Evidence Table 6. Patient/Provider Education: Cost-Effectiveness of Asthma Self-Management Education

Abbreviations used in table:

ED	**emergency department**
FEV_1	**forced expiratory volume in 1 second**
FVC	**forced vital capacity**
GP	**general practitioner**
ICER	**incremental cost-effectiveness ratio**
ITT	**intent-to-treat analysis**
OR	**odds ratio**
PEF	**peak expiratory flow rate**
QoL	**quality of life**
RR	**relative risk**
95% CI	**95% confidence interval**

*** indicates primary outcome**

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Citation (Sponsor)	Study Design	Purpose/Objective	Study N (Number Evaluable)	Population Characteristics	Asthma Severity at Baseline (If Reported)	Treatment	Assessment/ Off-Treatment Followup	Lung Function	Resource Use	Morbidity	Knowledge/Quality of Life/Self-Care Behavior
Kauppinen et al. Long-term (3-year) economic evaluation of intensive patient education for self-management during the first year in new asthmatics. Respir Med 1999;93(4): 283–289. (The Finnish Office for Health Care Technology Assessment; The Finnish Anti-Tuberculosis Association; Viipuri Tuberculosis Foundation)	Randomized clinical trial	To compare the long-term cost-effectiveness of an intensive program of patient education and supervision for self-management in newly diagnosed asthmatics during the first treatment year with that of a conventional program	162 (150)	**Age** 18–76 yr, mean = 43.7 yr **Gender** 35.2% male, 64.8% female **Smoking** 22% current smokers	Newly diagnosed FVC % pred., mean = 93.8 FEV_1 % pred., mean = 84.4 FEV_1/FVC, mean = 89.6 PEF, mean = 83.8 Atopic, 56%	**Intervention group (E)** Visit to specialist clinical every 3rd month during the 1st year, alternately to the respiratory nurse or attending chest physician for patient education and supervision for self-management (n=80; n=72 completers) **Control group (C)** Patient education and guidance for self-management only at baseline and randomization visits (n=82; n=78 completers)	1-year treatment; assessment at 12 and 36 months	Difference in % pred. FEV_1 between E and C groups was 5.3 (95% CI 0.6 to 10.0), and in PEF it was 4.4 (95% CI 0.1 to 8.7). No difference in improvement was found between current smokers and nonsmokers. No difference was found in airway responsiveness at 3 yr, but improvement in dose steps was greater in E group (diff. 0.40 dose steps, 95% CI 0.05 to 0.75).	Average cost of primary care services was £5 in E and £12 in C group (95% CI –13.4 to –1.3, p <0.05), and cost of extra courses of antibiotics was £1 in E and £4 in C group (95% CI –5.8 to –0.3, p <0.05). Average total 3-year extra costs (without regular asthma drugs) were £464 in E group vs. £477 in C group, suggesting a mean net saving of £12 with E (not significant).	Risk ratio for sickness day was less in E group vs. C group (RR of 0.6, 95% CI 0.5 to 0.7, p <0.001).	QoL scores improved in both E and C groups, with no difference between groups.
Gallefos and Bakke. Cost-effectiveness of self-management in asthmatics: a 1-yr follow-up randomized, controlled trial. Eur Respir J 2001;17(2): 206–213. (Norwegian Medical Association Fund for Quality Improvement)	Randomized, controlled trial	To carry out a cost-effectiveness analysis of patient education in asthmatics in a 12-month followup	78 (71)	**Age** >18 yr, mean = 42 yr **Gender** 29.5% male, 70.5% female **Smoking** 28% current smoker 68% employed	Mild-to-moderate FEV_1 % pred., mean = 94 FVC % pred., mean = 104.5 FEV_1 %, mean = 76.5	**Intervention group (E)** Two 2-hour group sessions, 1–2 hours of individual counseling administered by a nurse and a physiotherapist, and a booklet of information were provided. Content included pathophysiology of asthma, drug mechanisms, coping with asthma, and principles for self-management. (n=39; 32 completers) **Control group (C)** Usual care (n=39; n=39 completers)	1-year followup	FEV_1 increased by 6.1% (95% CI 0.2–12.1) in E group compared to C group (p <0.005).	*Reported in Norwegian Krone (NOK) No difference was found in mean total costs: NOK 10,500 for E group vs. NOK 16,000 for C group (p=0.51). Cost-effectiveness ratios were NOK –3,400 per 10-unit improvement in QoL score, NOK –4,500 per 5% improvement in FEV_1, and NOK –12,200 per symptom-free patient.	Symptom-free days for E group were 81 vs. 36 for C group (OR 7.4, 95% CI 2.4–22.7, p=0.001).	Asthma QoL scores showed improvement in E vs. C group (diff. 16.3, 95% CI 8.2–24.4, p=0.0002).

