

# The Healthy Homes Initiative:

## A Preliminary Plan

(Summary)

U.S. Department of Housing and Urban Development

Office of Lead Hazard Control



APRIL 1999

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## I. Introduction

The Department of Housing and Urban Development (HUD) is submitting this Preliminary Plan for the Healthy Homes Initiative (HHI) in response to the directive of the Committee on Appropriations of the U.S. House of Representatives. Public Law 105-276 (the Departments of Veterans Affairs and Housing and Urban Development, and Independent Agencies Appropriations Act of 1999) provides \$10 million for the Initiative to "develop and implement a program of research and demonstration projects that would address multiple housing-related problems affecting the health of children" of which at least \$4 million is to "be devoted to preventive measures to correct moisture and mold problems in inner-city housing occupied by families with infants in communities where toxic mold exposure has been linked to acute pulmonary hemorrhage and infant death."

The Committee asked HUD to submit a plan that "inventories the problems to be addressed, describes their intersections, identifies key technical questions, and provides a spending plan allocating funds among technical and policy studies, pilot projects, and emergency remediation." The Department is to perform research on moisture and mold prevention through proper ventilation and other means, and to develop and disseminate model standards appropriate to residential housing.

The Initiative is designed to build upon the Department's existing activities related to housing-related health and safety issues, including lead hazard control, building structural safety, electrical safety, fire protection, etc., to address multiple childhood diseases and injuries related to housing in a more coordinated fashion. In language accompanying the Appropriations Act, Congress agreed that "...the Healthy Homes approach appears superior to addressing problems one by one..." The Department will update the Plan as it gains further knowledge of the connection between housing deficiencies and health hazards and experience on the most effective means of implementing the Initiative.

## II. Spending Plan for FY 1999 and FY 2000

### A. Spending Plan for FY 1999

The following summarizes the allocation of funding for FY 1999:

\$4.0 million	Funding to solve mold and moisture problems in inner-city housing by demonstrating the effectiveness of remediation methods that have been developed in the research setting, but not yet implemented in large numbers of urban houses (to be awarded competitively through a Notice of Funds Availability (NOFA))
\$4.0 million	Funding to demonstrate and evaluate housing repairs that simultaneously prevent asthma, lead poisoning, pulmonary hemorrhage, injuries and other health and safety threats to children in several hundred homes in several cities (NOFA & Interagency Agreements)
\$500,000	Funding to build upon the Healthy Homes advertising campaign initiated last year by leveraging other private-sector resources from the other partners in the campaign, such as the Mortgage Bankers Association, American Academy of Pediatrics, hardware store and other retail outlets and others, to deliver key children's health and safety messages (Competitive Contract)
\$500,000	Funding to develop a housing-based surveillance system that can be linked to a variety of adverse health and safety outcomes through an interagency agreement with the Centers for Disease Control and Prevention (CDC), which will combine housing data systems established at HUD (e.g., the American Housing Survey) with disease tracking systems in place at CDC
\$1.0 million	Funding interagency agreements to establish epidemiological baseline data, develop the capacity of code enforcement agencies to take on certain health and safety housing issues, research methods of measuring mold and allergens in the housing environment, update the <u>Basic Home Inspection Manual</u> , last issued by CDC and the American Public Health Association in the 1970s, examine home energy design methodologies, and other projects.
<b>Total = \$10 million</b>	

### B. Funding Initiative Descriptions For FY 1999

#### 1. Toxic-Mold-Related Disease Projects (\$4 million)

The appropriation for FY 1999 directed HUD to initiate preventive action projects on mold and moisture in inner-city housing related to the bleeding lung disease in infants, which is often fatal. These projects are to be funded at a minimum of \$4 million.

