Developing a National Healthy Homes Training Center and Network

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Abstract

There is a growing awareness among health and housing experts that a coordinated, comprehensive, systematic, and holistic approach to residential health and safety hazards is more cost effective and prevention effective than a categorical approach. The National Healthy Homes Training Center and Network cross-trains environmental, health, and housing professionals in the discipline of "healthy housing." The training initiative takes into account the scientific evidence connecting housing and health; the prevalence of hazards and the burden of associated illness or injury; and the availability of practical, low-cost, and reliable methods and protocols for assessing and treating housing-related health and safety hazards. The overarching purpose of the initiative, which is funded by the U.S. Centers for Disease Control and Prevention (CDC) and the U.S. Department of Housing and Urban Development (HUD), is to increase the competency of the public health, environmental health, and housing workforces in the area of healthy housing and to motivate policy change in the way housing in America is developed, renovated, and maintained. The training center provides participants with an opportunity to learn key healthy housing principles; a forum for exchanging information on healthy housing strategies; a mechanism for introducing new research into practice; and opportunities for networking, collaboration, and partnerships. Because less than half of the public health workforce in the United States has formal public health education, the training is also part of a broader national agenda to strengthen the public health infrastructure. The training will be delivered through a network of geographically dispersed, regionally based, university partners and will include the use of distance learning technology. This paper describes the methods used for developing the training center initiative and how the initiative contributes to the broader goal of preventing housing-related disease and injury by reconnecting the health, housing, and environmental disciplines to improve the quality of services delivered to the American public through workforce development, capacity building, and policy dissemination.

Introduction

Public health and housing are inextricably linked. Substandard housing has long been associated with a multitude of poor health outcomes. Lawrence Veiller's 1901 study of tuberculosis in New York City tenements and the subsequent landmark Tenement House Act of 1901 laid down the foundations of key expectations for healthful conditions in public housing that still exist today (Krieger & Higgins, 2002).

In the United States, only in the past century have the disciplines of housing and health become separate and distinct. In part, this divergence reflects the maturation of these fields resulting from significant social change and scientific advances. Yet the fragmented nature of housing and health services has created unintended effects for those who rely upon them. The wide array of categorical programs that were born from this system are deeply embedded in policy and practice and include programs dedicated to childhood lead poisoning, asthma, rodents, radon, pesticides, environmental tobacco smoke, injuries, and energy efficiency. Behind each of these programs is a categorical source of funding, a set of categorical program strategies, and often an associated advocacy group.

Public health professionals focus on improving the health of individuals and communities by identifying and eliminating diseases, but not on strategies to address social determinants of health. This is evidenced by the fact that nearly 95 percent of health care spending in the U.S. is applied to direct curative medical care and biomedical research (McGinnis 2002). Put differently, spending is directed more at personal health care than at population-based preventative interventions to improve health. Similarly, housing practitioners tend to focus on compliance with narrowly drawn, jurisdiction-specific building codes and health standards, but not on the broader implications of inadequate housing.

States and local jurisdictions grapple with the intersection of health and housing, and practitioners seeking training and information about healthy homes are challenged because there is no central repository or resource. Moreover, resources directed toward health professionals often neglect the housing component while information for housing professionals tends to lack the public health perspective. The lack of a common, scientifically based framework for

implementing healthy homes practices inevitably leads to confusion and misinformation, liability concerns, and ultimately inappropriate actions and/or inaction.

The relationship between health and housing continues to impact policy priorities and initiatives in the United States today. Specifically, Goal 8-23 in the U.S. Centers for Disease Control (CDC) and Prevention's Healthy People 2010 calls for improving the 1995 levels of occupied housing units that are substandard by 52 percent because "residents of substandard housing are at increased risk for fire, electrical injuries, lead poisoning, falls, rat bites, and other illnesses and injuries" (DHHS 2000). The U.S. Department of Housing and Urban Development (HUD) administers a $10 million demonstration program aimed at identifying affordable solutions to residential health hazards. Together, the government and non-governmental organizations are promoting a multidisciplinary systems approach referred to as "healthy homes" or "healthy housing." "Healthy housing" typically refers to the physical and material effects of housing on health while "healthy homes" incorporates the psychosocial and behavioral ways in which housing interacts with health. Although no consensus definition of healthy housing has been developed, it is generally defined as housing that is constructed, maintained, and renovated in a manner that is conducive to public health. Healthy housing is dry, well-ventilated, pest-free, free of contaminants, safe, and well maintained. When these principles are followed, housing is also more comfortable for occupants, which is another key element of healthy housing since many residential health hazards are the result of occupants' efforts to improve the comfort of their homes (e.g. using unvented space heaters or ovens for heating, spraying pesticides to control pests, etc.).

