Evidence Table 3. Patient/Provider Education: Asthma Self-Management Education for Adults

Abbreviations used in table:

COPD	**chronic obstructive pulmonary disease**
DPI	**dry powder inhaler**
ED	**emergency department**
FEF	**forced expiratory flow**
FEV_1	**forced expiratory volume in 1 sec.**
FVC	**forced vital capacity**
HMO	**health maintenance organization**
ICS	**inhaled corticosteroid**
ITT	**intent-to-treat analysis**
MDI/DED	**metered-dose inhaler (MDI) with delivery enhancement device (DED)**
OR	**odds ratio**
PCP	**primary care provider**
PEFR	**peak expiratory flow rate**
pMDI	**pressurized metered-dose inhalers**
SpO_2	**saturation of oxyhemoglobin**
95% CI	**95% Confidence Interval**

*** indicates primary outcome**

Evidence Table 3. Patient/Provider Education: Asthma Self-Management Education for Adults

A. Asthma Self-Management Education For Adults In Clinic-Based Settings

Citation (Sponsor)	Study Design	Purpose/Objective	Study N (Number Evaluable)	Population Characteristics	Asthma Severity at Baseline (if reported)	Treatment	Duration of Active Treatment; Duration of Postintervention/ Off-Treatment Followup	Lung Function	Morbidity	Knowledge/Quality of Life
Ford et al. Health outcomes among African American and Caucasian adults following a randomized trial of an asthma education program. Ethn Health 1997;2(4):329–339. (Agency for Health Care Policy and Research)	Secondary analysis of data from a randomized trial (2 EDs, 1 inner city and 1 suburban, of a large Midwestern health care system)	To conduct a race-specific re-analysis of a clinical trial of an asthma education program	241 (241 ITT)	**African American (n=163)** **Age** 18–70 yr, mean = 35.8 yr **Gender** 30.1% male, 69.9% female **Smoking** 28.2% current smokers, 58.3% exsmoker, 13.5% never smoked **Other** 27.6% married, 66.3% with income <$15,000/year, 39.7% with education over 12 years, 52.8% employed/student **Caucasian (n=78)** **Age** 18–70 yr, mean = 40.2 yr **Gender** 89.2% male, 10.8% female **Smoking** 20.5% current smokers, 59.0% exsmoker, 20.5% never smoked **Other** 57.7% married, 25.6% with income <$15,000/year, 65.6% with education over 12 years, 64.1% employed/student	**African American (n=163)** Average ED visits due to asthma, mean = 5.9/yr Average days with limited activity due to asthma, mean = 12.2 days/yr Taking medication for asthma, 94.5% Overall health rating of good to excellent, 46.6% **Caucasian (n=78)** Average ED visits due to asthma, mean = 5.5/yr Average days with limited activity due to asthma, mean = 10.8 days/yr Taking medication for asthma, 94.9% Overall health rating of good to excellent, 44.9%	**Intervention group (E):** 3 small-group educational sessions on asthma led by a specially trained health care professional at either of the 2 ED sites. Those not attending were mailed the class materials. (n=79 African Americans, n=40 Caucasians) **Control group (C):** Usual care (n=84 African Americans, n=38 Caucasians)	Data collected through telephone interviews at baseline and 4, 8, and 12 months		E showed a decrease in number of ED visits vs. C (E: 5.0 to 2.7, C: 6.7 to 4.8 for African Americans; E: 4.7 to 1.5, C: 6.5 to 4.7 for Caucasian). There was no racial difference for E vs. C in number of ED visits (p=0.60), change in asthma knowledge and beliefs score (p=0.51), or limited activity days due to asthma (p=0.43) over the period of the study.	

Citation (Sponsor)	Study Design	Purpose/Objective	Study N (Number Evaluable)	Population Characteristics	Asthma Severity at Baseline (if reported)	Treatment	Duration of Active Treatment; Duration of Postintervention/ Off-Treatment Followup	Lung Function	Morbidity	Knowledge/Quality of Life
Klein et al. Benefit from the inclusion of self-treatment guidelines to a self-management programme for adults with asthma. Eur Respir J 2001;17(3): 386–394. (Netherlands Asthma Foundation; GlaxoWellcome; the "Stichting Astmabestrijding;" Amicon Health Care Insurance Fund)	Single-blind randomized, parallel group trial (outpatient clinic of a teaching hospital)	To assess the long-term effects and safety of adding self-treatment guidelines to a self-management program for adults with moderate to severe asthma who were well controlled and already on a relatively high dose of inhaled corticosteroids	245 (238 at 12 months; 173 at 24 months)	**Age** 18–65 yr, mean = 44 yr **Gender** 45% male, 55% female **Education** 35% low, 38.3% medium, 26.7% high **Smoking** 53.1% nonsmokers, 35.5% exsmokers, 11.4% smokers	Stable, moderate-to-severe asthma Duration of asthma, mean = 20 yr Continuous use of inhaled steroids for at least 3 months, MDI equivalent 589 mcg/day Morning PEF, mean = 385 L/min FEV_1 % pred., mean = 76.5 Positive skin prick test = 67.5%	**Self-treatment group (E):** Instructions about self-treatment of exacerbations: told to measure PEF weekly, both on a fixed day and any time asthma symptoms worsened, and given a 4-zone self-treatment plan. (n=123; n=? completers) **Control group (C):** Usual care (n=122; n=? completers)	2-week diary data and spirometry collected at 4, 8, 12, 18, and 24 months after start of educational program All subjects were educated by a specially trained asthma nurse in 3 consecutive weekly sessions each lasting 90 minutes. Self-treatment instruction given during 3rd session to E.	Decrease in PEF variability over 24 months was 32% in E and 29% in C. Difference between groups not significant. PC_{20} histamine increased significantly in both groups over 12 months (2.54 mg/mL in E; 2.33 mg/mL in C). Difference between groups not significant. C showed a significant increase in FEV_1 over E (3% vs. 2%).	Frequency of exacerbations decreased by 2% in E and increased by 5% in C (diff 7%, 95% CI –2 to 16). Difference in total number of outpatient visits in both groups decreased (E by 25%, C by 18%) with no difference between groups. No difference between groups in percentage of symptom free days and nights.	Quality of life for both groups increased by 7% over the 12 months with no difference between groups in overall score or domain scores. After 12 months, percentage who perceived better control of asthma was 90.7% for E and 74.6% for C ($p<0.001$). Perceived self-confidence was 3.76 for E vs. 3.41 for C (p=0.018).

