

Asthma Education Cost-Effectiveness and Return on Investment Studies

Combining Asthma Education and Home-Based Environmental Interventions in Disease Management Program: Example Evidence of Return on Investment					
Source	Study Type	Program Description	Program Cost per Patient	Health Improvement Results	Savings
Jowers JR, et al 2000	Pre-Post Intervention	Targeted medium to high-risk children (over 12 years) and adults with asthma. Provided 4-6 phone-based case management and education calls delivered by Respiratory Nurse and 2 home-based education/environmental intervention visits delivered by a home health care agency.	\$303	12 months after baseline: fewer hospital days (37%); fewer ER visits (76%); fewer ICU admissions (66%); fewer unscheduled Dr. visits (66%); reduced use of rescue medications (50%); fewer missed work days (99%); fewer missed school days (77%)	Saved \$4.64 in health care costs and lost work days/school days (additional care taker lost work days) for every \$1 spent on the program.
<p>Jowers JR, et al. "Disease Management Program Improves Asthma Outcomes," <i>The American Journal of Managed Care</i>. 2000;6(5):585-592. *On-line access to the article is not available.</p>					

Asthma Education: Example Evidence of Return on Investment					
Source	Study Type	Program Description	Program Cost per Patient	Health Improvement Results	Savings
Bolton MB, et al. 1991	Randomized Controlled Trial	Delivered by a Registered Nurse (with specialized asthma training) to high risk adult asthma patients during 3, 1-hour group sessions in the clinic.	\$85	59% fewer ED visits	Saved \$22.50 in health care costs for every \$1 spent on the program.
<p>Bolton MB, et al. "The Cost Effectiveness of an Education Program for Adults Who Have Asthma," <i>Journal of General Internal Medicine</i>. 1991;6(5):401-407 http://www.springerlink.com/content/0884-8734/6/5/</p>					

Source	Study Type	Program Description	Program Cost per Patient	Health Improvement Results	Savings
Castro M, et al. 2003	Randomized Controlled Trial	Delivered by an Asthma Nurse Specialist to high-risk adult asthma patients in the clinic, by phone and at home as needed	\$186	54% fewer hospital readmissions; 34% fewer ED visits; 8% greater improvement in overall Quality of Life; 76% fewer lost work/school days	Saved \$36 in health care costs and lost work days for every \$1 spent on the program.
Castro M, et al. "Asthma Intervention Program Prevents Readmission in High Health Care Users," <i>American Journal of Respiratory Critical Care</i> , 2003;168:1095-1099. http://ajrccm.atsjournals.org/content/168/9/1095.full.pdf+html					
Clark NM, et al. 1986	Randomized Controlled Trial	Delivered by a health educator to high risk children with asthma during 6, 1-hour individual sessions in the clinic	\$1558	58% fewer hospitalizations and 59% fewer ED visits among cases with 1 or more baseline hospitalizations	Saved \$11.22 in health care costs for every \$1 spent on the program for children hospitalized the previous year for asthma.
Clark NM, et al. "The Impact of Health Education on Frequency and Cost of Health Care Use by Low Income Children with Asthma," <i>Journal of Allergy and Clinical Immunology</i> . 1986;78:108-115. *Online access to the article is not available.					
Greineder DK, et al. 1999	Randomized Controlled Trial	Comprehensive asthma case management services for high-risk children with asthma, including education delivered by an Asthma Case Manager.	\$190	57% fewer ED visits; 75% fewer hospitalizations	Saved \$7.69-\$11.67 for every \$1 spent on a case-manager's salary.
Greineder DK, et al. "A Randomized Controlled Trial of a Pediatric Asthma Outreach Program," <i>Journal of Allergy and Clinical Immunology</i> . 1999;103:436-440. http://download.journals.elsevierhealth.com/pdfs/journals/0091-6749/PIIS0091674999704689.pdf					
Trautner C, et al. 1993	Pre-Post Intervention	Delivered by a Specialized Nurse Educator to high-risk adult asthma patients while in the hospital.	\$233	Average reduction 3-yrs after intervention in: hospital days (51%); missed work days (44%); physician visits (70%); asthma attacks (79%). 8.5% average improvement in lung function.	Saved \$3 in health care costs and lost work days for every \$1 spent on the program.
Trautner C, et al. "Cost-Effectiveness of a Structured Treatment and Teaching Programme on Asthma," <i>European Respiratory Journal</i> . 1993;6:1485-1491. http://erj.ersjournals.com/content/6/10/1485.abstract					