In 2003, CDC and HUD funded the National Center for Healthy Housing (NCHH) to create the National Healthy Homes Training Center and Network. NCHH is a Maryland-based national non-profit organization dedicated to reducing residential health hazards to children while preserving affordable housing. The training center is responsible for developing and disseminating scientifically valid information about healthy housing practices and for creating a workforce skilled in delivering these services. The courses offered through the training center integrate knowledge from the disciplines of health, housing, and the environment to promote a coordinated, holistic, and systematic approach to the assessment and treatment of housing related

health hazards. Training is delivered nationally by NCHH and through a regional network of partners composed of the Johns Hopkins University, the University of Cincinnati, the University of Washington, and Eastern Kentucky University.

Problem Definition

Over the previous decade in the United States, there has been a shift toward an ecological/ contextual model for explaining differences in health as opposed to a compositional model. The compositional model suggests that differences in health in different places are explained by the differences in the kinds of people who live there. One implication of the compositional model is that poor people will have the same morbidity and mortality rates wherever they live. A contextual or ecological model suggests that differences in health status are attributable to differences in the places people live not the fact that the individuals are poor, implying that the health of poor people will vary depending on the type of area in which they live (Kawachi 2003). One implication of the ecological/contextual model is that good or poor health is increasingly viewed as a multidimensional concept, dependent upon a multiplicity of variables, including the quality of the neighborhoods and homes in which people live.

Housing as a Determinant of Health

The quality of housing conditions plays a decisive role in the health status of the residents, because many health problems are either directly or indirectly related to the building itself, the construction materials used, the heating, cooling equipment and appliances used, or the size or structure of the individual units. Mental and social health are affected by the living conditions, although no straightforward mechanisms have been postulated (Shaw 2004). Substandard housing has been independently linked to many health endpoints including childhood lead poisoning, asthma and respiratory disease, and unintentional injuries. Housing quality remains an important component of health disparities in America and around the world (Breysse et. al 2004).

System level change in service delivery

As the health equation grows more complex, so must our response. Current practice in the U.S. is to address environmental diseases and the housing conditions that cause them on an issue-by-issue basis. As a result, the training, funding, and programs developed over the previous 50 years

have been categorical in nature. According to the Institutes of Medicine, "with more than 200 categorical public health programs in the Department of Health and Human Services and a variety of health related programs in other federal agencies, the alignment of policies and strategies is challenging"(DHHS 2003). Strengthening public health infrastructure to make it more effective will depend upon adequately addressing these inefficiencies and limitations. As the public health community increases its emphasis on holistic, prevention-oriented, and population-based approaches, the workforce will require commensurate training.

Preparing the public health workforce to offer healthy housing services
The majority of the nation's public health workers have not been trained to deal with the challenges they are facing in the 21st century (U.S. Department of Health and Human Services 1997, Gebbie 1999). Only 44 percent of the public health workforce has formal public health education (HRSA 1992) and only 22 percent of local public health department executives have graduate degrees in public health (Gerzoff 1997). Nearly52 percent of public health nurses, the largest professional discipline in public health, lack baccalaureate-nursing education (HRSA 1996). Only an estimated 23 percent of environmental health training needs are being addressed (Johnson et al. 1999). According to the IOM, improving the nation's health in the 21st century will require major overhauls in the funding, organization, and coordination of the government public health infrastructure to ensure that it has the technology, workforce, and other resources needed to promote and protect health (2003). An earlier IOM report points out that the demands on the public health workforce include expectations for competency in behavioral sciences, community mobilization, health communications, and policy development, which many are unprepared for either through educational preparation or work experience (1998).

