National Governors Association

NGA Paper

Health Investments That Pay Off: Strategies for Addressing Asthma in Children

Executive Summary

Asthma is one of the most common chronic conditions in the United States, affecting nearly one in 12 adults and one in 11 children.[1] In 2007, asthma imposed estimated costs in the United States of $56 billion, more than $50 billion of which was for direct medical expenses.[2] Leading experts in asthma policy and research have asserted that to improve health outcomes and reduce asthma-related health care costs, it is important to augment high-quality medical management with asthma self-management education and home visiting programs. Studies indicate that when those three evidence-based public health interventions are provided for children in a stepwise manner, they have the potential to yield a positive return on investment (ROI). Those interventions have been found to reduce emergency department visits and hospitalizations, improve asthma control, decrease the frequency of symptoms, decrease work and school absenteeism, and improve quality of life.[3] Guidelines developed by an expert panel convened by the National Asthma Education and Prevention Program (NAEPP) of the National Heart, Lung, and Blood Institute (NHLBI) also support that approach.

Governors can improve population health outcomes and health care quality and reduce health care costs by incorporating evidence-based asthma interventions for children in their overall agenda for state health care transformation. Governors can use the following strategies to implement and finance asthma-based interventions:

- Use a broad range of qualified providers to support effective and efficient delivery of asthma services;
- Encourage collaboration and resource sharing for asthma initiatives across public and private programs and sectors;
- Encourage health insurers to improve clinical management and reimburse for asthma education and home visit services; and
- Build efficiency and sustainability for the interventions through evaluation.

Introduction

Asthma costs the United States nearly $56 billion each year in medication, office visits, hospitalizations, emergency department (ED) visits, mortality, and work and school absenteeism.[4] Medicaid programs collectively spend more than $10 billion annually to

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[1] Division of Environmental Hazards and Health Effects, National Center for Environmental Health, "Asthma's Impact on the Nation: Data from CDC National Asthma Control Program," http://www.cdc.gov/asthma/impacts_nation/asthmafactsheet.pdf (accessed November 13, 2014).

[2] S.B. Barnett and T.A. Nurmagambetov, "Costs of Asthma in the Unites States: 2002–2007," *Journal of Allergy and Clinical Immunology* 127, no. 1 (January 2011): 145–152, http://www.ncbi.nlm.nih.gov/pubmed/21211649 (accessed December 3, 2014).

[3] Return on investment (ROI) is often presented differently in the literature. For the purposes of uniformity and comparison with other potential interventions, in this paper, ROI is calculated as (intervention benefit − intervention cost) / intervention cost. In some instances, the ROI has been recalculated using this formula and may differ from the ROI presented in the original source. A positive ROI reflects cost savings after accounting for all intervention costs within a given time frame. A negative ROI indicates that the benefits from the intervention were not enough to offset the cost of the intervention within the timeframe of study.

[4] "Asthma's Impact on the Nation."

Asthma Fast Facts[5]

- Asthma costs nearly $56 billion a year.
- Asthma affects nearly 25 million Americans, including 1 in 11 children.
- In 2009, one in five children with asthma visited the emergency department.
- Asthma causes nearly 10.5 million missed school days and 14.2 million missed work days per year.

treat the condition.[6] Asthma also ranks as the third-leading cause of hospitalizations among children under 15 years of age and is one of the most common chronic medical conditions among all children.[7] In 2009, 20 percent of children with asthma visited an ED.[8] In 2008, asthma caused more than 10 million missed days of school and more than 14 million missed days of work.[9]

Currently, asthma cannot be prevented or cured, but people who have asthma can be symptom free, fully active, and avoid costly emergency room (ER) visits and hospitalizations if they receive appropriate treatment and services.[10] When delivered sequentially as a package, three interventions can improve outcomes for and reduce the cost of treating children suffering from asthma. Those interventions are:

- Measures to promote health care providers' adherence to recommended clinical guidelines for diagnosing, assessing, treating, and monitoring patients who have asthma;
- Educational efforts to improve the ability of children who have asthma or their caregivers to self-manage their condition; and
- Home visits that provide education and identify and address indoor asthma "triggers" that aggravate the condition.

