



**U.S. Department of Housing and Urban Development**

Lead Hazard Control and Healthy Homes

Lead and Healthy Homes Technical Studies (LHHTS) Grant Program Pre- and Full Application

FR-6600-N-15

07/18/2022

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**Program Office:**

Lead Hazard Control and Healthy Homes

**Funding Opportunity Title:**

Lead and Healthy Homes Technical Studies (LHHTS) Grant Program Pre- and Full Application

**Funding Opportunity Number:**

FR-6600-N-15

**Assistance Listing Number:**

14.906,14.902

**Due Date for Applications:**

07/18/2022

**Summary**

The U.S. Department of Housing and Urban Development (HUD) Strategic Plan sets the direction and focus of our programs and staff to create strong, sustainable, inclusive communities and quality, affordable homes for all.

**HUD's Strategic Goals**

HUD's FY 2022-2026 Strategic Plan lays out this administration's strategy for ensuring everyone has an affordable, healthy place to live. Over the course of the next four years HUD will pursue two overarching priorities focused on increasing equity and improving customer experience across all HUD programs. Five strategic goals undergird the Plan as follows:

- Strategic Goal 1: Support Underserved Communities
- Strategic Goal 2: Ensure Access to and Increase the Production of Affordable Housing
- Strategic Goal 3: Promote Homeownership
- Strategic Goal 4: Advance Sustainable Communities
- Strategic Goal 5: Strengthen HUD's Internal Capacity

The five goals of the FY 2022-2026 Strategic Plan present the core vision of what we hope to accomplish, the strategies to accomplish those objectives, and the indicators of success.

**Overview**

The U.S. Department of Housing and Urban Development (HUD) issues this Notice of Funding Opportunity (NOFO) to invite applications from eligible applicants for the program and purpose described within this NOFO. Prospective applicants should carefully read all instructions in all sections to avoid sending an incomplete or ineligible application. HUD funding is highly competitive. Failure to respond accurately to any submission requirement could result in an incomplete or noncompetitive proposal.

During the selection process HUD is prohibited from disclosing 1) information regarding any applicant's relative standing, 2) the amount of assistance requested by an applicant, and 3) any information contained in the application. Prior to the application deadline, HUD may not disclose the identity of any applicant or the number of applicants that have applied for assistance.

For Further Information Regarding this NOFO: Please direct questions regarding the specific

requirements of this NOFO to the office contact identified in Section VII.

**Paperwork Reduction Act Statement.** The information collection requirements in this notice have been approved by OMB under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501-3520). In accordance with the Paperwork Reduction Act, HUD may not conduct or sponsor, and a person is not required to respond to a collection of information unless the collection displays a valid OMB control number. Each NOFO will identify its applicable OMB control number unless its collection of information is excluded from these requirements under [5 CFR part 1320](#).

**OMB Approval Number(s):**  
2539-0015

## **I. FUNDING OPPORTUNITY DESCRIPTION.**

### **A. Program Description.**

- **Purpose**

Through this NOFO, HUD is funding studies to improve HUD's and the public's knowledge of housing-related health and safety hazards and to improve or develop new hazard assessment and control methods, with a focus on lead and other key residential health and safety hazards. HUD is especially interested in applications that will advance our knowledge on priority healthy homes issues by addressing important gaps in the science related to the accurate and efficient identification of hazards and the implementation of cost-effective hazard mitigation. This includes studies using implementation sciences in identifying specific conditions under which residential environmental hazard interventions, that have been shown to be effective in specific housing types and residential settings, can be assessed in other contexts. Key hazards are discussed in Appendix A, Key Residential Health and Safety Hazards, of this NOFO. A list of references that serves as the basis for the information provided in this NOFO is provided as Appendix B, Relevant Publications, Guidelines and Other Resources. Priority research topics of particular interest to HUD are identified in section III.F.1.

Both the Lead and Healthy Homes Technical Studies (LHHTS) Programs are important for the achievement of research goals identified in HUD's *Healthy Homes Strategic Plan* (available at: [https://www.hud.gov/sites/documents/DOC\\_13701.PDF](https://www.hud.gov/sites/documents/DOC_13701.PDF)), the federal healthy homes strategic plan, *Advancing Healthy Housing : A Strategy for Action* (available at: [https://www.hud.gov/program\\_offices/healthy\\_homes/advhh](https://www.hud.gov/program_offices/healthy_homes/advhh) ), and the *Federal Action Plan to Reduce Childhood Lead Exposures and Associated Health Impacts* ([https://www.hud.gov/sites/dfiles/HH/documents/fedactionplan\\_lead\\_final.pdf](https://www.hud.gov/sites/dfiles/HH/documents/fedactionplan_lead_final.pdf)).

#### **a. General Goals**

##### **(1). Lead Technical Studies (LTS)**

The overall goal of the LTS grant program is to gain knowledge to improve the efficacy and cost-effectiveness of methods for evaluation and control of residential lead-based paint hazards. Through this Program, HUD is working to fulfill the requirements of sections 1051 and 1052 of the Residential Lead-Based Paint Hazard Reduction Act of 1992 (Title X) (42 U.S.C. §§ 4854 and 4854a) which directs HUD to conduct research on topics which include the development of improved methods for evaluating and reducing lead-based paint hazards in housing, among others. Brief descriptions of active and previously funded LTS projects can be found on HUD's website at [https://www.hud.gov/program\\_offices/healthy\\_homes](https://www.hud.gov/program_offices/healthy_homes). Where appropriate, you are encouraged to build your proposed study upon HUD-sponsored work that has been previously

completed, in addition to other relevant research (i.e., reported in the published literature). The results of the applicable aspects of LTS will be used in part to update *HUD's Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* (Guidelines) and other HUD policy guidance. For supporting references, including where to find the Guidelines, see Appendix B.

## **(2). Healthy Homes Technical Studies (HHTS)**

The overall goal of the HHTS Program is to advance the recognition and control of priority residential health and safety hazards and more closely examine the link between housing and health. The overall objectives of the Program include but are not limited to:

- (a). Development and evaluation of cost-effective test methods and protocols for the identification and assessment of housing-related hazards.
- (b). Development and assessment of cost-effective methods for reducing or eliminating housing-related hazards.
- (c). Evaluation of the effectiveness of housing interventions and barriers and incentives affecting future use of the most cost-effective strategies.
- (d). Supporting translational and implementation research studies which involve the adaptation and use of effective healthy homes intervention strategies in different housing types, residential settings, and populations.
- (e). Investigation of the epidemiology of housing-related hazards and illness and injuries associated with these hazards, with an emphasis on low income, vulnerable populations (e.g., children, senior citizens, etc.).
- (f). Analysis of existing data or generation of new data to improve knowledge regarding the prevalence and severity of specific hazards in various types of housing and by demographic characteristics of residents, with a focus on low-income housing.
- (g). Improved understanding of the relationship between a residential exposure and illness or injury of children or other vulnerable populations. (Note: Applicants that propose this type of study should discuss how the knowledge that is gained from the study could be used in a program to reduce these hazards in target communities).

HUD anticipates that the results of program-supported studies will help to develop evidence-based approaches that are cost-effective and efficient and will result in the reduction of health threats for the maximum number of residents and, in particular, children and other vulnerable populations (e.g., the elderly) in low-income households. Study results are also expected to improve our understanding of how specific aspects of the indoor environment can affect the health of residents.

Applicants should consider the ability of their proposed study to generate definitive results. Since the size of the awards under this NOFO may limit the ability of applicants to design and implement research on health outcomes using the strongest methodology (i.e., a randomized controlled trial), applicants should consider focusing on important indoor environmental quality (IEQ) measures instead of health outcomes in studies where this is appropriate, such as when existing research has demonstrated a significant association between the IEQ measures and health outcomes. A focus on environmental outcomes is generally expected to produce more definitive results as opposed to a health outcome focus, and the impact of improvements to IEQ on health outcomes can be inferred where the evidence base is sufficient. HUD is especially

interested in funding practical, applied research, including studies using implementation science, that can directly inform policies and practices to reduce the prevalence and severity of residential health and safety hazards and improve the health and well-being of residents. You should be aware of where your proposed study fits within a translational research framework (i.e., Pettibone et al, 2018: <https://doi.org/10.1289/EHP3657>). Implementation research (IR) helps identify the context (real world environmental and social setting) that impact the adoption of the interventions within a community to address persistent residential environmental health hazards (Bauer, 2020; Smith, 2020). Identifying and understanding the specifications of the context within which the study is being conducted helps provide a better understanding of how and for whom the interventions work, under what conditions, and the expected outcomes (Smith, 2020). To use IR studies effectively the researcher needs to identify the interventions of interest, then determine whether the interventions have shown both effectiveness and efficacy, and if they have, finally use mixed methods designs (Lane-Fall, 2019). HUD is particularly interested in IR proposals that involve the identification and study of the context and conditions under which different interventions are effective, thus making these interventions more acceptable and easily implementable in low-income and affordable housing environments.

The HHTS Program is a component of HUD's Healthy Homes Program. A description of the Healthy Homes Program is available on the HUD website at [https://www.hud.gov/program\\_offices/healthy\\_homes/hhi](https://www.hud.gov/program_offices/healthy_homes/hhi). In addition to deficiencies in basic housing conditions that may impact health (e.g., structural problems, lack of adequate heating and cooling, pest infestation, excess moisture), other subtler health hazards may exist in the residential environment (e.g., asthma triggers, volatile and semi-volatile organic compounds including pesticide residues, injury hazards, etc.). While some hazards will be found disproportionately in housing that is substandard, housing-related environmental hazards may also exist in housing that is otherwise of acceptable quality. Appendix A of this NOFO briefly describes the key housing-associated health and safety hazards HUD considers targets for intervention. The hazards and conditions identified in Appendix A are not considered exhaustive, applicants may submit applications that focus on topics that are not included in Appendix A. HUD has also developed resource papers on several topics of importance under the Healthy Homes Program, including mold, environmental aspects of asthma, carbon monoxide, pesticides, residential assessment and unintentional injuries. These resource papers can be downloaded from [https://www.hud.gov/program\\_offices/healthy\\_homes](https://www.hud.gov/program_offices/healthy_homes).

#### **b. Community Participation**

HUD believes that it is important for researchers to incorporate meaningful community participation in the development and implementation of studies that are conducted in communities and/or involve significant interaction with community residents. Community participation can improve study effectiveness in various ways, including the development of more appropriate research objectives, improving recruitment and retention of study participants, improving participants' involvement in and understanding of a study, improving ongoing communication between researchers and the affected community, and improving dissemination of study findings. Community Based Participatory Research (CBPR) offers researchers the opportunity to use translational science to improve sustainability/long-term success and efficacy of effective scientific interventions to address residential environmental health issues in diverse communities. It also helps identify specific conditions and structures within the communities

needed for these effective interventions to work best. HUD encourages applicants to consider using elements of a CBPR approach, where applicable, in study design and implementation. (See, e.g., The National Institute of Environmental Health Sciences report titled "Successful Models of Community-Based Participatory Research" at [https://www.hud.gov/sites/documents/DOC\\_12485.PDF](https://www.hud.gov/sites/documents/DOC_12485.PDF) and the Wallerstein and Duran (2010) paper titled "Community-based participatory research contributions to intervention research: The intersection of science and practice to improve health equity"). CBPR is characterized by substantial community input in all phases of a study (i.e., design, implementation, data interpretation, conclusions, and communication of results).

- **Changes from Previous NOFO.**

The following is a summary of the major changes in this NOFO relative to the Fiscal Year (FY) 2021 LHHTS NOFO. This is not intended to be an exhaustive list, so applicants should be sure to read the entire NOFO.

- a. HUD has modified the list of priority research topics for FY 2022 (see section III.F.1).
- b. Organizations that received an award under the FY 2020 or FY 2021 Lead and Healthy Homes Technical Studies Grant Program cycle are ineligible unless applying with a different Principal Investigator (PI).
- c. HUD has revised some of the rating factors for the full application.

- **Definitions.**

- a. Standard Definitions

**Affirmatively Furthering Fair Housing (AFFH).** Affirmatively Furthering Fair Housing (AFFH) means taking meaningful actions, in addition to combating discrimination to overcome patterns of segregation and foster inclusive communities free from barriers that restrict access to opportunity based on protected characteristics. Specifically, affirmatively furthering fair housing means taking meaningful actions that, taken together, address significant disparities in housing needs and in access to opportunities, replacing segregated living patterns with truly integrated and balanced living patterns, transforming racially and ethnically concentrated areas of poverty into areas of opportunity, and fostering and maintaining compliance with civil rights and fair housing laws. The duty to affirmatively further fair housing extends to all program participant's activities and programs relating to housing and urban development.

**Assistance Listing number** refers to the publicly available listing of Federal assistance programs managed and administered by the General Services Administration, formerly known as the Catalog of Federal Domestic Assistance (CFDA). Assistance Listing is a unique number assigned to identify a Federal Assistance Listings, formerly known as the CFDA

**Authorized Organization Representative (AOR)** is the person authorized to submit applications on behalf of the organization via Grants.gov. The AOR is authorized by the E-Biz point of contact in the System for Award Management. The AOR is listed in item 21 on the SF-424.

**Consolidated Plan** is a document developed by states and local jurisdictions. This plan is completed by engaging in a participatory process to assess their affordable housing and community development needs and market conditions, and to make data-driven, place-based

investment decisions with funding from formula grant programs. (See [24 CFR part 91](#) for HUD's requirements regarding the Consolidated Plan and related Action Plan).

**Contract** means, for the purpose of Federal financial assistance, a legal instrument by which a recipient or subrecipient purchases property or services needed to carry out the project or program under a federal award. For additional information on contractor and subrecipient determinations, see [2 CFR 200.331](#).

**Contractor** means an entity that receives a contract as defined above and in [2 CFR 200.1](#).

**Deficiency** is information missing or omitted within a submitted application. Examples of deficiencies include missing documents, information on a form, or some other type of unsatisfied information requirement. Depending on specific criteria, deficiencies may be either Curable or Non-Curable.

- *Curable Deficiencies* may be corrected by the applicant with timely action. To be curable the deficiency must:
- Not be a threshold requirement, except for documentation of applicant eligibility;
- Not influence how an applicant is ranked or scored versus other applicants; and
- Be remedied within the time frame specified in the notice of deficiency.

**Non-Curable Deficiencies** cannot be corrected by an applicant after the submission deadline. Non-curable deficiencies are deficiencies that, if corrected, would change an applicant's score or rank versus other applicants. Non-curable deficiencies may result in an application being marked ineligible, or otherwise adversely affect an application's score and final determination.

**DUNS Number** is the nine-digit Dun and Bradstreet Data Universal Number System identification number assigned to a business or organization by Dun & Bradstreet and provides a means of identifying business entities on a location-specific basis.

**E-Business Point of Contact (E-Biz POC)** A user registered as an organization applicant who is responsible for the administration and management of grant activities for his or her organization. The E-Biz POC is likely to be an organization's chief financial officer or authorizing official. The E-Biz POC authorizes representatives of their organization to apply on behalf of the organization (see Standard AOR and Expanded AOR). There can only be one E-Biz POC per DUNS Number.

**Eligibility requirements** are mandatory requirements for an application to be eligible for funding.

**Expanded Authorized Organization Representative (AOR)** An AOR is a member of your organization authorized by the EBiz POC to submit applications in Grants.gov on behalf of the organization. An applicant user with the Expanded AOR role is authorized to submit any applications on behalf of the organization and has privileges that allow the user to modify organization-level settings in Grants.gov.

**Federal Financial Assistance** means assistance that entities received or administer in the form of:

1. Grants;

2. Cooperative agreements (which does not include a cooperative research and development agreement pursuant to the Federal Technology Transfer Act of 1986, as amended (15 U.S.C. 3710a)).
3. Loans;
4. Loan guarantees;
5. Subsidies;
6. Insurance;
7. Food commodities;
8. Direct appropriations;
9. Assessed and voluntary contributions; and
10. Any other financial assistance transaction that authorizes the non-Federal entity's expenditure of Federal funds.
11. Federal financial assistance does not include amounts received as reimbursement for services rendered to individuals as described in section [200.502\(h\)](#) and (i). ([2 CFR 200.1](#))

**Federal award**, has the meaning, depending on the context, in either paragraph (i) or (ii) of this definition:

1. (i) The Federal financial assistance that a recipient receives directly from a Federal awarding agency or a subrecipient receives indirectly from a pass-through entity, as described in [2 CFR §200.101](#); or
  - ii. The cost-reimbursement contract under the Federal Acquisition Regulations that a non-Federal entity receives directly from a federal awarding agency or indirectly from a pass-through entity, as described in [2 CFR §200.101](#).
2. The instrument setting forth the terms and conditions. The instrument is the grant agreement, cooperative agreement, other agreement for assistance covered in paragraph (2) of the definitions of Federal financial assistance in [2 CFR §200.1](#), and this NOFO, or the cost-reimbursement contract awarded under the Federal Acquisition Regulations.
3. Federal award does not include other contracts that a Federal agency uses to buy goods or services from a contractor or a contract to operate Federal Government owned, contractor operated facilities (GOCOs).
4. See also definitions of Federal financial assistance, grant agreement, and cooperative agreement in [2 CFR 200.1](#).

**Grants.gov** is the website serving as the Federal government's central portal for searching and applying for Federal financial assistance throughout the Federal government. Registration on Grants.gov is required for submission of applications to prospective agencies unless otherwise specified in this NOFO.

**Historically Black Colleges and Universities (HBCUs)** The Higher Education Act of 1965, as amended, defines an HBCU as: "...any historically black college or university that was established prior to 1964, whose principal mission was, and is, the education of black Americans, and that is accredited by a nationally recognized accrediting agency or association determined by the Secretary of Education to be a reliable authority as to the quality of training offered or is, according to such an agency or association, making reasonable progress toward

accreditation.” HBCUs offer all students, regardless of race, an opportunity to develop their skills and talents.

**Non-Federal Entity (NFE)** means a state, local government, Indian tribe, Institution of Higher Education (IHE), or non-profit organization that carries out a federal award as a recipient or subrecipient.

**Point of Contact (POC)** is the person who may be contacted with questions about the application submitted by the AOR. The POC is listed in item 8F on the SF-424.

**Recipient** means an entity, usually but not limited to non-Federal entities, that receives a federal award directly from HUD. The term recipient does not include subrecipients or individuals that are beneficiaries of the award.

**Small business** is defined as a privately-owned corporation, partnership, or sole proprietorship that has fewer employees and less annual revenue than a corporation or regular-sized business. The definition of “small”—in terms of being able to apply for government support and qualify for preferential tax policy—varies by country and industry. The U.S. Small Business Administration defines a small business according to a set of standards based on specific industries. See [13 CFR Part 121](#).