In response to this Congressional directive, HUD issued a Notice of Funds Availability published in the *Federal Register* on February 26, 1999 as part of the Department's SuperNOFA. The purpose of this initiative is to assist States and local governments in demonstrating preventive measures to correct moisture and mold problems in inner city housing occupied by families with young children in communities where exposure to toxigenic molds has been linked to cases of acute pulmonary hemorrhage and death in infants. These awards will include an evaluation to assess whether and how the preventive measures tested can be applied to other types of housing, environmental conditions, and geographic settings and will use multi-factorial randomized trials to the extent possible. Eligible applicants will include units of State and local government (such as health or housing departments), Aerialities and other research organizations,

non-profit organizations, for-profit contractors with research capabilities, and combinations of these. Awards are expected to be made by September 1999. In addition, HUD may undertake activities in this category through agreements with other Federal agencies.

## 2. Demonstration Projects (\$4 million)

Competitive funding to demonstrate and evaluate housing repairs that simultaneously prevent asthma, lead poisoning, pulmonary hemorrhage, injuries and other childhood health and safety hazards. Funds will be used for demonstration projects that combat multiple childhood diseases and injuries. We expect to issue a NOFA in the summer of 1999, with awards to be issued in the fall of 1999. The projects will involve hundreds of units in several cities and will be a combination of interventions with a strong evaluation component.

## 3. Education Projects (\$500,000)

Competitive funding awarded through a NOFA for public education projects that build on the on-going Healthy Homes advertising campaign. The NOFA is expected to be issued in the summer of 1999, with awards issued in the fall of 1999. These awards will include a requirement for leveraging private-sector resources and outreach to specific at-risk populations throughout the nation. These projects may be combined with the Demonstration projects described above, which will also include public education components.

## 4. Housing-Based Disease and Injury Surveillance Database Development (\$500,000)

Development of an Interagency Agreement with the Centers for Disease Control and Prevention (CDC), for a housing-based surveillance system that can be linked to a variety of adverse health and safety outcomes. This project will link housing data systems established at HUD with disease tracking systems in place at CDC.

## 5. Interagency Agreements and Task Force Support (\$1 million)

Interagency agreements will be used to fund efforts to establish epidemiological baseline data, research methods of measuring mold, allergen loadings, and moisture in the housing environment, update the "Basic Housing Inspection Manual," originally issued by CDC and the American Public Health Association in the 1970's, and examine new, healthy home energy design methodologies.

Through the National Institute of Building Sciences, an institutional foundation will be formed to enable the national code inspection community to evaluate the possibilities for implementing code changes based on children's health. Currently, no such organizational entity exists. The foundation will develop a report on how code changes in the past have benefited children's safety and health with recommendations for future code changes.

HUD will begin developing model residential housing standards appropriate to Healthy Homes. This includes a review of existing housing-related codes (e.g., housing, property maintenance, building, fire, electrical, plumbing, and mechanical codes) issued by the major private-sector model code organizations, and adopted by most State and local governments. HUD's review will also cover "International" model codes now under development. Code provisions will be revised or replaced with provisions that better address the housing-related health issues covered by the Initiative. Review reports will be disseminated, and draft revised model code provisions developed. Participation by State and local housing code officials, technical experts and model code organizations will be sought during this process.

## C. Spending Plan for FY 2000

Future funding of the Healthy Homes Initiative will be needed to continue the beginning activities described here. The request for the Healthy Homes Initiative in the President's FY 1999 budget was \$25 million; \$10 million was actually appropriated. The Administration's request for FY 2000 is level at \$10 million, which, among other things, will continue the surveillance project initiated with CDC, continue support for the code enforcement network, and support additional demonstration projects in other cities. With a combined \$20 million spread over two fiscal years, most of the originally-conceived Healthy Homes projects can be implemented and evaluated.

