

Something new in the air: Paying for community-based environmental approaches to asthma prevention and control

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Despite the recommendation in national asthma guidelines to target indoor environmental exposures, most insurers generally have not covered the outreach, education, environmental assessments, or durable goods integral to home environmental interventions. However, emerging payment approaches offer new potential for coverage of home-based environmental intervention costs. These opportunities are becoming available as public and private insurers shift reimbursement to reward better health outcomes, and their key characteristic is a focus on the value rather than the volume of services. These new payment models for environmental interventions can be divided into 2 categories: enhanced fee-for-service reimbursement and set payments per patient that cover asthma-related costs. Several pilot programs across the United States are underway, and as they prove their value and as payment increasingly becomes aligned with better outcomes at lower cost, these efforts should have a bright future. Physicians should be aware that these new possibilities are emerging for payment of the goods

and services needed for indoor environmental interventions for their patients with asthma. (*J Allergy Clin Immunol* 2017;■■■:■■■-■■■.)

Key words: Asthma, environmental interventions, health care payment

Over the past decade, there has been a growing appreciation of the importance of indoor environmental exposures in asthma morbidity. There is also greater awareness that reducing these exposures should complement such medical approaches as controller medication and allergen immunotherapy in asthma management, particularly in children.

Approximately 80% of children with persistent asthma have evidence of allergic sensitization, and home-based interventions primarily aimed at reducing relevant allergen exposures have had beneficial effects on asthma.¹⁻⁶ In addition, indoor pollutants, such as fine and coarse particulate matter,⁷ nitrogen dioxide,^{8,9} and carbon monoxide,¹⁰ have been linked to asthma morbidity. The major source of indoor fine particulate matter is secondhand smoke exposure. Recommended strategies to reduce the concentrations of these pollutants in homes include home smoking bans or smoking cessation, use of high-efficiency particulate air (HEPA) purifiers, replacement of gas appliances with electric ones, use of a vacuum cleaner, and use of safe cleaning supplies.^{1-5,11-15}

The most recent update of the National Asthma Education and Prevention Program guidelines endorse advising patients “to reduce exposure to allergens and pollutants or irritants to which they are sensitive.”⁶ The guidelines further endorse an individually tailored, multifaceted approach to reducing relevant exposures, largely based on evidence of the efficacy of such an approach in a multicentered randomized controlled trial in children with persistent asthma.¹ Recently published practice parameters for environmental assessment and exposure reduction support evaluating environmental contributions to respiratory disease followed by professional assessment and exposure control measures as part of standard asthma and allergy treatment.¹³⁻¹⁵ The Centers for Disease Control and Prevention (CDC)¹⁶ and American Academy of Pediatrics¹⁷ have recently reviewed evidence and made recommendations on multitrigger, multifaceted home-based interventions.

Although traditional health care payment models have not covered the costs of home-based environmental interventions, there are emerging payment models that cover these costs, and our

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Abbreviations used

CDC: US Centers for Disease Control and Prevention
 CMS: Centers for Medicare & Medicaid Services
 HEPA: High-efficiency particulate air
 SIB: Social impact bond

work group was tasked with developing this report to educate health care providers about these emerging payment models. Based on increasing evidence for the effectiveness of implementation of evidence-based home-based asthma interventions, including from Seattle-King County,^{5,18,19} the Sinai Urban Health Institute,²⁰ and the New England Asthma Innovations Collaborative,²¹ a few health care payers have invested in environmental interventions for asthma. For example, the Optima Health Plan of Virginia (managed care division of Sentara Healthcare) was one of the first health plans to fund community-based environmental interventions. This innovative program included an “asthma life coach,” either a nurse or respiratory therapist who visited the homes of children with poorly controlled asthma and made referrals for caregiver smoking cessation and home remediation.²²

However, despite the experience of a few insurers and the recommendation in national asthma guidelines to target indoor environmental exposures, insurers traditionally have not covered the outreach, education, environmental assessments, or durable goods integral to environmental control practices.

Emerging payment approaches offer new potential for coverage of home-based environmental intervention costs. These opportunities are becoming available as public and private insurers shift reimbursement to reward better health outcomes. These approaches can take a variety of shapes and forms, but their key characteristic is a focus on the value rather than the volume of services. For example, instead of individual fees for traditional asthma-related medical services rendered by a health care provider, health care organizations could receive a patient-centered payment that provides the flexibility to support community health worker services, such as in-home asthma education, environmental assessments, smoking cessation programs for caregivers, and/or home allergen remediation in return for the health care organization accepting responsibility for reducing the number of asthma-related hospital admissions. Clinicians interested in supporting effective environmental interventions to prevent asthma exacerbations and improve control should become familiar with these emerging models for delivery of home-based services and alternative payment structures. The aim of this article is to review innovative payment models for home and environmental interventions to improve asthma control.