Clinical guidelines issued by the National Asthma Education and Prevention Program (NAEPP) of the National Institutes of Health's (NIH) National Heart, Lung, and Blood Institute (NHLBI) define the care that children who have asthma should receive.[11] Those children who have moderate to severe asthma or who do not respond to the treatment outlined in the guidelines, however, could benefit from more intensive self-management education.[12] Typically, patients are

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[5] Division of Environmental Hazards and Health Effects, National Center for Environmental Health, "Asthma's Impact on the Nation: Data from Centers for Disease Control and Prevention National Asthma Control Program." http://www.cdc.gov/asthma/impacts_nation/asthmafactsheets.pdf (accessed Novermber 13, 2014).

[6] Calculations from the Centers for Disease Control and Prevention (CDC) based on 2003–2008 Medical Expenditure Panel Surveys and the CDC Chronic Disease Cost Calculator. The cost of asthma for each state and territory can be found in Appendix A. See http://www.cdc.gov/chronicdisease/resources/calculator (accessed February 20, 2015).

[7] American Lung Association, *Asthma & Children Fact Sheet,* (Chicago: American Lung Association, September 2014), http://www.lung.org/lung-disease/asthma/resources/facts-and-figures/asthma-children-fact-sheet.html (accessed November 13, 2014).

[8] "Asthma's Impact on the Nation."

[9] Ibid.

[10] "How Can Asthma Be Prevented?" National Heart, Lung, and Blood Institute, http://www.nhlbi.nih.gov/health/health-topics/topics/asthma/prevention (accessed December 4, 2014); "How Is Asthma Treated and Controlled?" National Heart, Lung, and Blood Institute, http://www.nhlbi.nih.gov/health/health-topics/topics/asthma/treatment (accessed December 4, 2014); and "Living with Asthma" National Heart, Lung, and Blood Institute, http://www.nhlbi.nih.gov/health/health-topics/topics/asthma/livingwith (accessed December 23, 2014).

[11] National Heart, Lung, and Blood Institute, "Guidelines for the Diagnosis and Management of Asthma (EPR-3)," http://www.nhlbi.nih.gov/health-pro/guidelines/current/asthma-guidelines/index.htm (accessed December 4, 2014; referred to as *the guidelines* in this paper).

[12] Elizabeth Herman, Division of Environmental Hazards and Health Effects, Centers for Disease Control and Prevention, Interview with National Governors Association, March 11, 2014.

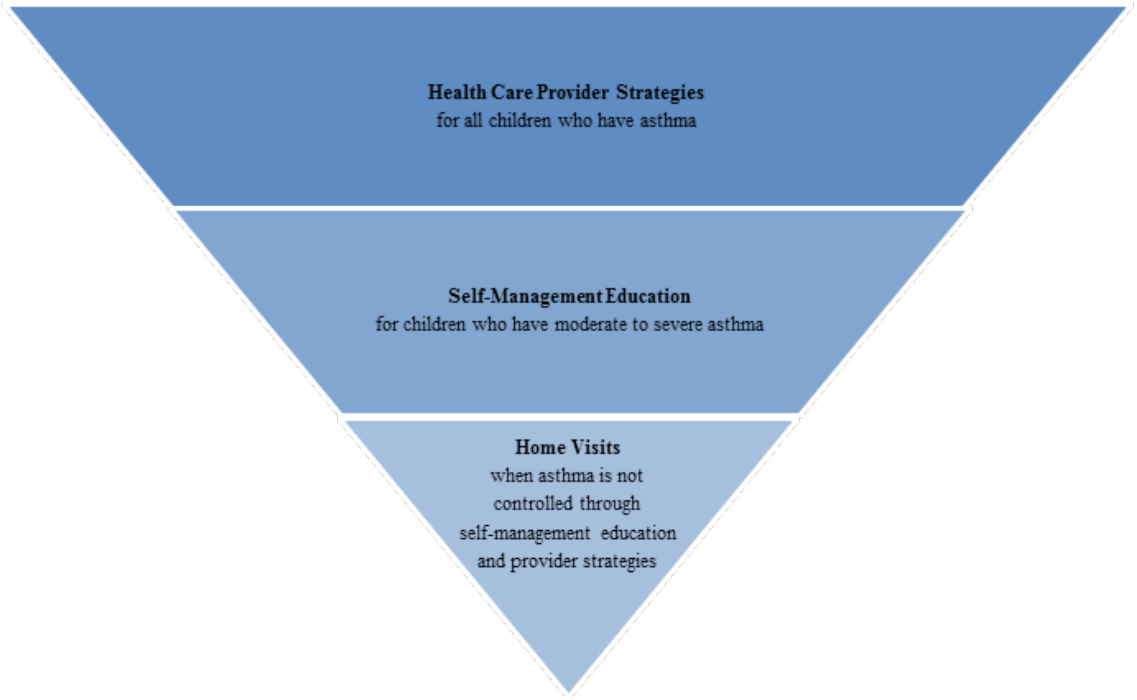
referred by their treating physician or other clinician where they and/or their caretakers can participate in a self-management education program provided by a community health worker, certified asthma educator, pharmacist, or nurse. Instruction focuses on how to prevent asthma attacks; how to manage symptoms when they occur; how and when to take medications; and how to recognize and reduce exposure to environmental triggers, such as tobacco smoke and allergens like dust mites, rodents, and pet dander.[13] Self-management education programs usually include several participatory sessions over days or weeks.