Citation (Sponsor)	Study Design	Purpose/Objective	Study N (Number Evaluable)	Population Characteristics	Asthma Severity at Baseline (if reported)	Treatment	Duration of Active Treatment; Duration of Postintervention/ Off-Treatment Followup	Lung Function	Morbidity	Knowledge/Quality of Life
Levy et al. A randomized controlled evaluation of specialist nurse education following accident and emergency department attendance for acute asthma. Respir Med 2000;94(9): 900–908. (National Asthma Campaign, UK; Allen and Hanbury's; Clement Clarke International; Astra Pharmaceuticals)	Randomized controlled trial (emergency department in 3 local hospitals)	To investigate whether patient education by hospital based specialist asthma nurses, using guided self-management plans based on nationally agreed guidelines, could improve patient recognition and self-treatment of asthma	103 (103 ITT)	**Age** >18 yr, mean = 40 yr **Gender** 38% male, 62% female **Ethnicity** Not reported	Attending accident and emergency departments or admitted to hospital for uncontrolled asthma 79% nebulized in ED; 64% prescribed oral steroids; 32% admitted	**Intervention group (E):** 1-hour consultation with nurse followed by 2 more consultations lasting 30 minutes at 6-week intervals. Patients taught to step up medication based on PEF or symptoms. (n=103, n=79 attended at least 1 consultation, n=81 completed interviews) **Control group (C):** Usual care (n=108, n=94 completed interviews)	Interviews at baseline, 6 weeks, 3 months and 6 months	E vs. C had higher (mean 20.1 L/min, 95% CI 0.4 to 39.7) and less variable PEF (p<0.001) at 6 months.	*Of those with mild attacks (E 14% & C 18%), E increased use of inhaled steroids vs. C (47% vs. 23%; OR 3.06, 95% CI 0.79 to 11.73) and use of rescue medication (89% vs. 82%; OR 1.89, 95% CI 0.31 to 11.68). Of those with severe attacks (E 34% & C 42%), E increased use of inhaled topical steroids vs. C (51% vs. 21%, OR 3.91, 95% CI 1.8 to 8.1, p<0.001) and use of rescue medication (89% vs. 76%, OR 2.88, 95% CI 1.1 to 7.9), p<0.04). E vs. C had lower (p=0.01) and less variable (p=0.01) symptom scores at 6 months. E had fewer days off work vs. C in the first 3 months (0.34 vs. 0.54, p=0.08) but not in the second 3 months (0.25 vs. 0.30). E vs. C had fewer routine consultations with the doctor (p<0.05) and nurse (p<0.03) with no difference in uncontrolled episodes and hospital visits.	Quality of life scores improved in both groups with no difference between groups.

Citation (Sponsor)	Study Design	Purpose/Objective	Study N (Number Evaluable)	Population Characteristics	Asthma Severity at Baseline (if reported)	Treatment	Duration of Active Treatment; Duration of Postintervention/ Off-Treatment Followup	Lung Function	Morbidity	Knowledge/Quality of Life
Neri et al. Short and long-term evaluation of two structured self management programmes on asthma. Monaldi Arch Chest Dis 2001;56(3): 208–210.	Randomized controlled trial	To evaluate the efficacy of 2 structured self-management programs on asthma at the end of interventions (short-term efficacy) and after 3 years (long-term efficacy)	40 (40)	**Age** Mean = 46.5 yr **Gender** 50% male, 50% female	Asthma duration at least 1 yr	**Intervention group (E):** "Asthma school" program consisting of 6 lessons of 1 hour each based on content in line with the International Asthma Guidelines (n=20) **Comparison group (C):** "Basic" educational program (n=20)	1-year and 3-year assessments	*No difference between groups in FEV_1 at 1 year and at 3 years ($p>0.05$).		*No difference between groups in knowledge at 1 year and at 2 years ($p>0.05$). *No difference between groups in number of correct steps performed during the inhalation procedure at 1 year and at 3 years ($p>0.05$).
Van der Palen et al. Behavioural effect of self-treatment guidelines in a self-management program for adults with asthma. Patient Educ Couns 2001;43(2):161–169. (The Netherlands Asthma Foundation; the "Stichting Astmabestrijding Nederlant"; GlaxoWellcome)	Randomized controlled parallel group trial	To assess whether including self-treatment guidelines (action plans) in a self-management program for adult asthmatics leads to greater behavioural changes than a similar program without these guidelines	245 (238)	**Age** 18–65 yr, mean 44.3 yr **Gender** 45% male, 55% female **Education** 35% low, 38% medium, 27% high **Smoking** 53% nonsmokers, 35% exsmokers, 12% smokers	Stable phase of disease Inhaled steroids, mean = 594 mcg/day metered dose inhaler equivalent FEV_1 % pred., mean = 76.5 Morning PEF, mean = 384.4 l/min	**Intervention group (E):** Self-management training and education by a specialized asthma nurse in three 90-minute small group sessions, instruction in correct use of inhaled medication and a peak flow meter, and instructions about the self-treatment of exacerbations. (n=123; 119 completers) **Comparison group (C)** Self-management training and education by a specialized asthma nurse in three 90-minute small group sessions and instruction in correct use of inhaled medication and a peak flow meter. No instruction about the self-treatment of exacerbations. (n=122; n=119 completers)	2-week diary 1 year after intervention			No difference between E and C in change in generalized self-efficacy (3.5% vs. 1.6%), asthma-specific self-efficacy expectancies (14% vs. 13%), and outcome expectancies (4% for both E and C) over 1 year. No change in intention toward self-management in either group. No differences between E and C in change in asthma-specific knowledge (20.3% for E and C combined).