INNOVATIVE PAYMENT MODELS

Fee for service is a reimbursement model in which the provider is paid for each medical service the patient receives, such as a well-child check, an emergency department visit, or a specific procedure. Coverage in traditional fee-for-service programs generally pays for physician’s office visits, inpatient hospitalizations, and medications; it does not pay for other evidence-based asthma services, such as environmental education or environmental assessment by a community health worker, home visits, or environmental remediation supplies.

Emerging innovative payment plans aim to stimulate higher-value care to achieve improved health outcomes and go beyond

traditional fee-for-service reimbursement. New payment models for environmental assessments and interventions can be divided into 2 categories: enhanced fee-for-service reimbursement and set payments per patient that cover asthma-related costs. The Center for Healthcare Quality and Payment Reforms payment reform series provides an overview of the mechanics of new payment arrangements.^{23,24} Start-up funding for these approaches might be needed depending on the length of time needed to achieve savings from avoided hospitalizations and other expensive services; funding for these startup costs can come from inside or outside of the traditional health care system. A brief description of the types of payment reform can be found in [Box 1](#).

Enhanced fee-for-service reimbursement of environmental interventions

This model of payment, which could also be referred to as payment for high-value service, expands the set of services to be reimbursed one at a time from the usual medical interventions to include environmental and other measures to prevent asthma. Medicaid, the public insurer that covers half of all low-income children in the United States, is beginning to move in this direction. Administered individually by each state, Medicaid has traditionally been structured as a fee-for-service payment for clinical care, with either the state or a managed care organization paying physicians based on a fee schedule. Effective January 1, 2014, a new Centers for Medicare & Medicaid Services (CMS) rule allows states to reimburse for preventive services “recommended by a physician or other licensed practitioner . . . within the scope of their practice under State law.”²⁵ This policy largely leaves decisions of what services would be covered and definition of criteria to be eligible for services up to the states. Previously, CMS allowed states only to pay for services that were provided by a licensed practitioner.²⁶

This new rule provides an opportunity for reimbursement for preventive services provided by a broad array of health professionals, including care coordination, case management and educational counseling, home visitation, group health education, and services from community health workers.²⁷ This opportunity is available on a state-by-state basis. States wishing to implement this option must submit a State Plan Amendment describing proposed services to be covered, who will provide them (eg, community health workers), and “any required education, training, experience, credentialing, or registration of these providers.”²⁸ However, currently, this policy only allows reimbursement for those activities CMS defines as “preventive services,” which might leave out a number of home-based interventions.

Other mechanisms within Medicaid exist for further expansion of what services can be paid for under fee-for-service programs. These mechanisms can take the form of waivers, such as Section 1115 Medicaid Waivers, which allow for coverage of nontraditional services on the basis that they are in the end cost neutral. For example, Texas is proposing to use such a waiver to pay for community health workers.²⁹ To be successful, states must justify the services from both a clinical and economic standpoint and be willing to go through a complex administrative process for approval.

After evidence demonstrated a promising return on investment, the Community Asthma Initiative at Boston Children’s Hospital, Boston, Massachusetts, began to focus on a pathway for state Medicaid reimbursement of environmental interventions.

Approaches under discussion include providing an extra payment for all high-risk children to cover community health worker–led home-based interventions, including asthma education, environmental assessments, and provision of environmental supplies, such as HEPA vacuums, bedding encasements, and integrated pest management materials.^{30,31} The New England Asthma Innovations Collaborative is exploring other options as well, including payments that would cover a population of children and allow providers to move resources to have the greatest effect.

The Family Health Network of Chicago, a provider-sponsored Managed Care Community Network in Medicaid, also supports an initiative by Sinai Urban Health Institute to provide community-based asthma services, which include community health workers providing home visits with individualized asthma education and environmental assessments.²⁰

Enhanced fee-for-service programs, which provide flexibility in funding for environmental interventions, have the advantage of supporting specific interventions through direct billing. However, there are several challenges. Because payers must pay both for the additional service and for traditional medical services, they might be concerned that spending will increase for the new services without offsetting savings in reduced admissions. As a result, they might not be willing to cover all potentially important interventions, such as direct home remediation (eg, hiring professional pest management or bringing in a contractor to remediate mold). In addition, payers might be skeptical that hospitals will be fully invested in efforts to reduce admissions as long as their general revenues still largely depend in large part on “keeping the beds filled.” As health systems move to population health management, payers are increasingly asking providers to show results in reducing hospital admissions and emergency department visits related to asthma in return for the ability to bill for the additional services.