Home visits are recommended for children whose asthma is not well controlled with medical management and self-management education. The intervention includes a home assessment conducted by a health worker (typically, a community health worker, certified asthma educator, respiratory therapist, or nurse) to identify indoor environmental exposures that can trigger asthma attacks. The visits can also include self-management education and coordination with social support services to help individuals better manage their asthma. Home visit programs range from one to multiple visits and can include distribution of products to reduce asthma triggers (for example, dust mite covers for bedding or pest control products) and in some cases provide remediation (such as by repairing leaks and replacing materials contaminated by mold).[14]

Identifying Potential Savings from Asthma Programs

Evidence suggests that augmenting clinical management with asthma education and home-based services for children with asthma can pay for themselves over a relatively short period.[15] For example, the Community

Figure 1. Asthma self-management strategies should be targeted to the intensity of patients' needs



[13] National Heart, Lung, and Blood Institute, "Guidelines for the Diagnosis and Management of Asthma (EPR3)."
[14] "Asthma Control: Home-based Multi-Trigger, Multicomponent Interventions," The Community Guide, http://www.thecommunityguide.org/asthma/multicomponent.html (accessed November 13, 2014).
[15] The studies highlighted in this paper focus on pediatric asthma cases and examine ROI within a three-year timeframe. ROI for the asthma interventions described above take into account initial start-up costs and are calculated based on savings resulting from averted ED visits and hospitalizations. Studies also show a greater ROI when accounting for productivity gains resulting from averted missed school and parental or caregiver work days.

Asthma Initiative in Boston, **Massachusetts**, applied the three recommended interventions in a strategic, stepwise fashion and achieved a positive return on investment (ROI). That intervention focused on children with asthma living within four zip codes who have had a hospitalization or multiple ED visits in the preceding year. Their costs and health care use were compared with a similar cohort of children in demographically similar zip code areas. The clinical assessment and management of children in the intervention group were augmented by nurse-supervised home visits to provide culturally appropriate asthma education, environmental assessments, remediation materials, and coordination with community resources. Over a 12-month period, ED visits for the intervention population decreased by 68 percent, hospitalizations decreased by 85 percent, days of limited physical activity decreased by 43 percent, missed school days dropped by 41 percent, and parent missed work days dropped by 50 percent. The total cost for the hospital to run the program was $2,529 per child, and the estimated savings for the intervention group was $3,827 per child during two years of followup. Each dollar spent returned $1.46 in reduced medical costs, which are attributable to fewer ED visits and hospitalizations.[16]

Other programs across the country have achieved similar results. For example, **Minnesota**'s Reducing Environmental Triggers of Asthma project provides self-management education and home visits to children who have asthma. The project reduced the numbers of unscheduled office and hospital visits and saved just under $2,000 per patient over a 12-month period.[17]

A systematic review of asthma home visit programs found that studies reporting both costs and benefits saw reductions in medical costs ranging from about $125 to more than $10,000 per person per year, with program costs ranging from $377 to $1,720 per person per year.[18] Factors contributing to program costs included level of environmental remediation, the educational component, the professional status of the home visitor, and the number of visits. Net benefits for all studies were calculated based on reductions in hospitalizations, ER visits, or total costs of asthma care. Because of the variation in program costs and benefits as well as program implementation and study design, ROI varied from −0.91 to 13.00. That range implies that some programs that reduced medical costs did not offset the initial investment during study followup. Interventions that targeted the most frequent and costly users of emergency rooms tended to have a higher ROI.[19]

