher guideline concordance was associated with significantly lower risk of hospital admission. This finding is highly encouraging and is consistent with the

Division of Epidemiology, The University of Texas School of Public Health, Houston, Tex

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Corresponding author: Chu-Lin Tsai, MD, ScD, Division of Epidemiology, The University of Texas School of Public Health, 1200 Herman Pressler, Suite W610, Houston, TX 77030. E-mail: cltsai@post.harvard.edu.

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previous US study.⁷ In an observational study, usually the effect of a treatment (eg, systemic corticosteroid) is confounded by disease severity, which means that patients who are sicker receive the indicated treatment, but they are more likely to have a worse outcome (eg, increased risk of hospital admission) because of more severe disease.¹¹ However, by restricting the denominator of a quality measure to patients at risk for that measure, this technique very effectively controls for confounding by disease severity. For example, a patient with a moderate-to-severe asthma exacerbation would have a lower overall concordance score if he or she did not receive an anticholinergic. By contrast, a patient with a mild asthma exacerbation would not need to consider this additional measure when calculating an overall concordance score, and he or she would have a higher concordance score than the previous patient, when assuming equal performance on other measures. Similar approaches have been used in chronic asthma to control for confounding by severity (eg, controller-to-total asthma medication ratio as a quality indicator).¹²

The association between high asthma case volumes and better care is a more novel finding. Associations between higher volumes and better outcomes have been well established for major surgical procedures (ie, practice makes perfect)¹³; however, the volume-outcome relationship in medical conditions is less clear. A recent study showed that a higher case volume of acute exacerbations of chronic obstructive pulmonary disease was associated with better patient outcomes¹⁴; the current study extended the volume-outcome relationship to asthma exacerbation. Given these positive findings, a logical next step would be to conduct a qualitative study to understand the best practices of treating respiratory emergencies in the higher case volume centers.

In summary, Hasegawa et al¹⁰ performed a large, rigorous chart review study in Japanese EDs and found a quality “chasm” in acute asthma care. The findings are concerning, and I agree with the researchers that knowledge translation initiatives should be implemented to improve asthma outcomes locally, nationally, and internationally. Such initiatives in the United States include the National Asthma Education and Prevention Program’s National Asthma Control Initiative¹⁵ and the National Asthma Control Program sponsored by the Centers for Disease Control and Prevention. It will require collective efforts of a variety of stakeholders (eg, clinicians, patients, federal and state agencies, and professional associations) to overcome barriers to implementing asthma guidelines. ED physicians should continue to raise the bar

for asthma care in EDs and work with primary care physicians and asthma specialists to bridge the gaps in care transitions, with the ultimate goal of improved patient outcomes.

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