Follow-up after acute asthma episodes: What improves future outcomes?

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Emergency departments (EDs) are commonly used for the acute and chronic management needs of patients with asthma in the United States and account for nearly 2 million visits each year.[1-5] Traditionally, the role of emergency physicians in caring for patients with acute asthma has been to provide emergency treatment and then to suggest follow-up visits with the primary care provider for ongoing preventive care. However, rates of follow-up with primary care providers are often low.[6]

Effective and timely outpatient care of asthma can prevent adverse asthma outcomes, specifically ED visits and hospitalizations.[7,8] For example, Ford et al[7] assessed the effect of an asthma education program on African American and white adults with asthma and found patients who received an asthma education intervention demonstrated a decrease in ED visits after the education intervention versus patients who did not receive the educational intervention, with the most significant period of improvement observed in the first 4 months of receiving the educational intervention program. A case-control study on children ages 0 to 14 years was conducted to identify outpatient management practices associated with increased or decreased risk of adverse outcomes. It was noted that patients with written asthma management plans were half as likely to have a hospitalization or an ED visit as those who lacked a plan.[9]

Abbreviation used
ED: Emergency department

The current systematic review is an attempt to identify effective strategies for patient follow-up after an asthma exacerbation that lead to improved clinical outcomes and decreased rates of subsequent exacerbations. Studies in both children and adults are included. Although follow-up after an asthma ED visit was the specific subject of the review, studies that report follow-up interventions after an asthma hospitalization that could be used after an ED visit are also included. The goal is to formulate specific follow-up management recommendations based on this review.

METHODS

Two sets of key words were selected for the systematic literature review. The first set included the following terms: *emergency asthma*; *status asthmaticus*; *acute asthma*; *severe asthma*; and *asthma exacerbation*. The second set of key words included the following terms: *allergist care*; *asthma specialist*; *discharge planning*; *discharge instructions*; *follow-up care*; *follow-up*; *long-term asthma care*; *patient care planning*; *preventative healthcare*; *preventative care*; *preventative health maintenance*; *primary health care provider*; *pulmonologist care*; *respiratory specialist care*; and *specialist care*. Additional details of the methodology for all literature reviews in this supplement are provided in the introduction to this supplement.[10] The task force specified the level of evidence used to justify the recommendations being made, and the system used to describe the level of evidence is also defined in the introduction to this supplement.

RESULTS

The literature search produced 25 randomized controlled trials and 6 meta-analyses. Ten randomized controlled trials were deemed relevant for this review, with none of the meta-analyses considered relevant. The relevant randomized controlled trials and other articles deemed important by the editorial team were organized by themes.

Achieving the follow-up appointment

Randomized controlled trials. Four studies have tested interventions to improve follow-up with primary care physicians after ED visits (Table I).[11-14] One studied adults only,[11] 1 studied children and adults,[12] and 2 studied children only.[13,14] The studies by Baren et al[11,12] used free prednisone, transportation vouchers, and appointment reminder telephone calls in 1 study[11] and actually scheduled the appointment before discharge in the other.[12] The interventions improved follow-up in both studies. Factors associated with improved follow-up in the first study[11] were identified to be a prior relationship with a primary care provider, older

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TABLE I. Randomized controlled trials addressing achieving the follow-up appointment

Reference	Country	Age (y)	No. of subjects (intervention/ control groups)	Intervention	Results: primary outcome	Other results
Baren et al, 2001[11]	United States	22.4-39.8	95/83	Five-day course of 50 mg of prednisolone daily Taxicab vouchers Asthma information card Written instructions Appointment reminder telephone call in 48 hours	Asthma follow-up with PCP within 4 weeks of index ED visit more common in intervention group (RR, 1.6; 95% CI, 1.1-2.4)	Study intervention was inexpensive (3-part intervention approximately $15 per patient).
Baren et al, 2006[12]	United States	2-54	126 (a); 132 (b)/126 (c)	Free prednisone (a and b) Transportation vouchers (a and b) Telephone reminder for appointment (a) Scheduling of appointment before discharge (b)	Follow-up higher in group b (65%) vs group a (48%) or group c (42%) ($P = .002$)	There was no improvement in long-term clinical and functional outcomes in group b (better follow-up) compared with groups a or c.
Smith et al, 2004[13]	Unites States	Parents of children 2-12	263/264	Telephone coaching on days 2 and 5 after ED visit Coaching addresses recommendations for and benefits of follow-up, barriers to follow-up Monetary incentive ($15) for achieving follow-up	Intervention group more likely to attend asthma planning visit within 15 days of ED visit (35.7%) than control group (18.9%; $P < .0001$)	Greater decrease in asthma symptoms was seen in the first 2 weeks in the intervention vs control groups. The proportions of children with asthma planning visits and acute asthma care visits during the 16-day to 6-month period were similar for both groups.
Smith et al, 2006[14]	United States	Parents of children 2-12	50/42	Asthma coaching in the ED, including discussing the importance and advantages of seeking follow-up care with the child's PCP, discussing barriers to such care, and discussing strategies for overcoming those barriers Fifteen dollar monetary incentive for completing the follow-up visit	No significant differences between groups in verified follow-up PCP visits (intervention group, 22.0% [95% CI, 11.5% to 36.0%]; control group, 23.8% [95% CI, 12.0% to 39.4%])	

PCP, Primary care physician.

patient age, regular access to transportation for scheduled medical care, black race, and lack of health insurance coverage. Although follow-up improved, the intervention in the second study[12] was not associated with improved outcomes, such as proportion of patients with relapse events; subsequent urgent care visits, ED visits, or hospitalizations; reported activity limitation; or use of asthma controllers.

The 2 studies in children by Smith et al[13,14] tested monetary incentives and coaching, either by telephone[13] or in the ED,[14] to enhance follow-up. The largest study,[13] which used telephone coaching on days 2 and 5 after the ED visit, was associated with an increased likelihood of follow-up and reduced symptoms. The smaller study,[14] which used asthma coaching in the ED but not telephone coaching, was not associated with increased verified follow-up. It is of interest that of the visits of patients who reported having follow-up in that study, only 37% could be verified by medical record review.

Other studies. Sin et al[15] conducted a relevant nonrandomized controlled trial in Edmonton, Alberta, Canada, in which patients were allocated to the intervention group during certain weeks and to the usual care group during other weeks. The intervention consisted of a study coordinator offering to make the follow-up appointment directly with the patient's primary care physician on behalf of the patient and a reminder call 1 or 2 days before the scheduled follow-up visit. Patients in the intervention group (n = 63) were significantly more likely ($P \leq .003$) to make at least 1 follow-up visit in the first month, 3 months, and 6 months after the ED visit compared with patients in the usual care group (n = 62). However, similar to the above results, there were no significant differences between groups in mean asthma control scores or the occurrence of subsequent asthma-related ED visits or hospitalizations during the first 1, 3, 6, or 12 months after the index ED visit.

Asthma education after an asthma exacerbation

Three studies tested various educational models for their effect after an asthma ED visit or hospitalization (Table II).[16-18] The information provided in all 3 programs dealt with reinforcing treatment recommendations, optimizing inhaler technique, and self-management education. Two studies in children, one testing a telephone education session[16] and the other testing an enhanced