If Congress appropriates the Administration's request of \$10 million for FY 2000, HUD will complete the baseline assessment of available techniques and research on high priority issues, and initiate projects to promote implementation of techniques demonstrated to be successful. The funding will shift from that in FY 1999 to increase the portion for demonstration and outreach projects. The major elements of the FY 2000 spending plan will extend activities initiated in FY 1999, so the detailed justifications are not repeated here. These elements include:

1. Pilot-testing (through competitive awards) housing assessment, maintenance, renovation and construction techniques to identify and correct housing-related illness and injury risk factors.
2. Implementing a public education campaign (through competitive awards) to prevent both emerging and well-recognized housing-related diseases and injuries, and promote the use of identified solutions.
3. Conducting research (through competitive awards and interagency agreements) that evaluate the effectiveness of housing interventions and public education campaigns, and provide the knowledge base for recommending future use of the most cost-effective strategies.
4. Participating in housing and building code council activities to develop means of incorporating healthy-homes-appropriate code provisions into the model codes, and evaluating and promoting use of these provisions in State and local codes.
5. Continuing to co-chair, with CDC, the Interagency Task Force on Healthy Homes to exchange information and ideas; and implement an Internet-accessible database on the Initiative's projects.

### III. Outside Expert Advice in Development of the Preliminary Plan

In developing this Plan, the Committee advised HUD to seek expert advice. HUD held a meeting on December 8 and 9, 1998 with experts from a broad range of professions, Federal, State and local government agencies, and national and local practitioners in the private sector. This meeting, plus supplemental materials the experts provided, identified subjects and approaches on which general professional consensus exists.

Participants were asked whether there are sufficient data to develop cost-effective programs to demonstrate and promote housing interventions addressing multiple health, safety and environmental effects. They were also asked to identify the most appropriate single-focus interventions.

HUD prepared a discussion paper for the meeting titled, "HUD's Healthy Homes Initiative: Scientific, Implementation and Programmatic Issues - Background for Peer Review Meeting." The premise of the paper is incorporated in this summary report. The proceedings of the meeting are summarized by the National Institute of Building Sciences in the full report, which is available from the Office of Lead Hazard Control.

### IV. Problems to be Addressed and Key Technical Questions

#### A. Inventory of Healthy Homes Issues

The experts assembled by HUD identified a fairly large number of hazards, diseases and safety issues that could potentially be addressed under the Healthy Homes Initiative, as follows:

- Lead
- Asthma/allergens
- Mold
- Insect pests
- Rodents
- Pesticides
- Other toxic chemicals
- Environmental tobacco smoke

- Combustion byproducts
- Radon
- Asbestos
- Take-home hazards (from work)
- Unintentional injuries (including fires)
- Uncontrolled moisture
- Inadequate ventilation
- Soil gases (other than radon)
- Hazardous building materials
- Drinking water contamination
- Sewage backup
- Swimming pools
- Noise and Vibration
- Crowding
- Firearms
- Faulty Construction
- Pets
- Appliances (ozone generators, humidifiers, unvented clothes dryers)
- Food handling sanitation

## B. Intersections of Housing & Health

While each of these problems is important in its own right, attempting to address each one individually through the prism of Healthy Homes would be unworkable. Rather than attempt to determine which specific issues should be included in a Healthy Homes agenda, experts felt it more productive to examine common housing deficiencies that cause adverse health and safety effects in children; correction of those deficiencies would yield the greatest results. For example, dealing with uncontrolled moisture would alleviate conditions associated with lead paint hazards (reduced paint deterioration), allergens (particularly dust mites), asthma, mold, structural safety, and others. Several communities are implementing programs capable of tackling more than one housing-related disease issue at a time, including Cleveland's Lead+Asthma program, New York State's Healthy Communities Program, Alameda County and others.

Table 1 illustrates the intersections between housing condition and disease and injury in children. It is likely that other relationships will be recognized in the course of program implementation.

[TABLE 1 \(follow this link to view Table 1\)](#)

Table 1 Health Hazards Explained

This section briefly describes the kinds of housing-associated childhood health and injury hazards being considered by HUD. Additional hazards may be added to this list.