Home-Based Environmental Interventions in for Asthma: Example Evidence of Cost-Effectiveness					
Source	Study Type	Program Description	Program Cost per Patient	Health Improvement Results	Savings
Kattan M, et al. 2005	Randomized Controlled Trial	5 home visits targeting high-risk children with asthma delivered by two Environmental Counselors	\$1469	19% reduction in unscheduled Dr. visits per year; 13% reduction in B-agonist inhaler use per year; 37.8 (7%) additional symptom free days.	Cost \$28 for each symptom-free day gained (\$16 per symptom-free day gained if just 1 Environmental Counselor administers the intervention).
Kattan M, et al. "Cost Effectiveness of a Home-based Environmental Intervention for Inner-city Children with Asthma," <i>Journal of Allergy and Clinical Immunology</i> . 2005;116(5):1058-1063. http://download.journals.elsevierhealth.com/pdfs/journals/0091-6749/PIIS0091674905017902.pdf					
Krieger J, et al. 2005	Randomized Controlled Trial	5-9 home visits targeting medium to high-risk children with asthma delivered by a Community Health Worker	\$1124	10% reduction in days with symptoms/2wks; 17% improvement in care giver quality of life; 45% reduction in urgent health service use/2mo; 13% fewer days with limited activity/2wks	Cost \$23 for each symptom-free day gained.
Krieger J, et al. "The Seattle-King County Healthy Homes Project: A Randomized, Controlled Trial of a Community Health Worker Intervention to Decrease Exposure to Indoor Asthma Triggers," <i>American Journal of Public Health</i> . 2005;95(4):652-658. http://ajph.aphapublications.org/doi/pdf/10.2105/AJPH.2004.042994					

***The three tables above have been adapted from the following source:**

Asthma Regional Council (ARC) - Investing in Best Practices for Asthma – A Business Case – August 2010 Update

<http://asthmaregionalcouncil.org/uploads/Asthma%20Management/Investing%20in%20Best%20Practices%20fo%20Asthma-A%20Business%20Case%20%20August%202010%20Update.pdf>

Asthma Studies Reporting Decreases in Cost/Utilization					
Author/Year	Target Population	Intervention Strategies	Evaluation Timeframe	Cost-Utilization Outcomes	Quality of Evidence
Harrish, 2001	Children and families	Use of specialty clinic to provide intensive medical and environmental control, education, close monitoring and 24-hour availability.	24 months	69% reduction in Year 1 ER visits; 60% reduction in Year 2 ER visits.	A
Harish, Z. Bregante, A C. Morgan, C. Fann, C S. Callaghan, C M. Witt, M A. Levinson, K A. Caspe, W B. "A comprehensive inner-city asthma program reduces hospital and emergency room utilization." <i>Annals of Allergy, Asthma, & Immunology</i> . 86(2):185-9, 2001 Feb. http://www.annallergy.org/article/S1081-1206(10)62689-0/abstract					
Kattan, 2006	Children and families	Use of patient feedback letters to providers combined with guideline-based recommendations for changes in therapy/	12 months	24% reduction in ER visits	A
Kattan, Meyer. Crain, Ellen F. Steinbach, Suzanne. Visness, Cynthia M. Walter, Michelle. Stout, James W. Evans, Richard 3rd. Smartt, Ernestine. Gruchalla, Rebecca S. Morgan, Wayne J. O'Connor, George T. Mitchell, Herman E. "A randomized clinical trial of clinician feedback to improve quality of care for inner-city children with asthma." <i>Pediatrics</i> . 117(6):e1095-103, 2006 Jun. http://pediatrics.aappublications.org/content/117/6/e1095.full.pdf+html					
Krishna, 2003	Children and families	Use of internet-enabled interactive multimedia asthma education program by participants in exam room and waiting rooms during clinic visits.	12 months	68% reduction in ER visits	A
Krishna, Santosh. Francisco, Benjamin D. Balas, E Andrew. Konig, Peter. Graff, Gavin R. Madsen, Richard W. "Internet- enabled interactive multimedia asthma education program: a randomized trial." <i>Pediatrics</i> , vol. 111, no. 3, March 2003, pp. 503-510 http://pediatrics.aappublications.org/content/111/3/503.abstract					
Teach, 2006	Children and families	Use of specialized, ER-based clinic following an ER visit for asthma. Clinic provided assessment and education in asthma self-management and environmental triggers, and linkages and referrals to ongoing care.	6 months	46% reduction in ER visits for asthma.	A
Teach, Stephen J. Crain, Ellen F. Quint, Deborah M. Hylan, Michelle L. Joseph, Jill G. "Improved asthma outcomes in a high-morbidity pediatric population: results of an emergency department-based randomized clinical trial." <i>Archives of Pediatrics & Adolescent Medicine</i> . 160(5):535-41, 2006 May. http://archpedi.ama-assn.org/cgi/content/full/160/5/535					