Recent case studies of six urban health systems (Macro International Inc. 1999) revealed resource and capacity limitations affecting their ability to adopt new roles in the core public health competencies: assessment of information on the health of the community, comprehensive pubic health policy development, and assurance that public health services are provided to the community. In these case studies and in other research, a central barrier to adopting new public health roles and responsibilities are the limitations in the skills, knowledge, abilities, and attitudes of the public health workforce (Gebbie 1998). A recent report by the Council of State

Governments cites high vacancy rates, high turnover rates, the aging of the work force, and high retirement eligibility, particularly among environmental health and nursing professionals, as additional public health work force concerns (Council of State Governments, 2004). In response, the U.S. Department of Health and Human Services in its Healthy People 2010 – a compendium of the nation's health objectives - incorporated an entire section entitled "Public Health Infrastructure," with a goal to "ensure that the public health infrastructure at the federal, state, and local levels has the capacity to provide essential public health services." Efforts to build competency among public health workers in the discipline of healthy housing must take into account gaps in the current infrastructure and must be coordinated with the broader national movement to improve the competency of the public health workforce.

Methods

The development of the Healthy Homes Training Center and Network is unique because it involves cross-training of environmental, public health, and housing practitioners. Few models exist for such a multidisciplinary training. Developing instruction for a training or educational program can take many forms; there is no perfect model because each model has advantages and disadvantages (ASTD 1997). Any successful approach will use a systematic, objective, and organized approach and will be based on the following parameters:

- For whom the program is developed (target audience)
- What the individual will learn or do (competencies)
- How the subject content or skills are best learned (infrastructure --methods, activities, resources)
- Extent to which the learning has been achieved (evaluation)

In designing the Healthy Homes Training Center Curriculum, NCHH combined two training development approaches – the Instructional Systems Design (ISD) process and the competency approach (Competencies and Curriculum Workgroup 2002, Grafinger 1998).

Review of Existing Trainings

Before embarking on the curriculum development process, NCHH conducted a review of available healthy homes training programs. A structured survey was disseminated to public health and housing agencies with established training programs, identified though the U.S. Housing and Urban Development Healthy Homes Initiative, the CDC-funded Academic Centers for Public Health Preparedness, the Health Care Resource Services Administration-funded Public Health Training Centers, and selected health, housing, and community development organizations. The survey captured information on: course offerings, location, target audiences, training medium, the content of the training programs, suitability for modification or adaptation, methods for assessing comprehension of healthy homes concepts and practices, and capacity for distance learning. NCHH used the results to document the information and training needs of the target audiences, any barriers to participation in the training, and to inform the curriculum development process.

A wide variety of courses were identified, ranging from 30-48 hour university-based courses to short seminars for child-care providers and teachers. The subject matter was equally diverse, including three-day symposia for contractors, consultants, and industrial hygienists on assessment and control of molds, to three-hour courses for community health workers, public health nurses, and housing agency staff focused on asthma, injuries, lead poisoning, hazardous materials, and disaster preparedness. Other training activities included the American Lung Association (ALA) of Washington's Healthy House training for builders, renovators, and architects, which is seven weeks long and addresses dust and moisture issues, ventilation and filtration, and building materials and environmental health. ALA also sponsors the Master Home Environmentalist training a volunteer-driven program designed to help people learn more about health risks from pollutants in their home through home assessment. A training by the Asthma Regional Council of New England (ARC) provides housing practitioners with information about pests, toxics, moisture, ventilation, and other housing vectors associated with asthma and respiratory disease (ARC 2001). The Center for Environmental Research and Technology at the University of Tulsa developed a one-day course designed for home-based child care providers with funding from the U.S. Environmental Protection Agency, which enables child-care providers and owner occupants to assess their home environments for potential threats to

children's health. This basic training covers moisture control, integrated pest management, environmental tobacco smoke, carbon monoxide, chemical contaminants, and other child safety hazards (U.S. EPA 2000).

The review yielded important information related to the development of the training curriculum and training delivery methods. For example, there was no consensus set of healthy homes competencies upon which the performance objectives for the trainings were based. The majority of the training activities provided specific training on a particular category of healthy housing (e.g. mold or lead) or a broad -based approach focused on awareness of healthy homes topics. Only one training program (Health House) was linked to a certification system, and only a few of the training activities were offered multiple times or built upon a learning system that would promote continuous learning. Although the review did not examine the extent to which the trainings incorporated a formal evaluation, no published evaluations of the training activities were identified during a literature review of healthy housing related journal articles.