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Schermer et al. Randomized controlled economic evaluation of asthma self-management in primary health care. Am J Respir Crit Care Med 2002;166(8): 1062–1072. (Netherlands Organization for Scientific Research; Astra Zeneca BV, The Netherlands)	Nonrandomized, controlled, parallel-group clinical trial (19 practices randomized; unit of analysis was individual patient)	To compare the self-management program with the "best" generally available medical treatment for asthma ("usual care") according to asthma treatment guidelines for family physicians	214 (193; ITT)	**Age** >16 yr, mean = 39.5 yr **Gender** 38% male, 62% female **Smoking status** 52% never smoker, 27% former smoker, 22% current smoker 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. postbronchodilator, mean = 91.3 Asthma Quality of Life Questionnaire score, mean = 5.5	**Intervention (E)** Self-management education and training of skills were provided on an individual basis from the family physician. Training consisted of 4 visits within a period of 3 months. Participants were prescribed budesonide, with the physician responsible for dosage scheme at study entry; participants received new inhalers at baseline and 6 months. (n=98; n=85 completers) **Control (C)** Usual care was given according to guidelines of the Dutch College of Family Physicians. Participants were prescribed budesonide, with physician responsible for dosage scheme at study entry. (n=95; n=86 completers)	24-month followup	The course of FEV_1 did not differ between E and C.	*Reported in Euro (€) Direct health care and implementation costs differed by €199 (95% CI 70–328) in favor of C. Total costs were €1084 (95% CI 938–1,228) for E; €1,097 (95% CI 933 –1,260) for C. Mean productivity costs were €213 lower for E vs. C. Mean number of quality-adjusted life yr (QALY) was 0.39 (95% CI 0.003 to 0.075) for E and 0.024 (95% CI –0.022 to 0.071) for C. E is associated with a gain of 1.5 QALY (95% CI, –1.4 to 4.4) relative to C.	Number of weeks of successful treatment was 81 for E vs. 75 for C, a significant incremental effect of 6. Average number of limited-activity days was 1.2 (95% CI 0.5–1.9) for E group participants and 3.9 (95% 2.5–5.4) for C group participants.	
Sullivan et al. The cost-effectiveness of an inner-city asthma intervention for children. J Allergy Clin Immunol 2002;110(4): 576–581. (National Institute of Allergy and Infectious Disease, NIH; GlaxoSmithKline)	Prospective cost-effectiveness analysis as part of a randomized trial	To evaluate the cost-effectiveness of the National Cooperative Inner-City Asthma Study	1,033 (1,033)	**Age** 5–11 yr, mean = 7.7 yr **Gender** 64% male, 36% female **Ethnicity** 74.5% Black, 17.3% Hispanic, 8.2% other **Income** 67% <$15,000/yr **Smoking** 42% caretaker smokes Children lived in inner-city census tracts where at least 20% of population was below Federal poverty guidelines.	Moderate-to-severe Number of asthma medications, mean = 2.7 At least 1 positive allergen skin test, 85.6% Maximum symptom days, mean = 5.1/2 weeks At least 1 hospitalization in previous 2 months, 4.5%	**Intervention group (E)** 2 group asthma education sessions and 1 individual meeting for caretaker regarding asthma triggers, environmental controls, asthma physiology, strategies for problem solving, and communicating with physician were given. 2 group sessions for children and feedback regarding use of metered dose inhaler were presented. Families were given pillow and mattress covers. Monthly contact was provided with an asthma counselor with master's level degree in social work. (n=515) **Control group (C)** (n=518)	2-month education intervention and monthly contact for 1 year Assessed every 2 months for 2 years.		*Cost of providing the intervention was $227/child over the 2-year period. Compared with C, the 2-year incremental cost-effectiveness ratio for E was $9.20 per symptom-free day gained (95% CI –$12.56 to $55.29 per symptom-free day gained). E was less costly in the most severe strata at baseline: costs were reduced by $2,509/child for those with ≥1 hospital visits, $1,050/child for those with ≥2 unscheduled visits, and $220/child for those with >50% of days with symptoms.	No significant differences were found between E and C groups in rate of scheduled and unscheduled physician visits, hospital admissions, and ED visits.	