**Standard Authorized Organization Representative (AOR)** An AOR is a member of your organization authorized by the EBiz POC to submit applications in Grants.gov on behalf of the organization. An applicant user with the Standard AOR role can only submit applications when they are a Participant of that workspace.

**Subaward** means an award provided by a pass-through entity to a subrecipient for the subrecipient to carry out part of a federal award received by the pass-through entity. It does not include payments to a contractor or payments to an individual that is a beneficiary of a federal program. A subaward may be provided through any form of legal agreement, including an agreement that the pass-through entity considers a contract.

**Subrecipient** means an entity, usually but not limited to non-Federal entities, that receives a subaward from a pass-through entity to carry out part of a federal award but does not include an individual that is a beneficiary of such award. A subrecipient may also be a recipient of other federal awards directly from a federal awarding agency.

**System for Award Management (SAM)** is the Federal Repository into which an entity must provide information required for the conduct of business as a recipient. Registration with SAM is required for submission of applications via Grants.gov. You can access the website at <https://www.sam.gov/SAM/>. There is no cost to use SAM.

**Threshold Requirements** are an eligibility requirement that must be met for an application to be reviewed. Threshold requirements are not curable, except for documentation of applicant eligibility and are listed in Section III.D Threshold Eligibility Requirements. Similarly, there are eligibility requirements under Section III.E, Statutory and Regulatory Requirements Affecting Eligibility.

**Unique Entity Identifier (UEI)** means the identifier assigned by SAM to uniquely identify business entities.

- Program Definitions.

None

## **B. Authority.**

The Lead Technical Studies program is authorized under sections 1051 and 1052 of the Residential Lead-Based Paint Hazard Reduction Act of 1992 (Title X of the Housing and Community Development Act of 1992, 42 U.S.C. §§ 4854 and 4854a). The Healthy Homes Technical Studies program is authorized under sections 501 and 502 of the Housing and Urban Development Act of 1970 (12 U.S.C. §§ 1701z-1 and 1701z-2). Funding is provided by the Consolidated Appropriations Act, 2022 (Public Law 117-103), approved March 15, 2022, the Consolidated Appropriations Act, 2021 (Public Law 116-260), approved December 27, 2020, and the Further Consolidated Appropriations Act, 2020 (Public Law 116-94), approved December 20, 2019.

## **II. Award Information.**

### **A. Available Funds**

Funding of approximately **\$7,000,000** is available through this NOFO.

Additional funds may become available for award under this NOFO. Use of these funds might be subject to statutory constraints or other requirements. All awards are subject to the funding restrictions contained in this NOFO.

Of the \$7,000,000 available through this NOFO, up to \$2,000,000 is available for the LTS grant program and \$5,000,000 is available for the HHTS grant program.

### **B. Number of Awards.**

HUD expects to make approximately 13 awards from the funds available under this NOFO.

For each of the grant programs funded under this announcement, HUD expects to make the following awards: approximately 3 to 5 awards for the LTS Grant Program and approximately 5 to 8 awards for the HHTS Grant Program. However, the estimated awards will depend on the number of eligible applicants for each grant program, their requested amounts, and other factors. For information on the methodology used to make award determinations under this NOFO, please see Section V.B Review and Selection Process below.

### **C. Minimum/Maximum Award Information**

1. Awards will range from \$300,000 to a maximum of \$700,000 for the LTS Grant Program and \$300,000 to a maximum of \$1,000,000 for the HHTS Grant Program.
2. **Note for New Applicants.** If supported by the majority of the Application Review Panel, HUD will make an award of up to \$700,000 under the LTS Grant Program or up to \$1,000,000 under the HHTS Grant Program for the highest scoring full application from a qualified new applicant, as defined here, on the condition that the application receives a score of at least 82 points. **A new applicant is an organization that has not been previously funded by the Office of Lead Hazard Control and Healthy Homes (OLHCHH) under the Technical Studies Grant Program to which they are applying as the primary grantee.** A new applicant may have previously been a sub-grantee under an award to another organization. If there is not a qualified new applicant for funding, any remaining funds will be made available to the general pool of qualified LHHTS Grant Program applicants based on the final overall ranking.

Estimated Total Funding:

\$7,000,000

Minimum Award Amount:

\$300,000

Per Project Period

Maximum Award Amount:

\$1,000,000

Per Project Period

#### **D. Period of Performance**

The start date will be determined during the period of negotiations with successful applicants. The period of performance cannot exceed 36 months from the time of award. The proposed performance period should include adequate time for such project components as the Institutional Review Board process (if required), the hiring of new staff, the recruitment of study participants, and the development of methods (e.g., analytical methods), all of which have been found to delay projects in the past.

Period of performance extensions for delays due to exceptional conditions beyond the grantee's control will be considered for approval by HUD in accordance with 2 CFR § 200.308(e)(2), as applicable, and the OLHCHH Program Guide ([https://www.hud.gov/sites/documents/PGI\\_2013-03.PDF](https://www.hud.gov/sites/documents/PGI_2013-03.PDF)) . If requested, determined to be appropriate, and subsequently approved by OLHCHH, grantees will be eligible to receive a single extension of up to 12 months in length.

Estimated Project Start Date:

11/01/2022

Estimated Project End Date:

11/01/2025

Length of Project Periods:

36-month project period and budget period

Length of Periods Explanation of Other:

N/A

#### **E. Type of Funding Instrument.**

Funding Instrument Type:

CA (Cooperative Agreement)

Awards will be made as cooperative agreements. Anticipated substantial involvement by HUD staff for cooperative agreements may include, but will not be limited to:

1. Review and suggestion of amendments to the study design, including study objectives; field sampling plan; data collection methods; sample handling and preparation; and sample and data analysis.
2. Review and provision of technical recommendations in response to quarterly progress reports (e.g., amendments to study design based on preliminary results).
3. Review and provision of technical recommendations on the journal article(s) and final study report.

Awardees are expected to make reasonable efforts to incorporate HUD suggestions and recommendations when provided.

### **III. Eligibility Information.**

#### **A. Eligible Applicants.**

- 00 (State governments)
- 01 (County governments)
- 02 (City or township governments)
- 04 (Special district governments)
- 05 (Independent school districts)
- 06 (Public and State controlled institutions of higher education)
- 07 (Native American tribal governments (Federally recognized))
- 08 (Public housing authorities/Indian housing authorities)
- 11 (Native American tribal organizations (other than Federally recognized tribal governments))
- 12 (Nonprofits having a 501(c)(3) status with the IRS, other than institutions of higher education)
- 13 (Nonprofits without 501(c)(3) status with the IRS, other than institutions of higher education)
- 20 (Private institutions of higher education)
- 22 (For profit organizations other than small businesses)
- 23 (Small businesses)

#### **Additional Information on Eligibility**

Applications to supplement existing projects are eligible to compete with applications for new awards.

#### **B. Ineligible Applicants.**

1. Individuals
2. Federal agencies
3. Organization that received an award under the FY 2020 or FY 2021 Lead and Healthy Homes Technical Studies Grant Program cycle except for those applying with a different Principal Investigator (PI).
4. Foreign entities and sole proprietorship organizations are not eligible to compete for, or receive, awards made under this announcement.

#### **C. Cost Sharing or Matching.**

This Program does not require cost sharing or matching, but provides points based on leverage as describe below.

Under the full application rating factor 3, applicants that provide evidence of significant resource leveraging will receive points (see Leveraging Resources under Section V.A.1.b.(3).(e)).

#### **D. Threshold Eligibility Requirements.**

Applicants who fail to meet any of the following threshold eligibility requirements will be deemed ineligible. Applications from ineligible applicants will not be evaluated.

**1. Resolution of Civil Rights Matters.** Outstanding civil rights matters must be resolved before the application deadline. Applicants, who after review are confirmed to have civil rights matters unresolved at the application deadline, will be deemed ineligible. Their applications will receive no further review, will not be rated and ranked, and they will not receive funding.

- a. Applicants having any of the charges, cause determinations, lawsuits, or letters of findings referenced in subparagraphs (1) – (5) that have not been resolved to HUD’s satisfaction before or on the application deadline date are ineligible for funding. Such matters include:
  1. Charges from HUD concerning a systemic violation of the Fair Housing Act or receipt of a cause determination from a substantially equivalent state or local fair housing agency concerning a systemic violation of a substantially equivalent state or local fair housing law proscribing discrimination because of race, color, religion, sex, national origin, disability or familial status;
  2. Status as a defendant in a Fair Housing Act lawsuit filed by the United States alleging a pattern or practice of discrimination or denial of rights to a group of persons raising an issue of general public importance under 42 U.S.C. 3614(a);
  3. Status as a defendant in any other lawsuit filed or joined by the Department of Justice, or in which the Department of Justice has intervened, or filed an amicus brief or statement of interest, alleging a pattern or practice or systemic violation of Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Section 109 of the Housing and Community Development Act of 1974, the Americans with Disabilities Act or a claim under the False Claims Act related to fair housing, non-discrimination, or civil rights generally including an alleged failure to affirmatively further fair housing;
  4. Receipt of a letter of findings identifying systemic non-compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Section 109 of the Housing and Community Development Act of 1974; or the Americans with Disabilities Act; or
  5. Receipt of a cause determination from a substantially equivalent state or local fair housing agency concerning a systemic violation of provisions of a state or local law prohibiting discrimination in housing based on sexual orientation, gender identity, or lawful source of income.
- b. HUD will determine if actions to resolve the charge, cause determination, lawsuit, or letter of findings taken before the application deadline date will resolve the matter. Examples of actions that may be sufficient to resolve the matter include, but are not limited to:
  1. Current compliance with a voluntary compliance agreement signed by all the parties;
  2. Current compliance with a HUD-approved conciliation agreement signed by all the parties;

3. Current compliance with a conciliation agreement signed by all the parties and approved by the state governmental or local administrative agency with jurisdiction over the matter;
4. Current compliance with a consent order or consent decree;
5. Current compliance with a final judicial ruling or administrative ruling or decision; or
6. Dismissal of charges.

**2. Affirmatively Furthering Fair Housing.** With some exceptions for federally recognized Indian tribes and their instrumentalities, the application must discuss how the applicant will carry out the proposed activities in a manner that affirmatively furthers fair housing in compliance with the Fair Housing Act and its implementing regulations. Applicants may propose activities that are consistent with their jurisdiction’s Analysis of Impediments (AI), an Assessment of Fair Housing (AFH), or other means of fair housing planning that meaningfully supports their AFFH certification.

If the applicant will carry out proposed activities in a jurisdiction with an accepted Assessment of Fair Housing (AFH), the proposed activities should be consistent with the AFH’s fair housing goals and with fair housing strategies specified in the jurisdiction’s Consolidated Plan or Public Housing Agency Plan.”

**3. Timely Submission of Applications.** Applications submitted after the deadline stated within this NOFO that do not meet the requirements of the grace period policy will be marked late. Late applications are ineligible and will not be considered for funding. See Section IV. D. Application Submission Dates and Times.

#### **E. Statutory and Regulatory Requirements Affecting Eligibility.**

##### **Eligibility Requirements for Applicants of HUD’s Grants Programs**

The following requirements affect applicant eligibility. Detailed information on each requirement is posted on [HUD’s Funding Opportunities Page](#).

- Active Prime and Sub Recipient registration with SAM.gov
- Outstanding Delinquent Federal Debts
- Debarments or Suspensions, or both
- Pre-selection Review of Performance
- Sufficiency of Financial Management System
- False Statements
- Mandatory Disclosure Requirement
- Prohibition Against Lobbying Activities
- In addition, each applicant under this NOFO must have the necessary processes and systems in place to comply with the Award Term in Appendix A of [24 CFR part 170](#) if the applicant receives an award, unless an exception applies as provided in [2 CFR 170.110](#).

#### **F. Program-Specific Requirements.**

##### **1. Priority Research Topics/Study Conducted in Properties Remediated with OLHCHH Grant**

Even though HUD will consider funding applications for technical studies on topics that are consistent with the overall goals and objectives of the LHHTS Grant Program as described above, HUD is particularly interested in the following research topic areas listed below.

Applications that focus on one of the following topics or form a partnership with at least one of OLHCHH grantees (see grantee contact list at [https://www.hud.gov/sites/dfiles/HH/documents/HUD\\_OLHCHH\\_Lead\\_Hazard\\_Control\\_Grantees.pdf](https://www.hud.gov/sites/dfiles/HH/documents/HUD_OLHCHH_Lead_Hazard_Control_Grantees.pdf) and [https://www.hud.gov/program\\_offices/healthy\\_homes/hhi/hhts](https://www.hud.gov/program_offices/healthy_homes/hhi/hhts)) and conduct a significant part of the proposed study in properties that are or were remediated with an OLHCHH grant, will receive 3 points under **rating factor 2** of the full application (see section V.A.1.b.(2)). However, you are not limited to addressing only topic areas listed below in your application. If topics other than those identified under the priority topics are proposed, it is important that the applicant describe in sufficient detail how the proposed study is consistent with the overall LHHTS Grant Program goals and objectives.

Applications for additional work related to ongoing HUD-funded technical studies (i.e., for work outside of the scope of the original agreement) are eligible to compete with applications for awards on new subjects. These applications will be evaluated in the same manner as applications on new subjects. Brief descriptions of current and recently completed technical studies grant projects and grantee contact information can be found on the HUD website at [https://www.hud.gov/program\\_offices/healthy\\_homes/hhi/hhts](https://www.hud.gov/program_offices/healthy_homes/hhi/hhts)

#### **a. LTS Grant Program**

(1). Evaluation of the effectiveness of specific residential lead hazard control interventions. The effectiveness of lead hazard control interventions (i.e., interim controls or a combination of interim controls and abatement) over various time periods following implementation is a topic that has been primarily covered through HUD's Evaluation of the HUD Lead Hazard Control Grant Program (referred to as the National Evaluation) (see, e.g., [http://nchh.org/resource-library/Early\\_Overall\\_Findings.pdf](http://nchh.org/resource-library/Early_Overall_Findings.pdf)) that assessed the impact of lead hazard control interventions conducted by 14 grantees that were among the first recipients of HUD lead hazard control grants. Follow-up research on a subset of the original study participants demonstrated that dust-lead levels generally remained low (particularly on floors) six years following interventions (Wilson et al., 2006). Although this research has demonstrated that interim controls can be effective in reducing dust-lead levels over an extended period, there is still value in conducting research on the efficacy and durability of specific interventions or combinations of interventions. For example, HUD has supported research that focused on the benefits of window replacement in reducing window and floor dust-lead approximately 12 years post-intervention (Dixon et al., 2012). It is notable that these durability results were achieved even though the grant programs do not require ongoing lead-based paint maintenance after the interventions, in contrast to the requirement for such maintenance under most housing assistance programs covered by HUD's Lead Safe Housing Rule and described in Chapter 6 of the HUD Guidelines ([www.hud.gov/program\\_offices/healthy\\_homes/lbp/hudguidelines](http://www.hud.gov/program_offices/healthy_homes/lbp/hudguidelines)).

Furthermore, because there is no recognized safe level of lead exposure for children, the ability of interim controls to maintain low dust-lead levels in treated homes has assumed even greater importance. The lack of a specific blood-lead threshold for adverse health effects in children is reflected by the action of the U.S. Centers for Disease Control and Prevention in adopting a "reference value" approach for lead in children's blood based on the blood lead level distribution in U.S. children (currently set at 3.5 µg/dL: <https://www.cdc.gov/nceh/lead/data/blood-lead-reference-value.htm>). Research supports the need to achieve and maintain low dust-lead levels in order to keep children's lead exposure as low as is feasible, so evaluations of the effectiveness of

specific interim controls, combinations of interim controls, and/or ongoing lead-based paint maintenance activities following well characterized interim controls are of particular interest to HUD with respect to their ability to sufficiently maintain low dust-lead levels over both the short and long term (e.g., 3 or more years). HUD is also interested in the ability of specific lead hazard control treatments to consistently achieve low clearance levels (i.e., at or below the clearance levels of 10 µg/ft<sup>2</sup> for floors and 100 µg/ft<sup>2</sup> for windowsills) that became effective on March 8, 2021 through an EPA regulatory action.

(2). The value of lead risk assessments when triggered by children with blood lead levels (BLLs) at or near CDC's blood lead reference value of 3.5 µg/dL is not well understood. Some local, state, and federal laws require that an environmental investigation (i.e., a lead risk assessment) be conducted in a residence if a child has a BLL at or above the reference value. However, the frequency at which lead based paint (LBP) hazards are identified in the homes of children with these BLLs has not been well documented. A study conducted by Cluett et al. (2019) found relatively small differences in the frequency of LBP hazard detection in the homes of children with BLLs of 5-9 µg/dL compared to the homes of children with BLLs ≥ 10 µg/dL. The researchers reported that a slightly higher percentage of homes among the children in the lower BLL group (23%) had no identified LBP hazards compared to the higher BLL group (15%). HUD is interested in supporting similar research for children with BLLs near or above the current CDC blood-lead reference value of 3.5 µg/dL (e.g., BLLs ≥ 3 µg/dL and < 5 µg/dL). HUD anticipates that this research could likely be conducted in a cost-effective manner using existing data sets.

(3). Analysis of Available Data and Databases. HUD is interested in supporting research using existing data to address key scientific issues related to the identification and control of lead-based paint hazards. Research efforts often generate large data sets that are analyzed to address primary research objectives; however, there is often important information to be gained by conducting additional analyses of the collected data. Such analyses can generally be conducted at low-cost relative to the cost of the initial research. Applicants submitting proposals in this area should explain how the analyses would address one or more important issues and will result in improvements in lead hazard assessment and control methods. HUD is also interested in the creative use of existing databases (e.g., Census data, blood-lead screening data, etc.) to improve the efficacy of lead hazard control programs (e.g., by improved targeting of the highest risk homes and neighborhoods), assess the effectiveness of enforcement and lead hazard control activities and regulations, and other uses of these data that further the goal of improving methods for the identification and control of residential lead-based paint hazards. If using data older than 10 years, the applicant needs to justify why they are using that data.

#### **b. HHTS Grant Program**

(1). Developing easily replicable, cost-effective methods for identifying, preventing, and controlling mold and excess moisture in various types of residential buildings, with a focus on affordable housing. Specific needs include better tools for the identification of hidden mold and moisture problems and the assessment of improved surveillance and maintenance protocols for existing residential buildings (e.g., training of maintenance workers and supervisors on use of structured surveillance and response protocols).