Citation (Sponsor)	Study Design	Purpose/Objective	Study N (Number Evaluable)	Population Characteristics	Asthma Severity at Baseline (if reported)	Treatment	Duration of Active Treatment; Duration of Postintervention/ Off-Treatment Followup	Lung Function	Morbidity	Knowledge/Quality of Life
Couturaud et al. Education and self-management: a one-year randomized trial in stable adult asthmatic patients. J Asthma 2002;39(6): 493–500. (Projets Hospitaliers de Recherche Clinique 1995)	Multicenter, prospective, open, randomized parallel group design (outpatient clinic of 2 university hospitals)	To assess the effects of an educational program in asthmatic patients following treatment readjustment	72 (54)	**Age** 18–72 yr, mean = 38 yr **Gender** 32% male, 68% female **Smoking** 12% current smokers	Moderate to severe asthma FEV_1 % pred., mean = 84 Inhaled steroids, mean = 1562 mcg/day Long-acting $beta_2$-agonists = 67% 75% hospitalized in past 5 years	**Intervention group (E):** Personal education program consisting of 5 sessions covering pathophysiology of asthma, role of medication and side effects, asthma triggers and their avoidance, detection of an asthma flare up, and self-management plan based on symptoms and peak-flow monitoring (n=36; 26 completers) **Control group (C):** No personal education program (n=36; 28 completers)	30–60 minutes of education at each of 5 sessions 2-week run in period to optimize asthma control with a maximum of 3 run in periods 12-month followup	Control and Education groups comparable in FEV_1 (84% vs. 85%, p>0.05).	*No difference in symptom-free days (89% for E and 88% for C). No difference in days off work (4% for E, 8% for C) or unscheduled visits (1 vs. 0.6 for E vs. C). Percentage of days of oral steroid intake higher in E vs. C (6% vs. 3%, p=0.01). Among E, those who complied with action plan (n=5) had higher percentage of symptom-free days (97% vs. 87%, p=0.009).	Asthma Quality of Life scores did not differ between E and C.
Cowie et al. Asthma in adolescents: a randomized, controlled trial of an asthma program for adolescents and young adults with severe asthma. Can Respir J 2002;9(4):253–259. (Alberta, Canada, Lung Association)	Randomized controlled trial (recruited from EDs in Calgary, Alberta)	To determine the impact of an age-specific asthma program on asthma control, particularly on exacerbations of asthma requiring ED treatment, and on the quality of life of adolescents with asthma	93 (93 ITT)	**Age** 15–20 yr, mean = 17.2 yr **Gender** 29% male, 71% female	Severe asthma 26% admitted for asthma in year before study 76% using inhaled corticosteroid 56% waking with asthma, mean of 2 times/week 77% using $beta_2$-agonist more than once/day FEV_1 % pred., mean = 81	**Intervention group (E):** Young Adult Asthma Program was staffed by asthma educators, respiratory therapists, and a respiratory physician or pediatrician. Subject assessed individually and seen by a physician trained in asthma management for 90–120 minutes. Report was sent to regular family physician. Subject given appointment for followup visit with full team. (n=?; n=29 completers) **Control group (C):** Usual care (n=?; n=29 completers)	Asthma and quality of life questionnaires mailed at 3 months and at 6 months.			At 3 months, 12.5% of E vs. 34.0% of C had visited an ED for asthma treatment (p=0.03). At 6 months, there were no differences between E and C in disease control and management.

Citation (Sponsor)	Study Design	Purpose/Objective	Study N (Number Evaluable)	Population Characteristics	Asthma Severity at Baseline (if reported)	Treatment	Duration of Active Treatment; Duration of Postintervention/ Off-Treatment Followup	Lung Function	Morbidity	Knowledge/Quality of Life
Gibson et al. Self-management education and regular practitioner review for adults with asthma (Review). Cochrane Database Syst Rev 2002;(2):CD001117. (NSW Health Cooperative Research Centre for Asthma, Australia)	Meta-analysis and Systematic Review of randomized controlled trials and controlled clinical trials	To evaluate the literature supporting Step 5 of the Australian Asthma Management Plan, "Educate and Review Regularly," to determine whether health outcomes are influenced by asthma education and self-management programs	36 trials published 1986–2001 6090 participants randomized; 4593 completers; drop out rates ranged from 0% to 54%	**Age** Over 16 years		**Intervention group (E):** Self-management education included optimal self-management (15 studies), self-monitoring and regular review (7 studies), self-monitoring only (10 studies), regular review only (1 study), and written action plan but not optimal self-management (2 studies) **Control group (C):** Usual care		No significant effect of education on FEV_1 (10 studies) or PEF (16 studies)	Self-management education reduced hospitalizations (RR 0.64, 95% CI 0.50 to 0.82; 8 studies), emergency room visits (RR 0.82, 95% CI 0.73 to 0.94; 20 studies), unscheduled visits to the doctor (RR 0.68, 94% CI 0.56 to 0.81; 3 studies), and days off work or school (RR 0.79, 95% CI 0.67 to 0.93; 16 studies).	Self-management education increased quality of life (standard mean difference 0.29, 95% CI 0.11 to 0.47; 3 studies).
Gibson et al. Limited (information only) patient education programs for adults with asthma (Review). Cochrane Database Syst Rev 2002;(2):CD001005. (Cooperative Research Centre for Asthma, Australia; Garfield Weston Foundation UK)	Meta-analysis and Systematic Review of randomized and controlled trials	To assess the effects of limited (i.e., information only) asthma education on health outcomes in adults with asthma.	12 trials published 1979–1997	**Age** Over 16 years		**Intervention (E):** Asthma education delivered to individual or group that included information about pathophysiology of asthma, management of trigger factors, and action and side effects of medication **Control (C):** Usual care, which may or may not have involved a degree of education, waiting list control, or lower-intensity educational intervention		E did not affect FEV_1 (weighted mean difference 0.20, 95% CI –0.35, 0.75; 1 study).	E did not reduce hospitalization for asthma (weighted mean difference –0.03 hospitalizations/per person/year, 95% CI –0.09, 0.03; 3 studies) or doctor visits (weighted mean difference 0.22 visits/ person/year, 95% CI –0.09, 0.52; 5 studies). No difference in medication use (n=3 studies). No reduction in days lost from normal activity (n=3 studies).	