Needs Assessment

Both the competency to curriculum and ISD training development approaches require a front-end analysis/needs assessment to answer key questions about the target audiences, and to identify what individuals are expected to learn, the optimal delivery system for the training, and the potential constraints for carrying out a successful training initiative.

NCHH initiated the curriculum development process by establishing a work group of technical experts from the disciplines of public health, housing, building science, environmental health, and training and education. NCHH hosted a two-day needs assessment workshop on January 22-23, 2004 to obtain a consensus on the target audience for the training initiative, the technical competencies they would be taught, and the infrastructure needed to support the initiative. On the initial day of the workshop, participants were divided into three groups—target audience, technical competencies, and infrastructure. Due to time constraints, the project team decided to address separately a fourth topic–evaluation. On day two, participants were divided into three groups according to their areas of expertise (housing, health, environment). These groups were tasked with elaborating upon and validating the work of day one.

Target Audience

At the beginning of a training development process no question is more important than "who is your target audience"? The work group identified a list of more than a dozen audiences who would benefit from training in healthy homes (see Table 1). From this list, the work group selected four primary target audiences: environmental health practitioners (e.g. sanitarians, industrial hygienists), public health nurses (e.g. public health nurses, visiting nurses), housing/code inspectors, and community organizers.

The group then developed a "learner profile" for each audience. Learner profiles answer questions about the target audiences' prior education, relevant training and experience, personal and professional characteristics (e.g. learning styles, level of motivation, communications skills), and logistical information (e.g. are the members of the target audience situated in close proximity or are they widely dispersed?). The learner profiles influence the design and delivery of the training, including the

Table 1: List of Potential Audiences	
Apprentices/ trades people	Housing inspectors
Childcare workers	Law enforcement
Community-based nurses	Public health nurses
Community development corporations	Property managers & maintenance staff
Community organizers	Realtors/ insurance lenders
Community outreach workers	Retail housing groups
Contractors	Social Workers
Environment health practitioners	Unions (trade schools)
Fire departments	Utilities
	Weatherization Agencies

degree of customization that might be necessary, the degree to which audiences could/should be trained together, and the types of materials and delivery methods that the target audiences would find most accessible and acceptable. The learner profiles showed considerable variation among the target audiences in terms of their relevant experience and education levels as well as their communication skills and learning styles, suggesting that the training materials and delivery method must be designed to be flexible and should use a variety of teaching methods. A modular approach was recommended to ensure that information is at the appropriate level for students. Problem solving, case studies, and other types of interactive learning would make the course material interesting and relevant to students who may be learning the concepts for the first time.

A critical recommendation from the target audience analysis was that senior level managers in health and housing would also need to be aware of healthy homes principles to enable the training program to successfully engage the primary target audiences. The target audience group suggested a short primer course for this audience.

Competency Development

A second group was tasked with developing a core set of technical competencies for healthy homes professionals. Core competencies provide a framework, based on performance objectives, on which curriculum and training are developed, delivered, and against which performance can be measured. The development of technical competencies for healthy homes used the framework outlined in the Competency-to-Curriculum Tool Kit: Developing Curricula for Public Health Workers (Competencies and Curriculum Workgroup 2002). Competency statements describe the complex combinations of applied knowledge, skills, and behaviors that enable people to perform their work effectively and efficiently. Competency statements express a standard level of worker performance in a specific area and are meant to describe: 1) an acceptable level of performance, 2) the skill needed to perform the work, and 3) the actual conditions under which the work is executed. The group identified seven competency domains and specific sub-competencies under those domains (see Table 2).

The group agreed that trainees in different positions would have different competency requirements and thus organized the training audiences into three categories of positions as follows:
Front-Line Staff: Individuals who carry out the bulk of day-to-day tasks, including fieldwork.
Mid-level Supervisory Staff: Individuals with a specialized staff function but not necessarily hands-on fieldwork (may be responsible for coordination and/or oversight of pieces of projects or programs).
Decision-Makers/Management Staff: Individuals responsible for major programs, functions of an organization, and decision-making, including recommendations on policy issues.