(2). Physical Injury Prevention Measures: HUD is interested in research on the combined efficacy of evidence-based injury intervention packages for preventing injury in high-risk populations, particularly children and seniors in low-income households. HUD is further interested in demonstrating the feasibility and cost-effectiveness of incorporating evidence-based physical injury prevention measures into residential programs (such as packages of interventions that can be used in the OLHCHH's Older Adult Home Modification grant program), including housing for seniors and green renovation and rehabilitation programs, as well as ongoing maintenance.

(3). Mitigation of Residential Asthma Triggers: In 2014, three Institutes within the National Institutes of Health held a workshop on the state of the science on the indoor environment and asthma (Gold et al., 2017). Research needs identified by participants included well-designed (and, if feasible, blinded and controlled) trials to test the conditions under which free-standing air filtration systems, structural interventions, and other emerging building-level interventions reduce indoor pollutants, allergens, and other contaminants. The authors noted that this is a precondition to assessing whether exposure reduction improves respiratory health. An additional area of research need of relevance for this NOFO is the testing of low-cost interventions easily transferable from home to home or interventions that can be applied to any home without the need for structural changes, with these targeting highly mobile populations or populations with little control over the structure of their homes.

In a more recent systematic review of the research on indoor allergen control, Leas et al. (2018) concluded that the strength of evidence for the effectiveness of both single and multicomponent interventions was not strong. Common weaknesses of the reviewed studies included infrequent use of validated measures of asthma control, inconsistent assessment of asthma severity, and infrequent reporting of standardized measures of asthma exacerbations, healthcare use, and quality of life. The authors concluded that additional evaluation was needed for the following single interventions: HEPA vacuum cleaning; carpet removal; pet cleaning/removal, and mold removal. Although the authors concluded that multicomponent interventions that include HEPA vacuums or pest control reduce asthma exacerbations and improve quality of life, they indicate a need to evaluate these interventions more efficiently such as by testing standardized bundles of interventions. **If you are proposing research on home asthma interventions, you must describe how your study design addresses the weaknesses identified in the systematic review and why it would be expected to produce definitive findings or information that would be important in the design of a larger, more definitive study. HUD will not fund additional studies within this focus area unless there are one or more compelling and novel aspects of the study design and the common weaknesses identified in the systematic review are clearly addressed.**

(4). Implementation research on interventions incorporating the eight principles of healthy homes. HUD is interested in assessing novel or promising methods for implementing integrated housing health and safety assessments and subsequent interventions (i.e., the healthy homes model) in high-risk homes. This priority topic addresses the need for the wider adoption of the healthy homes model (or major aspects of it), especially with respect to its application in neighborhoods or housing with a high prevalence of substandard housing and/or vulnerable populations. Previous HUD-funded research has documented significant reductions in housing-

related health and safety hazards and conditions. These studies have demonstrated significant reductions in the total number of hazards, including injury hazards and asthma triggers, when units were assessed three to six months following intervention (see Appendix B: Reddy et al., 2017; Dixon et al., 2009; Klitzman et al., 2005).

(5). Studies in Native American tribal communities: Studies that address important healthy homes issues in Federally recognized, Native American communities. Applicants in this area are encouraged to explore potential opportunities to partner with communities that have received a grant through HUD's "Healthy Homes Production Grant Program for Tribal Housing" (CFDA number: 14.913). These grants were first offered in FY 2018 and most recently awarded in FY 2020. A recent HHTS Program cooperative agreement supported important research in tribal housing in rural Alaska (see Appendix B: Singleton et al. 2017 and 2018). HUD's Office of Policy Development and Research published a report on the "Housing Needs of American Indians and Alaska Natives in Tribal Areas" in 2017 (<https://www.huduser.gov/portal/publications/HNAIHousingNeeds.html>).

**2. HUD will not fund applications** that involve laboratory testing on living organisms except for laboratory testing on animals that are residential pests (e.g., cockroaches, bed bugs, mice, etc.) that is a component of a more comprehensive study to improve IPM methods. Applicants should be aware that under the technical studies grant programs, HUD is interested in funding applied research that is closely related to improving our ability to identify and sustainably implement interventions to control key residential hazards. Applications that have a more basic research focus may not be well suited for funding through these programs.

### **3. General Information**

You may address one, or more than one, of the above technical studies topic areas within your proposal, or submit separate applications for different topic areas. You must, however, submit your application under the LTS program or the HHTS program; your application cannot be reviewed under both programs. In proposing to conduct a study on a particular topic, applicants should consider:

- a. The "fit" of the proposed hazard assessment and/or control methods within the overall goal of addressing "priority" health and safety hazards in a cost-effective manner;
- b. The expected efficacy and cost-effectiveness of the proposed methods for hazard control and risk reduction. Questions to consider include the degree to which interventions would be accepted by occupants and by housing owners and managers, ease and cost of implementation, the length of time the intervention would stay effective, and the cost effectiveness of the intervention in preventing illness or injury or in improving the health of residents with existing illness;
- c. The ability of the study to generate definitive results. If your proposed study design does not incorporate the strongest methodology (i.e., a randomized controlled trial) to assess the effect of an intervention on health outcomes, you should consider focusing on important indoor environmental quality (IEQ) measures instead of health outcomes where this is appropriate. A focus on environmental outcomes is generally expected to produce more definitive results as opposed to a health outcome focus, and the impact of improvements to IEQ on health outcomes can be inferred where the evidence base is sufficient;
- d. Where and how these methods would be applied and tested, and/or perform demonstration

activities;

- e. The degree to which the study will help develop practical, widely applicable, and accepted methods and protocols or improve our understanding of a key residential health hazard; and
- f. The likelihood that the study findings could be used to reduce racial and ethnic health disparities that are attributable or strongly associated with exposure to residential health and safety hazards.

Applicants should consider the efficiencies that might be gained by working cooperatively with one or more recipients of HUD's Lead-Based Paint and Lead Hazard Reduction Demonstration grants, which are widely distributed throughout the United States. Information on current grantees is available at [https://www.hud.gov/program\\_offices/healthy\\_homes/lbp/lhc](https://www.hud.gov/program_offices/healthy_homes/lbp/lhc).

**NOTE:** A limited amount of hazard control activities, which involve construction limited to what is necessary to conduct the proposed research, may be conducted as part of a Healthy Homes or Lead Technical Study (see Section IV.F.7).

#### **4. Program Requirements**

a. **Program Performance.** Grantees shall take all reasonable steps to accomplish all activities within the approved period of performance. HUD reserves the right to terminate the cooperative agreement prior to the expiration of the period of performance if the grantee fails to make reasonable progress in implementing the approved program of activities or fails to comply with the terms of the cooperative agreement.

b. **Regulatory Compliance.** Grantees must comply with all relevant federal (40 CFR 260 - 268 (RCRA) and 300 - 374 (CERCLA)), state, and local regulations regarding exposure to and proper disposal of hazardous materials.

c. **Blood Lead Testing.** Any blood lead testing, blood lead level test results, medical referral, or follow-up for children under 6 years of age must be conducted according to the recommendations of the CDC, Preventing Lead Poisoning in Young Children (see Appendix B of this NOFO).

d. **Restricted Use of Funds.** HUD LHHTS grant funds must not be used to replace existing resources dedicated to any ongoing project.

e. **Laboratory Analysis for Lead.** Laboratory analysis covered by the EPA's National Lead Laboratory Accreditation Program (NLLAP) must be conducted by a laboratory recognized under the program, unless approved by HUD based on its prior consideration of the justification by the grantee.

f. **Laboratory Analysis for Mold.** Samples to be analyzed for mold (fungi) must be submitted to a laboratory accredited through the Environmental Microbiological Laboratory Accreditation Program (EMLAP), administered by the American Industrial Hygiene Association (AIHA), unless approved by HUD based on its prior consideration of the justification by the grantee.

g. **Human Research.** Human research subjects will be protected from research risks in conformance with Federal Policy for the Protection of Human Subjects, required by HUD at 24 CFR 60 (See Section V.A.1.b.(3).(b).(iii) below regarding the Institutional Review Board process, which is required for some technical studies).

h. **OSHA Compliance.** The requirements of the Occupational Safety and Health Administration (OSHA) (e.g., 29 CFR parts 1910 and/or 1926, as applicable) or the state or local occupational safety and health regulations, whichever are most stringent, must be met.

i. **Disclosure.** All test results and other information in pre-1978 housing related to lead-based paint or lead-based paint hazards must be provided to the owner of the unit, together with a

statement describing the owner's legal duty to disclose the knowledge of lead-based paint and its hazards to prospective tenants (before initial leasing or lease renewal with changes) and buyers (before sale) (24 CFR Part 35, subpart A). Disclosure of other identified housing-related health or safety hazards to the owner of the unit, for purposes of encouraging remediation is encouraged but not required by HUD.

j. **Privacy.** Submission of any information to databases (whether website, computer, paper, or other format) of addresses of housing units identified, treated, or cleared under these studies may be subject to the protections of the Privacy Act of 1974, and shall not include any personal information that could identify any household member. You should also check to ensure you meet state and local privacy regulations as well as other federal privacy laws and regulations.

k. **Community Involvement.** Applicants who incorporate meaningful community involvement into any study that requires a significant level of interaction with a community during implementation (e.g., projects being conducted within occupied dwellings or which involve surveys of community residents) will receive a higher score in rating factor 3, Soundness of Approach. The term community refers to a variety of populations comprised of persons who have commonalities that can be identified (e.g., based on geographic location, ethnicity, health condition, common interests, age, disability, limited English proficiency, etc.). Applicants should identify the community that is most relevant to their particular project. Meaningful community involvement also requires that recipients ensure that information provided to the community during these activities is provided in a manner that is effective for persons with disabilities (see 24 CFR § 8.6) and gives meaningful access to persons with limited English proficiency. There are many different approaches to involving the community in the conception, design, and implementation of a study and the subsequent dissemination of findings. Examples include but are not limited to: establishing a structured approach to obtain community input and feedback (e.g., through a community advisory board); including one or more community-based organizations as study partners; employing community residents to recruit study participants and collect data; and enlisting the community in the dissemination of findings and translation of results into improved policies and/or practices. A discussion of community involvement in research involving housing-related health hazards can be found in Chapter 5 of the Institute of Medicine publication titled "Ethical Considerations for Research on Housing-Related Health Hazards Involving Children" (see Appendix B for more information on this report).

l. **Standardized Dust Sampling Protocol and Quality Control Requirements.** Grantees collecting samples of settled dust from participant homes for environmental allergen analyses (e.g., cockroach, dust mite) will be required to use a standard dust sampling protocol, unless the grantee provides compelling justification to use an alternate protocol (e.g., the study involves the development of an alternative sampling method). The HUD protocol is on the OLHCHH website at: [https://portal.hud.gov/hudportal/documents/huddoc?id=DOC\\_12539.pdf](https://portal.hud.gov/hudportal/documents/huddoc?id=DOC_12539.pdf).

m. **Requirements for Peer Review of Scientific Data.** All HUD-sponsored research is subject to the Office of Management and Budget (OMB) Final Information Quality Bulletin for Peer Review (70 FR 2664-2677, January 14, 2005) prior to its public dissemination. In accordance with paragraph II.2 of the Bulletin, HUD will not require further peer review conducted on information that has already been subjected to adequate peer review.

n. **Principal Investigator (PI).** The PI for the proposed study must directly represent and be directly employed by the applicant organization for the proposed role in the grant application. If the proposal includes co-PIs, the lead co-PI must represent and be directly employed by the applicant organization.

## G. Criteria for Beneficiaries.

N/A

## IV. Application and Submission Information.

### A. Obtaining an Application Package.

#### Instructions for Applicants.

You must download both the Application Instructions and the Application Package from Grants.gov. You must verify that the Assistance Listing Number and Assistance Listing Description on the first page of the Application Package, and the Funding Opportunity Title and the Funding Opportunity Number match the Program and NOFO to which you are applying.

The Application Package contains the portable document forms (PDFs) available on Grants.gov, such as the SF-424 Family. The Instruction Download contains official copies of the NOFO and forms necessary for a complete application. The Instruction Download may include Microsoft Word files, Microsoft Excel files, and additional documents.

An applicant demonstrating good cause may request a waiver from the requirement for electronic submission, for example, a lack of available Internet access in the geographic area in which your business offices are located. Lack of SAM registration or valid DUNS/UEI is not good cause. If you cannot submit your application electronically, you must ask in writing for a waiver of the electronic grant submission requirements. HUD will not grant a waiver if the Applicant fails to submit to HUD in writing or via email a request for a waiver at least 15 calendar days before the application deadline. If HUD grants a waiver, a paper application must be received before the deadline for this NOFO. To request a waiver, you must contact:

Name:

J. Kofi Berko Jr PhD

Email:

j.kofi.berko@hud.gov

HUD Organization:

OLHCHH

Street:

451 7th Street, S.W. Rm 8236

City:

Washington

State:

DC DISTRICT OF COLUMBIA

Zip:

20410

Grants.gov provides customer support information on its website at

<https://www.grants.gov/web/grants/support.html>. If you have difficulty accessing the application and instructions or have technical problems, you can receive customer support from Grants.gov by calling (800) 518-GRANTS (this is a toll-free number) or by sending an email to [support@grants.gov](mailto:support@grants.gov). (Hearing- or speech-challenged individuals may access this number through TTY by calling the toll-free Federal Relay Service at 800-877-8339.) The Grants.gov Help Desk can be reached twenty-four hours per day, seven days per week, except federal holidays. HUD recommends calling the Help Desk rather than emailing, because determining the

basis for the problem may require a conversation with the Grants.gov Support Customer Service Representative.

**B. Content and Form of Application Submission.**

You must verify that boxes 11, 12, and 13 on the SF-424 match the NOFO for which you are applying. If they do not match, you have downloaded the wrong Application Instruction and Application Package.

Submission of an application that is otherwise sufficient, under the wrong Assistance Listing and Funding Opportunity Number is Non-Curable unless otherwise stated under the Threshold requirements section.

**1. Content.**

<b>Forms/Assurances/Certifications</b>	<b>Submission Requirement</b>	<b>Notes/Description</b>
HUD Applicant Recipient Disclosure Report (HUD) 2880 Applicant/Recipient Disclosure/Update Report	Submission is required for all applicants by the application due date.	
Application for Federal Assistance (SF424)	Submission is required for all applicants by the application due date.	Required for all applications.
Disclosure of Lobbying Activities (SFLLL), if applicable	HUD will provide instructions to grantees on how the form is to be submitted.	If any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan, the applicant shall complete and submit the SF-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions. Applicants must furnish

Forms/Assurances/Certifications	Submission Requirement	Notes/Description
		an executed copy of the Certification Regarding Lobbying prior to award.
Grant Application Detailed Budget Worksheet (HUD424-CBW)	HUD will provide instructions to grantees on how the form is to be submitted.	HUD will provide instructions to grantees on how the form is to be submitted.

Additionally, your complete application must include the following narratives and non-form attachments.

**a. Pre-Applications:**

The preliminary application must be formatted as per section IV.B.2.a below. Any description/narrative more than this limit will not be read. The preliminary application shall consist of:

- a cover sheet with the name and contact information for the applicant.
- an abstract of 200 words or less. The abstract should list the study objectives, identify partner organizations, identify the target population/community, and clearly identify the knowledge gap that the study will address.
- a narrative addressing the rating factors which must not exceed 5 pages in length (excluding the cover sheet). Note that although submitting pages more than the page limit will not disqualify the pre-application, HUD will not consider the information on any page beyond the 5-page limit.
- biographical sketches (maximum length of one page per person) for a maximum of three key personnel.
- a list of references that are cited in the responses to the rating factors.
- the estimated total funding that would be requested in a full application if successful.
- Form SF424 Application for Federal Assistance and applicable assurances (SF-424A-D, as applicable). Be sure to correctly identify the NOFO title, Funding Opportunity Number and CFDA number. Applicants must also include the nine-digit zip code (zip code plus four digits) associated with the applicant address in box 8d of Form SF-424. You can find the 9-digit zip code through the USPS website (<http://usps.com>) by selecting "Look Up a Zip Code?" under the "Quick Tools" menu on the USPS homepage and entering the street address.

HUD will use the response to the factors at V.A.1.a below to rate, rank, and invite a subset of eligible pre-applicants to submit a full application. The responses provided to the factors in your preliminary application are the only source of information that will be evaluated in determining whether you are invited to submit a full application.

**b. Full Applications:**

Selected pre-applicants will be invited to submit a full application, which must contain the items listed in this section. These items include the standard forms that are applicable to this funding announcement (collectively referred to as the "standard forms"). Copies of these forms are available online at [www.grants.gov/web/grants/applicants/apply-for-grants.html](http://www.grants.gov/web/grants/applicants/apply-for-grants.html). The required items are:

- Application Abstract (two-page maximum, see par. 3, below for the page layout requirements). An abstract with the project title, the names and affiliations of all investigators; identification of partner organizations; a summary of the objectives, study design, and expected results, and the total funds requested, must be included in the proposal. Information contained in the abstract will not be considered in the evaluation and scoring of your application and will not be counted towards the 25-page maximum. Any information you wish to be considered in scoring of the application must be provided under the appropriate rating factor response.
- Response to Rating Factors. A project description/narrative statement addressing the rating factors for award, which are identified in section V.A.1.b. The narrative statement must be identified in accordance with each factor for award (Rating Factors 1 through 4). The full application must be formatted as per section IV.B.2.b. The project description or narrative must be included in the responses to the rating factors. Any description/narrative more than this limit will not be read. The points you receive for each rating factor will be based on the portion of your narrative statement that you submit in response to that particular factor, supplemented by any appendices that are referenced in your narrative response to the rating factor. Supporting materials that are not referenced or discussed in your responses to the individual rating factors will not be considered. Additional materials (e.g., appendices) can be submitted with your application. The footer on the pages of these materials should identify the rating factor that they are supporting.
- Supporting Materials. Include, as appendices the following materials that are needed to support your responses to the rating factors. These will not be counted towards the Rating Factors narrative 25-page limit:
  - The resumes of the PI and other key personnel. Each resume shall not exceed three pages and is limited to information that is relevant in assessing the qualifications and experience of key personnel to conduct and/or manage the proposed technical study.
  - Organizational chart.
  - Letters of commitment.
  - List of references cited in your responses to the rating factors.
- Additional Information. The additional optional materials must not exceed 20 pages. Any pages more than this limit will not be read. The additional information should not be a continuation of the rating factor narrative but provide further clarification if needed, of statements made in the rating factor narrative. Additional information that is a continuation of rating factor narrative will not be considered.