Citation (Sponsor)	Study Design	Purpose/Objective	Study N (Number Evaluable)	Population Characteristics	Asthma Severity at Baseline (if reported)	Treatment	Duration of Active Treatment; Duration of Postintervention/ Off-Treatment Followup	Lung Function	Morbidity	Knowledge/Quality of Life
Marabini et al. Short-term effectiveness of an asthma educational program: results of a randomized controlled trial. Respir Med 2002;96(12): 993–998. (National Research Council, Italy)	Randomized controlled trial (outpatients attending asthma clinic, Italy)	To assess the effectiveness of an educational program and its impact on quality of life	77 (77)	**Age** ≥18 yr, mean = 51.1 yr **Gender** 46.8% male, 53.2% female **Ethnicity** Not reported **Smoking** 59.7% nonsmokers, 29.9% exsmokers, 10.4% current smokers **Employment Status** 15.6% unemployed or retired	Primary diagnosis of persistent asthma for at least 1 year: 16.9% mild, 64.9% moderate, 18.2% severe Duration of asthma, mean = 14.2 yr Stable asthma in 3 months before recruitment Atopy, 35.1%	**Intervention group (E):** Usual treatment plus educational program based on "Teach Your Patients about Asthma: A Clinician Guide." Education delivered by physician. (n=37) **Control group (C):** Usual care (n=40)	Three 2-hour sessions Followup data collected at 3 months	No significant improvement in FEV_1 or PEF in either group. When stratified for asthma severity, FEV_1 was higher in E vs. C (81.2 vs. 72.5, p<0.05) after adjusting for baseline.	No significant improvement in morbidity in either group.	At 3 months, E vs. C had higher score in quality of life overall (6.0 vs. 5.6, p<0.05) and in environment (6.6 vs. 6.0, p<0.005) and symptom (6.2 vs. 5.7, p<0.005) domains. Among those with moderate-to-severe asthma, E improved in overall QOL score (5.6 to 6.0, p<0.05), symptom score (5.7 to 6.2, p<0.01), and activities (5.1 to 5.4, p<0.05) domains with no change in scores of C.
Perneger et al. Effect of patient education on self-management skills and health status in patients with asthma a randomized trial. Am J Med 2002; 113(1):7–14. (Swiss National Science Foundation, Berne, Switzerland)	Randomized controlled trial (1 university hospital)	To assess the effectiveness of a newly established education program for adults with asthma designed to improve patients' health and functional status	131 (115)	**Age** <30 yr, 23.7% 30–44 yr, 30.5% 45–59 yr, 28.2% 60+ yr, 17.6% **Gender** 40% male, 60% female **Smoking** 34% current smokers, 26% exsmokers, 40% never smoked **Other** 26% university education	Hospitalized for asthma (76%), seen in the emergency ward, or received asthma medications while hospitalized for another reason Confirmed diagnosis of asthma Duration of asthma: <2 yr, 18%; 2–10 yr, 28%; >10 yr, 54%	**Intervention group (E):** Three 75-minute educational group sessions, 1 week apart, conducted by 2 respiratory physicians and a physiotherapist. Purpose was to design individual self-management plans. Copies of plans were sent to the patients' physicians. (n=66; n=57 completers) **Control group (C):** Delayed education scheduled after followup assessment at 6 months. (n=65; n=58 completers)	Assessed at 6 months post-intervention	No difference between E and C in improvements in pulmonary function		2 of 9 improvements in self-management favored E: "correct inhalation technique" (OR 2.4, 95% CI 1.0 to 5.7, p=0.048) and "knows peak flow reading that requires calling physician" (OR 3.1, 95% CI 1.4 to 6.7, p=0.004). No difference between E and C in functional outcomes or use of health care in past 6 months.

Citation (Sponsor)	Study Design	Purpose/Objective	Study N (Number Evaluable)	Population Characteristics	Asthma Severity at Baseline (if reported)	Treatment	Duration of Active Treatment; Duration of Postintervention/ Off-Treatment Followup	Lung Function	Morbidity	Knowledge/Quality of Life
Powell et al. Options for self-management education for adults with asthma (Review). Cochrane Database Syst Rev 2003;(1):CD004107. (Cooperative Research Centre for Asthma, Australia)	Meta-analysis and systematic review of randomized controlled trials	To compare the differing components of self-management interventions in asthma	15 studies published 1990–2001 2460 participants randomized; dropout rates ranged from 0% to 60.3% with rate not reported for 1 study	**Age** Over age 16 years		**Three primary comparisons:** (1) Optimal Self-Management vs. Regular Medical Review (6 studies) (2) Peak Expiratory Flow Based vs. Symptom Based Self-Management (6 studies) (3) Optimal Self-Management vs. Modified Optimal Self-Management (3 studies) 3 levels of education based on patient asthma severity and initial needs assessment. Topics included trigger avoidance, environmental control, the role of medications, delivery systems, action plans, and self-monitoring skills. Assessment and education took approximately 2 hours.	6-month followup visit to education program Health care utilization and absenteeism during 6 months before and 6 months after initial visit compared	Comparison 2: No difference in PEF (6 studies). Comparison 3: Regular review was associated with improvement in mean percent predicted FEV_1 as compared with omission of regular review (1 study).	Comparison 1: No difference in hospitalizations for asthma (4 studies), emergency room visits (1 study), unscheduled doctor visits (studies), and nocturnal asthma (3 studies). Comparison 3: Omission of regular review was associated with more health center visits and 2.5 more sickness days (1 study).	