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Kamps et al. Impact of nurse-led outpatient management of children with asthma on healthcare resource utilization and costs. Eur Respir J 2004;23(2): 304–309. (GlaxoSmith Kline)	Randomized trial	To report on health care utilization and health care costs of 2 management approaches	74 (73)	**Age** 2–16 yr, mean = 6.4 yr **Gender** 64% male, 36% female	21.6% mild persistent, 67.6% moderate persistent, 10.8% severe persistent FEV_1 % pred., mean = 97.6 All patients were on inhaled fluticasone propionate and using salbutamol as needed; mean dose = 221 mcg/day	**Nurse group** Followup visits were conducted by board-certified asthma nurses with 3 or 8 yr of experience with childhood asthma. Visits were made at 1, 3, 6, and 12 months; additional visits were made according to the judgment of the asthma nurse. (n=37; n=36 completers) **Pediatrician group** Followup was by pediatrician at 1, 3, 6, and 12 months; additional visits were made according to the judgment of the pediatrician. (n=37; 37 completers)	1-year followup		Followup by asthma nurse resulted in a reduction in costs of 7.2% (p <0.001). Overall costs were 4.1% lower for treatment of patients by an asthma nurse.	Asthma nurses asked patients to return for additional visits more often than did pediatrician (median 2 vs. 0; p <0.0001). No hospitalizations or visits to ED occurred because of acute, severe asthma. No difference was found between the nurse group and pediatrician group in other health care resources.	
Sullivan et al. A multisite randomized trial of the effects of physician education and organization change in chronic asthma care. Arch Pediatr Adolesc Med 2005;159(5): 428–434. (Agency for Healthcare Research and Quality; National Heart, Lung, and Blood Institute)	Randomized controlled trial (Practices were randomly assigned; effectiveness analysis was adjusted for clustering effect.)	To estimate the cost-effectiveness of the interventions in the PAC-PORT II trial compared with usual asthma care	42 practices; 638 children (42 practices and 554 children) Practices were associated with 4 managed care organizations.	**Age** 3–15 yr, mean = 9.4 yr **Gender** 60% male, 40% female **Ethnicity** 66% White, 17% African American, 5% Hispanic, 11% other	Mild-to-moderate persistent asthma Medications: 28% cromolyn sodium or nedocromil sodium, 34% inhaled corticosteroid, 74% reliever Symptom-free days in previous 2 weeks, mean = 4.2 In past year: hospitalized for asthma, 3%; ED visit for asthma, 23%	**Peer Leader Education (PLE)** 1 physician in each practice was trained to serve as a peer leader who functioned as change agent within the practice. (n=226; n=203 completers) **Planned Care Intervention (PC)** Peer leader approach plus a multifaceted approach involved self-directed asthma care and support with active followup from an asthma nurse and the primary care physician. (n=213; n=173 completers) **Control group (C)** Usual care in which each practice received copies of treatment guidelines and informational handouts for patients. (n=199; n=178 completers)	2-year trial. Outcomes were assessed every 8 weeks by telephone survey.		*Annual treatment costs were lowest in PLE ($344) followed by C ($385) and PC ($475). Combining treatment and intervention costs, annual costs per patient were $1,292 for PC, $504 for PLE, and $385 for C. Combining difference in costs with difference in effectiveness resulted in ICER of $18 per symptom-free day gained for PLE compared with C (95% CI $5 to dominated) and $68 per symptom-free day gained for PC compared with C (95% CI $37 to $361).	Patients in C group had an increase of symptom-free days of 14.8/yr. Patients in PC group gained 13.3 symptom-free days/yr (95% CI 2.1 to 24.7) vs. C, and PLE had a gain of 6.5 symptom-free days (95% CI –3.6 to 16.9) vs. C. Average number of physician visits was 4.70 in PC group, 3.24 in C group, and 3.12 in PLE group (p=0.002 for PC vs. C and PLE).	