Lead: Exposure to lead, especially from deteriorating lead-based paint, remains one of the most important and best-studied of the household environmental hazards to children. Although blood lead levels have fallen nationally, a large reservoir of lead remains in housing. The most recent national survey, conducted from 1991-94, showed that nearly one million U.S. preschoolers still have elevated blood lead levels. Overall, the prevalence rate among all children under six years of age is 4.4%. Among low-income children living in older housing where lead-based paint is most prevalent, the rate climbs to 16%; and for African-American children living in such housing, it reaches 21%. HUD estimates that 64 million dwellings have some lead-based paint, and that 20 million have lead-based paint hazards. Of those, about 3.6 million have young children and of those, about 500,000 units have inadequate cash flow to respond to lead-based paint hazards.

Well-defined protocols exist to assess the risk of lead exposure in housing. Data exists on the effectiveness and costs of various measures to reduce exposure to lead in the residential environment and have been detailed in an earlier Report to Congress. Costs can range anywhere from \$500 to \$15,000 per unit. Corrective measures include paint stabilization, enclosure and removal of certain building components coated with lead paint, and cleanup and "clearance testing", which ensures the unit is safe for young children.

Allergens and asthma: Experts estimate that 14 million Americans have asthma, with an associated annual cost of \$6.2 billion. For sensitized children, exposure to antigens from dust mites, certain pets, and cockroaches has been associated with more severe asthma. Some evidence also indicates that exposure to antigens early in life may predispose or hasten the onset of allergies and asthma. Dozens of studies show a dose-response relationship between exposure and prevalence of asthma and allergies.

Cockroach allergens appear to be excessive in 30-50% of inner-city housing and affect 5-15% of the population. Asthma is now recognized as the leading cause of school and work absence, emergency room visits and hospitalization. Techniques exist for measuring antigen levels in household dust, but standardized protocols, action thresholds, and the infrastructure to support widespread testing and remediation are not yet available for key antigens. Interventions known to have beneficial effects include installation of impervious mattress and pillow covers, which can reduce allergens by 90%. Cleaning carpets with tannic acid solution has also been demonstrated to greatly reduce dust mites.

Asthma prevention program costs have been estimated at about \$500 per unit, which includes about \$150 for educational interventions. There is also anecdotal evidence suggesting that homes with lead-based paint hazards may also be more likely to pose asthma-related hazards.

Mold: Animal models demonstrate that exposure to satratoxins produced by *stachybotrys* fungi have the potential to produce inflammation and injury in gastrointestinal and pulmonary tissues. An investigation of a cluster of pulmonary hemosiderosis (PH) cases in infants showed PH was associated with a history of recent water damage to homes and with levels of *Stachybotrys atra* (SA) in air and in cultured surface samples. Associations between exposure to SA and "sick building" symptoms in adults have also been observed. Other related toxigenic fungi have been found in association with SA-associated illness and could play a role. For sensitive individuals, exposure to a wide variety of common molds may also aggravate asthma.

In Cleveland, where lead, asthma and mold intervention programs are being combined, the cost of mold-related work (when added to lead hazard control work) is as follows:

Intervention Program	Cost
Integrated pest management of cockroaches	\$150
Check, clean & tune furnace	\$ 60
Address basement cold air return system	\$360
Remove cellulose debris from basement	\$10
Vent clothes dryer	\$40
Cover dirt floor with impermeable vapor barrier	\$85
Install furnace filter + labor	\$20

Insect pests: The observed association between exposure to cockroach antigen and asthma severity has already been noted. In addition, cockroaches may act as vehicles to contaminate environmental surfaces with certain pathogenic organisms. Treatment of insect infestations often includes the use of toxic pesticides.

Rodent pests: Rodents can transmit a number of communicable diseases to humans, either through bites, arthropod vectors, or exposure to aerosolized excreta. In addition, humans can become sensitized to proteins in rodent urine, dander, and saliva. Such sensitization may contribute to asthma severity among children.