Citation (Sponsor)	Study Design	Purpose/Objective	Study N (Number Evaluable)	Population Characteristics	Asthma Severity at Baseline (if reported)	Treatment	Duration of Active Treatment; Duration of Postintervention/ Off-Treatment Followup	Lung Function	Morbidity	Knowledge/Quality of Life
Janson et al. Effects of individual self-management education on clinical, biological, and adherence outcomes in asthma. Am J Med 2003;115(8): 620–626. (National Institutes of Health)	Prospective, randomized controlled trial	To assess the effects of individual self-management education on adherence to anti-inflammatory medication, biological markers of airways inflammation, and clinical outcomes	68 (65)	**Age** ≥18 yr, mean = 33.5 yr **Gender** 45% male, 55% female **Education** Mean = 16 yr **Smoking** All nonsmoking	Mild-to-moderate persistent asthma All prescribed an inhaled corticosteroid of at least 400 mcg/day Duration mean = 19.5 yr FEV_1 % pred., mean = 78.5 Symptom severity score mean = 10 out of 50 Nights with symptoms, mean = 2/week Perceived asthma control score, mean = 39 out of 55 Asthma quality of life score, mean = 25.5 out of 80 Methacholine PC_{20}, mean = 0.80 mg/mL	**Intervention group (E):** 30-minute individual session of asthma education consisting of components recommended in National Institutes of Health guidelines: basic facts about asthma, role of airway inflammation and bronchospasm, roles and actions of anti-inflammatory and quick relief medications, skill for correct inhalation and for peak flow measurement. Reinforcement by study coordinator at next 2 biweekly visits. (n=33) **Control group (C):** Monitoring only (n=32)	6 weeks with 5 study visits after 1-week run in	*No difference between groups in change in FEV_1 % pred. (p=0.09) or morning peak flow (p=0.23).	*Adherence increased in E from 70% to 91% vs. decrease from 65% to 62% in C (p=0.01). Perceived control of asthma improved 14% in E vs. 5% in C (p=0.04). No difference between E and C in change in use of beta-agonist (p=0.21).	No difference in increase in quality of life (37% for E and 21% for C, p=0.06).

Citation (Sponsor)	Study Design	Purpose/Objective	Study N (Number Evaluable)	Population Characteristics	Asthma Severity at Baseline (if reported)	Treatment	Duration of Active Treatment; Duration of Postintervention/ Off-Treatment Followup	Lung Function	Morbidity	Knowledge/Quality of Life
Thoonen et al. Self-management of asthma in general practice, asthma control and quality of life: a randomized controlled trial. Thorax 2003;58(1):30–36. (The Netherlands Organization for Scientific Research; ASTRAZeneca Pharmaceutica BV)	Nonrandomized controlled trial (practices randomized; unit of analysis was individual patient)	To determine if guided self-management can provide a safe treatment strategy for asthmatic patients in general practice	19 practices; 214 patients (193 ITT)	**Age** >16 yr, mean = 39.5 yr **Gender** 38% male, 62% female **Smoking status** 52% never smokers, 27% former smokers, 22% current smokers **Employment** 68% employed full-time or part-time	Stable asthma Duration of asthma, mean = 19.6 yr 40% with asthma attack in previous 6 months FEV_1 % pred. post-bronchodilator, mean = 91.3 Asthma Quality of Life Questionnaire score, mean = 5.5	**Intervention group (E):** 4 individual training sessions during a period of 3 months consisting of tailored education and instructions on how to use a personalized written self-treatment plan. After training sessions, biannual control visits were recommended over a followup period of 21 months. (n=95; n=86 completers) **Control group (C):** Usual care according to guidelines of the Dutch College of Family Physicians, which recommends followup visits every 3-6 months. 1 visit was scheduled at start to instruct patients on the use and dosage of inhaled steroids (budesonide 200 mcg Turbuhaler). (n=98; n=85 completers)	Assessment every 6 months for 2 years	No difference between E and C in estimated rate of decline in FEV_1 reversibility and PC_{20} histamine.	No difference between E and C in median dose of short-acting $beta_2$ bronchodilators (p=0.71) or ipratropium (p=0.61), but a higher number of courses of oral prednisolone in E vs. C (p=0.015).	*Increased number of mean percentage of successfully treated weeks per patient in E vs. C (78% vs. 72%, p=0.003). *Mean number of limited activity days was lower in E vs. C (1.2 vs. 3.9; p<0.05). No difference between E and C in number of diagnosed exacerbations.

Citation (Sponsor)	Study Design	Purpose/Objective	Study N (Number Evaluable)	Population Characteristics	Asthma Severity at Baseline (if reported)	Treatment	Duration of Active Treatment; Duration of Postintervention/ Off-Treatment Followup	Lung Function	Morbidity	Knowledge/Quality of Life
Hopman et al. Outcomes of asthma education: results of a multisite evaluation. Can Respir J 2004;11(4): 291–297.	Multicenter, prospective, observational, comparative study; pre-post design (7 sites across Canada: 5 Community Asthma Care Centres, 1 community hospital, 1 academic health sciences center)	To compare the effectiveness of a standardized asthma education program on health care utilization, absenteeism, amount of leisure time missed, and health-related quality of life in a variety of settings	396 (252)	**Age** ≥16 yr; mean = 42 yr **Gender** 24% male, 76% female	All referred for education on basis of poor asthma control and/or exacerbation of asthma Action plan, 31% Inhaled cortiocosteroids, 90.5% Corticosteroid tablets, 18% Short-acting beta-agonist, 90.9% Long-acting beta-agonist, 11.5%	3 levels of education based on patient asthma severity and initial needs assessment. Topics included trigger avoidance, environmental control, the role of medications, delivery systems, action plans, and self-monitoring skills. Assessment and education took approximately 2 hours.	6-month followup visit to education program Health care utilization and absenteeism during 6 months before and 6 months after initial visit compared		*Significant improvement ($p<0.001$) in regular physician visits (3.13 vs. 1.96), unscheduled physician visits (2.71 vs. 0.51), number of hospital admissions (0.46 vs. 0.13), number of days in hospital (1.72 vs. 0.92), number of emergency room visits (0.96 vs. 0.27), missed work/school days (5.04 vs. 3.85), and missed leisure time days (2.14 vs. 1.61). Significant improvement in unscheduled specialist visits (0.14 vs. 0.06, $p<0.05$). No significant difference in proportion taking inhaled corticosteroid (90.5% vs. 87.2%). Use of long-acting $beta_2$-agonist increased from 11.5% to 20.6% ($p=0.02$) and use of oral corticosteroid decreased from 17.9% to 6.2% ($p=0.02$).	6 months after asthma education there were significant improvements in all health-related quality of life domains (SF-36) except mental health. Change in physical function, role physical, role emotional, bodily pain, and vitality exceeded clinically meaningful change of 5 points.

