Strategies for Addressing Asthma in Homes

National Center for Environmental Health
Division of Environmental Hazards and Health Effects

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This document is comprised of two parts and an appendix. Part I includes the workgroup's suggestions for home-based strategies and outlines core and additional elements which are important for home visits. Part II briefly describes some of the scientific literature which was considered in deliberations undertaken to arrive at the suggestions (note: suggestions appear at the end of each section in bold text). The appendix is a summary of asthma education in home visits of programs the home-based strategies workgroup considered in our deliberations.

Contents

Part I
Workgroup Suggestions for Home-based Strategies

Main Objective

To define core components of home visits (who visits, what education occurs in home, how the home environment is assessed, how/what linkages to care are beneficial).

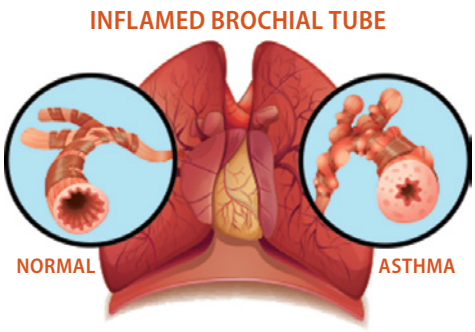
Secondary Objective

To define additional components that can augment the home visits and perhaps overcome barriers (e.g., social & housing factors) that impede successful home-based strategies.

Core Elements of a Home Visit

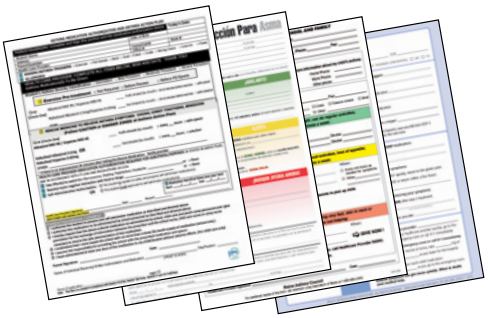
Asthma Education

What Is Asthma?



Medications and Devices

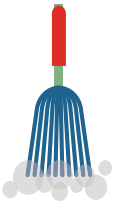
Asthma Action Plans



Home Exposure Assessment

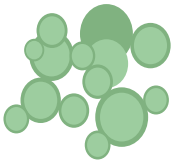
Asthma Triggers

PETS

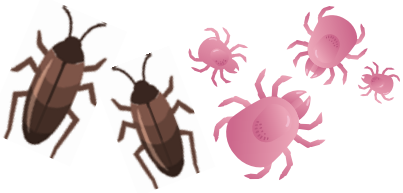


DUST

CHEMICALS



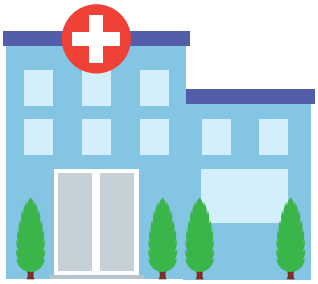
MOLD

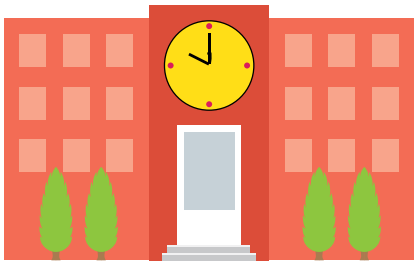


PESTS

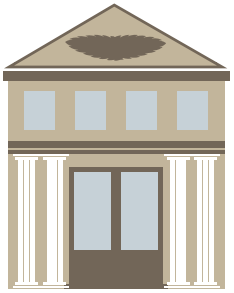
Partnering and Resources

Communication with Healthcare Providers, Schools, etc.