The potential savings from an asthma program depend on factors such as the clinical criteria for eligibility, the intensity of the intervention and the qualifications of the providers who furnish the services. Accordingly, as states consider implementing asthma self-management education and home visiting programs, it is critical that they consider targeting services according to the intensity of patients' needs and use the most efficient staffing models possible. For example, states could target home visiting programs to patients who have uncontrolled symptoms and

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[16] Elizabeth R. Woods et al., "Community Asthma Initiative: Evaluation of a Quality Improvement Program for Comprehensive Asthma Care," *Pediatrics* 129, no. 3 (March 2012): 465–472, http://pediatrics.aappublications.org/content/early/2012/02/15/peds.2010-3472.full.pdf+html (accessed December 9, 2014).

[17] Centers for Disease Control and Prevention National Asthma Control Program, *Asthma Self-Management Education and Environmental Management: Approaches to Enhancing Reimbursement* (Atlanta, GA: Centers for Disease Control and Prevention, 2013), http://www.cdc.gov/asthma/pdfs/Asthma_Reimbursement_Report.pdf (accessed December 9, 2014).

[18] Tursynbek Nurmagambetov 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 Preventative Medicine* 41, 2S1 (2011): S33–S47, http://www.thecommunityguide.org/asthma/supportingmaterials/Asthma%20Econ.pdf (accessed December 9, 2014).

[19] The authors identified 13 out of 1,551 studies that qualified for a financial review. Although this paper summarizes program costs identified in all of 13 studies, with respect to ROI, the authors reported only on the subset of the 13 studies that provide more complete program cost information that could be used to calculate a cost–benefit ratio. Program costs are reported in 2007 U.S. dollars.

might consider using community health workers instead of more costly health care professionals, when appropriate.

State policy leaders also must consider whether the additional investments required to implement the intervention (for example, increasing the frequency of home visits) would yield diminished or negative returns in terms of both savings and improved outcomes. In conducting such a cost–benefit analysis, one consideration is which populations should be targeted, such as Medicaid beneficiaries (or other state-sponsored populations, such as state employees). Whether to limit an intervention solely to Medicaid beneficiaries is a decision that requires consideration of several factors. Although the studies of asthma interventions highlighted in this paper provide evidence of savings and typically include Medicaid patients, they are not focused solely on the effect on Medicaid programs. For example, the New England Asthma Innovations Collaborative is an effort studying coverage of services by public and private payers.[20]

States can use the Agency for Healthcare Research and Quality's Asthma ROI Calculator to explore potential financial returns from asthma programs in their state. The calculator uses existing scientific research combined with de-identified patient claims data to estimate the net effects of an asthma program on state or local spending and health outcomes. In particular, it allows the user to estimate the differences in ROI achieved by focusing on people who have differing levels of severity of illness. The calculator also allows users to drill down by type of insurance, meaning that users are able to estimate potential ROI for the Medicaid program only.[21]

Strategies to Implement and Finance Evidence-Based Asthma Interventions

States can use several strategies to increase the likelihood of success in implementing and financing asthma interventions, including using a broad range of providers in the health care workforce, encouraging collaboration and resource sharing across programs and sectors, encouraging health insurers to improve clinical management and payment for services, and building efficiency and sustainability through evaluation.

State Success Story[22]

In 2012, **Missouri**'s Asthma Prevention and Control Program partnered with the University of Missouri to train school nurses specifically on asthma self-management education. The program also developed an asthma training program for pharmacists to provide guideline-based asthma patient education. Missouri HealthNet (MO Medicaid) reimburses pharmacists for delivering medication/disease management education /counseling services.

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[20] Health Resources in Action, "New England Asthma Innovations Collaborative (NEAIC)," http://www.cga.ct.gov/med/committees/med1/2013/1211/20131211ATTACH_NEAIC%20Abstract%202013.06.18.pdf (accessed December 9, 2014).

[21] "Asthma Return on Investment Calculator," U.S. Department of Health and Human Services Agency for Healthcare Research and Quality, http://nhqrnet.ahrq.gov/asthma (accessed November 13, 2014).