Citation (Sponsor)	Study Design	Purpose/Objective	Study N (Number Evaluable)	Population Characteristics	Asthma Severity at Baseline (if reported)	Treatment	Duration of Active Treatment; Duration of Postintervention/ Off-Treatment Followup	Lung Function	Morbidity	Knowledge/Quality of Life
Magar et al. Assessment of a therapeutic education programme for asthma patients: "un soufflé nouveau." Patient Educ Couns 2005;58(1):41–46. (GlaxoSmithKline)	Multicenter randomized controlled trial (26 pneumologists in 4 centres in France)	To assess the effects of a new asthma self-management education program entitled "un soufflé nouveau"	238 (193)	**Age** 18–60 yr **Gender** Not reported	Asthma diagnosed according to GINA guidelines All required ongoing inhaled corticosteroids and/or long acting beta$_2$-agonists In the previous month, averaged 1 daytime asthma attack per week, 1 nighttime asthma attack per week, or had to use bronchodilator once per week	**Intervention group (E):** Education program of initial 30–60 minute appointment followed by 2 group sessions of 2.5 hours each at an interval of 15 days, each addressed selected teaching objectives. (n=127; n=104 completers) **Control group (C):** Information in form of printed document. (n=111; n=89 completers)	Both groups assessed at 6 months and 12 months			Number of symptom-free days increased over time in E, but not C (3.5 vs. –0.22 at 6 months; 3.53 vs. –0.26 at 12 months, p=0.03). Number of nighttime awakenings decreased in E vs. C (–2.11 vs. –0.48 at 6 months; 0.1 vs. –0.17 at 12 months, p=0.04). Use of oral corticosteroids decreased in both groups with a gain of 8.8 days in E vs. 1.8 days in C (p=0.03). Monthly use of fast-acting beta$_2$-agonists decreased in E from 10.6 at 6 months to 1.3 at 12 months with no change in C (p=0.03).

Citation (Sponsor)	Study Design	Purpose/Objective	Study N (Number Evaluable)	Population Characteristics	Asthma Severity at Baseline (if reported)	Treatment	Duration of Active Treatment; Duration of Postintervention/ Off-Treatment Followup	Lung Function	Morbidity	Knowledge/Quality of Life
Urek et al. Effect of educational programs on asthma control and quality of life in adult asthma patients. Patient Educ and Couns 2005;58(1):47–54.	Randomized trial (clinical site in Croatia)	To investigate the effectiveness of different forms of medical education in improving the control of asthma and quality of life in patients with moderate persistent asthma	60 (60)	**Age** mean = 43.4 yr **Gender** 35% male, 65% female	Moderate persistent asthma based on GINA guidelines criteria FVC % pred., mean = 93.9 FEV_1 % pred., mean = 68.9 FEF_{50} % pred., mean = 55.8 PEF % pred., mean = 72.1	**Group 1 (AS)** Asthma school: three 4-hour sessions of group education consisting of lectures and workshops. (n=20; n=20 completers) **Group 2 (IVI)** Individual verbal instruction in three 1-hour sessions. (n=20; n=20 completers) **Group 3 (B)** Written information in an asthma booklet. (n=20; n=20 completers)	12 weeks All patients regularly treated with inhaled corticosteroids and allowed to use salbutamol as rescue medication as needed. No change in medication allowed during the study.	Using repeated measures and adjusting for gender, age, and baseline values, improvement was greater for IVI than for B in morning PEFR ($p<0.05$) and evening PEFR ($p<0.05$).		All groups improved in daily average number of day and nighttime symptoms ($p<0.001$) with no difference between groups ($p=0.74$ for daytime; $p=0.56$ for nighttime) using repeated measures and adjusting for gender, age, and baseline values. All groups decreased significantly in use of rescue medication ($p<0.05$) with no difference between groups ($p=0.61$ for day usage; $p=0.87$ for night usage) using repeated measures and adjusting for gender, age, and baseline values.

B. Asthma Self-Management Education For Adults In Hospital-Based Settings

Citation (Sponsor)	Study Design	Purpose/Objective	Study N (Number Evaluable)	Population Characteristics	Asthma Severity at Baseline (if reported)	Treatment	Duration of Active Treatment; Duration of Postintervention/ Off-Treatment Followup	Lung Function	Morbidity	Knowledge/Quality of Life
George et al. A comprehensive educational program improves clinical outcome measures in inner-city patients with asthma. Arch Intern Med 1999;159(15): 1710–1716. (NIH; Health Management Alternatives, Abbott Laboratories; Mary Rockefeller Foundation; Merck & Co, West Point, PA; Schering-Plough/Key Pharmaceuticals, Kenilworth, NJ)	Randomized controlled trial (patients admitted to hospital from university hospital ED)	To examine whether a comprehensive in-patient educational program by an asthma nurse educator improved outpatient follow-up to an asthma outpatient program and whether outpatient follow-up then decreased subsequent hospital utilization in a cohort of indigent, inner-city patients with asthma	77 (77; 50 for data from Medicaid MCO database)	**Age** 18–45 yr, mean = 29 yr **Gender** 20.8% male, 79.2% female **Insurance** Medicaid, 57.1%; Self-pay, 11.7%; Private, 31.2%	Admitted to the hospital from the ED with acute exacerbation	**Intervention group (E):** Educational program that included inpatient asthma instruction, bedside spirometry, assistance with discharge planning, a post discharge telephone call, and scheduled follow-up in an outpatient asthma care program (n=44; n=30 with 6 month data) **Control group (C):** Routine care (n=33; n=20 with 6 month data)	Assessment at 6 months after enrollment			Mean length of hospital stay did not differ between groups (2.1 for E vs. 2.7 for C, p=0.12). *60% of E vs. 27% of C returned for initial follow-up visit (p=0.01). Patients in E vs. C had reduced need for ED visits (p=0.04) and number of hospitalizations (p=0.04) in 6 months after enrollment as compared to 6 months prior to enrollment.
Morice & Wrench. The role of the asthma nurse in treatment compliance and self-management following hospital admission. Respir Med 2001;95(11): 851–856. (Astra Pharmaceuticals)	Randomized controlled trial (large teaching hospital in United Kingdom)	To determine primarily whether nurse intervention could change behavior in adult asthmatics and whether this was reflected in the number of emergency visits/call-outs to General Practitioners and re-admission to hospital with asthma-related programs following discharge.	80 (70 at 6 weeks; 65 at 6 months)	**Age** 16–72 yr, mean = 36.1 yr **Gender** 34% male, 66% female	Admitted to hospital with documented primary diagnosis of acute asthma	**Intervention group (E):** Education program from the asthma nurse over a minimum of 2 separate sessions, lasting on average 30 minutes each, carried out on an individual basis (n=40; n=39 at 6 weeks; n=35 at 6 months) **Control group (C):** Information in form of printed document (n=40; n=31 at 6 weeks; n=30 at 6 months)	Data collection at 6 weeks and 6 months; General Practitioners contacted at 4 months.			Higher proportion presented to hospital in E vs. C (91% vs. 62.5%) over the 18 months of the study. No difference in combined endpoint of readmissions plus emergency call-outs over the 18 months of the study.