The group then established three levels of competency for the trainees:

Aware: Basic level of mastery of the competency. Individuals may be able to identify the concept or skill but have limited ability to perform the skill.

Knowledgeable: Intermediate level of mastery of the competency. Individuals are able to apply and describe the skill.

Proficient: Advanced level of mastery of the competency. Individuals are able to synthesize, critique or teach the skill.

In general, the group agreed that front-line workers should demonstrate "proficiency" in the technical competencies, that mid-level supervisory staff should achieve a "knowledge" level, and decision-makers/management staff should achieve an "awareness" level of competency.

Table 2 –Healthy Homes Competencies

1. ASSESSMENT SKILLS
   - Initial assessment of the home environment using senses (especially smell and sight)
   - Environmental sampling and measurement in the home
   - Hazard recognition skills
   - Resident survey/environmental health history

2. ANALYTIC SKILLS
   - Baseline data collection/research on health and environmental factors
   - Evidence and performance-based outcomes
   - Program evaluation
   - Basic computer proficiency

3. BACKGROUND KNOWLEDGE
   - Basic environmental health
   - Basic public health
   - Basic building science
   - Specific environmental and safety hazards (interior house & exterior built environment)
   - Specific health effects for children, adults, elderly

4. HAZARD CONTROL MEASURES
   - Prevention: design, construction, planning, maintenance, renovation
   - Remediation or intervention
   - Intervention or actionable hazards
   - Emergency action items (i.e. carbon monoxide, etc.)

5. COMMUNICATION SKILLS/COMMUNITY DIMENSIONS
   - Active listening skills to actually "hear" the client
   - Cultural competency skills
   - Conflict resolution
   - Training to be a "change" agent
   - Training and intervention for residents, owners, community workers
   - Knowledge of other agencies roles and responsibilities for collaboration, referrals

6. ETHICAL, LEGAL, OTHER CONSIDERATIONS
   - Personal safety
   - Ethical and legal considerations Insurance and liability issues
   - Code and Regulatory issues

Infrastructure

A third group – the infrastructure group - was tasked with identifying the optimal teaching methods and delivery mechanisms for successful learning. The group identified opportunities for the widespread dissemination of the training, including potential partners who could deliver the training and incentives to motivate participation. The group discussed delivery options (e.g. didactic, web-based, etc.) and how political, budgetary and time constraints might impact any training activity. The infrastructure workgroup presented the following recommendations:

- Create policy change by convincing policy makers of the importance of healthy housing.
- Develop a good standardized training approach and materials that could be used nationally and recruit and train a cadre of trainers to offer the training.
- Partner with associations for specific interest and trade groups to set up a delivery network.
- Take advantage of existing training and accreditation systems.
- Anchor the training locally to ensure sustainability.
- Provide resources to trainees after the training.
- Develop training that has the flexibility to meet the needs of trainees.
- Be creative and practical in the design of the training.

Evaluating the Training

Evaluation is a critical component of any training initiative and should be built into critical points in the entire process.. Careful evaluation planning can reduce evaluation costs, and a focused evaluation may reduce training costs in the future by highlighting opportunities for improved efficiency. Key questions that should be answered at the outset of the development of any training initiative include: how should individual competencies be evaluated (after training)? How should training programs/curriculum be evaluated? How should effectiveness of the learning systems be evaluated? (CDC 1999)

Following the development of the training curriculum, NCHH piloted the two-day training course for a cross section of front-line practitioners including public health, housing, and environmental workers. The purpose of the pilot course was to elicit participant feedback on the

quality of the educational experience, the quality of instruction, the appropriateness of tools and curriculum, and the satisfaction with the entire exercise. A written evaluation tool was administered, which queried participants about each module of the training and the extent to which the module enabled them to achieve the stated learning objectives. A separate unstructured focus group with students and with faculty ascertained strengths and weaknesses of the training and yielded suggested changes for future course offerings.

Results

NCHH and its technical workgroup developed a multi-disciplinary proficiency level training for front-line practitioners. Continuing education units (CEUs) are offered to training participants through Johns Hopkins University. The pilot course revealed a number of major themes. Participants recognized that the course was geared toward creating system level change in the way that government agencies deliver services and that high level support from decision makers is necessary to enable practitioners to implement healthy housing practices.