Links to Services



Additional Elements

Home Cleaning

Hand-Washing

Allergen Avoidance Supplies

Asthma Symptom Diary

Summary Statements

Referral criteria	Programs will establish referral criteria which result in referral of those with poorly-controlled asthma. Regardless of how patients come into the program, home-based strategies should be tailored to the age range, language, and education level of the household.
Home visit staff characteristics	Community health workers with specialized asthma education and home assessment training are a core element of many successful home-based strategies. Regardless of professional training and credentials, home visitors are best-equipped when trained on relevant climate and housing issues that may influence the efficacy of the home-based strategy, and other culturally appropriate behaviors for the population they are serving.
Home visit format	An initial and follow-up home visit by at least one staff per home visit (two may be preferable for safety reasons) over a 12-month period are a core element of successful home-based strategies.
Home intervention strategies	Multi-trigger/multi-component interventions which are appropriate for the type and location of housing are a core element of successful home-based strategies.
Linkage to services	At a minimum, information such as an up-to-date list of local healthcare providers, schools, social services, housing groups, and departments of health are core elements of successful home-based strategies.

Part II
Brief Discussion of Supporting Literature

Background

To date, much of the evidence for factors leading to the development and exacerbation of asthma (particularly in children) points to the home environment [1–4]. In addition, outdoor air pollution has decreased in many westernized countries, and the time that individuals spend indoors has increased [5, 6]. This means that any attempt to decrease asthma morbidity ideally includes assessment of the home environment, and a multi-trigger/multi-component intervention as part of an overall home-based strategy to decrease exacerbations of asthma [7, 8]. The peer-reviewed literature has many examples of home interventions; the Community Guide systematic review includes 23 such studies; however, the literature for how these home interventions are conducted by public health practitioners in a non-research framework is sparse [9, 10] and not technically peer-reviewed [11].

Aside from the actual **home assessment** and **interventions**, many other facets of home-based strategies are crucial to decreasing asthma morbidity. The following facets are described in further detail below:

- Referral criteria to be in a home-based strategy program
- Characteristics of the home visit staff
- Format for home visits
- Implementation of home intervention strategies
- Linkages to services
- Evaluation of programs addressing asthma in homes

Referral criteria to be in a home-based strategy program

Many home-based intervention strategies target those with poorly-controlled asthma. Poorly-controlled asthma is defined by the Guidelines for the Diagnosis and Management of Asthma (Expert Panel Review #3, also known as EPR 3): http://www.nhlbi.nih.gov/health-pro/guidelines/current/asthma-guidelines/full-report. Ideally, home-based strategies for at-risk households are flexible with regard to potential barriers due to age range, language, and education level of the participants. For example, if the household is referred into the home visit program via elementary schools, then the education materials/messaging and evaluation are improved when tailored toward dialogue with elementary school-aged children. On the other hand if a household is referred into the program via adult asthma clinics, the dialogue might include discussions about smoking cessation, avoiding potential asthma triggers at the workplace, bars, etc. Besides flexibility in designing age-appropriate asthma education, flexibility is also important for addressing age-specific asthma triggers. In contrast, strategies for very young children might emphasize limiting exposure to secondhand smoke and respiratory viruses. In summary, programs establish referral criteria which will result in referral of those with poorly-controlled asthma (defined in accordance with EPR-3 guidelines). Regardless of how patients come into the program, home-based strategies should be tailored to the age range, language, and education level of the household.

Characteristics of the home visit staff

In a review of six home-visit programs funded by Centers for Disease Control and Prevention (CDC) [9], the training required for the home visit staff for the following urban areas: Chicago, IL; Oakland, CA; Philadelphia, PA; Richmond, VA; St. Louis, MO; and Minneapolis/St. Paul, MN was described as follows:

"All home visitors received training, from either site staff or the accredited home health agencies for

which they worked, about the role of the Institutional Review Board, the Health Insurance Portability and Accountability Act, and personally-identifiable data protection. To ensure quality data collection, the Chicago site developed a biannual, mandatory 8-hour retraining session to review these issues. At most of the other sites, staff held less formal, regular meetings to review guidelines and data collection procedures. Several sites also conducted periodic shadow visits, either by program management staff or field supervisors, to observe, critique, and improve home-visitor field techniques."