Citation (Sponsor)	Study Design	Purpose/Objective	Study N (Number Evaluable)	Population Characteristics	Asthma Severity at Baseline (if reported)	Treatment	Duration of Active Treatment; Duration of Postintervention/ Off-Treatment Followup	Lung Function	Morbidity	Knowledge/Quality of Life
Osman et al. A randomized trial of self-management planning for adult patients admitted to hospital with acute asthma. Thorax 2002;57(10): 869–874. (NHS R&D Programme in Delivery of Care in Asthma managed by the National Asthma Campaign, UK)	Randomized controlled trial (7 general medical units and the respiratory unit of a 1022-bed teaching hospital)	To test whether the self-management program offered in the hospital to adults admitted with acute asthma was effective in reducing readmission and morbidity after discharge and whether it was acceptable to patients as part of their hospital management	280 (226 at 1 month; 271 at 12 months)	**Age** 14–60 yr, median 29 yr **Gender** 34% male, 66% female **Smoking** 43% current smoker	Admitted to hospital with acute asthma Median admission PEF % pred., = 41.2 Inhaled steroid prescribed before admission = 79% Previous admission for acute asthma: 51% never, 45% within 10 yr, 4% within 11–20 yr Median yr since previous admission = 2	**Intervention group (E):** Self-management program of 2 visits of about 30 minutes each by a trained respiratory nurse that included a symptom-and peak-flow-based self-management plan. (n=135; n=108 at 1 month; n=131 at 12 months) **Control group (C):** Standard care as directed by patient's physician (n=145; n=118 at 1 month; n=140 at 12 months)	Patients surveyed at 4 weeks after discharge; hospital records reviewed at 12 months			*At 12 months E less likely than C to be readmitted (17% vs. 27%, OR 0.5, 95% CI 0.3 to 1.0, p=0.04). At discharge, E more likely than C to be prescribed inhaled steroids (99% vs. 92%, p=0.03) and to have hospital follow up (98% vs. 84%, p<0.01). At 1 month, E more likely than C to report no daytime wheeze (OR 2.6, 95% CI 1.2 to 5.3) and no night disturbance (OR 2.0, 95% CI 1.2 to 3.5) and more likely to have written management plan (93% vs. 30%, OR 28.0, 95% CI 12.3 to 63.8). E vs. C more satisfied with hospital explanation of asthma (100% vs. 76%, p<0.001).

Citation (Sponsor)	Study Design	Purpose/Objective	Study N (Number Evaluable)	Population Characteristics	Asthma Severity at Baseline (if reported)	Treatment	Duration of Active Treatment; Duration of Postintervention/ Off-Treatment Followup	Lung Function	Morbidity	Knowledge/Quality of Life
Castro et al. Asthma intervention program prevents readmissions in high healthcare users. Am J Respir Crit Care Med 2003;168(9): 1095–1099. (Barnes-Jewish Hospital Foundation)	Prospective randomized, controlled trial	To study the effect of a limited nurse-focused intervention on rate of admission, lost work/school days, asthma-specific quality of life, and overall cost of health care	96 (ITT)	**Age** Mean = 36 yr **Gender** 18% male, 82% female **Ethnicity** 82% African American **Education** 62% 12th grade or lower	Moderate to severe airflow obstruction Asthma duration mean = 17 yr Age at onset of asthma, mean = 15 yr FEV_1 % pred., range 14–113, mean = 57 FEV_1 mean = 1.56L All hospitalized in previous 12 months, mean = 2.4 times	**Intervention group (E):** Multifaceted approach by asthma nurse specialist including "Asthma Care" flow sheet while in hospital, asthma education, psychosocial support, individualized self-management plan, facilitation of discharge planning, and outpatient followup. (n=50) **Control group (C):** Usual care (n=46)	Assessment at 6 and 12 months; costs during 180 days.		*60% reduction in readmissions in E vs. C (31 vs. 71, p=0.04). Multiple readmissions more frequent in C vs. E (15 vs. 7, p=0.03). Adjusting for other variables, C was 3.6 times more likely to be readmitted 2 times or more (95% CI 1.2–10.9). Time to first readmission was not different between E and C. 69% reduction in hospital days in E vs. C (p=0.04). No difference in number of health care provider visits. Fewer lost work/school days for E vs. C (246 vs. 1040). Savings of $6462/patient attributable to the intervention (p=0.03).	No difference in improvement of quality of life between 2 groups (1.2 for E vs. 1.4 for C, p=0.55).