Pesticide residues: Animal models have demonstrated that exposure to chlorpyrifos (CP), a commonly used organophosphate insecticide, in the prenatal and early postnatal period may impair neurodevelopment. While CP is a biodegradable pesticide, substantial persistence of CP in house dust has been demonstrated. There are available data on hazard evaluation methods and remediation effectiveness regarding pesticide residues in the home environment.

Unintentional injuries/ fire: Unintentional injury is now the leading cause of death and disability among

children younger than 15 years of age. In 1997, nearly 7 million persons in the United States were disabled for at least 1 full day by unintentional injuries received at home. During the same year, 28,400 deaths were attributable to unintentional home injuries, of which 1800 occurred among children 0-4 years of age. Among young children, three types of events accounted for more than 3/4 of deaths: fires/ burns, drownings, and mechanical suffocation. Falls and poisoning are the next most common.

Home visitation protocols have been shown to be effective in reducing exposure to such hazards. The "add-on" cost of injury prevention measures, when combined with other housing interventions are estimated at about \$100 per unit. This includes the cost of some injury prevention devices, such as smoke alarms, electrical socket covers, etc.

Combustion products of heating and cooking appliances: Burning of oil, natural gas, kerosene, and wood for heating or cooking purposes can release a variety of combustion products of health concern. Depending upon the fuel, these may include carbon monoxide (a chemical asphyxiant), oxides of nitrogen (respiratory irritants), polycyclic aromatic hydrocarbons (e.g., the carcinogen benzo[a]pyrene), and airborne particulate matter (respiratory irritants). Improper venting and poor maintenance of heating systems and cooking appliances can dramatically increase exposure to combustion products.

Radon progeny: Epidemiologic studies of miners exposed to high levels of radon in inhaled air have defined the dose response relation for radon-induced lung cancer at high exposure levels. Extrapolation of these data has been used to estimate the excess risk of lung cancer attributable to exposure to radon gas at the lower levels found in homes. These estimates indicate that radon gas is an important cause of lung cancer deaths in the U.S. The National Academy of Sciences estimates that approximately 14,000 cases of lung cancer per year are related to radon exposure. Excessive exposures are typically related to home ventilation, structural integrity and location. Measurement and remediation methods are well-developed.

Asbestos: Asbestos was also shown to be a human carcinogen in studies of heavily exposed workers. As with radon, dose-response extrapolations suggest that lower level exposures, as may occur when asbestos-containing building materials deteriorate or are disturbed, may also cause cancer.

Take home hazards from work/ hobbies and work at home: When the clothing, hair, skin, or shoes of workers become contaminated with hazardous materials in the workplace, such contaminants may inadvertently be carried to the home environment and/or an automobile. Such "take-home" exposures have been demonstrated, for example, in homes of lead-exposed workers. In addition, certain hobbies or workplaces located in the home may provide an especially great risk of household contamination.

## V. Conclusions of the Experts for Structuring Healthy Homes Issues

HUD, in consultation with the experts, concluded the many Healthy Homes activities could be grouped into one or more of the categories shown below, which are reflected in the FY 1999 Spending Plan.

- Excess moisture reduction
- Dust control
- Improving air quality (e.g. combustion sources)
- Education
- E. Key Scientific and Implementation Questions The Experts Addressed

The following provides an explanation of the category and what is included. HUD does not expect all hazard control methods will be employed in each house or each demonstration project.

### A. Excess moisture reduction

Moisture problems are evident in many homes, more so in older urban areas and communities with humid climates. While high moisture levels alone are not sufficient to necessarily result in health hazards, it is a common precursor. Moisture problems can lead to paint deterioration (lead poisoning), mold formation (pulmonary hemosiderosis), higher concentrations of dust mites, cockroach infestation, asthma and allergen sensitization, and structural hazards associated with rot and rust (injuries). In a 1995 study, Cleveland's experience shows that toxic molds were identified in 65% of homes within the target areas, compared to a national prevalence rate of 3%. The disease resulting from such exposures have a 30%

mortality rate. Nationally, then, the mold-related diseases appear to have a fairly low prevalence, but, for those children who contract these diseases, a very high mortality rate. In addition, the presence of moisture problems is a risk factor for respiratory illnesses and symptoms, especially in children.