In a comprehensive review of the role of community health workers (CHWs) in several home visit programs (conducted mainly in a research setting), the characteristics of the CHWs were described in detail [12]:

Characteristics of community health workers (CHWs)

Types of shared characteristics with study participants

- Lived, had lived, had worked in the target community
- Same ethnicity or shared ethnic background
- Had asthma or had close family members with asthma
- Communicated in the language of the participants, bilingual

Types of training

- Intensive initial training followed by continuing education
- CHW training at a local college

Types of quality control

- Instructed to follow protocols
- Met with primary investigator every other week
- Met with project steering committee quarterly

The CHW review article mentioned that it was difficult to discern the exact mechanism of how the CHWs led to changes in asthma outcomes (e.g., giving education, helping with psychosocial factors, providing household trigger reduction resources, linkages to social/medical care) [12]. Nonetheless, it was clear that the CHWs could effectively conduct home visits that led to measurable impacts on asthma morbidity among children. For example, the review article described a study of children's homes in Philadelphia (n=208) that found that the average number of emergency department (ED) visits were significantly decreased by 12 months post-intervention compared with 12 months before intervention ($p < 0.01$) [13]). Of note, the home visit programs were mainly research-based and length of follow-up of the children ranged from 4 months to 2 years. Research gaps include understanding the long-term outcomes for children participating in CHW-based home visit programs and how such programs affect adults with asthma. These gaps notwithstanding, several other types of staff have conducted home visits with many positive health outcomes. These staff include: nurses, respiratory therapists, health educators, certified asthma educators, social workers, paramedics, pharmacists, code enforcement officials, entomologists, industrial hygienists, and others [10, 11, 14, 15].

The caveat of this review article was that for some outcomes (hospitalization, ED visits, and environmental triggers) the CHW and environmental intervention vs. observation only (with CHWs) did not significantly differ. This often occurs in research studies. However, even if just by having someone visit the children's homes, asthma morbidity decreases, this is still an effective strategy for health departments. Effective public health practice is not research. In summary, **interventions that use CHWs with specialized asthma education and**

home assessment training are a core element of many successful home-based strategies.

Format for home visits

As mentioned, different types of staff (CHWs, nurses, respiratory therapists, health educators, certified asthma educators, social workers, paramedics, pharmacists, code enforcement officials, entomologists, industrial hygienists, and others) might be in the home at any given time. Based upon a review of several CDC-funded programs, other programs known to CDC staff (Appendix), and several peer-reviewed studies [7, 8, 12], the frequency of home visits can range from one to many (e.g., nine over a period of 12 months). Teams of two are also often used for security reasons on the part of the family and of the home-visit team. Often during a home visit, an assessment of sources of asthma triggers is conducted by one staff member, while another staff member conducts asthma education/management activities as described in the appendix. The asthma self-management strategy is based upon the Guidelines for the Diagnosis and Management of Asthma (EPR-3): http://www.nhlbi.nih.gov/health-pro/guidelines/current/asthma-guidelines/full-report. In brief, the asthma education/management has core elements:

- Description of asthma
- Warning signs of asthma
- Methods to decrease exposure to asthma triggers
- Check to see if the individual has an updated and functional asthma action plan
- Mechanisms to deal with possible stigma for "disease" status
- Plan to communicate effectively about their asthma with healthcare providers, schools, etc.
- Updated links to services that are tailored to their needs (e.g., smoking cessation, flu shots, housing department)

The time spent inside the home for a home visit can vary, but most state programs and research study investigators have reported that about 1–1.5 hours is the average time; more than 2 hours is reported as being burdensome for the family (private communications with staff). Given that scheduling the home visits, traveling to and from the home, and conducting a home assessment and asthma education can involve several hours, many state asthma programs might not find a strategy that includes several home visits to be feasible. Therefore, **an initial and follow-up home visit by at least one staff per home visit (two may be preferable for safety reasons) over a 12-month period are a core element of successful home-based strategies**. Regardless of professional training and credentials, home visitors are best-equipped when trained on relevant climate and housing issues that may influence the efficacy of the home-based strategy, and other culturally appropriate behaviors for the population they serve.