[22] "University of Missouri Asthma Team, "University of Missouri Asthma Ready Team," http://asthmaready.org/wordpress/wp-content/uploads/2014/01/WhoWeAre.pdf; Children's Hospital University of Missouri Health Care, "Development of Web-Based Training for the Pharmacist Asthma Encounter Management Application, http://asthmaready.org/static/posters/Phamacist_EMA_Training.pdf; and Centers for Disease Control and Prevention National Asthma Control Program, *Asthma Self-Management Education and Environmental Management: Approaches to Enhancing Reimbursement* (Atlanta, GA: Centers for Disease Control and Prevention, 2013), http://www.cdc.gov/asthma/pdfs/Asthma_Reimbursement_Report.pdf (accessed December 9, 2014).

Use a Broad Range of Qualified Providers

Asthma self-management education and home visiting programs are typically administered by a variety of health care professionals, including community health workers, respiratory therapists, pharmacists, certified asthma educators, and nurses.[23] Evidence suggests that a broad range of professionals, when properly trained, can effectively deliver services that lead to significant reductions in reported symptoms, schools days missed, caregiver work days missed, and ED visits.[24] In addition, nurses and community health workers who have appropriate training have been used effectively to perform home visits for children.[25] Because the cost of each category of health professional varies, the staffing models used for asthma self-management education programs can directly affect the program's ROI. As states consider scaling asthma self-management education and home visiting programs statewide, they should ensure that the level of training for and supervision of health care professionals is targeted to the appropriate intervention and patient population.

Encourage Collaboration and Resource Sharing Across Programs and Sectors

Several state and federally funded programs provide a range of services to target populations that experience a disproportionately high prevalence of asthma. States could consider coordinating efforts among those programs to offer asthma interventions. Gubernatorial leadership can break down barriers to sharing resources, referrals, training, and even personnel across programs to ensure that states take advantage of all opportunities to pay for and deliver self-management education and home visiting programs.

For example, the Health Resources and Services Administration's Maternal, Infant and Early Childhood home visiting program provides voluntary home visits to the most vulnerable children and families, many of whom have asthma.[26] Similarly, the U.S. Department of Housing and Urban Development's (HUD) lead hazard-control grants provide funding for home visits and modifications related to non-lead issues, including asthma triggers.[27] Also, HUD provides funds for low-income housing rehabilitation that local communities administer, which funds can be used to support asthma home visiting programs.[28]

Encourage Health Insurers to Improve Clinical Management and Payment for Services

Currently, most self-management education and home visiting programs are funded through public health and foundation grants. Those funds vary from year to year, which can jeopardize the long-term sustainability of asthma self-management education programs.[29] States might consider fostering more permanent funding through coverage for these services by private insurers that contract with Medicaid or state employee and retiree programs. A good first step would be for states to require the use of quality measurements that reflect the guidelines for appropriate assessment, diagnosis, and followup of asthma patients.

The Medicaid program offers a more sustainable source of funding for asthma services for low-income beneficiaries. States have certain options to expand Medicaid coverage from clinical services to community-based asthma-prevention and intervention programs under their state plans. For example, a

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[23] U. Bhaumik et al., "A Cost Analysis for a Community-based Case Management Intervention Program for Pediatric Asthma," *Journal of Asthma* 50, no. 3 (April 2013): 310–317, http://www.ncbi.nlm.nih.gov/pubmed/23311526 (accessed December 9, 2014).
[24] Ibid.
[25] "Asthma Control: Home-based Multi-Trigger, Multicomponent Interventions."
[26] U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health, "Maternal, Infant, and Early Childhood Home Visiting," http://mchb.hrsa.gov/programs/homevisiting (accessed November 13, 2014).
[27] Peter Ashley, U.S. Department of Housing and Urban Development, Interview with the National Governors Association, March 24, 2014.
[28] U.S. Department of Housing and Urban Development, "The Healthy Homes Program," http://portal.hud.gov/hudportal/HUD?src=/program_offices/healthy_homes/hhi (accessed November 13, 2014).
[29] Elizabeth Herman, Interview with the National Governors Association.