Author/Year	Target Population	Intervention Strategies	Evaluation Timeframe	Cost-Utilization Outcomes	Quality of Evidence
Walders, 2006	Children and families	Use of interdisciplinary care team including pediatric pulmonologist, asthma nurse and social worker to provide medical care, asthma education and problem-solving therapy.	12 months	32% reduction in combined outcome of ER visits and/or hospital admissions.	A
Walders, Natalie. Kerckmar, Carolyn. Schluchter, Mark. Redline, Susan. Kirchner, H Lester. Drotar, Dennis. "An interdisciplinary intervention for undertreated pediatric asthma." <i>Chest</i> . 129(2):292-9, 2006 Feb. http://chestjournal.chestpubs.org/content/129/2/292.full.pdf+html					

*The table above has been adapted from the following source:
 Center for Health Care Strategies, Inc. – ROI Evidence Base: Studies on Asthma, November 2007
http://www.chcs.org/usr_doc/Asthma_Studies.pdf

Other Examples of Cost Effectiveness and/or Return on Investment					
Source	Study Type	Program Description	Program Cost per Patient	Health Improvement Results	Savings
Woods E, et al. 2012	Intervention/ Comparison	Assessment of the cost-effectiveness of a quality improvement program (which included nurse case management and home visits) in reducing asthma ED visits, hospitalizations, limitations of physical activity, patient missed school, and parent missed work.	Unknown	Over a twelve month period decrease in: asthma ED visits (68%); hospitalization (85%); limitation of physical activity (43%); patient missed school (41%); and parent missed work (50%).	Significant reduction in hospital costs compared with the comparison community and a return on investment of 1.46.
Woods E, et al. "Community Asthma Initiative: Evaluation of a Quality Improvement Program for Comprehensive Asthma Care," <i>Pediatrics</i> . 2012;129(3):465-472 http://pediatrics.aappublications.org/content/129/3/465.abstract					
Morgan W, et al. 2004	Randomized Controlled Trial	One year environmental intervention that included education and remediation for exposure to both allergens and environmental tobacco smoke.	\$1500 to \$2000 per child or approximately \$750 to \$1000 for each year of the study.	The intervention group had fewer days with symptoms than the control group both during the intervention year and the year afterward, as well as greater declines in the levels of allergens at home. This results in reduced asthma-associated morbidity.	The authors noted that the costs are similar to the cost of medications for a child with moderately severe asthma. They also noted that while the direct health care savings from the intervention may not offset its cost, the overall improvements in terms of societal benefits and the quality of life of children with asthma and their families need to be considered when evaluating the intervention.
Morgan W, et al. "Results of a Home-Based Environmental Intervention among Urban Children with Asthma," <i>New England Journal of Medicine</i> . 2004;351(11):1068-1080. http://www.nejm.org/doi/pdf/10.1056/NEJMoa032097					

Source	Study Type	Program Description	Program Cost per Patient	Health Improvement Results	Savings
Gibson PG, et al, 2003	Meta-analysis and/or Study Review	Guidelines for the treatment of asthma recommend that patients be educated about their condition, obtain regular medical review, monitor their condition at home with either peak flow or symptoms and use a written action plan.	Unknown	The results of trials comparing asthma self-management education to usual care were combined. These results showed that asthma sufferers who were educated about their asthma, visited the doctor regularly and who used a written action plan had fewer visits to the emergency room; less hospital admissions; better lung function; improvement in peak expiratory flow; fewer symptoms; and used less rescue medication.	Unknown
<p>Gibson PG, Powell H, Coughlan J, Wilson AJ, Abramson M, Haywood P, et al. Self-management education and regular practitioner review for adults with asthma. <i>Cochrane Database of Systematic Reviews</i>. 2003;(1):CD001117. http://summaries.cochrane.org/CD001117/self</p>					

Other Resources:

From the Asthma Regional Council (ARC):

- Asthma: A Business Case for Employers and Health Care Purchasers

http://asthmaregionalcouncil.org/uploads/Asthma%20Management/Business_Case_Employers_Health_Care_Purchasers%20_2010.pdf

(This report includes a description of The Asthma Return on Investment Calculator - <http://statesnapshots.ahrq.gov/asthma/>)