



EVIDENCE SUMMARY

Control Asthma

WHAT IS CDC'S 6|18 INITIATIVE?

The CDC is partnering with health care purchasers, payers, and providers to improve health and control health care costs. CDC provides these partners with rigorous evidence about high-burden health conditions and associated interventions to inform their decisions to have the greatest health and cost impact. This initiative aligns evidence-based preventive practices with emerging value-based payment and delivery models.

WHO'S AT RISK?

Nearly 26 million Americans have asthma, affecting 1 in 11 children and 1 in 12 adults. Black Americans are 2-3 times more likely to die from asthma than any other racial or ethnic group. In 2010, there were 439,000 asthma-related hospitalizations, 1.8 million emergency department visits, and 14.2 million asthma-related doctor visits. Asthma was linked to 3,447 deaths (about 9 per day) in 2007. Asthma costs in the U.S. grew from about \$53 billion in 2002 to \$56 billion in 2007, roughly a 6% increase. Lastly, Medicaid spends over \$10 billion per year treating asthma.

PROPOSED PAYER INTERVENTION

1

Promote evidence-based medical management following the 2007 National Asthma Education and Prevention Program guidelines (NAEPP Guidelines).



OPPORTUNITIES FOR PAYERS AND PROVIDERS

The 2007 National Asthma Education and Prevention Program guidelines are evidence-based guidelines for asthma management that significantly improve asthma care. Payers can universally promote the use of these guidelines to their health care providers and staff as part of primary care operations.



KEY HEALTH AND COST EVIDENCE MESSAGES FOR PAYERS AND PROVIDERS

Asthma symptoms and health care use can be significantly reduced by following the NAEPP guidelines for medical management.

CURRENT PAYER COVERAGE (AS OF AUGUST 2015)

MEDICARE

- ✓ Variable emphasis among Medicare plans.

MEDICAID

- ✓ State Medicaid programs are encouraged by the Centers for Medicare and Medicaid Services (CMS) to accelerate widespread adoption of the NAEPP Guidelines; however, states vary in the degree to which the NAEPP Guidelines are emphasized to patients and providers.

COMMERCIAL/PRIVATE

- ✓ Plans vary in how extensively providers follow the NAEPP Guidelines in practice.

SUPPORTING HEALTH AND COST EVIDENCE: SCIENCE BEHIND THE ISSUE

In a study of 3,298 urban children, when clinicians used the NAEPP Guidelines to determine asthma severity and then developed a written asthma plan with corresponding medications, 19.5% fewer symptom days were noted among the intervention children, along with 13.0% fewer emergency department visits compared with a control group. Program start-up costs in the first year were \$29 per child, but annual operating costs in subsequent years decreased to about \$10 per child. Return on investment was \$3.58 per \$1 spent.¹



Primary care providers who participated in a citywide asthma management program for urban children were able to increase their adherence to the NAEPP Guidelines for anti-inflammatory therapy from 38% adherence before participating in the program to 96% after program participation. While participating in this program, the patients who followed these guidelines increased their use of inhaled corticosteroid by 25%. Asthma-related emergency visits decreased by 27%, hospitalizations by 35%, and outpatient visits by 19%.²



Inner city asthma patients between 12 and 20 years of age with physician-diagnosed asthma were studied in a randomized, double-blind, parallel-group trial at 10 centers in cities across the United States. Medications were prescribed and adjusted based on the assessment of severity and control prescribed in the NAEPP guidelines. Researchers found that applying recommended medical management and medication access significantly reduced symptom days and asthma exacerbations over the course of the 1-year treatment period.³

PROPOSED PAYER INTERVENTION

2

Promote strategies that improve access and adherence to asthma medications and devices.



OPPORTUNITIES FOR PAYERS AND PROVIDERS

Increasing asthma medication adherence involves the participation of patients, providers, and payers.

Payers and providers can consider how asthma prescription fill rates affect adherence. Additional attention to improve adherence can be considered for patients who may need longer-term use of asthma medications as these patients may be less likely to fill those medications requiring higher copays.⁴



KEY HEALTH AND COST EVIDENCE MESSAGES FOR PAYERS AND PROVIDERS

Costs of promoting asthma medication adherence are outweighed by cost savings after improved adherence, and the use of collaborative strategies that include attention to health care system, provider, and patient involvement can improve asthma care outcomes.