Citation (Sponsor)	Study Design	Purpose/Objective	Study N (Number Evaluable)	Population Characteristics	Asthma Severity at Baseline (If Reported)	Treatment	Assessment/ Off-Treatment Followup	Lung Function	Resource Use	Morbidity	Knowledge/Quality of Life/Self-Care Behavior
Evans et al. Improving care for minority children with asthma: professional education in public health clinics. Pediatrics 1997;99(2): 157–164. Stony Wold-Herbert Fund; National Heart, Lung, and Blood Institute)	Quasi-experimental design (2 panels of 11 clinics each created to maximize balance of ethnicity, total clinic population, and caseload of asthma patients randomly assigned to treatment or control; analysis at the clinic level)	To assess whether training based on National Asthma Education and Prevention Program guidelines delivered to professional and support staff in clinics would increase the number of children diagnosed with asthma and receiving continuing care and improve quality of care by increasing staff use of new pharmacologic and educational treatment methods	22 (22)	**Staff** 22 clinics had collective staff of 37 pediatricians, 42 public health nurses, 42 public health assistants, 13 laboratory technicians, and 16 clerical workers. **Patient Population** Mean = 2,800 patients; 36% on Medicaid; 45% African-American and 33% Latino; 2.25% with asthma		**Intervention group (E)** Intervention was based on planned organizational change theory and learner-centered teaching to help staff link the goals of continuing care for asthma to the preventive-care mission, to help staff resolve organization problems that blocked acceptance of the new approach to asthma care, to guide teamwork, and to give a sense of owning the program. (n=11 clinics) **Control group (C)** No intervention (n=11 clinics)	Series of five 3-hour sessions over a 5-month period for all clinical staff, followed by 2 additional 3-hour sessions, at the end of the 1st followup year, to reinforce communication skills. 1- and 2-year followup data are from computer database of patient visits and treatment; other data are from followup interviews with children's caregivers			<u>Results at 2 years</u> A greater rate of new asthma patients were in E vs. C group (40/1000 vs. 16/1000, p <0.01). Percent of returning patients wqs greater for E vs. C group (16% to 42% for E vs. 14% to 12% for C). Total visits for asthma increased for E vs. C group at year 2, from 1.41 to 2.42 for E vs. no change for C (1.30 to 1.24) (p <0.001). In E vs. C groups, a higher proportion of patients were given inhaled therapy (25% vs. 2%, p <0.001), spacer devices (26% vs. 1%, p <0.001), and beta$_2$-agonist (74% vs. 52%, p <0.05). Caregivers from E group vs. C group reported receiving higher levels of patient education from physicians (71% vs. 58%, p <0.01) and nurses (61% vs. 44%, p <0.05).	

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Clark et al. Long-term effects of asthma education for physicians on patient satisfaction and use of health services. Eur Respir J 2000;16(1):15–21. (Lung Division of the National Heart, Lung, and Blood Institute; Arnold P. Gold Foundation)	Cluster randomized controlled trial (Physicians randomly assigned; analysis adjusted for clustering effect)	To evaluate the long-term impact of an interactive seminar for physicians based on principles of self-regulation on clinician behavior, children's use of health services for asthma, and parent's views of physician performance	74 pediatricians; 637 enrolled (67 pediatricians; 369 patients)	**Physician Sample** **Age** 30–39 yr, 22%; 40–49 yr, 37%; 50–59 yr, 27%; ≥60 yr, 14% **Gender** 60% male, 40% female **Practice** 57% solo, 37% group, 6% multispecialty **Patient Sample** **Age** <2 yr, 7%; 27 yr, 59%; 8–12 yr, 34% **Gender** 70% male, 30% female **Ethnicity** 15% Latino/Hispanic, 15% African American, 70% White **Parent Sample** 60% 30–39 yr; 75% married; 90% high school education or above; 20% of families ≤$20,000 income, 16% ≤$15,000 income; 17% on Government assistance for health care	Asthma diagnosis made by physician No other chronic disorders with pulmonary complications At least 1 emergency medical visit for asthma in previous year	**Intervention group (E)** Interactive seminar was based on the theory of self-regulation that included (1) optimal clinical practice based on the National Asthma Education and Prevention Program guidelines and (2) patient teaching and communication. (n=38 physicians and 336 patients; n=34 physicians and 202 patients at final evaluation) **Control group (C)** No interactive seminar (n=36 physicians and 301 patients; n=33 physicians and 167 patients at final evaluation)	Seminars were delivered in 2 sessions of 2–3 hours each over a period of 2–3 weeks. Physicians completed midpoint survey within 5 months of the seminar (E) or on an assigned date (C) and 12 months after midpoint. Over a 22-month period, patients were evaluated at the midpoint (on average within 2 months of 1st visit subsequent to intervention) and 1 year after the midpoint.			At 2 years post intervention, children in E vs. C had fewer hospitalizations (p=0.03) and those with higher levels of ED use at baseline had fewer subsequent ED visits (p=0.03).	At 2 yr postintervention, physicians in E vs. C group wrote down for the patient how to adjust dose or timing of medicines when symptoms changed (OR 3.3, p=0.02), provided guidelines on how to adjust therapy (OR 2.4, p=0.02), and used protocol to track elements of education provided (OR 1.9, p=0.01). No difference was found between E and C groups in amount of time spent with patients (25.9 vs. 29.0 minutes) or proportion of patients for prescribed anti-inflammatory medicine (87.5% vs. 77.3%). Parents in E vs. C group were more likely to report their physician paid close attention to the family (p=0.03), commended parents for taking right management actions (p=0.02), created exchange of information (p=0.03), inquired about patient-specific fears and concerns regarding new medicines (p=0.02), explained short-term therapeutic plan (p=0.03), and made it easy for family to follow medication instructions (p <0.01).