Moisture problems require a variety of interventions to correct, ranging from simple patching to correction of basic drainage. In Cleveland, mold interventions, including repairs to ventilation systems and basement flooring, in the most heavily-contaminated homes range from \$500 - \$5,000, with some costs also being dedicated to lead hazard control simultaneously through its lead+asthma program.

Structural problems can allow moisture intrusion, as well as create safety and fire hazards and provide access for rodent and insect pests. Structural defects can result from improper construction, poor maintenance, or natural hazards. Holes in floors, open cracks or holes in walls, and broken plaster or peeling paint are present in more than one million, four million and three million homes, respectively.

Addressing mold problems in housing requires coordination among the medical, public health, microbiological, housing, and building science communities.

### B. Dust Control

Dust sources, sinks and traps can serve as a vehicle for a variety of hazardous agents, such as lead, allergens, and pesticide residues. Settled and airborne dust can become problems where surface conditions hinder cleaning, such as rough or porous surfaces. Dust is the principal pathway through which children are exposed to lead-based paint and mold and is also an exposure route for allergens, dust mites, asthma, and some pesticides. In young children, transmission occurs principally through normal hand-to-mouth contact. Some dust traps are relatively easily addressed, for example, the removal of carpets and sealing of floor surfaces. Dust remediation often consists of removal by using special vacuum systems, and the creation of smooth and cleanable surfaces, as well as controlling dust sources, such as sinks (e.g., carpets), sources (paint, exterior bare soil), and unsafe work practices (uncontrolled renovation). New household vacuums with dust sensors are now available on the retail market and require study. Another key research need involves the sink and filtering action of carpets. Low-cost dust control methods are available and cost as little as \$250 per unit.

### C. Improving Air Quality

Ventilation can be either a problem or an intervention. Proper ventilation supplies adequate oxygen and removes carbon dioxide and other pollutants, such as allergens. Virtually no home ventilation system actively supplies clean fresh air; instead, infiltration through building "leakage" is the norm, although tighter building envelopes and better insulation typically reduce fresh air incursion. In some climates, increasing ventilation can result in increased moisture problems. Poorly-designed systems, such as the forced-air systems in Cleveland (which use basement air as supply air) can contribute to dispersal of mold, soil gases and other contaminants. Carbon monoxide exposures can occur through combustion spillage caused by airflow reversal in chimneys or use of unvented heaters or appliances. Carbon monoxide alarms and airflow analysis that could detect dangerous air movements are rare in U.S. housing. Improperly-maintained or vented heating and cooking appliances may introduce hazardous gases and particulate matter into the living environment and are also related to fire hazards. Building materials, cleaning products, and appliances can emit gases with irritant, allergic, or other toxic properties. Ozone generators, for example, are known to increase indoor ozone with no positive impact on air quality.

### D. Education

Education is an important part of most of the interventions that will be implemented. Occupant behavior can be modified using well-understood prompting tools that can be especially effective in preventing injuries at low cost (\$100-\$200 per unit), based on experience in Wisconsin. For example, provision of a hot water thermometer (as a "prompting device") is known to result in dramatic reductions in scald injuries, because hot water heater temperatures are lowered and residents know to keep them lowered.

The Healthy Homes Initiative will also deliver important educational messages to the public at large, not just individual occupants whose homes are treated for hazards. These messages will use community-based delivery systems where they exist, and help to create them where they do not.

## E. Key Scientific and Implementation Questions The Experts Addressed

Technical and implementation questions presented to the panel of experts convened by HUD are described below.