Trainees underscored the importance of ensuring that the information is practical and that it reflects the diversity of settings within which they practice (e.g. rural settings and inner city). Participants recommended expanding the "background knowledge" module to ensure that participants were starting with a good foundation in the principles of the housing, health, and environmental disciplines.

The participants also commented on the format of the training, recommending that the course be extended to three days, but for shorter periods each day. Participants also suggested increasing the interactivity of the course and incorporating a field component. One of the most important recommendations was the need for ongoing implementation support and technical assistance. Some participants expressed concerns that although they had learned a significant amount about healthy homes concepts, they lacked the confidence to implement the practices and were uncertain where to go for technical assistance or funding for the activities. Likewise, trainees suggested evaluating how successfully the information is integrated into local policy and practice.

Discussion

The developmental workgroup was professionally and geographically diverse, and enabled the creation of a training program built upon existing expertise, and that is multi-disciplinary and relevant across the country. It also created a sense of ownership among professionals from different disciplines, which is critical to success and sustainability of the training initiative. The resulting curriculum provided a good basic framework for the skills needed to create healthier housing. It allows for flexibility and customization and is centered on the development and promotion of practical skills since members of the target audience were involved in the development process.

However, the multi-disciplinary and collaborative process includes some challenges. A collaborative process by definition requires a greater time investment than if a small group of like-minded professionals were tasked with putting together the curriculum. Creating a common vocabulary and avoiding jargon are critical first steps toward ameliorating the group process. Work group members set aside categorical perspectives in favor of a systems approach to healthy housing, a challenging proposition for individuals who have spent decades in careers built around a categorical public health and housing systems.

Another challenge was to design a curriculum that was appropriate for individuals with varying professional and educational backgrounds. For example, a housing inspector has experience identifying unsafe building conditions and can make recommendations regarding how to remedy such problems, while a public health nurse is able to recommend an approach to managing a specific disease when a patient presents with a certain set of symptoms. At the most basic level, solving this challenge was critical to ensuring that participants found the training relevant and that it built on their existing skills. Equally important, however, was reaching agreement on what individuals would be prepared to do after the training to ensure that they would not be put at legal/ethical risk if their activities extended beyond the scope of their current job responsibilities. Ultimately, the training curriculum does not train one professional to do another's job, it creates a core set of technical competencies, which individuals from a variety of professions can master to enhance their skill sets thereby improving the quality of services they deliver to their clients. By training housing, health, and environmental professionals together, the training is intended to

enhance each professional's understanding of the other disciplines and optimally promote collaboration, referrals, and integration of services.

In 2005, the Healthy Homes Training Center course will be offered twice nationally and twice by each of the four regional network partners. Future plans include developing a web-based clearinghouse to provide online access to healthy housing training materials, guidance documents, and research; developing a proficiency level training course for contractors and builders drawing upon available materials and based on the competency–based training development approach; developing an awareness course for decision makers/management staff in health and housing departments; and exploring the feasibility of delivering the training through web-based formats.

Conclusions

Reducing the amount of substandard housing and creating healthier neighborhoods is a task that requires public health and housing officials to find 'a meeting place' for their shared interests – together they offer a powerful voice and the capacity to create large-scale system level change in the way we develop, deliver, and value housing in America.

The trend toward a more holistic approach to disease prevention and to housing quality requires a dramatic restructuring in the framework for delivering health and housing services. A long-term goal of the healthy housing field is to redefine the service delivery system, and some jurisdictions are moving in this direction. For example, in Alameda County, California, public health and housing are housed in one agency. In Marion County, Indiana, code inspection and the childhood lead poisoning prevention are co-located. These models are intended to promote a more seamless delivery of holistic services. Although co-location can improve synergies and efficiencies, organizational structure alone is unlikely to result in large-scale change. Furthermore, such a change in all fifty states is likely to be an evolutionary process and would need to be accompanied by more flexible funding streams and political or legislative support. Cross-training the relevant workforces so that they are prepared and confident in their abilities to deliver holistic services will help motivate that shift and also ensure successful implementation. Accordingly, an achievable near-term goal is to create a workforce of progressive public health

and housing professionals who embrace this new approach and who will serve as leaders in defining and implementing healthy housing practices.

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