- Budget. Include a total budget using form HUD424CBW (<https://www.hudexchange.info/resource/304/hud-form-424cbw/>) included in the Instructions download at Grants.gov, with supporting cost justification of up to four pages, which will cover all budget categories of the federal grant request. This information will not be counted towards the Rating Factors narrative 25-page limit. Use the budget format discussed in Rating Factor (3), Section V.A.1.b.(3).(d).(i) below. In completing the budget forms and justification, you should address the following elements:
  - Direct Labor costs, including all full- and part-time staff required for the planning and implementation phases of the project. These costs should be based on full time equivalent (FTE) or hours per year (hours/year) (i.e., one FTE equals 2,080 hours/year);
  - Allowance for two trips to HUD Headquarters in Washington, DC, during the period of performance of your grant, planning each trip for 1-2 people, as needed. In planning your trips, you should assume one or two overnight stays depending on your location;
  - A separate budget form and justification for each sub-recipient receiving more than 10 percent of the total federal budget request;
  - Supporting documentation for salaries and prices of materials and equipment, upon request.

**2. Format and Form.**

Narratives and other attachments to your application must follow the following format guidelines.

\_\_\_\_\_ Pages maximum length of narratives

Other

**a. Pre-Application:**

Up to five (5) 8-1/2 x 11-inch page limit.

Number the pages of the narrative.

Minimum 12-point Times New Roman font. Minimum margin width of 1-inch on all sides

Minimum of single line spacing

**b. Full Application:**

Up to twenty-five (25) 8-1/2 x 11-inch page limit.

Number the pages of the narrative.

Minimum 12-point Times New Roman font. Minimum margin width of 1-inch on all sides

Minimum of single line spacing

**C. System for Award Management (SAM) and Unique Entity Identifier (UEI).**

**1. SAM Registration Requirement.**

Applicants must be registered with <https://www.sam.gov/> before submitting their application.

Applicants must maintain current information in SAM on immediate and highest-level owner and subsidiaries, as well as on all predecessors that have been awarded a federal contract or grant within the last three years, if applicable. Information in SAM must be current for all times during which the applicant has an active Federal award or an application or plan under consideration by HUD.

## **2. UEI Requirement.**

Applicants must provide a valid UEI, registered and active at [www.sam.gov/](http://www.sam.gov/) in the application. For more information, see: <https://www.gsa.gov/about-us/organization/federal-acquisition-service/office-of-systems-management/integrated-award-environment-iae/iae-systems-information-kit/unique-entity-identifier-update>.

The DUNS number remained the official identifier for doing business with the U.S. Government only until April 4, 2022. As of April 4, 2022, entities doing business with the federal government must use the Unique Entity Identifier created in SAM.gov.

## **3. Requirement to Register with Grants.gov.**

Anyone planning to submit applications on behalf of an organization must register at grants.gov and be approved by the E-Biz POC in SAM to submit applications for the organization. Registration for SAM and grants.gov is a multi-step process and can take four (4) weeks or longer to complete if data issues arise. Applicants without a valid registration cannot apply through grants.gov. Complete registration instructions and guidance are provided on grants.gov.

## **D. Application Submission Dates and Times.**

### **Application Due Date Explanation**

The application deadline is 11:59:59 PM Eastern Standard time on 07/18/2022

Submit your application to Grants.gov unless a waiver has been issued allowing you to submit a paper application. Instructions for submitting your paper application will be contained in the waiver of electronic submission.

"Received by Grants.gov" means the applicant received a confirmation of receipt and an application tracking number from Grants.gov. Grants.gov then assigns an application tracking number and date-and timestamp each application upon successful receipt by the Grants.gov system. A submission attempt not resulting in confirmation of receipt and an application tracking number is not considered received by Grants.gov.

Applications received by Grants.gov must be validated by Grants.gov to be received by HUD.

"Validated by Grants.gov" means the application has been accepted and was not rejected with errors. You can track the status of your application by logging into Grants.gov, selecting "Applicants" from the top navigation, and selecting "Track my application" from the dropdown list. If the application status is "rejected with errors," you must correct the error(s) and resubmit the application before the 24-hour grace period ends. Applications in "rejected with errors" status after the 24-hour grace period expires will not be received by HUD. Visit Grants.gov for a complete description of processing steps after applying.

HUD strongly recommends you submit your applications at least **48 hours before the deadline** and during regular business hours to allow enough time to correct errors or overcome other problems.

**Grants.gov Customer Support.** Grants.gov provides customer support information on its website at <https://www.grants.gov/web/grants/support.html> . Applicants having difficulty accessing the application and instructions or having technical problems can receive customer

support from Grants.gov by calling (800) 518-GRANTS (this is a toll-free number) or by sending an email to [support@grants.gov](mailto:support@grants.gov). The customer support center is open 24 hours a day, seven days per week, except Federal holidays. The phone number above may also be reached by individuals who are deaf or hard of hearing, or who have speech disabilities, through the Federal Relay Service's teletype service at (800)-877-8339.

You can verify the contents of your submitted application to confirm Grants.gov received everything you intended to submit. To verify the contents of your submitted application:

- Log in to Grants.gov.
- Click the Check Application Status link, which appears under the Grant Applications heading in the Applicant Center page. This will take you to the Check Application Status page.
- Enter search criteria and a date range to narrow your search results.
- Click the Search button. To review your search results in Microsoft Excel, click the Export Data button.
- Review the Status column, to view more detailed submission information, click the Details link in the Actions column.
- To download the submitted application, click the Download link in the Actions column.

Please make note of the Grants.gov tracking number, it will be needed by the Grants.gov Help Desk if you seek their assistance.

HUD may extend the application deadline for any program if Grants.gov is offline or not available to applicants for at least 24 hours immediately prior to the deadline date, or the system is down for 24 hours or longer and impacts the ability of applicants to cure a submission deficiency within the grace period.

HUD may also extend the application deadline upon request if there is a presidentially declared disaster in the applicant's area.

If these events occur, HUD will post a notice on its website establishing the new, extended deadline for the affected applicants. HUD will also include the fact of the extension in the program's NOFO required to be published in the Federal Register.

In determining whether to grant a request for an extension based on a presidentially declared disaster, HUD will consider the totality of the circumstances including the date of an applicant's extension request (how closely it followed the basis for the extension), whether other applicants in the geographic area are similarly affected by the disaster, and how quickly power or services are restored to enable the applicant to submit its application.

**PLEASE NOTE:** Busy servers, slow processing, large file sizes, improper registration or password issues are not valid circumstances to extend the deadline dates or the grace period.

1. Amending or resubmitting an application.

Before the submission deadline, you may amend a validated application through Grants.gov by resubmitting a revised application containing the new or changed material. The resubmitted application must be received and validated by Grants.gov by the applicable deadline.

If HUD receives an original and a revised application for a single proposal, HUD will evaluate only the last submission received by Grants.gov before the deadline.

## 2. Grace Period for Grants.gov Submissions.

If your application is received by Grants.gov before the deadline, but is rejected with errors, you have a grace period of 24 hours after the application deadline to submit a corrected, received, and validated application through Grants.gov. The date and time stamp on the Grants.gov system determines the application receipt time. Any application submitted during the grace period not received and validated by Grants.gov will not be considered for funding. There is no grace period for paper applications.

## 3. Late Applications.

An application received after the NOFO deadline date that does not meet the Grace Period requirements will be marked late and will not be reviewed by HUD for funding consideration. Improper or expired registration and password issues are not sufficient cause to allow HUD to accept applications after the deadline date.

## 4. Corrections to Deficient Applications.

HUD will not consider information from applicants after the application deadline except for curable deficiencies.

HUD will uniformly notify applicants of each curable deficiency. See curable deficiency in the definitions section (Section I.A). Examples of curable (correctable) deficiencies include inconsistencies in the funding request and failure to submit required certifications. These examples are non-exhaustive.

When HUD identifies a curable deficiency, HUD will notify the authorized organization representative identified on the SF-424 Application for Federal Assistance via email. This email is the official notification of a curable deficiency.

Applicants must email corrections of Curable Deficiencies to [applicationsupport@hud.gov](mailto:applicationsupport@hud.gov) within the time limits specified in the notification. The time allowed to correct deficiencies will be no less than 48 hours and no more than 14 calendar days from the date of the email notification. The start of the cure period will be the date stamp on the email sent from HUD. If the deficiency cure deadline date falls on a Saturday, Sunday, Federal holiday, or on a day when HUD's Headquarters are closed, then the applicant's correction must be received on the next business day HUD Headquarters offices in Washington, DC are open.

The subject line of the email sent to [applicationsupport@hud.gov](mailto:applicationsupport@hud.gov) must state: Technical Cure and include the Grants.gov application tracking number or the GrantSolutions application number (e.g., Subject: Technical Cure - GRANT123456 or Technical Cure - XXXXXXXXXXXXX). If this information is not included, HUD cannot match the response with the application under review and the application may be rejected due to the deficiency.

Corrections to a paper application must be sent in accordance with and to the address indicated in the notification of deficiency. HUD will treat a paper application submitted in accordance with a waiver of electronic application containing the wrong UEI/DUNS number as having a curable deficiency. Failure to correct the deficiency and meet the requirement to have a UEI/DUNS number and active registration in SAM will render the application ineligible for funding.

5. **Authoritative Versions of HUD NOFOs.** The version of these NOFOs as posted on Grants.gov are the official documents HUD uses to solicit applications.
6. **Exemptions.** Parties that believe the requirements of the NOFO would impose a substantial burden on the exercise of their religion should seek an exemption under the Religious Freedom Restoration Act (RFRA).

#### **E. Intergovernmental Review.**

This program is not subject to Executive Order 12372, Intergovernmental Review of Federal Programs.

#### **F. Funding Restrictions.**

1. **Purchase of Real Property.** The purchase of real property is not an allowable cost under these programs.
2. **Purchase or Lease of Equipment.** The purchase or lease of equipment having a per unit cost more than \$5,000 is not an allowable cost unless prior written approval is obtained from HUD.
3. **Medical Treatment.** Medical treatment costs are not allowable under this program.
4. **Profit.** For profit entities are not allowed to earn a profit under this grant program.
5. You must comply with the Coastal Barrier Resources Act (16 U.S.C. § 3501 et seq.).
6. You may not conduct lead or healthy home hazard control activities or related work that constitutes construction, reconstruction, repair, or improvement (as referenced in Section 3(a)(4) of the Flood Disaster Protection Act of 1973 (42 U.S.C. §§ 4001-4128)) of a building or mobile home which is in an area identified by the Federal Emergency Management Agency (FEMA) as having special flood hazards unless:
  - a. The community in which the area is situated is participating in the National Flood Insurance Program in accordance with the applicable regulations (44 CFR parts 59-79), or less than a year has passed since FEMA notification regarding these hazards; and
  - b. Where the community is participating in the National Flood Insurance Program, flood insurance on the property is obtained in accordance with section 102(a) of the Flood Disaster Protection Act (42 U.S.C. § 4012a(a)). You are responsible for assuring that flood insurance is obtained and maintained for the appropriate amount and term.
7. **Construction Activities.** Construction activities supported with funds awarded under this NOFO are limited to what is necessary to conduct the proposed research and subject to the limitations cited below;
  - a. The amount of HHTS grant funds used for construction activities, e.g., to supplement a new housing construction or substantial rehabilitation project to improve indoor environmental quality may not exceed 20% of the total HUD funds awarded and must be limited to construction that is necessary to conduct the proposed research. Furthermore, the majority of any funds dedicated to construction activities supported by a HHTS grant shall be spent for interventions not intended for lead hazard control.
  - b. The amount of LTS grant funds used for construction activities, e.g., to conduct repair or substantial rehabilitation that is necessary to conduct the proposed study, may not exceed 20% of the total HUD funds awarded.
8. Costs related to insect or animal testing are not allowable under this program except when necessary, in the context of a broader study focusing on improving integrated pest management methods.

#### **Indirect Cost Rate.**

Normal indirect cost rules under [2 CFR part 200, subpart E](#) apply. If you intend to charge indirect costs to your award, your application must clearly state the rate and distribution base you intend to use. If you have a Federally negotiated indirect cost rate, your application must also include a letter or other documentation from the cognizant agency showing the approved rate. Successful applicants whose rate changes after the application deadline must submit the new rate and documentation to assure the award agreement incorporates the applicable rate.

Applicants other than state and local governments. If you have a Federally negotiated indirect cost rate, your application must clearly state the approved rate and distribution base and must include a letter or other documentation from the cognizant agency showing the approved rate. If your organization does not have a current negotiated rate (including provisional) rate and elects to use the de minimis rate, your application must clearly state you intend to use the de minimis rate of 10% of Modified Total Direct Costs (MTDC). As described in [2 CFR 200.403](#), costs must be consistently charged as either indirect or direct costs but may not be double charged or inconsistently charged as both. Once elected, the de minimis rate must be applied consistently for all Federal awards until the organization chooses to negotiate a rate, which the organization may apply to do at any time. Documentation of the decision to use the de minimis rate must be retained on file for audit.

State and local governments. If your department or agency unit has a Federally negotiated indirect cost rate, your application must include that rate, the applicable distribution base, and a letter or other documentation from the cognizant agency showing the negotiated rate. If your department or agency unit receives more than \$35 million in direct Federal funding per year, you may not claim indirect costs until you receive a negotiated rate from your cognizant agency for indirect costs as provided in Appendix VII to [2 CFR Part 200](#).

If your department or agency unit receives no more than \$35 million in direct Federal funding per year and your department or agency unit has developed and maintains an indirect cost rate proposal and supporting documentation for audit in accordance with 2 CFR Part 200, Appendix VII, you may use the rate and distribution base specified in that indirect cost rate proposal. Alternatively, if your department or agency unit receives no more than \$35 million in direct Federal funding per year and does not have a current negotiated rate (including provisional) rate, you may elect to use the de minimis rate of 10% of MTDC. As described in [2 CFR 200.403](#), costs must be consistently charged as either indirect or direct costs but may not be double charged or inconsistently charged as both. Once elected, the de minimis rate must be applied consistently for all Federal awards until your department or agency chooses to negotiate for a rate, which you may apply to do at any time. Documentation of the decision to use the de minimis rate must be retained on file for audit.

## **G. Other Submission Requirements.**

### **Application, Assurances, Certifications and Disclosures.**

**Standard Form 424 (SF-424) Application for Federal Assistance** is the government-wide form required to apply for Federal assistance programs, discretionary Federal grants, and other

forms of financial assistance programs. Applicants for this Federal assistance program must submit all required forms in the SF-424 Family of forms, including SF-424B (Assurances of Non construction Programs) or SF-424D (Assurances for Construction Programs). Applications receiving funds for both non-construction programs and construction programs must submit both the SF-424B and SF-424D.

By signing the forms in the SF-424 either through electronic submission or in paper copy submission (for those granted a waiver), the applicant and the signing authorized organization representative affirm that they have reviewed the certifications and assurances associated with the application for Federal assistance and (1) are aware the submission of the SF-424 is an assertion that the relevant certifications and assurances are established and (2) acknowledge that the truthfulness of the certifications and assurances are material representations upon which HUD will rely when making an award to the applicant. If it is later determined the signing authorized organization representative to the application made a false certification or assurance, caused the submission of a false certification or assurance, or did not have the authority to make a legally binding commitment for the applicant, the applicant and the individual who signed the application may be subject to administrative, civil, or criminal action. Additionally, HUD may terminate the award to the applicant organization or pursue other available remedies. Each applicant is responsible for including the correct certifications and assurances with its application submission, including those applicable to all applicants, those applicable only to Federally recognized Indian tribes, or Alaskan native villages and those applicable to applicants other than federally recognized Indian tribes or Alaskan native villages.

#### **Assurances.**

By submitting your application, you provide assurances that, if selected to receive an award, you will comply with U.S. statutory and other requirements, including, but not limited to civil rights requirements. Upon receipt of an award, you, and any recipients and subrecipients of the award are also required to submit assurances of compliance with federal civil rights requirements. *See, e.g.,* Title VI of the Civil Rights Act of 1964, Title IX of the Education Amendments Act of 1972, Section 504 of the Rehabilitation Act of 1973, and the Age Discrimination Act of 1975; *see also* [24 C.F.R. §§ 1.5; 3.115; 8.50](#); and [146.25](#). HUD accepts these assurances in the form of the SF-424B and SF-424D, which also require compliance with all general federal nondiscrimination requirements in the administration of the grant.

#### **Applicant Disclosure Report form 2880.**

Required for each applicant applying for assistance within the jurisdiction of HUD to any housing project subject to Section 102(d). Assistance is provided directly by HUD to any person or entity, but not to subrecipients. It includes assistance for the acquisition, rehabilitation, operation conversion, modernization, renovation, or demolition of any property containing five or more dwelling units that is to be used primarily for residential purposes. It includes assistance to independent group residences, board and care facilities, group homes and transitional housing but does not include primarily nonresidential facilities such as intermediate care facilities, nursing homes and hospitals. It also includes any change requested by a recipient in the amount of assistance previously provided, except changes resulting from annual adjustments in Section 8 rents under Section 8(c)(2)(A) of the United States Housing Act of 1937 ([42 U.S.C. 1437f](#)). [See HUD Reform Act regulation for additional information.](#)

### **Affirmatively Furthering Fair Housing.**

With some exceptions for federally recognized Indian tribes and their instrumentalities, the application must discuss how the applicant will carry out the proposed activities in a manner that affirmatively furthers fair housing in compliance with the Fair Housing Act and its implementing regulations. Applicants may propose activities that are consistent with their jurisdiction's Analysis of Impediments (AI), an Assessment of Fair Housing (AFH), or other means of fair housing planning that meaningfully supports their AFFH certification.

If the applicant will carry out proposed activities in a jurisdiction with an accepted Assessment of Fair Housing (AFH), the proposed activities should be consistent with the AFH's fair housing goals and with fair housing strategies specified in the jurisdiction's Consolidated Plan or Public Housing Agency Plan

## **V. Application Review Information.**

### **A. Review Criteria.**

#### **1. Rating Factors.**

##### **a. Rating Factors for PRELIMINARY Applications**

Threshold Requirements. Preliminary applications that meet all the threshold requirements will be eligible to be scored and ranked, based on the total number of points allocated for each of the rating factors described below in this section.

Each of the four factors is weighted as indicated by the number of points that are assigned to it. Subfactors that are not applicable to a specific application (e.g., community involvement) will be scored as "NA" (Not Applicable) and the points for the subfactor will be redistributed to other subfactors under that rating factor. The maximum score that can be attained is 100 points.

Applicants should be certain that each of these factors is adequately addressed within the 5-page narrative and accompanying materials submitted in response to the rating factors. To the extent feasible, include all the needed information within your response to each rating factor. If your response to a particular rating factor cites information provided in your response to another rating factor, clearly indicate where the information is located so that the reviewer can easily locate it. Your response to the rating factors should be submitted on consecutively numbered pages.