State Success Story[30]

In 2008, **Michigan**'s Asthma Network of West Michigan program, which has received reimbursement for its home-based services since 1999, convened a payer summit at which insurers agreed to reimburse home asthma self-management education visits at the standard Medicaid rate for a skilled nurse visit in additional communities. The summit allowed for expansion of asthma home visits in the state.

recent federal regulatory change gives states the option to broaden the scope of providers that can furnish preventive services to Medicaid beneficiaries.[31] Specifically, with Centers for Medicare & Medicaid Services approval, states can choose to reimburse non-licensed providers that furnish self-management education or home visiting services to Medicaid-eligible children who have asthma, if these services are recommended by a physician or other licensed provider.[32] The Patient Protection and Affordable Care Act also created an option that allows individuals who have one or more chronic conditions, including asthma, to receive care through a health home. Under the health home model, states can target certain Medicaid populations and incorporate a broad range of providers to ensure access to preventive and community-based services. States also receive an enhanced federal match for health home expenditures at 90 percent for the first eight quarters of state participation.[33] At least seven states have established Medicaid health homes that target individuals who have asthma.[34]

States that enroll their Medicaid populations in managed care plans could build asthma self-management education and home visiting programs into those managed care contracts. Private health insurers that administer Medicaid-managed care plans might be unfamiliar with or skeptical of the savings they can achieve through asthma self-management education and home visiting programs. Thus, an important step in ensuring the success of statewide programmatic efforts is working with private health insurers to share best practices and economic evidence. In particular, governors might consider convening "payer summits" that gather public and private payers to highlight the effectiveness of those programs.[35] Successful payer summits sometimes use Medicaid agencies to "recruit" a Medicaid managed care plan that provides asthma self-management education or home visiting services and offers a first-hand account to other insurers of the beneficial ROI of those programs.[36] Medicaid medical directors and public health officials also might meet with medical directors from insured and self-insured

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[30] Karen L. Meyerson, "Asthma Network of West Michigan: A Model of Home-based Case Management for Asthma," *Nursing Clinics of North America*, 48 (March 2013): 177–184, http://www.sciencedirect.com/science/article/pii/S0029646512001065 (accessed March 12, 2015); and National Asthma Control Program, Approaches to Enhancing Reimbursement (Atlanta, GA: Centers for Disease Control and Prevention, 2013), http://www.cdc.gov/asthma/pdfs/Asthma_Reimbursement_Report.pdf.

[31] 78 Fed. Reg. 42,160 (July 15, 2013), codifying 42 C.F.R. § 440.130(c); and the National Governors Association, "An Opportunity for States to Fund Community Based Programs," Issue Brief (Washington, DC: National Governors Association, 2014), http://www.nga.org/files/live/sites/NGA/files/pdf/2014/1411AnOpportunityForStatesToFundCommunityBasedPreventionPrograms.pdf (accessed March 12, 2015).

[32] Mary-Beth Harty and Katie Horton, "Using Medicaid to Advance Community-based Childhood Asthma Interventions: A Review of Innovative Medicaid Programs in Massachusetts and Opportunities for Expansion Under Medicaid Nationwide," *Issue Brief from the Childhood Asthma Leadership Coalition* (Washington, DC: The George Washington University, 2013), http://www.childhoodasthma.org/wp-content/uploads/2013/03/Community-Based-Asthma-Interventions-and-Medicaid-CALC-White-Paper_2.28.13.pdf (accessed November 13, 2014).

[33] 42 U.S.C. § 1396w–4.

[34] Mary-Beth Harty, "Using Medicaid to Advance Community-based Childhood Asthma Interventions."

[35] National Asthma Control Program, *Asthma Self-Management Education and Environmental Management.*

[36] Karen Meyerson, Asthma Network of West Michigan, Interview with the National Governors Association, March 19, 2014.

plans to present the business case for these programs.[37]

Build Efficiency and Sustainability through Evaluation

To ensure the efficiency and long-term sustainability of asthma self-management education and home visiting programs, it is important that states create a comprehensive evaluation strategy for those programs. Governors can support evaluation as a means of monitoring and assuring fidelity to interventions, improving program implementation, and demonstrating effectiveness and efficiency. Some states have successfully used evaluation findings from their asthma programs to modify interventions to increase effectiveness and enhance their operations to improve efficiency. Resources are available from the Centers for Disease Control and Prevention (CDC) to support states in their evaluation efforts.[38]

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[37] Ibid.

[38] *Learning & Growing through Evaluation: State Asthma Program Evaluation Guide,* Centers for Disease Control and Prevention, http://www.cdc.gov/asthma/program_eval/guide.htm (accessed December 9, 2014).