Increasing the cost of asthma medication copays in some patient populations can be associated with decreasing fill rates and medication possession rates.⁵

CURRENT PAYER COVERAGE (AS OF AUGUST 2015)

MEDICARE

- ✓ Medicare Part B (medical insurance) covers nebulizers (and some medicines used in nebulizers if considered reasonable and necessary) as durable medical equipment for Medicare-enrolled providers.

MEDICAID

- ✓ All states provide drug coverage, but not all asthma medications are covered. States can also charge copays to adults and some children for asthma drugs on their formularies and/or require prior authorization.

COMMERCIAL/PRIVATE

- ✓ Varies by plan.
- ✓ Some (but not all) asthma medications are covered, and plans have the option to charge copayments and require prior authorization.

SUPPORTING HEALTH AND COST EVIDENCE: SCIENCE BEHIND THE ISSUE

In a retrospective observational study of 41,234 commercially insured asthmatics to determine if adherence to anti-inflammatory treatment could reduce overall cost of asthma care, researchers reviewed adherence rates of patients treated with either leukotriene inhibitors (LI) or inhaled corticosteroids (ICS). The relationship between adherence and four outcomes was examined: (1) emergency department (ED) visits, (2) hospitalizations, (3) nondrug net payments for asthma care, (4) total net payments for asthma care (including drug costs). Both ED and hospital use was negatively associated with adherence to LI. In contrast, ED visits and hospital admissions did not differ significantly between adherence groups for ICS. Total payments for asthma care increased significantly with higher adherence for both LI and ICS patients. The only subgroup for which overall asthma payments did not increase with better adherence were patients with past ED visit or hospital admission on LI. In this observational study, treatment with LI, but not with ICS, appeared to improve disease control, as evidenced by the reduction in the incidence of ED visits and hospitalizations in patients on LI. Savings generated by this reduction in high-cost events may offset the increased payments for drugs in selected high-risk patients.⁹



A study in a 14-state Medicaid population to examine asthma controller medication adherence rates and study the association of low adherence with adverse outcomes such as emergency department visits and hospital admissions was conducted. An analysis of nine of these state Medicaid claims demonstrated both low prescribing of appropriate medication (only 49% of adult asthma patients received even one pharmacy claim for any acceptable long-term controller therapy) and low adherence (only 27% filled the long-term controller medication [LTC] at least twice). Even among those patients who did refill the LTC prescription, only 16% were consistent in adhering to therapy for 6 months. However, among the study population's adult managed care patients, those with LTC prescription claims representing more than half of their total asthma drug claims, had less than half the risk of asthma hospitalizations or ED visits than patients with lower LTC-prescription-to-total-asthma-drug ratios. Among the Florida and Texas Medicaid study population's children with asthma, adherence with long-term controller medication was associated with a significantly lower rate of the emergency department visits, but not for hospitalizations. Previous studies of the Florida Medicaid population also showed that higher adherence to long-term controller therapy was associated with lower ED visit rates.¹⁰



In terms of medication adherence and ability of patients to fill prescriptions within 30 days of the prescription order date, a private HMO retrospective cohort study of 2023 patients linked electronic health records with pharmacy claims and demonstrated that the first-fill rate was lower for patients with a copay above the mean of \$12 and higher for patients prescribed oral plus inhaled medications.¹¹



Increasing the copayment to greater than \$5 resulted in a significant decline in average annual days of medication supplied of -47.1 days of inhaled corticosteroid use -35.3 days of combined steroid and long-acting medications, and -47.5 days of leukotriene receptor antagonists (LTRA). Among combined and LTRA medication users, the more than \$5 copayment increase was associated with more asthma-related outpatient visits and ED visits compared with the less than \$5 group.¹²

PROPOSED PAYER INTERVENTION

3

Expand access to intensive self-management education for individuals whose asthma is not well-controlled with the 2007 National Asthma Education and Prevention Program (NAEPP Guidelines) based medical management alone.



OPPORTUNITIES FOR PAYERS AND PROVIDERS

Payers can use multiple options such as physicians, nurses, certified asthma educators, health education teams, and schools to increase patient access to intensive self-management education when asthma symptoms are not well-controlled with the NAEPP Guidelines-based medical management.



KEY HEALTH AND COST EVIDENCE MESSAGES FOR PAYERS AND PROVIDERS

Intensive asthma self-management education can improve asthma symptom control for individuals whose asthma is not well-controlled with medical management based upon the NAEPP Guidelines.