#### **(1). Capacity of the Applicant and Relevant Organizational Experience: Maximum Points = 20**

(a). Brief description of the academic qualifications and professional experience (including publications) of key study personnel that is relevant to the proposed study (15 points).

For the evaluation of this subfactor, HUD will use the information provided in this section as well as that provided in the biographical sketches of the key study personnel.

(b). Concise description of the qualifications and relevant professional experience of any partner organization(s) that makes them suitable in providing research support must be included in your proposal. Identify up to two key staff in partner organization(s) and provide a short (one paragraph) biographical sketch for each. HUD strongly encourages collaboration with Historic Black Colleges and Universities (HBCUs) and Hispanic Associations of Colleges and Universities (HACUs) as partners. (Note: these points will be redistributed to subfactor V.A.1.a.(1)(a) if no partner organization(s) are included in your application) (5 points).

**(2). Need for the research: Maximum Points = 35**

(a). Key Research Gap Addressed and Importance of Study Focus Area (20 points).

Clearly and succinctly discuss the need for the proposed research based on the extent to which it addresses a key research gap on a healthy homes or lead-based paint hazard issue. Cite published literature where possible. Explain why the knowledge gap that your proposed study will address is considered key (based on identified gaps in the literature and/or well documented knowledge from professional practice). The importance of the specific topic that your proposed study addresses can be demonstrated by factors such as, but not limited to; the severity and frequency of occurrence of the illness/injury that is addressed; the prevalence and distribution of the housing condition or exposure; the economic impact of the issue that is addressed; the impact of the illness/injury on vulnerable populations; etc. If your proposed study involves implementational science, clearly describe the effective interventions and provide data that shows that the interventions have not been widely adopted to address the residential environmental hazards they are intended for.

(b). Strategic Value in Informing Policy or Practice (15 points).

Describe the strategic value of your proposed research with respect to its potential impact in informing policy or practice within the focus area of your proposed lead or healthy homes technical study. Describe the potential application of your expected study findings in advancing policies and/or program practice related to lead-based paint hazards or other key healthy homes issues.

**(3). Soundness of Approach: Maximum Points = 35**

(a). Study Objectives and Design (25 points).

Identify the major objectives of your proposed study and any hypotheses to be tested (if testable hypotheses are appropriate for the proposed research). Clearly and succinctly describe the design of your proposed technical study, identifying major study milestones. If you are proposing an implementation science study, clearly identify the effective interventions and the context within which you intend to conduct your studies. Discuss any aspects of the study design that would increase the value and utility of study findings (e.g., randomization, use of an appropriate control). Include sufficient detail to demonstrate feasibility and the likelihood that you will achieve the stated objectives. If appropriate, describe your plans for community involvement.

(b). Data Collection and Analysis (10 points).

Describe your plans for ensuring the accuracy and validity of the data that will be collected. Briefly describe the plans for the statistical analysis of study data and your plans for the publication and dissemination of study findings.

**(4). Achieving Results and Project Management: Maximum Points = 10**

(a). Submit a timeline for the completion of major research activities and tasks and a brief description of actions that will be taken to ensure timely completion of the study. It is expected that the study, including drafting and submission of at least one article to a peer-reviewed journal, will be completed within three years of award, which is the maximum period of the cooperative agreement (5 points).

(b). Provide a brief description of your plan for managing and coordinating study activities (5 points).

**b. Rating Factors for FULL Applications**

*Note: You should respond to the following only if you received a notification inviting you to submit a full application. If you respond to the full-application rating factors in your preliminary application submittal, your response to them will not be rated. If your preliminary application submittal includes the preliminary and full-application rating factors and is longer than the preliminary application length limit (see section V.A.1.a), any description/narrative more than the preliminary application limit will not be reviewed (see section IV.B.1).*

Each of the four factors is weighted as indicated by the number of points that are assigned to it. The maximum score that can be attained is 102 points (100 points from the four rating factors and an extra 2 preference points if the applicant is either a Historically Black College or University (HBCU) institution or partnering with a HBCU institution that is substantially involved in conducting the technical studies. For the HBCU partner to be substantially involved, they must either manage a phase of the proposed study and/or at least have one person as a key personnel on the study team). Applicants should be certain that each of these factors is adequately addressed in the project description and accompanying materials. To the extent feasible, include all the needed information within your response to each rating factor. If your response to a particular rating factor cites information provided in your response to another rating factor, clearly indicate where the information is located so that the reviewer can easily locate it.

**(1). Capacity of the Applicant and Relevant Organizational Experience: Maximum Points = 20**

This factor addresses the extent to which you have the ability, capacity, and organizational resources necessary to successfully implement your proposed activities in a timely manner. The rating of your application will include any sub-grantees, consultants, sub-recipients, and members of consortia that are firmly committed to the project (generally, "subordinate organizations"). In rating this factor, HUD will consider the extent to which your application demonstrates:

(a). The capability and qualifications of key and supporting personnel (13 points). HUD will assess the qualifications of key personnel (especially the PI and co-Principal Investigator(s) (co-PIs)) to carry out the proposed study as evidenced by academic and professional background, publications, and recent (within the past 5 years) research experience. The proposed PI must directly represent and be compensated directly by the applicant for their role in the proposed study. Publications and/or research experience are considered relevant if they required the acquisition and use of knowledge and skills that can be applied in the planning and execution of the technical study that is proposed under this NOFO. **In providing information on the key personnel, please include information on their organization position title, phone/fax numbers, email addresses, percentage of time proposed for this grant, percentage of time being spent on other HUD grants, and percentage of time to be spent on other activities. (Note: you have the option to provide the information on key personnel's organization, position title, phone/fax numbers, email addresses, percentage of time proposed for this grant, and percentage of time to be spent on other activities as an attachment).** HUD will also evaluate the qualifications of supporting personnel such as statisticians and research assistants. Indicate roles and activities of partner organizations as they will be evaluated with respect to their qualifications and capabilities to successfully implement

their proposed project roles and activities. HUD strongly encourages collaboration with Historic Black Colleges and Universities (HBCUs) and Hispanic Associations of Colleges and Universities (HACUs) as partners. Please do not include the Social Security Numbers (SSN) of any staff members.

(b). Past performance of the study team in managing similar projects (7 points).

HUD will evaluate your demonstrated ability to successfully manage various aspects (e.g., personnel management, data management and analysis, quality control, reporting) of a complex technical study, as well as your overall success in completing studies on time and within budget. If applicable, provide the number and title of any past OLHCHH grants and describe the objectives and outcomes of those grants and your organization's performance in their implementation (e.g., whether they were completed on time without the request for an extension of the original period of performance). Also, describe the past performance of the organization (applicant and/or partners) on other research related to residential environmental health and safety, or other relevant experience. Provide details about the nature of the project, the funding organization, and your performance (e.g., timely completion, achievement of desired outcomes). If your organization has an active OLHCHH grant or cooperative agreement, provide a description of the progress and outcomes achieved under that award. If you completed one or more HUD-funded Technical Studies grants, your performance will be evaluated in terms of achievements made under the previous grant(s). If you were a PI or a co-PI of a previous HUD technical studies grant from OLHCHH in a fiscal year in which the NOFO required that grantees provide HUD with a draft manuscript for publication as a final work product (i.e., NOFOs starting in Fiscal Year 2006) and you have not submitted a final report or demonstrated a credible attempt to publish the results in a scientific or professional journal, 5 points will be deducted under this sub-factor.

**(2). Need for the research: Maximum Points = 30**

This factor addresses the need for the proposed technical study based on the extent to which it is expected to advance scientific knowledge on a key healthy homes or lead hazard control issue by addressing an important information gap. In responding to this factor, you should document in detail how your project will make a significant contribution towards achieving some or all of HUD's stated goals and objectives for one or more of the topic areas described under section III.F.1. For example, you should demonstrate how your proposed study addresses a need with respect to the development of improved methods for the assessment and control of residential hazards or addresses a need associated with an important housing-related environmental health hazard. Keep in mind that HUD is particularly interested in protecting the health of children and other sensitive populations such as seniors. This is especially important if you are proposing to study a topic that is not highlighted as a priority area by HUD in Section III.F.1. Specific issues to be addressed for this factor include:

(a). Research Need to be addressed:

(i). A concise review of the research need that is addressed by your proposed study and why it is consistent with the goals and objectives of the NOFO; identify which NOFO goals and objectives are addressed by the proposed study. Explain why the knowledge gap that your proposed study will address is considered key (e.g., based on identified gaps in the literature or well documented knowledge from professional practice) for advancing our understanding of

important healthy homes or lead-based paint hazard issues. The importance of the issue that the proposed study addresses can be demonstrated by factors such as: the severity and frequency of occurrence of the illness/injury that is causally related to the study focus; the prevalence of the condition; the economic impact of the issue, and the impact of the illness/injury on vulnerable populations. If your proposed study involves implementation science, clearly describe the effective interventions, and provide data that shows that the interventions have not been widely adopted to address the residential environmental hazards they are intended for (12 points).

(ii). If you are proposing research on a topic identified in Section III.F.1 of this NOFO or you have partnered with an OLHCHH program grantee and a significant part of your study (over 50 percent) will be conducted on properties that are or were remediated with an OLHCHH grant, you will be awarded additional points under this rating factor. (3 points).

(b). Discuss the relevant scientific literature, which should be thoroughly cited in your application. Your proposed study will be judged in part on the soundness of the underlying body of research upon which it is based (e.g., the degree to which it is based upon well-understood or poorly understood associations from previous studies) and the clarity and soundness of your summary and interpretation of this research base. If your application also incorporates the results of unpublished research, you should clearly summarize the results of that research in your response to this rating factor (7 points).

(c). A discussion of how your proposed study would significantly advance the current state of scientific knowledge by summarizing its relationship to past research that is published in the peer-reviewed literature and/or which builds upon pilot research that has not been published (a summary of the latter data should be provided in the application, if applicable). HUD will award the most points under this sub-factor for proposals that are expected to have the greatest impact in advancing the evidence base on key healthy homes or lead hazard topics, with the ultimate goal of applying the research findings to the creation of a larger supply of healthy housing in the U.S. (4 points).

(d). A discussion on how you anticipate your study findings will be used to improve current methods for assessing or mitigating the hazards under study, particularly for affordable housing. Describe how the findings from your study could ultimately be used by programs conducting housing interventions, such as HUD's Lead Hazard Control Program that also conduct non-lead focused interventions with "healthy homes supplement" funding. If applicable, indicate why the method/protocol that would be improved through your study would lead to improved practice and could be widely adopted (e.g., low cost, easily replicated, lack of other options). (4 points).

### **(3). Soundness of Approach: Maximum Points = 38**

This factor addresses the quality of your proposed technical study plan. Specific components include the following:

(a). Soundness of the study design (20 points).

(i). Clearly and thoroughly describe your proposed study and its design and identify the major objectives. If you are proposing an implementation science study, clearly identify the effective interventions and the context within which you intend to conduct your studies. Describe and

discuss why your choice of research design, variables to be measured, and the expected outcomes will address the knowledge gap identified in Rating Factor 2a. If you are proposing a community-based research of home interventions to reduce the risk or severity of an illness or injury, provide evidence for the need for the interventions in the target community (e.g., the prevalence of the targeted hazard and/or the related health outcome). If possible, your study should be designed to address one or more testable hypotheses that you should state clearly and specifically. If you are requesting an award of \$800,000 or more under the HHTS Grant Program, you must clearly describe how funding at this level allows you to design your study in a manner that will provide more definitive findings than would a lower funding level (e.g., use of a randomized controlled trial or other design that incorporates a control group). Failure to describe the study design in sufficient detail will result in the loss of points (10 points).

(ii). The study should be presented as a logical sequence of steps or phases with individual tasks described for each phase and all-important milestones identified, as well as any important "decision points" (2 points).

(iii). Describe the statistical basis for your study design and demonstrate that you would have adequate statistical power (showing the power calculations) to test your stated hypotheses and achieve your study objectives (2 points).

(iv). Discuss your plans for data management and analysis describing key data and the statistical methods that will be employed to analyze these data. (3 points).

(v). If you are proposing to conduct a study that includes a significant level of community interaction (e.g., studies involving participant recruitment, survey research, environmental assessment, or intervention in homes), describe your plan for meaningful involvement of the affected community in your proposed study, including the manner in which you will provide effective communication for persons with disabilities and persons with Limited English Proficiency (LEP). You should define the community of interest with respect to your proposed study and discuss why and how your proposed approach to community involvement will make a meaningful contribution to your study and to the community. For studies in which community participants must visit a facility operated by the applicant pursuant to activities conducted under this NOFO, applicants are advised that such activities must be held in facilities that are accessible to persons with disabilities as required by Section 504 of the Rehabilitation Act and its implementing regulations at 24 CFR Part 8 (3 points or NA).

(b). Quality assurance mechanisms (6 points).

You must describe the quality assurance mechanisms that will be integrated into your project design to ensure the validity and quality of the results. Applicants that receive awards will be required to submit a quality assurance plan to HUD. You should plan for this and include quality assurance activities in your study work plan.

(i). Discuss the major quality assurance mechanisms that are relevant for your proposed study. Examples of quality assurance mechanisms include but are not limited to: procedures for selection of samples/sample sites, sample handling, use of quality control samples, validating the accuracy of instrumentation, standardization of interventions, measures to ensure accuracy during data capture and management, staff training and oversight, and final validation of your dataset. If applicable, documents (e.g., government reports, peer-reviewed academic literature) that provide the basis for your quality assurance mechanisms should be cited. Identify who will have primary responsibility for drafting and ensuring compliance with the Quality Assurance Plan (QAP) and describe how the QAP will be used during the implementation of your study. (A

sample QAP template is available at [www.hud.gov/sites/documents/DOC\\_36504.DOC](http://www.hud.gov/sites/documents/DOC_36504.DOC). Your application will be rated on the thoroughness, clarity, and validity of your proposed quality assurance activities, and their appropriateness for ensuring the validity and quality of the data (3 points).

(ii). For the collection of data using survey or other observational tools, describe the procedures that you will follow to ensure accurate data capture and transfer (e.g., transfer of data from the field to a database). Also, describe any research done (or planned) to validate the instrument (2 points or NA).

(iii). Institutional Review Boards. In conformance with the Common Rule (Federal Policy for the Protection of Human Subjects, codified by HUD at 24 CFR 60.101, which incorporates the DHHS regulation at 45 CFR part 46, subpart A), if your research involves human subjects, your organization must provide proof (e.g., a letter signed by an appropriate official) that the research has been reviewed and approved by an Institutional Review Board (IRB) before you can initiate activities that require IRB approval. Before initiating such activities, you must also provide the number for your organization's assurance (i.e., an "institutional assurance") that has been approved by the DHHS's Office for Human Research Protections (OHRP). You must also provide proof that the IRB that approves your study is registered with the OHRP. You do not have to provide proof of IRB approval with your application. If you do not have IRB approval yet, you should address how you will obtain such approval. Describe how you will obtain informed consent (e.g., from the subjects, their parents, or their guardians, as applicable) and discuss the steps you will take to help ensure participants' understanding of the elements of informed consent, such as the purpose, benefits, and risks of the research. Describe how this information will be provided and how the consent will be collected. For example, describe your use of "plain language" forms, flyers, and verbal scripts, and how you plan to work with families with LEP or primary languages other than English, and with families including persons with disabilities. For additional information on what constitutes human subject research or how to obtain an institutional assurance see the OHRP website at <https://www.hhs.gov/ohrp/> (1 point or NA).

(c) Affirmatively Furthering Fair Housing (AFFH) and Section 3 Requirements (1 point or NA).

(i) AFFH (0.5 points or NA).

If your proposed project will confer a benefit to members of the public in which the work is to be done, through hazard intervention that involves limited construction or rehabilitation of housing (not including routine housing maintenance or minor repair) and/or education or training, then your application must discuss in very specific ways, and in a separate narrative how your proposed plans affirmatively further fair housing, in order to receive funding consideration and points. If, on the other hand, your proposed project entails research without human subjects, such as laboratory research, conducting surveys, analyzing existing data sets, or other narrowly focused activities, your research may still provide results that may affirmatively further fair housing and should be discussed. If that is the case, you need only include an explicit statement (in your narrative response to this sub-factor) to that effect regarding affirmatively furthering fair housing. If applicable, this narrative must describe how your proposed activities further at least one of the following objectives: {i} help overcome any impediments to fair housing choice related to the assisted program or activity itself; {ii} promote racially, ethnically, and socio-economically diverse communities; or {iii} promote housing-related opportunities that overcome

the effects of past discrimination because of race, color, national origin, religion, sex, disability, and family status (i.e. presence of children). The narrative must also show how your proposed plans are designed to help overcome the effect of impediments to fair housing choice that are identified in the Analysis of Impediments to Fair Housing Choice (“AI”) of the jurisdiction(s) in which the planning occurs or are consistent with the Assessment of Fair Housing (AFH) of the jurisdiction(s) in which the planning occurs if the jurisdiction(s) has an accepted AFH. Federally recognized Indian tribes and their instrumentalities are not required to comply with the requirement to affirmatively further fair housing in their use of HUD funds, but may discuss it, if applicable. While HUD is not prescriptive in the actions that may affirmatively further fair housing, strategies that affirmatively further fair housing must include meaningful actions to overcome historic patterns of segregation, promote fair housing choice, and foster inclusive communities free from discrimination. For projects involving limited construction or rehabilitation, examples of activities that affirmatively further fair housing may include, depending on local context, those that ensure that existing residents relocated (or temporarily relocated) to facilitate rehabilitation are entitled to assistance under the URA including preference or right of first refusal for new units in the same location (See Appendix A to 49 CFR 24.2(a)(9)(ii)(D)), as part of a balanced approach towards affirmatively furthering fair housing. For projects which involve community-based research and/or which include enrollment outreach, education and/or training based on local context, examples of activities that affirmatively further fair housing may include but are not limited to:

- (A). where appropriate, designing and implementing the research study to maximize communication and participation with, or dissemination of information to, persons unlikely to have access to the study, including persons of different ethnic and racial backgrounds, and persons with disabilities;
- (B). to the maximum extent practicable, affirmatively marketing the existence of the study or affirmatively disseminating the results of such studies broadly to persons affected, including persons of different races or ethnicities, persons of different socioeconomic status, or persons with disabilities who are not likely to be aware of the study;
- (C). conducting such activities in a manner that provides meaningful access to persons with LEP; and
- (D). targeting the benefits of the research, outreach, or educational activities to vulnerable populations, including, but not limited to, women with children and racial and ethnic minorities.

(ii) Section 3 Requirements (0.5 points or NA).