Payment for lives covered

A second emerging payment approach shifts away from fee-for-service reimbursement to having a health care organization receive funding on the basis of lives covered and, in exchange, take responsibility for managing the costs for all care of children with asthma from community interventions to intensive care unit treatment. This form of payment can also be referred to as a capitated payment or condition-based payment.

Although there are many ways to structure payment in this area, the basic idea is that the health care organization is expected to work within a budget to produce better outcomes at lower costs. The provider is given the flexibility to deliver a different mix of services than it can afford to deliver under current fee-for-service payments, but it is also accountable for spending less in total for care of the patient population than would be anticipated under fee-for-service programs, as well as for maintaining or improving performance on quality and outcome measures.

If the cost of delivering services is less in total than the agreed-upon payment or budget, then the health care organization can keep some or all of the difference. However, if the health care organization spends more on caring for the patient population than what was expected by the insurer, then the health care organization might be at risk for losing money. For example, an insurer might anticipate spending \$1 million per year to provide asthma-related care for a group of children under fee-for-service reimbursement. If a health care provider had a plan for

implementing an aggressive environmental intervention approach, enhancing primary care services, and achieving reduced hospital admissions that would cost less than \$1 million per year, the provider would have the flexibility to do so and keep part of the savings.

This more global payment structure is being pursued for all types of patient health problems, not just asthma, through Accountable Care Organizations, which started in the Medicare program and are being used increasingly in Medicaid and with private insurers as well. These organizations, which are groups of providers and suppliers (eg, hospitals, physicians, and others involved in patient care), can receive significant bonus payments for better health and reduced cost, giving them the incentive to think creatively about how to improve outcomes for pediatric patients with asthma.

There is an additional advantage to paying providers for lives covered: by locating the risk and reward at the level of the clinical organization instead of the insurer, there might be greater appreciation for the long-term benefits of preventive interventions. Whereas an insurer might be reluctant to pay for prevention when patients and families switch plans frequently, a health care organization can invest in preventive care, knowing that it will realize the benefits of improved community health over time.

START-UP FUNDING FOR ASTHMA HOME-BASED INTERVENTIONS

A critical challenge to advancing innovative payment for environmental approaches to asthma prevention under both expanded fee-for-service and set payment for lives covered approaches is finding start-up funding. Start-up funding is needed to scale-up capacity for community-based programs to demonstrate the value of the interventions for payers. Under the fee-for-service approach, payers need confidence that savings in reduced acute care will materialize, as well as improvements in health (eg, as evidenced by Healthcare Effectiveness Data and Information Set measures). Similarly, under the population-based payment approach, health care organizations at financial risk need assurance that the specific services established will deliver results.

The traditional approach to funding innovative evidence-based asthma home visits and environmental remediation interventions has been through grants from public health entities, such as the CDC, US Department of Housing and Urban Development, National Institutes of Health, and private funders. However, such grants might not provide sufficient funding, might have artificial time limits, and are increasingly limited in tighter fiscal climates.

With support from the California Endowment, a private philanthropy, Fresno, is piloting a randomized feasibility study comparing emergency care use between children with asthma who receive preventive interventions and children receiving normal asthma care. Thirty-eight patients have completed the 12-month program as of May 2015, with initial results demonstrating substantial decreases of greater than 50% in both emergency department visits and hospital admissions. After a comprehensive evaluation is completed in 2016, Fresno will seek to scale up with support from Medicaid and other insurers.

Funding from outside the health care system is helping to broaden availability of resources for start-up funding. Social impact bonds (SIBs), also known as health impact bonds or pay

Box 1. Type of payment

Type of payment	Description	Examples
Fee for service	Provider is paid for each medial service the patient receives.	Providers are paid per well-child check, emergency department visit, or specific procedure.
Enhanced fee for service	Payment is expanded to a set of services to be reimbursed per service provided from the usual medical interventions to include environmental and other preventative measures.	Reimbursement is made for care coordination, home visitation, community health worker services, educational counseling, and environmental remediation (eg, HEPA vacuums).
Payment for lives covered	Payment is given per “life covered”; therefore the health care organization/provider has flexibility to deliver a mix of services but must manage a budget.	Provider can deliver a mix of services designed for prevention, including home visitation, education, and environmental remediation, as long as the total costs are within the budget.

for success bonds, are a funding mechanism for preventive social programs in which the bond is paid only if measurable outcomes are realized. Under these arrangements, the investor takes the upfront risk, and the public or private payer provides support only if the effort is successful. SIBs can be publically (eg, city bond) or privately funded. SIBs were first tested as a mechanism to try to reduce teen criminal recidivism in New York City, where Goldman-Sachs put up \$10 million for a SIB. The results of the return on this SIB investment are still being collected. In this context the bonds bring external investment to prove the point that the right kinds of community interventions can reduce overall costs.