CURRENT PAYER COVERAGE (AS OF AUGUST 2015)

MEDICARE

- ✓ Variable payment depending upon patient education coding.

MEDICAID

- ✓ Effective January 1, 2014, the Centers for Medicaid and Medicare Services expanded which type of providers can be reimbursed for providing preventive services to Medicaid/Children's Health Insurance Program beneficiaries. This rule change, in combination with existing flexibility for states to define practice setting, allows state Medicaid programs to reimburse for asthma interventions that use nontraditional providers (such as community health workers or certified asthma educators) in a nonclinical setting, as long as the service was initially recommended by a physician or other licensed practitioner.¹³

COMMERCIAL/PRIVATE

- ✓ Varies by plan.
- ✓ Billing codes for education and training for patient self-management of chronic diseases management by a qualified, non-physician health care professional using a standardized curriculum, face-to-face with the patient (could include caregiver/family) may be considered by third-party payers if prescribed by a physician.

SUPPORTING HEALTH AND COST EVIDENCE: SCIENCE BEHIND THE ISSUE

A sample of 310 low-income asthmatic urban children from 290 families was studied to determine whether health education would increase the ability of parents and children to manage asthma and reduce the use of health services.

Study subjects were randomized into a control group and an experimental group that received health education. When the comparison was limited to children in the control and experimental groups who had been hospitalized during the preceding year, the experimental group was found to have decreased its use of the emergency room significantly more than the control group and to have experienced a significantly greater reduction in the mean number of hospitalizations during the year of follow-up. The program reduced health costs for children with one or more hospitalizations, saving \$11.22 for every \$1 spent to deliver health education. Although asthma self-management behavior increased significantly for children receiving the educational program, regardless of their history of health care use, there was a significant effect of the health education program on children whose episodes of asthma were severe enough to have caused hospitalization in the baseline year. For this group of children, there were fewer subsequent hospitalizations and ER visits for asthma. This study provides evidence that asthma management training for low income parents and their children who have had one or more hospitalizations can yield cost-savings.¹⁴



A group of 212 inner-city asthmatic children age 1 to 16 with repeated asthma health care visits were randomized into three groups to study the effects of reinforced health education sessions combined with case management services.

Asthma-related hospitalizations, emergency department visits, and clinic visits were the primary outcomes. The cost-benefit analysis sought to estimate the expected cost savings to the Illinois Department of Healthcare and Family Services (Medicaid administrator). Averaged across all three groups, the magnitudes of declines were substantial: 81% for hospitalizations, 69% for hospital days, 64% for emergency department visits, and 58% for clinic visits. The group with reinforced asthma education and case management consistently improved to the greatest degree. All three interventions were associated with considerable cost savings ranging from \$4,021 per child per year for group 1 to \$4,503 per child per year for group 3.¹⁵



A group of 267 adults with recurrent asthma symptoms were randomized in a study to determine efficacy and cost of an asthma education program.

The experimental group received a standardized program from a health education specialist, including a self-help guide, asthma support-group sessions, and telephone reinforcement calls. Although costs to routinely deliver the intervention were found to be \$32.03 per patient using a nurse, findings suggest costs may be less if a health educator is used. Experimental group patients exhibited a significantly higher level of improvement in adherence (44 percent) than control group patients (2 percent).¹⁶

PROPOSED PAYER INTERVENTION

4

Expand access to home visits by licensed professionals or qualified lay health workers to improve self-management education and reduce home asthma triggers for individuals whose asthma is not well-controlled with the 2007 National Asthma Education and Prevention Program (NAEPP Guidelines) based medical management and intensive self-management education.



OPPORTUNITIES FOR PAYERS AND PROVIDERS

Payers can consider expanding patient access to home visits by licensed professionals or qualified lay health workers to improve patients' ability to self-manage their asthma and reduce home asthma triggers.



KEY HEALTH AND COST EVIDENCE MESSAGES FOR PAYERS AND PROVIDERS

Home-based educational and environmental intervention delivered by non-physician teams (nurses, certified asthma educators, community health workers) can improve asthma symptom control, particularly in inner-city children with asthma, and may have cost savings for payers.

CURRENT PAYER COVERAGE (AS OF AUGUST 2015)

MEDICARE

- ✓ Variable payment depending upon patient education coding.