If your proposed project will conduct limited housing construction or rehabilitation, explain in a separate narrative how you will provide appropriate opportunities to Section 3 residents and Section 3 businesses of the target area, in compliance with Section 3 of the Housing and Urban Development Act of 1968 (12 U.S.C. § 1701u) and HUD’s implementing rules at 24 CFR Part 75. If, on the other hand, your proposed project will not conduct housing construction or rehabilitation, your application need only include an explicit statement (in your narrative response to this sub-factor) to that effect.

(d) Budget Proposal (8 points).

(i). Your budget proposal should thoroughly estimate all applicable direct and indirect costs and be presented in a clear and coherent format. HUD is not required to approve or fund all proposed activities. You must thoroughly document and justify all budget categories and costs (Form

HUD424CBW) and all major tasks, for yourself, sub-recipients, major subcontractors, joint venture participants, or others contributing resources to the project (2 points).

(ii). A separate budget must be provided for partners who are proposed to receive 10 percent or more of the federal budget requested. (1 point or NA).

(iii). Your narrative justification associated with these budgeted costs should be submitted as part of the Total Budget (Federal Share and Leveraging) but is not included in the 25-page limit for this submission. The narrative should clearly provide an explanation of the basis for the major budget items. Separate narrative justifications should be submitted for partners that are submitting separate budgets (3 points).

(iv). Your budget will be assessed on the degree to which it appears to be an efficient use of resources considering the proposed scope of your study. A particular focus will be on the mix of individuals that will be compensated by the grant and the estimated number of hours for each (2 points).

(e). Leveraging Resources (3 points)

Your proposal will be assessed on the extent to which it demonstrates that the effectiveness of HUD's Technical Studies grant funds is being increased by securing other resources or by structuring the study in a cost-effective manner, such as integrating the work into an existing study that will be concurrent with your proposed study. Contributed resources must be shown to be specifically dedicated to and integrated into supporting study activities. Staff and in-kind contributions should be assigned a market-rate monetary value. You should be aware that federal sources are generally not allowed to be used for monetary leverage unless otherwise permitted by that specific federal program's authorizing statute. Your proposal will be scored based on the magnitude of your proposed leveraging, with leveraging valued at 6% or more of your proposed budget awarded the maximum number of points.

To receive points for leveraging from a partner or a source outside your organization, it must be documented with a letter of firm commitment that identifies the monetary value of the contribution. The commitment letter must also be signed by an official of the organization legally able to make commitments on behalf of the organization.

#### **(4). Achieving Results and Project Management: Maximum Points =12**

This factor emphasizes HUD's commitment to ensuring that applicants keep promises made in their applications. The performance of successful applicants will be assessed quarterly to ensure that performance goals are met. This factor requires applicants to clearly identify benchmarks and milestones that demonstrate progress in study completion as well as final study outcomes. Applicants must also provide a management plan that indicates how they will ensure timely and successful completion of the study. The application should include the following:

(a). Demonstration that it is clearly feasible to complete the study within the proposed period of performance and successfully achieve your objectives. You should provide a schedule for the clear and expeditious completion of all major tasks, with associated benchmarks and major study milestones and deliverables. Benchmarks and important milestones (e.g., completing the recruitment of study participants) should be identified on a quarterly basis in a study timeline. Any interim products should be identified. HUD has observed that studies can miss targeted performance timelines because of delays in the IRB approval process, unexpected difficulties with recruiting study participants, or delays in developing new laboratory methods or

instruments. Successful applicants will be required to enter project benchmarks and milestones into a spreadsheet, which will be used by HUD to track study progress. (3 points).

(b). A management plan that discusses the schedule for the completion of all major tasks, with associated benchmarks and major study milestones and deliverables. Identify the organization/person that will have primary responsibility for completion of each of the major study tasks and indicate plans for ensuring effective communication among members of the study team as well as the community, if applicable, about goals, methods, progress, and timeliness. You must also submit an organizational chart that shows the key players in the project, their roles, and their reporting relationships. The chart may be submitted as an attachment and will not count towards the 25-page maximum. (6 points).

(c). In your response you should identify potential obstacles and delays in maintaining your proposed schedule and achieving your study objectives (e.g., recruitment and/or retention) and discuss steps and adjustments you would take to respond to these potential obstacles and delays to ensure timely completion of the study (2 points).

(d). Include plans and schedules for preparation and submission of a minimum of one manuscript for publication in a peer-reviewed academic journal following HUD acceptance. Depending on the study's focus, HUD may also accept submission of a manuscript for publication of study findings in one or more high quality professional journals (i.e., if this is considered more appropriate for the focus area than publication in a scientific/academic journal). Where possible, include the name of the journal in which you plan to publish. The final deliverable can be submitted to HUD during the agreed upon period of performance or during the 90-day closeout period following award expiration (1 point).

**Maximum Points: 100**

## **2. Other Factors.**

### **Preference Points**

HUD encourages activities in support of the interdepartmental initiatives. HUD may award no more than four total preference points for a combination of any of the four (4) preferences (Climate Change, Environmental Justice, Promise Zones (PZ) or Historically Black Colleges and Universities (HBCU). Each preference is worth up to two (2) points. For example, points may be awarded for Climate Change and Environmental Justice, or for Promise Zones and HBCUs.

This program does not offer points for Climate Change

This program does not offer points for Environmental Justice

### **HBCU.**

An applicant designated by the U.S. Department of Education as a Historically Black College or University (HBCU) will receive up to two (2) preference points when the application includes documentation of the applicant's status as an HBCU. [Click here to view the list of accredited HBCU's](#)

Also an applicant partnering with a Historically Black College or University (HBCU) will receive up to two (2) Preference Points when the application includes a Letter of Commitment certifying that an HBCU Partnership is in place and signed by an authorizing official of the

HBCU and documentation of the college or university's status as an HBCU. The HBCU must be substantially involved in carrying out the technical study.

### **Promise Zones**

This program does not offer Promise Zone preference points.

## **B. Review and Selection Process.**

### **1. Past Performance**

In evaluating applications for funding, HUD will consider an applicant's past performance in managing funds. Items HUD will consider include, but are not limited to:

The ability to account for funds in compliance with applicable reporting and recordkeeping requirements;

Timely use of funds received from HUD;

Timely submission and quality of reports submitted to HUD;

Meeting program requirements;

Meeting performance targets as established in the grant agreement;

The applicant's organizational capacity, including staffing structures and capabilities;

Timely completion of activities and receipt and expenditure of promised matching or leveraged funds;

The number of persons served or targeted for assistance;

Producing positive outcomes and results.

HUD may reduce scores based on the past performance review, as specified under V.A. Review Criteria. Whenever possible, HUD will obtain past performance information. If this review results in an adverse finding related to integrity of performance, HUD reserves the right to take any of the remedies provided in Section III E., Statutory and Regulatory Requirements Affecting Eligibility, "[Pre-selection Review of Performance](#)".

### **2. Assessing Applicant Risk.**

In evaluating risks posed by applicants, HUD may use a risk-based approach and may consider any items such as the following:

- Financial stability;
- Quality of management systems and ability to meet the management standards prescribed in this part;
- History of performance. The applicant's record in managing Federal awards, if it is a prior recipient of Federal awards, including timeliness of compliance with applicable reporting requirements, failing to make significant progress in a timely manner, failing to meet planned activities in a timely manner, conformance to the terms and conditions of previous Federal awards, and if applicable, the extent to which any previously awarded amounts will be expended prior to future awards;
- Reports and findings from audits performed under Subpart F—Audit Requirements of this part or the reports and findings of any other available audits; and

- The applicant's ability to effectively implement statutory, regulatory, or other requirements imposed on non-Federal entities.

**a. Preliminary Applications.** Invitations to submit a full application will be made in rank order. Full applications will be solicited from up to 20 Lead and 20 Healthy Homes Technical Study Grant Program pre-applicants whose pre-applications scored at least 75 points. If more than 20 pre-applications for a grant program receive scores of 75 or greater, the 20 highest scoring pre-applicants in that program will be invited to submit full applications; however, for pre-applications that have a score lower by one point or less than the lowest-ranked of the 20 highest-ranked pre-applications, the Application Review Panel will make the final recommendation for soliciting full applications from among those pre-applications based on which application(s) it judges address(es) the most critical research needs. HUD may increase the number of full applications solicited following the scoring of pre-applications if additional funds become available or if an unexpectedly large number of highly qualified pre-applications are received.

**b. Full Applications.** An award will be made to the highest scoring “new applicant” that is eligible for an award if the decision is supported by the majority of the Application Review Panel and the applicant's score is 82 points or higher. Awards will then be made in rank order in the LTS and HHTS programs separately, within the limits of funding availability of each program, from among full applications that scored at least 75 points; however, for the lowest ranked of the highest ranked applications that differ in score by one point or less, the Application Review Panel will make the final funding recommendation based on which application(s) it judges address(es) the most critical research needs.

**c. Partial Funding.** In the selection process, HUD reserves the right to offer partial funding to any or all applicants. If you are offered a reduced grant amount, you will have a maximum of 14 calendar days to accept such a reduced award. If you fail to respond within the 14-day limit, you shall be considered to have declined the award.

## **VI. Award Administration Information.**

### **A. Award Notices.**

Following the evaluation process, HUD will notify successful applicants of their selection for funding. HUD will also notify other applicants, whose applications were received by the deadline, but have not been chosen for award. Notifications will be sent by email to the person listed as the AOR in item 21 of the SF-424.

**Final Grant.** After HUD has made selections, HUD will finalize specific terms of the award and budget in consultation with the selected applicant. If HUD and the selected applicant do not finalize the terms and conditions of the award in a timely manner, or the selected applicant fails to provide requested information, an award will not be made to that applicant. In this case, HUD may select another eligible applicant.

HUD may impose specific conditions on an award as provided under [2 CFR 200.208](#):

- Based on HUD’s review of the applicant’s risk under [2 CFR 200.206](#);
- When the applicant or recipient has a history of failure to comply with the general or specific

terms and conditions of a Federal award;

- When the applicant or recipient fails to meet expected performance goals contained in a federal award; or
- When the applicant or recipient is not otherwise responsible.

**Adjustments to Funding.** To ensure the fair distribution of funds and enable the purposes or requirements of a specific program to be met, HUD reserves the right to fund less than the amount requested in an application.

a. HUD will fund no portion of an application that:

- (1) Is not eligible for funding under applicable statutory or regulatory requirements;
- (2) Does not meet the requirements of this notice; or
- (3) Duplicates other funded programs or activities from prior year awards or other selected applicants.

b. If funds are available after funding the highest-ranking application, HUD may fund all or part of another eligible fundable application. If an applicant turns down an award offer, or if HUD and an applicant do not finalize the terms and conditions of the award in a timely manner, HUD may withdraw the award offer and make an offer of funding to another eligible application.

c. If funds remain after all selections have been made, remaining funds may be made available within the current FY for other competitions within the program area, or be held for future competitions, or be used as otherwise provided by authorizing statute or appropriation.

d. If, after announcement of awards made under the current NOFO, additional funds become available either through the current appropriations, a supplemental appropriation, other appropriations or recapture of funds, HUD may use the additional funds to provide additional funding to an applicant awarded less than the requested amount of funds to make the full award, and/or to fund additional applicants that were eligible to receive an award but for which there were no funds available.

**Funding Errors.** If HUD commits an error that when corrected would cause selection of an applicant during the funding round of a Program NOFO, HUD may select that applicant for funding, subject to the availability of funds. If funding is not available to award in the current fiscal year, HUD may make an award to this applicant during the next fiscal year, if funding is available.

1. Applicants who have been selected for award will be notified by email from the OLHCHH Grant Officer. The email will state the amount the applicant is eligible to receive, and the name of the Government Technical Representative (GTR). This email is not an authorization to begin work or incur costs under the award. An executed cooperative agreement is the authorizing document.

2. HUD may require that the selected applicants participate in negotiations to determine the specific terms of the cooperative agreement and budget. If you accept the terms and conditions of the cooperative agreement, you must return your signed cooperative agreement by the date specified during negotiation. In cases where HUD cannot successfully conclude negotiations with a selected applicant or a selected applicant fails to provide HUD with requested information, an award will not be made to that applicant. In this instance, HUD may offer an award, and proceed with negotiations with the next highest-ranking applicant. You should note

that, if you are selected for multiple OLHCHH awards, you must ensure that you have sufficient resources to provide the promised leveraging for the multiple awards. During negotiations, if you are selected for multiple awards, you will be required to provide alternative leveraged resources, if necessary, before any of the cooperative agreements can be awarded. This is required in order to avoid committing duplicate leveraged resources to more than one OLHCHH cooperative agreement.

3. If you are awarded a cooperative agreement, you will receive additional instructions on how to have the grant account entered into HUD's Line of Credit Control System (eLOCCS) payment system or its successor will be provided. Other forms and program requirements will also be provided.

4. In accordance with 2 CFR 200, Subpart F - Audits Requirements, grantees expending \$750,000 in Federal funds within a program or fiscal year must have a single or program-specific audit conducted for that year in accordance with the provisions of that subpart.

## **B. Administrative, National and Department Policy Requirements and Terms for HUD Recipients Financial Assistance Awards**

For this NOFO, the following [Administrative, National and Department Policy Requirements and Terms for HUD Financial Assistance Awards](#) apply.

1. Unless otherwise specified, these non-discrimination and equal opportunity authorities and other requirements apply to all NOFOs. Please read the following requirements carefully as the requirements are different among HUD's programs.

- Improving Access to Services for Persons with Limited English Proficiency (LEP) See [https://www.hud.gov/program\\_offices/fair\\_housing\\_equal\\_opp/limited\\_english\\_proficiency](https://www.hud.gov/program_offices/fair_housing_equal_opp/limited_english_proficiency).

- Accessible Technology. See

<https://www.hud.gov/sites/dfiles/OCIO/documents/s508103017.pdf>

2. Equal Access Requirements. [See 24 CFR 5.105\(a\)\(2\)](#)

3. Participation in HUD-Sponsored Program Evaluation.

4. Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards.

5. Drug-Free Workplace.

6. Safeguarding Resident/Client Files.

7. Compliance with the Federal Funding Accountability and Transparency Act of 2006 (Pub. L.109-282) (Transparency Act), as amended.

8. Accessibility for Persons with Disabilities. See

[https://www.hud.gov/program\\_offices/fair\\_housing\\_equal\\_opp/disability\\_overview](https://www.hud.gov/program_offices/fair_housing_equal_opp/disability_overview)

9. Violence Against Women Act. See [24 CFR part 5](#), subpart L and applicable program regulations.

10. Conducting Business in Accordance with Ethical Standards/Code of Conduct.

11. Environmental Requirements, which include compliance with environmental justice requirements under Executive Order 12898 and 14008.

## **Eliminating Barriers That May Unnecessarily Prevent Individuals with Criminal Histories from Participation**

In accordance with HUD Secretary Fudge's April 12, 2022, memorandum, Eliminating Barriers That May Unnecessarily Prevent Individuals with Criminal Histories from Participating in HUD Programs, you must not exclude a person's housing unit or property from enrollment in this grant

program, nor exclude a person from participating in a program, service, or activity under this grant program, based on arrest records only. You must ensure that any reliance on a person's conviction history is based on records and evidence showing that it will actually promote safety. You must also ensure that no person is excluded for criminal history without taking into account mitigating circumstances, such as the length of the time since the offense, the nature and severity of the offense, and evidence of rehabilitation. Before excluding an individual because of a criminal record, you should offer that individual the opportunity to provide evidence of mitigating circumstances or that the record is inaccurate.

### **Environmental Review**

Compliance with [24 CFR part 50](#) or [58](#) procedures is explained below:

Compliance with 24 CFR part 50 or 58 procedures is explained below:

a. Eligible Construction and Rehabilitation Activities. A FY 2022 LHHTS award does not constitute approval of specific sites where activities that are subject to environmental review may be carried out. The provisions of section 305(c) of the Multifamily Housing Property Disposition Reform Act of 1994, implemented by HUD regulations at 24 CFR part 58, "Environmental Review Procedures for Entities Assuming HUD Environmental Responsibilities," are applicable to properties assisted with LHHTS grant funds. Therefore, recipients conducting eligible construction and rehabilitation activities must comply with 24 CFR part 58. Recipients that are States, units of general local government or Native American tribes must carry out environmental review responsibilities as a responsible entity under part 58. Recipients that are academic, not-for-profit, for-profit institutions or specialized units of local government must contact and partner with a non-recipient responsible entity, usually the unit of general local government or Native American tribe, to assume the environmental review responsibilities for construction or rehabilitation activities funded (in whole or in part) under this NOFO. Reasonable expenses incurred for compliance with these environmental requirements are eligible expenses under this NOFO. Under 24 CFR 58.11, where the recipient is not a State, unit of general local government or Native American tribe, if a responsible entity objects to performing the environmental review, or the recipient objects to the responsible entity performing the environmental review, HUD may designate another responsible entity to perform the review or may perform the environmental review itself under the provisions of 24 CFR part 50. When HUD performs the review itself, following grant award execution, HUD will be responsible for ensuring that any necessary environmental reviews are completed.

b. For all cooperative agreements under this NOFO, recipients and other participants in the project are prohibited from undertaking, or committing or expending HUD or non-HUD funds (including leveraged funds) on, a project or activities under this NOFO (other than activities listed in 24 CFR 58.34, 58.35(b) or 58.22(f)) until the responsible entity completes an environmental review and the applicant submits and HUD approves a Request for the Release of Funds and the responsible entity's environmental certification (both on Form HUD-7015.15) or, in instances where the recipient is not a State, unit of general local government or Native American tribe and HUD performs the environmental review under part 50, HUD has completed the review and notified the grantee of its approval. The results of the environmental reviews may require that proposed activities be modified, or proposed sites rejected. For Part 58 procedures, see <https://www.hudexchange.info/programs/environmental-review/>. **For assistance, contact Karen Griego, the Office of Lead Hazard Control and Healthy Homes Program**

**Environmental Clearance Officer at (505) 346-6462 (this is not a toll-free number) or the HUD Environmental Clearance Officer in the HUD Field Office serving your area.** If you are a hearing- or speech-impaired person, you may reach the telephone number via TTY by calling the toll-free Federal Relay Service at 1-800-877-8339. Recipients of a grant under this program will be given additional guidance in these environmental responsibilities.

c. All other activities not related to construction or rehabilitation activities are exempt or categorically excluded under 24 CFR 50.19 (b)(1), (3), (5) and (9), and 24 CFR 58.34(a)(1), (3), (5), and (9) from the requirements of the National Environmental Policy Act of 1969 (42 U.S.C. § 4321) and are not subject to environmental review under the related environmental laws and authorities at 24 CFR 50.4.