Implementation of home intervention strategies

Once a home assessment is conducted, the staff member(s) can establish a plan for a tailored intervention for the person with asthma. The home intervention focuses on specific and nonspecific asthma triggers (e.g., cockroach allergen for those with cockroach allergy and volatile organic compounds for those with airway sensitivity to fragrances and cleaning products, respectively). In addition, the assessment takes into account issues such as type of housing stock, household income, renter vs. owner, regional climate, and neighborhood factors. For example, allergen profiles in multi-family homes can be different from those of single-family [16–27], and subsequently, implementation and also the efficacy of integrated pest management can vary between the two types of housing [16, 18]. Also, climate can play a part in what types of allergens might be prevalent. For example, dust mites are rare in arid areas of the country [30]. Another way that housing stock and climate can affect allergens is that in some areas of the Northeast, apartment buildings are often overheated during the winter to the point where relative humidity is extremely low for months and the dust mite populations cannot survive, much less produce allergens [22, 28, 29].

Once an intervention strategy is designed, there are a variety of ways that it can be implemented: 1) educating the individual to control the asthma triggers; 2) educating the entire household to control asthma triggers; 3) providing cleaning supplies and/or allergen avoidance materials (e.g., mattress covers); and 4) providing professional services (e.g., cleaning, mold remediation, structural repairs). In general, provision of cleaning supplies/allergen avoidance materials or professional services could be considered an additional component of home interventions, but such resources are not absolutely necessary, especially if budget constraints are a consideration. **Multi-trigger/multi-component interventions which are appropriate for the type and location of housing are a core element of successful home-based strategies.**

Linkages to services

Linkages to services such as housing inspectors or physicians, or healthcare providers are of often part of a multi-factorial home-based strategy [7, 8, 12]. Therefore, it is difficult to quantify the main effects of linkages to care (e.g., healthcare providers, schools, housing groups, social services) without doing many of the other aspects of home-based strategies mentioned earlier in this document. **At a minimum, information such as an up-to-date list of local healthcare providers, schools, social services, housing groups, and departments of health are core elements of successful home-based strategies.** If additional resources are available, the home visit staff can facilitate those linkages.

Evaluation of programs addressing asthma in homes

In order to assess whether or not your home-based strategy is effective, it is important to build in evaluation at the beginning while you are designing the intervention. This will enable you to collect data which will help you to answer evaluation questions about your home-based strategy. Evaluation should be considered in each of the core component areas. For specific guidance related to evaluation of home-based strategies, please refer to the *State Asthma Program Evaluation Guide: Learning and Growing through Evaluation, Module 5, Evaluation of Services and Health Systems Strategies*.

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Appendix
Summaries of Asthma Education in Home Visits

	Core Elements						Additional Elements
	Asthma education components			Other			
Program	What is asthma*	Medications and devices including asthma action plans	Asthma triggers	Stigma	How to communicate with healthcare providers/ schools, etc.	Links to services	Things to consider
Seattle-King County, "Healthy Homes II Asthma Project"	X	X	X		X	X (flu shots)	• How to clean your home • How to wash your hands • How to use a peak flow meter
Minnesota "Reducing Environmental Triggers of asthma in homes of children"	X (varying levels of literacy)	X (refrigerator magnet) or other materials	X		X (if needed)	X (smoking cessation)	Gave allergen avoidance supplies (dust mite covers, HEPA filters, etc.)
Columbia University "Helping Your Child Live with Asthma"	X	X	X				How to use a peak flow meter
"Wee Wheezers"¥	X	X	X		X		How to use a peak flow meter
Montana "Montana Asthma Home Visiting Project" ¥	X (nurses)	X	X			X (list of resources given)	Gave allergen avoidance supplies (mattress and pillow covers and HEPA filters for pet owners and smokers)
Connecticut "Putting on AIRS"	X (nurses)	X (reviewed by nurses)	X (Sanitarian)				
AAFA (developed by Georgetown Univ.) "You Can Control Your Asthma"	X	X	X	X	X (what to know when playing sports)		• How to use a peak flow meter • Asthma diary
Pennsylvania (developed by CHOP) "Community Asthma Prevention Program"	X	X	X			X (Referral to a community class)	Gave allergen avoidance supplies (depending upon intervention level)

*includes warning signs of an asthma attack

¥Strong use of pre/post-test (including bringing forms from previous visits)

For more information please contact
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