### 1. Scientific issues

- a) What is the causal relation of the housing hazard to health?
- b) What is the estimated prevalence of the hazard and burden of associated illness or injury?
- c) Are practical, valid, and reliable methods and protocols for assessing the hazard available?
- d) Is there scientific evidence to support practical, safe interventions that reduce or eliminate the hazard?
- e) Which of the hazards are high priority public health problems?
- f) For which hazards can action be taken without use of specialized personnel, elaborate testing, or laboratory analysis?
- g) Which corrective measures may introduce new hazards into the home environment or work at odds with interventions intended to control other hazards?

### 2. Implementation issues

- a. How should Healthy Homes activities address community-level hazards in relation to individual-home hazards?
- b. What is the best design for demonstration/evaluation projects to test implementation models, and what are key elements to include in such demonstration projects?
- c. How can evaluation and assessment of housing-related health and safety problems be accomplished most efficiently?
- d. How can basic research on the specific causes and pathways of housing-related illnesses and injuries and building conditions be combined with demonstration projects?
- e. What are the best evaluation markers of Healthy Homes activities?
  - Rates of illness, injury, or other biological markers?
  - Economic data (e.g., healthcare costs, housing value, energy consumption)?
  - Knowledge/behavior of stakeholders (e.g., occupants, landlords, property professionals, public health professionals)?
  - Changes in environmental or housing conditions (vs. the actual conditions themselves)?
- f. How should target groups (e.g., populations, housing, communities) be selected?
- g. What lessons have been learned from the experience with asbestos, radon, lead-based paint and code enforcement in housing?

### 3. Conclusion of the Experts: Main Problems to be Addressed

The focus of these projects should include the following:

- a. Identification of homes where intervention would be appropriate.
- b. Development of appropriately-scaled and efficient intervention strategies.
- c. Selection of efficient strategies for evaluating intervention effectiveness.

d. Development of local capacity to operate sustainable programs to prevent and control toxic mold hazards in low and very-low income residences.

e. Determination of biomarkers as to how much exposure to mold is dangerous.

#### 4. Key Technical Questions

The technical questions to be addressed as part of these projects include the following:

a. Can a cost-effective survey protocol be developed for identifying homes for moisture control interventions, and for screening out homes where structural or other conditions make interventions infeasible or impractical?

b. Can a flexible set of intervention strategies be developed that take into account the range of conditions likely to be encountered in older inner-city housing while maximizing the number of housing units that receive an intervention?

c. Can an efficient strategy be developed for evaluating the effectiveness of interventions in preventing moisture intrusion and controlling mold growth?

d. Can a local program be built which will continue beyond the HUD funding period?

e. What is the best way to foster cooperation among all levels of government, the private sector, and community-based organizations to identify and control moisture problems and associated mold hazards in inner city housing?

f. How can mold- and lead-safe work practices be integrated into housing maintenance, repair, and improvements?

## Acknowledgments

The Department of Housing and Urban Development is grateful for the assistance of the many experts who provided their time and insightful advice in the development of this plan. In particular, the contribution of Dr. Tom Matte' of the Centers for Disease Control and Prevention has been especially noteworthy and is another example of the long-standing fruitful collaboration between HUD and CDC. HUD's new Community Builders, who were represented at the deliberations leading to this document by John P. Winter, can also be expected to play a key coordinating role at the local level where Healthy Homes programs are funded.

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The Department's thinking about Healthy Homes has been greatly advanced by the insights and assistance of a broad range of experts and practitioners in a variety of fields and disciplines, including housing, building science, medicine, epidemiology, toxicology, environmental science, asthma, lead poisoning prevention, pulmonary medicine, and many others. HUD is extremely gratified by the active participation, technical input, and enthusiasm of these outside experts. Their willingness to juggle calendars to attend the 2-day meeting on December 8 and 9, 1998 is one measure of their interest in the promise of the Healthy Homes Initiative. Many of these participants invested substantial time and effort in

providing materials before and after the meeting and commenting on the discussion report. The Department intends to call on these experts either individually or in small or large groups to provide valuable feedback and counsel from time to time to help ensure that the Healthy Homes Initiative is designed for maximum effectiveness.

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