### **Prohibition on Surveillance**

[2 CFR 200.216](#) Prohibition on Certain Telecommunication and Video Surveillance Services or Equipment

### **Remedies for Noncompliance**

[2 CFR 200.340](#) *Termination* A Federal award may be terminated in whole or in part if the grantee fails to comply with the terms and conditions of the award or if HUD determines the award no longer effectuates the program goals or agency priorities.

### **Lead Based Paint Requirements.**

When providing housing assistance funding for purchase, lease, support services, operation, or work that may disturb painted surfaces, of pre-1978 housing, you must comply with the lead-based paint evaluation and hazard reduction requirements of HUD's lead-based paint rules (Lead Disclosure; and Lead Safe Housing ([24 CFR part 35](#))), and EPA's lead-based paint rules (e.g., Repair, Renovation and Painting; Pre-Renovation Education; and Lead Training and Certification ([40 CFR part 745](#))).

When providing education or counseling on buying or renting housing that may include pre-1978 housing under your grant you must inform clients of their rights under the Lead Disclosure Rule ([24 CFR part 35, subpart A](#)), and, if the focus of the education or counseling is on rental or purchase of HUD-assisted pre-1978 housing, the Lead Safe Housing Rule (subparts B, R, and, as applicable, F - M).

## **C. Reporting.**

HUD requires recipients to submit performance and financial reports under OMB guidance and program instructions.

**1. Recipient Integrity and Performance Matters.** Applicants should be aware that if the total Federal share of your federal award includes more than \$ 500,000 over the period of performance, the award will be subject to post award reporting requirements reflected in Appendix XII to Part 200 Award Terms and Conditions for Recipient Integrity and Performance Matters.

1.a. **Performance Reporting.** All HUD-funded programs, including this program, require recipients to submit, not less than annually, a report documenting achievement of outcomes under the purpose of the program and the work plan in the award agreement.

(1). Final budget and work plans are due 60 days after the start date.

- (2). Progress reporting is required on a quarterly basis. Project benchmarks and milestones will be tracked using a benchmark spreadsheet that incorporates the benchmarks and milestones identified in the response to the full application rating factor (4) (see section V.A.1.b.(4)).
- (3). Tangible Personal Property Report: Grant recipients who purchase equipment in excess of \$5,000 a piece must complete OMB's annual Tangible Personal Property Report, if and after that report receives OMB approval under the Paperwork Reduction Act of 1995 (see 75 Federal Register 14441-14442; March 25, 2011). This report has four components: the Annual Report, the Final (Award Closeout) Report, and the Disposition Report/Request, and, if needed, the Supplemental Sheet (see [https://www.whitehouse.gov/omb/grants\\_forms](https://www.whitehouse.gov/omb/grants_forms)). Generally, the average estimated time to complete each of these components is 0.5 hours; it is likely to be less for this grant program.
- (4). Section 3: Grant recipients covered by Section 3 (see Section V.A.1.b.3.(c).(ii) of this NOFO) must comply with reporting and record-keeping requirements for Section 3 of the Housing and Urban Development Act of 1968, 12 U.S.C. § 1701u (Economic Opportunities for Low- and Very Low-Income Persons in Connection with Assisted Projects). Those requirements can be found at 24 CFR part 75.
- (5). Compliance with Section 872 of the Duncan Hunter National Defense Authorization Act for Fiscal Year 2009 (Pub. L. 110-417), ("Section 872"). Section 872 requires the establishment of a government-wide data system – the Federal Awardee Performance and Integrity Information System (FAPIIS) - to contain information related to the integrity and performance of entities awarded federal financial assistance and making use of the information by federal officials in making awards. OMB is in the process of issuing regulations regarding federal agency implementation of section 872 requirements. A technical correction to this NOFO may be issued when such regulations are promulgated. HUD anticipates that the terms and conditions to its FY 2022 awards will contain requirements related to meeting FFATA and Section 872 requirements.
- (6). Annual submission of Form HUD27061, if applicable, for reporting on racial and ethnic data on human subjects.
- (7). Final Report: The cooperative agreement will specify the requirements for final reporting (e.g., final technical report and final project benchmarks and milestones achieved against the proposed benchmarks and milestones which were approved and incorporated into your cooperative agreement).
- (8). Draft Scientific Manuscript(s) and brown-bag presentation: Grantees will be required to complete a minimum of one draft manuscript for publication in a peer-reviewed journal as well as deliver a "brown-bag" presentation to OLHCHH staff on the results of their study. Questions regarding specific program requirements should be directed to the point of contact listed in Section VII below.

**2. Race, Ethnicity and Other Data Reporting.** HUD requires recipients that provide HUD-funded program benefits to individuals or families to report data on the race, color, religion, sex, national origin, age, disability, and family characteristics of persons and households who are applicants for, participants in, or beneficiaries or potential beneficiaries of HUD programs in order to carry out the Department's responsibilities under the Fair Housing Act, Executive Order 11063, Title VI of the Civil Rights Act of 1964, and Section 562 of the Housing and Community Development Act of 1987.

Many programs use the Race and Ethnic Data Reporting Form HUD-27061, U.S. Department of Housing OMB Approval No. 2535-0113.

**3. Compliance with the Federal Funding Accountability and Transparency Act of 2006 (Pub. L. 109-282) as amended (FFATA).** FFATA requires information on federal awards be made available to the public via a single, searchable website, which is [www.USASpending.gov](http://www.USASpending.gov). Accordingly, each award HUD makes under this NOFO will be subject to the requirements provided by the Award Term in Appendix A to [2 CFR Part 170](#), “REPORTINGSUBAWARD AND EXECUTIVE COMPENSATION INFORMATION,” unless the Federal funding for the award (including funding that may be added through amendments) is not expected to equal or exceed \$30,000. Requirements under this Award Term include filing subaward information in the Federal Funding Accountability and Transparency Act (FFATA) Sub-award Reporting System (FSRS.gov) by the end of the month following the month in which the recipient awards any sub-grant equal to or greater than \$30,000.

#### **4. Program-Specific Reporting Requirements**

See section VI.C.1.a (Reporting Requirements and Frequency of Reporting) above.

##### **D. Debriefing.**

For a period of at least 120 days, beginning 30 days after the public announcement of awards under this NOFO, HUD will provide a debriefing related to their application to requesting applicants. A request for debriefing must be made in writing or by email by the authorized organization representative whose signature appears on the SF-424 or by his or her successor in office and be submitted to the POC in Section VII Agency Contact(s), below. Information provided during a debriefing may include the final score the applicant received for each rating factor, final evaluator comments for each rating factor, and the final assessment indicating the basis upon which funding was approved or denied.

An organization that submitted a preliminary application will receive a written debriefing after a request is made by the authorized official or his/her successor in office.

An organization that submitted a full application will receive a verbal debriefing after a request is made by the authorized official or his/her successor in office.

##### **VII. Agency Contact(s).**

HUD staff will be available to provide clarification on the content of this NOFO.

Questions regarding specific program requirements for this NOFO should be directed to the POC listed below.

Name:

J. Kofi Berko Jr. PhD.

Phone:

202 402 7696

Email:

[j.kofi.berko@hud.gov](mailto:j.kofi.berko@hud.gov)

Persons with hearing or speech impairments may access this number via TTY by calling the toll-free Federal Relay Service at 800-877-8339. Please note that HUD staff cannot assist applicants in preparing their applications.

##### **VIII. Other Information.**

###### **1. National Environmental Policy Act.**

A Finding of No Significant Impact (FONSI) with respect to the environment has been made for this NOFO in accordance with HUD regulations at [24 CFR part 50](#), which implement section 102(2)(C) of the National Environmental Policy Act of 1969 (42 U.S.C. 4332(2)(C)).

The FONSI is available for inspection at [HUD's Funding Opportunities](#) web page.

## **2. Web Resources.**

- [Affirmatively Furthering Fair Housing](#)
- [Code of Conduct list](#)
- [Assistance Listing \(formerly CFDA\)](#)
- [Unique Entity Identifier](#)
- [Equal Participation of Faith-Based Organizations](#)
- [Federal Awardee Performance and Integrity Information System](#)
- [FFATA Subaward Reporting System](#)
- [Grants.gov](#)
- [HBCUs](#)
- [Healthy Homes Strategic Plan](#)
- [Healthy Housing Reference Manual](#)
- [HUD's Strategic Plan](#)
- [HUD Grants](#)
- [Limited English Proficiency](#)
- [NOFO Webcasts](#)
- [Procurement of Recovered Materials](#)
- [Promise Zones](#)
- [Section 3 Business Registry](#)
- [State Point of Contact List](#)
- [System for Award Management \(SAM\)](#)
- [Uniform Relocation Assistance and Real Property Acquisition Act of 1970 \(URA\)](#)
- [USA Spending](#)

## **3. Program Relevant Web Resources**

For programmatic questions on the LHHTS Grant Program, you may contact Brenda M. Reyes, MD, Office of Lead Hazard Control & Healthy Homes, at 202-402-6745 or via email at [Brenda.m.reyes@hud.gov](mailto:Brenda.m.reyes@hud.gov).

For grants administrative questions, you may contact Ms. Deborah V. Roane, Office of Lead Hazard Control & Healthy Homes, at telephone 202- 402-7592 or via email at [Deborah.V.Roane@hud.gov](mailto:Deborah.V.Roane@hud.gov).

If you are a hearing- or speech-impaired person, you may reach the above telephone numbers through TTY by calling the toll-free Federal Relay Service at 1-800-877-8339.

Other Office of Lead Hazard Control & Healthy Homes Information: For additional general, technical, and grant program information pertaining to the Office of Lead Hazard Control and Healthy Homes, visit [www.hud.gov/healthyhomes](http://www.hud.gov/healthyhomes).

Appendices: Appendices A and B to this NOFO are available for downloading with the application at <https://www.Grants.gov>.

**Applicants may use the checklist below as a guide when preparing their PRE-APPLICATION package.**

- a. Cover sheet with the name and contact information
- b. Abstract (limited to 200 words)
- c. Pre-Application Rating Factor Responses (Total narrative response limited to 5 pages.)
  - (1). Capacity of the Applicant and Relevant Organizational Experience (20 points)
  - (2). Need for the Research (35 points)
  - (3). Soundness of Approach (35 points)
  - (4). Achieving Results and Project Management (10 points)
- d. Required materials in response to rating factors (do not count towards the pre-application 5-page limit)
  - (1). Biographical sketches (up to one page per person) for up to three key personnel (do not include Social Security Numbers on sketches)
  - (2). List of references cited in the responses to the rating factors.
- e. Additional materials not to exceed 3 pages
  - (1). Estimated total funding that would be requested
  - (2). All required forms in the SF-424 Family of Forms (including SF-424B)

**Applicants may use the checklist below as a guide when preparing your FULL APPLICATION package.**

- a. Applicant Abstract (limited to 2 pages)
- b. Full Application Rating Factor Responses (Total narrative response limited to 25 pages.)
  - (1). Capacity of the Applicant and Relevant Organizational Experience (20 points)
  - (2). Need for the Research (30 points)
  - (3). Soundness of Approach (38 points)
  - (4). Achieving Results and Project Management (12 points)
- c. Required materials in response to rating factors (do not count towards the full application 25-page limit)
  - (1). Resumes of Key Personnel (limited to 3 pages per resume; do not include Social Security Numbers on resumes)
  - (2). Organizational Chart
  - (3). Letters of Commitment (if applicable) – Letters of commitment should include language defining the activities to be performed, the contributions to be made, and the monetary value of each. NOTE: HUD recommends against including letters of support that do not commit services, materials, or funds; they will not be considered in the evaluation of your application.
  - (4). Affirmatively Furthering Fair Housing Requirements (if applicable) – If the Affirmatively Furthering Fair Housing requirements apply to your proposed project as described in Section V.A.1.b, you must include the applicable narrative discussed in that section in your application; failure to comply will result in the loss of points.
- d. Optional material in support of the Rating Factors (20-page limit).
- e. All required forms in the SF-424 Family of Forms (including SF-424B), SF-LLL, HUD-424CBW and HUD-2880.

## APPENDIX

### APPENDIX A: Key Residential Health and Safety Hazards

The following briefly describes the residential health and injury hazards HUD considers key targets for intervention:

**Allergens and Asthma:** In 2007, the CDC estimated that over 25 million Americans have asthma with an associated annual cost of more than \$56 billion. Asthma is now recognized as the leading cause of school and work absences, emergency room visits, and hospitalizations. For sensitized children, exposure to allergens from dust mites, cats, mold, and cockroaches have been confirmed to cause exacerbation of asthma, with suggestive evidence that dust mite and cockroach allergen can also exacerbate asthma in children that are not sensitized to them. There is sufficient evidence that exposure to tobacco smoke and damp conditions can exacerbate asthma in children. A causal relationship has also been identified for exposure to some of these agents (e.g., cockroaches, cats) and exacerbation of asthma in adults (Kanchongkittiphon et al., 2015). A study of children with atopic (allergic) asthma from seven major U.S. cities reported that over half of the children were allergic to cockroach and dust mite allergens (approximately 70% and 63%, respectively), with approximately 50% of the children allergic to mold (Morgan et al. 2004). Significant fractions of children also tested positive for allergy to cat, rodent and dog allergens. This is consistent with other studies that have found that cockroach allergens tend to be the dominant allergen among asthmatic children living in the inner-city, whereas dust mite allergens appear to dominate among asthmatic children living in most suburban environments. While children are the population most at risk for developing asthma, there is a growing need to address the onset of new cases in older adults, and to examine how their risk factors might differ from those of children (Selgrade et al. 2006).

HUD-funded researchers reported a significant association between higher values of the Environmental Relative Moldiness Index (ERMI), a measure of mold exposure derived using DNA-based measurements of specific fungi in house dust samples, during the first year of life and the diagnosis of asthma at age seven (Reponen et al., 2011). In a follow-up paper, the researchers identified three specific mold species that were significantly associated with asthma development among the study cohort (Reponen et al., 2102).

Interventions known to have beneficial effects include the installation of impervious mattress and pillow covers, which can reduce dust mite allergen exposure by 90 percent. Other dust mite control measures include dehumidification, laundering bedding in hot water, specialized cleaning (dry steam or use of a HEPA vacuum), and removal of carpets and other materials that accumulate dust and are difficult to clean (e.g., dust sinks). Providing residents with education and instruction on cleaning with repeat visits by outreach workers have been shown to result in significant reduction in levels of dust mite and cockroach allergens in floor dust and significant reductions in asthma symptoms among children living in the intervention group when compared to the control group (Takaro et al. 2004; Morgan et al. 2004). Numerous studies employing community health workers to conduct home interventions have demonstrated improvements in children's asthma control (Breyse et al. 2013; Campbell et al. 2015; Kapheim et al. 2015; Turcotte et al. 2014). CDC health scientists in coordination with the Task Force on Community Preventive Services reviewed 20 studies in which multi-trigger, multicomponent, interventions were conducted in the homes of children, and they reported reductions in symptoms, missed

school days, and asthma acute care visits (Crocker et al., 2011). A separate analysis reported a positive return on investment for the interventions in these studies (Nurmagambetov et al., 2011). Interventions emphasizing the mitigation of mold and moisture problems in the homes of asthmatic children have also been shown to be effective. In one HUD-supported study, asthmatic children living in homes in which nontrivial mold growth was identified, were randomized into two groups, with one group receiving interventions to address the residential mold/moisture problems. The remediation group showed statistically significant reductions in symptom days, symptom score, and the need for acute care (Kercsmar et al. 2006). The mean cost of home interventions was \$3,458 per home, including the cost of addressing lead-based paint hazards. Moving families with an asthmatic child into new housing designed to reduce exposure to asthma triggers has also been shown to be effective. HUD-supported research conducted by Takaro et al. (2011) demonstrated improvements in asthma symptoms and other indicators for subjects who lived in asthma-friendly Breathe-Easy Homes in addition to receiving traditional in-home asthma education and outreach. Breathe-Easy Homes addressed multiple asthma triggers by incorporating comprehensive enhancements into the physical structure, including moisture-reduction features, low dust-generating and chemical-emitting finishes, and advanced fresh-air ventilation systems. The authors reported significant improvements in primary (e.g., symptom-free days, FEV1) and secondary (days rescue medicine used, nights with symptoms) outcomes among BEH occupants. Another HUD-funded study conducted in Boston public housing that was newly constructed or rehabbed using green construction methods (and incorporated green management approaches) also demonstrated improvements in children's asthma and in adult sick-building type symptoms (Colton et al. 2015).

**Asbestos:** Asbestos is a mineral fiber that has been used commonly in a variety of building construction materials and household products for insulation and as a fire-retardant. The Environmental Protection Agency (EPA) and the Consumer Product Safety Commission (CPSC) have banned most asbestos products. Manufacturers have also voluntarily limited uses of asbestos. Today, asbestos is most commonly found in older homes in pipe and furnace insulation materials, asbestos shingles, millboard, textured paints and other coating materials, and floor tiles. Elevated concentrations of airborne asbestos can occur when asbestos-containing materials (ACMs) are disturbed by cutting, sanding or other remodeling activities. Improper attempts to remove these materials can release asbestos fibers into the air in homes, increasing asbestos levels and endangering the people living in those homes. The most dangerous asbestos fibers are too small to be visible. After they are inhaled, they can remain and accumulate in the lungs. Asbestos can cause lung cancer, mesothelioma (a cancer of the chest and abdominal linings), and asbestosis (irreversible lung scarring that can be fatal). Most people with asbestos-related diseases were exposed to elevated concentrations on the job; some developed disease from exposure to clothing and equipment brought home from job sites. 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. Intact asbestos-containing materials are not a hazard; they should be monitored for damage or deterioration and isolated if possible. Repair of damaged or deteriorating ACMs usually involves either sealing (encapsulation) or covering it (enclosure). Repair is usually cheaper than removal, but it may make later removal of asbestos more difficult and costly. Repairs should only be done by a trained professional certified to handle asbestos safely and can cost from a few hundred to a few thousand dollars; removal can be more expensive.

**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 inhalable particulate matter (PM). Exposure to carbon monoxide, an odorless gas, can be fatal. Nitrogen dioxide can irritate or damage the respiratory tract, and sulfur dioxide can irritate the eyes, nose and respiratory tract. Improper venting and poor maintenance of heating systems and cooking appliances can dramatically increase exposure to combustion products. As green construction and rehabilitation become more popular, and homes become increasingly airtight to improve energy efficiency, there are concerns about potential trade-offs in indoor air quality and resident health (Selgrade et al. 2006, Wilson et al. 2014). Experts recommend having combustion heating systems inspected by a trained professional every year to identify blocked openings to flues and chimneys, cracked or disconnected flue pipes, dirty filters, rust or cracks in the heat exchanger, soot or creosote build-up, and exhaust or gas odors. Also installing a carbon monoxide detector is recommended; however, such a detector will not detect other combustion by-products.