MEDICAID

- ✓ Effective January 1, 2014, the CMS expanded which type of providers can be reimbursed for providing preventive services to Medicaid/Children's Health Insurance Program beneficiaries. State Medicaid programs now have the option to reimburse for asthma interventions that use nontraditional providers (such as community health workers or certified asthma educators) in a nonclinical setting, as long as the service was initially recommended by a physician or other licensed practitioner.¹⁷

COMMERCIAL/PRIVATE

- ✓ Varies by plan; billing codes for education and training for patient self-management of chronic diseases management by a qualified, non-physician health care professional using a standardized curriculum, face-to-face with the patient (could include caregiver or family) may be considered by third-party payers if prescribed by a physician.

SUPPORTING HEALTH AND COST EVIDENCE: SCIENCE BEHIND THE ISSUE

Benefits from home-based, multi-trigger, multicomponent interventions with an environmental focus can match or even exceed their program costs. Based on cost-benefit and cost-effectiveness studies, the results of a systematic review of 13 studies show that these programs provide a good value (preventing medical care costs, missing school or work days) for dollars spent on the interventions.¹⁸



A randomized controlled trial using community health workers to decrease exposure to indoor asthma triggers, days with symptoms, urgent care symptoms, and missed school days resulted in the intervention group having an increase in asthma-symptom-free days, improved quality of life, and a greater decrease in visits to the healthcare system. The intervention arm saved \$1,340.92 for the \$707 in additional costs needed per patient. The return on investment was \$1.90.¹⁹



A randomized crossover design study examined whether a home-based educational and environmental intervention delivered by lay health educators would improve asthma symptom control in inner-city children with asthma. The mean number of emergency visits decreased by 30% and in-patient visits decreased by 53% ($P < .001$) after the intervention. Reductions were seen in pests, presence of carpets in bedrooms, and dust. Nighttime wheezing was significantly reduced after the intervention in both groups. The total costs for the environmental and educational intervention were relatively low at \$121 per child enrolled. With staff time, cost was \$450-\$500 per family. In a non-research setting, these costs would be even less because the lay health educators would be able to carry twice the caseload. Other studies have reported costs in similar interventions ranging from \$189 to \$1,469.²⁰



Researchers reviewed a model where nurses referred asthma patients who were not improving on medical management to additional education services. Patients who continued to have asthma problems even with the additional education received home visits. This model involved (1) nurse case management and coordination of care with primary care and referral services, (2) nurse (bilingual) or nurse-supervised community health workers (bilingual and bicultural in Spanish) home visits for asthma education, environmental assessment, and remediation materials (HEPA vacuum, bedding encasements, and exterminator materials tailored to family needs), and connection to community resources; and (3) referral to an exterminator or inspectional services. Twelve-month data showed a significant decrease in asthma emergency room visits (68.0%), hospitalizations (84.8%), days of limited physical activity (42.6%), patient missed school (41.0%), and parent missed work (49.7%). There was a significant reduction in hospital costs compared with the comparison community and a return on investment of \$1.46.²¹