Using this approach, the Alameda County, California, Pay-For-Success Initiative is seeking to develop a Collective Impact Fund to provide start-up funding for asthma management education and home-based environmental remediation (removing mold and other known asthma triggers).³² The concept is that future expansion of the initiative can be based on a performance agreement instead of on a percentage of savings secured by the end payers (health insurers, Accountable Care Organizations, hospitals, and self-insured employers).³³

The Green and Healthy Home Initiative, which is based in Baltimore, Maryland, received a private \$1 million SIB in partnership with the Calvert foundation from the Corporation for National and Community Service’s Social Innovation Fund to conduct feasibility studies with payers and providers across the United States. The Green and Healthy Homes Initiative provides home remediation services for children with asthma.³⁴

The CDC has made available technical resources to help physicians assess the funding landscape and move to a system of

community asthma care. Reports include “Asthma self-management education and environmental management: approaches to enhancing reimbursement,”³⁵ and the “Asthma change package,”³⁶ which provides a guide for physicians to achieve “breakthrough improvements in community asthma care.”

DISCUSSION

The coverage of home environmental intervention supplies and services by third-party payers is in its infancy. As pilot programs prove their value and as payment increasingly becomes aligned with better outcomes at lower cost, these efforts should have a bright future.

The emergence of new payment models for environmental interventions to control asthma presents opportunities and challenges for physicians. The major opportunity is to bring about new efforts to reduce the burden of asthma in local communities and improve health. Physicians should be aware of the fact that new possibilities are emerging to treat patients affected by respiratory exposures to indoor air pollutants, including allergens. Ideally, they should collaborate with organizations specializing in environmental interventions.

These efforts rest on a growing body of evidence for the effectiveness of real-world implementation of evidence-based and home-based asthma interventions on a larger public health and health system scale, including from Seattle-King County^{5,18,19} and the Sinai Urban Health Institute²⁰ and preliminary evidence from the New England Asthma Innovations Collaborative.²¹ Nonetheless, there are major challenges in implementation, and the new financing mechanisms, which presume the potential for savings, still have yet to prove themselves in large-scale implementation.

One challenge is to identify the specific set of environmental services linked to the greatest improvement in outcomes. Although there is strong evidence that individually tailored, multifaceted, home-based environmental interventions improve asthma, there are opportunities to improve on this approach to targeting the home environment. Many questions remain about which interventions are most effective for improving clinical outcomes in different populations and geographic areas and which are most cost-effective. For example, in a recent randomized controlled trial, changes in indoor allergen exposure were quite modest and similar between the control and intervention groups, highlighting the fact that more work is needed to optimize home environmental interventions.³⁷ There is a need to develop and evaluate novel approaches to reducing indoor allergen and pollutant exposure and to expand the research focus on homes to include schools, day care centers, and other public buildings, where exposures to known asthma triggers occur.^{38,39} The Environmental Protection Agency has published guidelines in that regard, which school boards and other interested organizations should implement and follow.^{40,41}

A second challenge is to identify optimal ways to integrate environmental approaches with clinical management of asthma. There might be synergistic effects of combining home interventions with standard anti-inflammatory therapy, such as inhaled corticosteroids, or targeted therapies, such as allergen immunotherapy. To this end, studies should evaluate what combinations of environmental and optimal medical management provide the most cost-effective improvement in patient outcomes.⁴² Furthermore, emerging payment strategies have not yet addressed how

incentive strategies could be applied to school or day care settings.

A third challenge is to develop the evidence base on cost and return on investment. Although the costs of any type of intervention depend on the exposure being targeted and the strategy used to target the exposure, the cost of an individually tailored multifaceted intervention in one multicenter trial was approximately \$1500 for a year-long intervention.¹ However, cost and comparative effectiveness work in this area is in its infancy, and more research is needed to understand which types of interventions and combinations of interventions are most cost-effective.

Thinking differently about payment for asthma care offers the potential for substantial benefits for the health of children. Set payment approaches especially offer a promising reimbursement approach because, by their nature, these convert savings in acute care into more funds to invest in prevention. They also are supremely flexible; any service that works can be supported. Physicians engaged in these models will be at the cutting edge of payment changes and health improvement.

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