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Lagerløv et al. Improving doctors' prescribing behaviour through reflection on guidelines and prescription feedback: a randomized controlled study. Qual Health Care 2000;9(3):159–165. (The Norwegian Medical Association's Fund for Quality Improvement; The Research Council of Norway; The Norwegian Community Pharmacy Foundation)	Randomized controlled trial (block randomization of 199 general practitioners (GPs) in 32 blocks of 4–8 GPs; multilevel modeling to adjust for block effect)	To examine the effect on the quality of prescribing by a combined intervention of providing individual feedback and deriving quality criteria using guidelines recommendations in peer review groups	199 general practitioners (GPs)	**Age** Mean = 44.1 yr **Gender** 77.4% male, 22.6% female **Other** Mean number of GPs working together, 2.4; Board certified as specialists, 66.8%		**Intervention group (E)** Group discussion was held about diagnosing asthma and common quality criteria found to be acceptable and unacceptable prescribing based on international and national guideline recommendations. Criteria were subsequently compared with the prescribing histories of the group as a whole over the previous year and then individually for each GP. (n=98; n=98 completers) **Comparison group (C)** Intervention was as above, but it focused on urinary tract infection. (n=101; n=101 completers)	2 evening meetings were held, about 1 week apart, lasting on average 2 hours and 45 minutes. Questionnaires regarding patient monitoring, prescribing, and education were mailed to GPs 6 months after the intervention.				GPs in E group increased proportion of acceptably treated asthma patients by 5.9% relative to GPs in C group (p=0.018) and by 21% relative to the preintervention value in E group. Among GPs In E group, 73% indicated they would change, 23% said they probably would change, and 4% said they would not change their treatment of asthma patients as a result of the intervention.

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Baker et al. Randomised controlled trial of the impact of guidelines, prioritized review criteria and feedback on implementation of recommendations for angina and asthma. Br J Gen Pract 2003;53(489): 284–291. (National Health Service R&D programme, UK)	Cluster controlled trial with incomplete block design (Practices randomly assigned; analysis adjusted for clustering effect)	To determine whether recommendations, in the form of systematically developed prioritized audit criteria, are more effective in stimulating improvements in the performance of primary health care teams than recommendations in the format of standard guidelines, and whether the addition of feedback to criteria increases effectiveness (Guidelines developed by the North of England Guidelines Development Project)	81 practices; 1,482 patients before intervention and second sample of 1,567 patients after intervention Note: Only results related to asthma patients are included here.	**Practice Sample** Mean number of full-time general practitioners = 2.6; mean number of part-time general practitioners = 0.5; teaching practices, 22.2%, asthma clinics, 82.7% **Patient Sample** **Age** Mean = 48.2 yr at 1st data collection; mean = 47.6 yr at 2nd data collection **Gender** 44% male, 56% female at 1st data collection; 46% male, 54% female at 2nd data collection	Patients diagnosed with asthma	**Evidence-based guidelines alone (G)** Guidelines containing 51 recommendations were graded A to C according to recommendation strength. (n=27 practices; n=483 patients preintervention and n=517 patients postintervention) **Guidelines in review criteria format along (CF)** 10 review criteria were based on guidelines that included specific clinical guidance. (n=27 practices; n=510 patients preintervention and n=524 patients postintervention) **Review criteria supplemented with feedback (CF+F)** Review criteria with feedback on performance were based on results of 1st data collection. (n=27 practices; n=489 patients preintervention and n=526 patients postintervention)	1st data collection was before administration of interventions; postintervention data collection was after approximately 12 months.				Level of adherence to 10 recommendations before and after was similar for all interventions except for the following: the proportion of patients for whom daily doses of $beta_2$-agonist had been checked rose from 11.2% to 22.2% in G group and from 15.5% to 20.7% in C+F group with no change in CF group (15.3% to 19.9%); proportion treated with cheapest inhaled steroid rose from 35.0% to 46.2% in CF group and from 43.0% to 58.9% in C+F group, with no change in G group (44.5% to 44.6%).