REFERENCES

1. Cloutier MM, Grosse SD, Wakefield DB, Nurmagambetov, T, Brown, CM. The Economic Impact of an Urban Asthma Management Program. *American Journal of Managed Care*, 2009. 15:6 345-51
2. Cloutier MM et al., Use of asthma guidelines by primary care providers to reduce hospitalizations and emergency department visits in poor, minority, urban children. *Journal of Pediatrics*, 2005. 146 (5) 591-7
3. Szeffler S, Gergen P, Mitchell M, Morgan M. Achieving asthma control in the inner city: Do the National Institutes of Health Asthma Guidelines really work? *Journal of Allergy and Clinical Immunology* Volume 125, Issue 3, March 2010, Pages 521-526 doi:10.1016/j.jaci.2010.01.025
4. Berger Z1, Kimbrough W1, Gillespie C1, Boscarino JA2, Wood GC2, Qian Z2, Jones JB2, Shah NR1. Lower copay and oral administration: predictors of first-fill adherence to new asthma prescriptions. *Am Health Drug Benefits*. 2009 Jun;2(4):174-80.
5. Bender, B, Rand, C. Medication non-adherence and asthma treatment cost. *Curr Opin Allergy Clin Immunol* 4:191-195.
6. Asthma's Impact on the Nation (2012) Accessed at http://www.cdc.gov/asthma/impacts_nation/asthmafactsheet.pdf
7. Asthma Facts (2013) Accessed at http://www.cdc.gov/asthma/pdfs/asthma_facts_program_grantees.pdf
8. National Environmental Public Health Tracking Network. Accessed at <http://ephtracking.cdc.gov>
9. Mattke, S, Martorell, F, Hong, S, Sharma, P, Cuellar, A, Lurie, N. Anti-inflammatory Medication Adherence and Cost and Utilization of Asthma Care in a Commercially Insured Population. *Journal of Asthma*, (2010) 47:3, 323-329. <http://dx.doi.org/10.3109/02770900903497196>
10. Rust, G, Zhang, S, Reynolds, J. Inhaled corticosteroid adherence and emergency department utilization among Medicaid-enrolled children with asthma *J Asthma*. 2013 September; 50(7): 769-775. doi:10.3109/02770903.2013.799687
11. Berger Z1, Kimbrough W1, Gillespie C1, Boscarino JA2, Wood GC2, Qian Z2, Jones JB2, Shah NR1. Lower copay and oral administration: predictors of first-fill adherence to new asthma prescriptions. *Am Health Drug Benefits*. 2009 Jun;2(4):174-80.
12. Campbell JD, Allen-Ramey F, Sajjan SG, Maiese EM, Sullivan SD. Increasing pharmaceutical copayments: impact on asthma medication utilization and outcomes. *Am J Manag Care* 2011;17(10):703-10
13. Pearson WS, Goates SA, Harrykissoon SD, Miller SA. State-Based Medicaid Costs for Pediatric Asthma Emergency Department Visits. *Prev Chronic Dis* 2014;11:140139. Accessed 2015 October 15. DOI: <http://dx.doi.org/10.5888/pcd11.140139> Available at http://www.cdc.gov/pcd/issues/2014/14_0139.htm
14. Clark, N, Feldman CH, Evans, D, Levison, M, Wasilewski, Y, Mellins, R. The impact of health education on frequency and cost of health care use by low income children with asthma. *J Allergy Clin Immunology* 78 (1986), pp. 108-115
15. Karnick, P, Margellos-Anast, H, Seals, G, Whitman, S, Aliadeff, G, Johnson, D. The Pediatric Asthma Intervention: A Comprehensive Cost-Effective Approach to Asthma Management in a Disadvantaged Inner-City Community, *Journal of Asthma*, 2007. 44:1, 39-44
16. Windsor RA, Bailey WC, Richards JM, Manzella B, Soong SJ, Brooks M. Evaluation of the efficacy and cost effectiveness of health education methods to increase medication adherence among adults with asthma. *Am J Public Health*. 1990 Dec; 80(12):1519-21.
17. Pearson WS, Goates SA, Harrykissoon SD, Miller SA. State-Based Medicaid Costs for Pediatric Asthma Emergency Department Visits. *Prev Chronic Dis* 2014;11:140139. Accessed 2015 October 15. DOI: <http://dx.doi.org/10.5888/pcd11.140139> Available at http://www.cdc.gov/pcd/issues/2014/14_0139.htm.
18. Nurmagambetov TA, Barnett SBL, Jacob V, Chattopadhyay SK, Hopkins DP, Crocker DD, et al. Economic value of home-based, multi-trigger, multicomponent interventions with an environmental focus for reducing asthma morbidity: a Community Guide systematic review. *American Journal of Preventive Medicine*. 2011;41(2S1):S33-S47.
19. Campbell JD et al., Community Health Worker Home Visits for Medicaid-Enrolled Children With Asthma: Effects on Asthma Outcomes and Costs *American Journal of Public Health*. 2015 Aug 13:e1-e7A
20. Bryant-Stephens T, Kurian C, Guo R, Zhao H. Impact of a household environmental intervention delivered by lay health workers on asthma symptom control in urban, disadvantaged children with asthma. *American Journal of Public Health*. 2009;99(Suppl 3):S657-65.
21. Woods ER, Bhaumik U, Sommer SJ, Ziniel SI, Kessler AJ, Chan E, et al. Community Asthma Initiative: asthma initiative: evaluation of a quality improvement program for comprehensive asthma care. *Pediatrics*. 2012;129(3):465-72. doi: 10.1542/peds.2010-3472.