C. Asthma Self-Management Education In Emergency Department Settings

Citation (Sponsor)	Study Design	Purpose/Objective	Study N (Number Evaluable)	Population Characteristics	Asthma Severity at Baseline (if reported)	Treatment	Duration of Active Treatment; Duration of Postintervention/ Off-Treatment Followup	Lung Function	Morbidity	Knowledge/Quality of Life
Baren et al. A randomized, controlled trial of a simple emergency department intervention to improve the rate of primary care follow-up for patients with acute asthma exacerbations. Ann Emerg Med 2001;38(2): 115–122. (American Lung Association, Southeastern Pennsylvania Chapter)	Randomized, controlled trial (urban university-based ED)	To determine whether a simple, inexpensive, 3-part ED intervention would increase the likelihood of PCP followup for patients treated and discharged from the ED for an acute asthma exacerbation.	192 (192; ITT analysis)	**Age** 16–46 yr, mean = 30.8 yr **Gender** 28% male, 72% female **Ethnicity** 84% Black, 10% White, 4% Asian, 2% Hispanic **Insurance** Government-HMO, 40%; Government/military, 4%; HMO, 22%; Private, 22%; None, 12%	Acute asthma exacerbation Respiratory rate, 21.3 breaths/min O_2 saturation, mean = 96.8% PEFR, mean = 245 L/min Number of times inhaler used in past 24 hrs, mean = 4.8 Inhaled steroids, 42% Oral steroids, 13% Symptom duration: < 6 hrs, 22%; 6–12 hrs, 10%; 12–24 hrs, 15%,; > 24 hrs, 53%	**Intervention group (E):** Self-contained "fanny pack" of materials designed to enhance the likelihood of scheduling timely followup: 5-day course of oral prednisone, 2 taxicab vouchers, an asthma information card, written instructions for use of medications and vouchers, and telephone reminder within 48 hours of ED release to make appointment with PCP. (n=98; n=95 completers) **Control group (C):** ED discharge instructions and medication prescriptions at discretion of treating physician. (n=94; n=83 completers)	Contact at 4 weeks by investigator blinded to study group assignment.		*46.3% of E and 28.9% of C followed up with PCP (RR 1.6, 95% CI 1.1 to 2.4). Characteristics associated with followup were older age, prior relationship with PCP (RR 4.4, 95% CI 1.9 to 10.2), black race (RR 0.54, 95% CI 0.37 to 0.79), and lack of health insurance (RR 0.33, 95% CI 0.11 to 0.96). Adjusting for variables associated with PCP followup, E was associated with increased likelihood of followup (adj. OR 3.0, 95% CI 1.5 to 6.3).	
Numata et al. Teaching time for metered-dose inhalers in the emergency setting. Chest 2002;122(2): 498–504. (Fonds de la Rechereche en Santé du Québec)	Descriptive report of data from 1 group in a randomized, open-label, parallel-group controlled trial (single acute-care day hospital)	To measure the teaching time that was necessary for successful MDI/DED use at acute-care facility based on demonstrated mastery according to a predefined protocol	61 (57) (Study sample included 119 with asthma and 68 with COPD. Only results of those who received the teaching protocol are reported. Table includes only those with asthma.)	**Age** ≥18 yr, median 46 yr **Gender** 65% male, 35% female **Education** Mean = 12.7 yr	Acute airflow obstruction FEV_1 % pred., mean = 63.5 49% received 1 dose of bronchodilator Mean modified Borg scale score, = 3.7 Mean = SpO_2 96.1 Previous MDI instruction, 65.6% Inhaled corticosteroid use during previous week, 73.8% Oral corticosteroid use during previous week, 23.0%	**Intervention group (E):** MDI/DED with standardized one-on-one teaching from 1 of 3 RNs based on a protocol of nurse demonstration, patient return demonstration, and teaching about care and maintenance of the device. (n=62; 57 completers) **Control group (C):** Wet nebulizer (n=57; n=56 completers) (Results for C not reported)	Teaching directly observed and timed. Treating physicians selected the bronchodilator(s) used and frequency of their administration; standard doses were used.		*Median total teaching time was 6.2 min (IQR 4.3 to 9.2 min). Among those with no previous MDI instruction, median teaching time was 8.4 min (IQR 5.9 to 11.3). 5% of patients required inpatient hospitalization. Most patients expressed satisfaction with MDI/DED teaching and treatment.	

Citation (Sponsor)	Study Design	Purpose/Objective	Study N (Number Evaluable)	Population Characteristics	Asthma Severity at Baseline (if reported)	Treatment	Duration of Active Treatment; Duration of Postintervention/ Off-Treatment Followup	Lung Function	Morbidity	Knowledge/Quality of Life
Baren et al. Randomized controlled trial of emergency department interventions to improve primary care follow-up for patients with acute asthma. Chest 2006;129(2): 257–265.	Randomized controlled trial (9 EDs, majority were tertiary teaching hospitals serving poor urban populations)	To compare the effect of 2 ED interventions on the rates of primary care follow-up for patients receiving either telephone reminders to make primary care appointments vs. those receiving a telephone contact to give them an actual appointment	384 (384; ITT analysis)	**Age** 11–39 yr, mean = 25 yr **Gender** 45% male, 55% female **Ethnicity** 57% Black, 25% White, 15% Hispanic, 3% other **Education** 76% high school graduates **Household income** Estimated mean = $28,700 **Insurance** 27% Private, 38% Medicaid, 10% other public, 23% none	Asthma exacerbation; 75% presented with severe symptoms Duration of symptoms <24 hours, 41% Received steroid treatment in ED, 86% Discharged receiving prednisone 25% admitted for asthma in past year During past 4 weeks: 84% inhaled beta$_2$-agonists, 34% inhaled corticosteroids	**Intervention group 1 (E1):** 5-day course of prednisone, 2 transportation vouchers for travel to and from PCP, general information sheet, telephone contact 2 days after visit to advise patient to make followup appointment (n=126; n=110 at 30 days; n=82 at 12 months) **Intervention group 2 (E2):** 5-day course of prednisone, 2 transportation vouchers for travel to and from PCP, general information sheet, telephone contact 2 days after visit to give a follow-up appointment if patient had not made one (n=132; n=106 at 30 days; n=87 at 12 months) **Control group (C):** Usual discharge care—not standardized (n=126; n=98 at 30 days; n=78 at 12 months)	Followup telephone interview 2 days, 30 days, and 12 months following ED visit; PCPs contacted at 30 days to verify followup is obtained.		*Patients in E2 were most likely to have a followup visit (E2, 73% vs. C, 49% and E1, 49%, p<0.001). Adjusting for age, race, gender, prior PCP, and insurance status, intervention for E2 remained significant (OR 2.8, 95% CI 1.5 to 5.1). Among patients with 30-day follow-up who did not have a PCP at enrollment, those in E2 were more likely to visit a PCP (45% of E1 vs. 30% of E1 and 19% of C, p=0.06). No differences in ED, hospitalizations, quality of life, or inhaled corticosteroid use at 12 months after index ED visit.	