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Brown et al. Physician asthma education program improves outcomes for children of low-income families. Chest 2004;126(2): 369–374. (Michigan Department of Health and Community Services; Lung Division of the National Heart, Lung, and Blood Institute)	Cluster randomized controlled trial (Physicians randomly assigned; analysis adjusted for clustering effect)	To examine the effects of a physician education program on a high-risk group (i.e., low-income patients) to see whether they benefited equally	74 pediatricians; 472 (36) (Data reported here are from 36 children from low-income families.)	**(Total Sample; characteristics not reported separately for low-income children)** **Age** <2 yr, 6%; 2–7 yr, 66%; 8–12 yr, 28% **Gender** 72% male, 28% female **Ethnicity** 73% white, 14% African American, 9% Latino/Hispanic, 4% other **Annual Household Income** Less than $20,000, 13%; $20,000–$40,000, 21%; $40,000–$60,000, 24%; $60,000–$80,000, 19%; >$80,000, 24% **Insurance** Medicaid, 40% **Parent Education** Less than high school, 4%; high school, 22%; 1–2 yr college, 13%; 3–4 yr college, 22%; >5-yr college, 39%	Persistent asthma, 96% Moderate/severe disease, 88%	**Intervention group (E)** Interactive seminar was based on the theory of self-regulation that included (1) optimal clinical practice based on the National Asthma Education and Prevention Program guidelines and (2) patient teaching and communication. (n=12 physicians and 17 low-income patients who had complete data) **Control group (C)** No interactive seminar (n=11 physicians and 19 patients with low income who had complete data)	Seminars were delivered in 2 sessions of 2–3 hours each over a period of 2–3 weeks. A random sample of patients was evaluated at 12 and 24 months after an initial visit that occurred within 22 months after the intervention.			No difference was found between children in E and C groups in average number of school days missed (8.65 vs. 12.61, p=0.48). Children in E vs. C group were less likely to have used ED (0.21/yr vs. 1.44/yr, p=0.001) and to have been admitted to hospital (0/yr vs. 0.03/yr, p<0.001). No difference was found between E and C groups in scheduled physician office visits (1.73/yr vs. 3.39/yr, p=0.06).	Parents in group E were more likely than those in group C to report their child had received prescription for inhaled anti-inflammatory therapy (RR 1.15, 95% CI 0.93 to 1.43, p >0.05) and more likely to receive a written asthma action plan (RR 1.40, 95% CI 0.58 to 3.36, p >0.05). No difference was found between groups E and C in parents' perceptions of the pediatrician's performance.

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White et al. Randomized trial of problem-based versus didactic seminars for disseminating evidence-based guidelines on asthma management to primary care physicians. J Contin Educ Health Prof, 2004;24(4): 237–243.	Randomized controlled trial	To investigate the utility and efficacy of the problem-based learning approach versus a more traditional lecture in the area of asthma management on knowledge gain, retention over time, attrition rates, and affective responses, while controlling for common confounders	52 (52)	Family physicians in community practice, with no academic affiliation		**Problem-based learning (PBL)** Case scenario was presented by a physician who facilitated a small-group discussion in a seminar fashion. (n=23, with 5 groups of 3–6 participants; n=20 at final measurement) **Traditional didactic sessions (C)** Traditional medical grand round, with the presentation of a case scenario, was followed by a didactic lecture delivered in lecture-theater format. (n=29, with 4 groups of 4–10 participants; n=20 at final measurement)	Sessions lasted approximately 60 minutes. Data were collected via case-based questionnaire of scenarios immediately pre- and postintervention and 3 months later.				Performance, attitude, and skill scores improved across time at 2nd administration and were maintained at 3rd testing, with no difference between groups. Confidence and knowledge scores for both groups increased at 2nd administration and decreased at 3rd administration, with no difference between groups.