Replacing unvented gas stoves with electric stoves or placement of air purifiers with HEPA and carbon filters can decrease indoor NO<sub>2</sub> concentrations in urban homes. In a HUD-funded study, Paulin et al. (2013) conducted a randomized trial to evaluate the efficacy of interventions aimed at reducing indoor NO<sub>2</sub> concentrations in homes with unvented gas stoves by replacing existing gas stoves with electric stoves, installing ventilation hoods over existing gas stoves and placing air purifiers with High-Efficiency Particulate Air (HEPA) and carbon filters in homes in low-income communities in Baltimore, MD and monitored over a three-month period.

Stove replacement resulted in a 51% and 42% decrease in median NO<sub>2</sub> concentration in the kitchen and bedroom respectively (p=0.01, p=0.01); air purifier placement resulted in an immediate decrease in median NO<sub>2</sub> concentration in the kitchen (27%, p<0.01) and bedroom (22%, p=0.02), but a significant reduction was seen after three months only in the kitchen (20%, p=0.05). Ventilation hood installation did not significantly change median NO<sub>2</sub> concentrations in either the kitchen or bedroom. Colton et. al. (2014) reported significant reductions in NO<sub>2</sub> in public housing apartments that were rehabbed using green methods, including replacing gas with electric stoves, compared with conventional units.

**E-Cigarettes:** A recent review of the public health consequences of electronic cigarettes by the National Academies of Sciences, Engineering, and Medicine (NASEM, 2018) noted in summary that while “[e]-cigarette aerosol contains fewer numbers and lower levels of most toxicants than smoke from combustible tobacco cigarettes does,” “[t]here is conclusive evidence that e-cigarette use increases airborne concentrations of particulate matter and nicotine in indoor environments compared with background levels,” and “that in addition to nicotine, most e-cigarette products contain and emit numerous potentially toxic substances.” The review noted that, “the absolute risks of the products cannot be unambiguously determined at this time. Long-term health effects, of particular concern for youth who become dependent on them, are not yet clear,” and recommended research on “the impact of e-cigarette use in indoor air quality and biomarkers of second-hand e-cigarette exposure in scenarios and exposure surveys that are relevant for the populations exposed, including ... children, [and] pregnant women.”

**Environmental Tobacco Smoke (ETS):** ETS (also known as secondhand smoke) results from the combustion of tobacco products and exhalation of inhaled tobacco smoke by active smokers. Tobacco smoke contains as many as 7000 individual compounds, including formaldehyde, carbon monoxide, nicotine, nitrosamines and polyaromatic hydrocarbons, with nearly 70 compounds identified as carcinogens (US DHHS, 2010; IARC, 2004). Exposure to ETS has been associated with numerous adverse health effects, including multiple types of cancer, coronary heart disease, asthma, respiratory tract infections and others. Additionally, exposure to ETS has been estimated to cause approximately 50,000 excess deaths annually in the U.S., including sudden infant death syndrome (Cal EPA, 2005). Children are particularly vulnerable to the effects of ETS. The U.S. Surgeon General's office reported that approximately 22 million children may be exposed to ETS in the U.S. (US DHHS, 2006). Exposure to ETS can be a problem even in rooms or units where smoking does not occur. Van Deusen et al. (2009) reported that levels of particulate matter (an indicator of tobacco smoke) were elevated in rooms within a home that were distant from the primary room where smoking occurred. In addition, ETS also migrates between units in multi-unit buildings. Kraev et al. (2009), measured nicotine in air and air exchange rates in individual units of a lower-income multi-unit building in the Boston area and found measurable levels of nicotine in units where no smoking occurred; King et al. (2010) reported similar results in nonsmoking units and hallways as part of a study in Buffalo. Wilson et al. (2011) analyzed measurements of cotinine exposure in children (an indicator of ETS exposure) and found that those living in multifamily housing had higher levels than children in detached housing, indicating the contribution from ETS migrating between units of multifamily housing.

**Green Construction and Energy Upgrades:** Green building and design standards are being incorporated into housing construction and rehab specifications with increasing frequency. The use of green standards has been primarily driven by the efficiency gains and the resulting reductions in cost of energy and water usage. The potential impact of green standards on indoor environmental quality and health has mainly been based on the expectation that green features and management practices would reduce exposure to allergens and toxic substances within the home (e.g., improved indoor air quality, use of integrated pest management). Some recent studies have shown a positive correlation between green construction/weatherization and improved health of residents. A HUD-funded study demonstrated benefits to indoor air quality and resident health in green vs. conventional low-income housing. The researchers reported 57%, 65%, and 93% lower concentrations of PM 2.5, NO2, and nicotine, respectively, in green vs control homes, as well as fewer reports of mold, pests, inadequate ventilation, and stuffiness (Colton et al. 2014). They further reported that asthmatic children living in green homes experienced fewer asthma symptoms, asthma attacks and asthma-related school absences when compared to those in conventional housing (Colton et al., 2015). In another HUD-funded study, Breyse et al. 2013 reported decreases in the overall number of children with poorly controlled asthma when combining weatherization and healthy homes interventions.

**Infiltration of Ambient Pollutants:** Personal exposure to airborne contaminants is a function of indoor and outdoor exposures. For people living in areas that are near roadways or a point source generating hazardous pollutants, for example, the infiltration of ambient pollutants has the potential to dominate personal exposures. Logue et al. (2010, 2011) identified a number of pollutants that present significant health risks in indoor environments; however, many of those

pollutants are found also in the ambient environment suggesting infiltration of ambient air pollution may be of concern when identifying exposure risks to occupants of a home. Meng et al. (2005) reported in the Relationships of Indoor, Outdoor, and Personal Air (RIOPA) study across three U.S. cities that approximately 60% of indoor PM<sub>2.5</sub> originated from the outdoors. Allen et al. (2012) identified the frequency of air conditioner use and the opening of windows as predictors of ambient pollution infiltration during the summer months, while temperature and the use of forced air heat were predictors during winter months. Studies on practical control technologies and to reduce the infiltration of outdoor air pollutants into homes are needed.

**Insect and Rodent Pests:** The observed association between exposure to cockroach allergen and asthma severity has already been noted above. In addition, cockroaches may act as vehicles to contaminate environmental surfaces with certain pathogenic organisms. Rodents can transmit a number of communicable diseases to humans, either through bites, arthropod vectors, or exposure to aerosolized excreta. Humans can become sensitized to proteins in rodent urine, dander and saliva. Such sensitization may contribute to asthma severity among sensitized individuals. Insect and rodent infestations are frequently associated with substandard housing that makes them difficult to eliminate. Even though studies have shown that bedbugs do not transmit any human diseases, CDC, EPA and USDA have declared bedbugs as pest of significant public health importance. Research indicates that the presence of bedbugs and their bites can result in adverse physical and mental health effects (e.g., infections, anxiety, and insomnia) as well as economic consequences. These include allergic reactions to their bites, secondary infections and expensive control measures and therefore have to be treated. However, the treatment of rodent and insect infestations often includes the use of toxic pesticides that may present hazards to occupants (see below). A HUD-funded study demonstrated that the use of an integrated pest management (IPM) approach resulted in significant reduction in cockroaches in heavily infested public housing (Wang et al.2009). The use of IPM for pest control is recommended by federal agencies, including the U.S. EPA, HUD, and the CDC because it minimizes the use of toxic pesticides and instead emphasizes environmental controls such as elimination of harborages and removing access to food and water. This recommendation was recently confirmed by an expert panel that systematically reviewed the literature on this topic (Sandel et al., 2010). According to the expert panel, sufficient evidence was available to support the implementation of an IPM approach as a way of reducing pesticide residues in the home.

**Lead Hazards:** 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 (BLLs) have fallen nationally, a large reservoir of lead remains in housing. Recent results from CDC's Fourth National Health and Nutrition Examination Survey (NHANES 2002) demonstrate that the national geometric mean blood lead concentration of children aged 1-5 years has decreased from 2.3 µg/dL in 1991 to 1.6 µg/dL in the period 1999-2002 (CDC 2005). During the 1999-2002 survey period, children aged 1-5 years had the highest prevalence of elevated BLLs (1.6%), so that approximately 310,000 children aged 1-5 years remained at risk for exposure to harmful lead levels. Overall, by race/ethnicity, non-Hispanic blacks and Mexican Americans had higher percentages of elevated BLLs (1.4% and 1.5%, respectively) than non-Hispanic whites (0.5%). Among subpopulations, non-Hispanic blacks aged 1-5 years and aged >60 years had the highest prevalence of elevated BLLs (3.1% and 3.4%, respectively). As BLLs have dropped over the years, recent analyses have examined the

relationship between relatively low blood lead concentrations (<10g/dL) and cognitive functioning in representative samples of U.S. children and adolescents and have found evidence that suggests that deficits in cognitive and academic skills associated with lead exposure have no threshold (Lanphear et al., 2000; Canfield et al., 2003). These findings clearly support the importance of primary prevention with respect to childhood lead exposure. Despite dramatic reductions in blood lead levels over the past 15 years, lead poisoning continues to be a significant health risk for young children.

According to the recent HUD funded American Healthy Homes Survey II lead findings report ([AHHS II](#)), an estimate of 34.6 million homes (about 29.4% of US housing stock) contain LBP, of which about 30.9 million (89%) were built before 1978. Using the definition of lead dust hazards applicable to AHHS, about 22.3 million (18.9% of all homes) have one or more significant LBP hazards. The survey further estimates that 1.6 million homes with one or more LBP hazards poses the highest risk of lead poisoning because they housed low-income families (household income less than \$35,000 per year) and have children who are less than six years of age. Among HUD grantees, lead hazard control (LHC) costs tend to range from \$500 to \$15,000 per unit, with a median cost of \$5,960. Corrective measures include paint stabilization, enclosure and removal of certain building components coated with lead paint, cleanup and 'clearance testing,' which ensures the unit is safe for young children. In addition, acute injuries to children have been well documented, most notably in instances involving sanding or stripping of lead-based paint or visible deterioration of lead-based painted residential building components combined with children who exhibit pica tendencies.

Evaluation of lead hazard control interventions conducted by recipients of HUD's lead hazard control grants found that interventions were effective in significantly reducing pre-intervention dust-lead levels on floors and window surfaces up to six years following intervention (Wilson et al. 2006). More intensive treatments were found to significantly reduce dust lead loadings on windowsills and troughs compared to lower-level treatments, however, no significant differences in dust-lead loadings on floors were reported. Sandel et al. (2010) confirmed these general findings, citing that lead hazard control interventions were effective in reducing exposures to lead exposures. The authors concluded that the evidence was sufficient to promote lead hazard control interventions as a means of reducing lead exposure and associated health effects, particularly in children. In a HUD-funded follow-up study of residential window replacement and lead hazard control after homes were enrolled in an evaluation of the HUD Lead Hazard Control Grant Program, Dixon, et al. 2012, reported that 12 years after intervention, homes with all replacement windows had significantly lower interior floor dust-lead and sill-lead levels compared to homes with partial window replacement. Wilson, et al. 2015 reported on the importance of including porches in the evaluation and control of lead-based paint hazards. The study demonstrated significant reductions in porch dust-lead levels following floor replacement or paint stabilization.

Drinking water can also be an important source of lead exposure. Lead can leach from brass fixtures into water as well as from lead solder used in interior plumbing. Also, some older homes in the U.S. have lead supply lines connecting the home to the larger public water supply line. Lead leaching from supply lines can be mitigated through treatment of the water using chemical agents at water treatment plants. Lead exposure from inadequate water treatment was documented among children living in Flint, Michigan in 2015 (Hanna-Attisha et al., 2016).

**Mold and Moisture:** An analysis of several pulmonary disease studies estimates that 25 percent

of airways disease, and 60 percent of interstitial lung disease may be associated with moisture in the home or work environment. Moisture is a precursor to the growth of mold and other biological agents, which is also associated with respiratory symptoms. 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 the mold *Stachybotrys Atra* (SA) in air and cultured surface samples, although this association could not be considered a causal relationship. 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. A review by an expert committee convened by the Institute of Medicine found sufficient evidence for an association between exposure to mold and other agents in damp indoor environments and asthma symptoms in sensitized persons, upper respiratory tract symptoms, cough, and wheeze (IOM 2004). The committee also found limited or suggestive evidence for an association between damp indoor environments and the development of asthma. A HUD-funded study reported three mold species common to water damaged buildings, *Aspergillus ochraceus*, *Aspergillus unguis*, and *Penicillium variabile*, when measured in house dust during the first year of life, were significantly associated with the development of asthma in children at age 7 (Reponen et al. 2012; Reponen et al. 2013). Addressing mold problems in housing requires coordination among the medical, public health, microbiological, housing, and building science communities. Krieger et al. (2010) report that an expert panel review of relevant literature on this topic found that a combined approach of eliminating active leaks and moisture intrusion into the home while also removing moldy items already in place was an effective intervention strategy for reducing exposure to mold and associated respiratory health effects. The panel concluded that there was sufficient evidence to support implementation of a coordinated intervention strategy for mold and moisture problems. The cost of mold/moisture-related intervention work (e.g., IPM, clean and tune furnace, remove debris, vent clothes dryer, cover dirt floor with impermeable vapor barrier) is a few hundred dollars, unless major modification of the ventilation system or structural repairs is needed. For example, in Cleveland, mold interventions, including repairs to ventilation systems and basement flooring, in the most heavily contaminated homes range from \$500 to \$5,000, with some costs also being dedicated to LHC simultaneously through its lead and asthma program.

**Pesticide Residues:** According to the EPA, 75 percent of U.S. households used at least one pesticide product indoors during the past year. Products used most often are insecticides and disinfectants. Another study suggests that 80 percent of most people's exposure to pesticides occurs indoors and that measurable levels of up to a dozen pesticides have been found in the air inside homes. The amount of pesticides found in homes appears to be greater than can be explained by recent pesticide use in those households; other possible sources include contaminated soil or dust that migrates in from outside, stored pesticide containers, and household surfaces that collect and then release the pesticides. Pesticides used in and around the home include products to control insects (insecticides), termites (termiticides), rodents (rodenticides), molds and fungi (fungicides), and microbes (disinfectants). In 2005, the American Association of Poison Control Centers reported that some 1.6 million children were involved in common household pesticide poisonings or exposures (AAPCC 2005). In households with children less than five years of age, almost half stored at least one pesticide product within the reach of children. Exposure to high levels of cyclodiene pesticides, commonly associated with

misapplication, has produced various symptoms, including headaches, dizziness, muscle twitching, weakness, tingling sensations, and nausea. In addition, the EPA is concerned that cyclodienes might cause long-term damage to the liver and the central nervous system, as well as an increased risk of cancer. A recent expert panel review (Sandel et al., 2010) found that implementation of an integrated pest management approach was an effective intervention for reducing pesticide residues in the home and should be implemented in lieu of pesticide application for reducing pests. Furthermore, there is evidence to suggest that the usage of insecticides for combating bed bugs is becoming increasingly ineffective due to the development of resistance to pyrethroids, the active ingredient (Adelman et al, 2011).

**Radon:** The National Academy of Sciences estimates that approximately 15,000 cases of lung cancer per year are related to radon exposure. 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. Excessive exposures are typically related to home ventilation, structural integrity and location. Radon measurement and remediation methods are well developed, and the EPA recommends that every home be measured for radon. Sandel et al. (2010) conducted a review of the literature and concluded that active soil depressurization beneath the foundation of the structure was an effective method for reducing radon exposures in the home. EPA estimates that materials and labor costs for radon reduction in an existing home are \$800-\$2,500. Including radon resistant techniques in new home construction costs \$350-\$500 and can save up to \$65 annually in energy costs, according to the EPA. The American Association of Radon Scientist (AARST) has published several standard protocols for the testing and mitigation of radon hazards in single and multifamily housing (e.g., ANSI/AARST ASD-RMS-2006, CCAH-2012, MAMF-2012, RMS-MF 2014, MAH 2014).

**Semi-Volatile Organic Compounds (SVOCs):** Several SVOCs are emerging as potential health risks in the home due to their ubiquitous nature in consumer and building products that are produced in high volume and used worldwide. SVOCs exist partially in the gas-phase and emit their respective chemical gradually over time, particularly in the presence of increased temperatures. Two compounds of increasing concern are phthalates and polybrominated diphenyl ethers (PBDE). During recent years, phthalate and PBDE compounds have received increased scrutiny due to their potential cumulative health risks and increased use in consumer products. PBDE are found in flame retardants, plasticizers, and flexible foams, and may also be found in children's products. Phthalates are used as plasticizers and are most notable for their use in children's products, such as teething rings, food contact items and other flexible polyvinyl chloride (PVC)-based products. The health effect most widely associated with phthalates exposures are reproductive effects, while PBDE have shown toxicity potential in liver, thyroid and neurodevelopment systems. Exposure to phthalates may occur via many different routes; inhalation, ingestion, water and soil. It may occur in various environments from the home to the workplace. Children are reported to have the highest exposures to phthalates among all age groups (CDC, 2005), along with lower socioeconomic status households (Zota et al., 2008). Both phthalates and PBDE have been found in house dust; exposure to dust has been reported as the primary route of exposure for PBDE (Wilford et al., 2005; Zota et al., 2008). The presence of

both phthalates and PBDE in house dust presents potential risks particularly to young children. Several house characteristics, including older age of house, water leakage and use of PVC in flooring materials, have been identified as significant indicators for potential phthalates exposures (Bornehag et al., 2005). The increased concern over phthalates and PBDE has led to increased regulatory scrutiny. In 2008, the U.S. Consumer Product Safety Commission issued a prohibition on the use of several phthalate compounds above threshold levels in children's toys and items used for childcare. Furthermore, PBDE have been banned at the state level, including in California and Washington.

**Third Hand Smoke (THS):** Adverse health effects from exposure to active smoking and passive smoking (ETS or Second-Hand Smoke (SHS)) are well documented. Tobacco smoke contains as many as 7000 individual compounds, including formaldehyde, carbon monoxide, nicotine, nitrosamines and polyaromatic hydrocarbons, with nearly 70 compounds identified as carcinogens (US DHHS, 2010; IARC, 2004). THS refers to residual pollutants originating from tobacco smoke that persist in dust and adsorb onto surfaces, ultimately re-emitting pollutants into the gaseous phase over time after the smoke has dissipated (Hoh et al., 2012). Pollutants that are re-emitted also have the potential to interact with the local atmosphere resulting in physical and chemical transformation of original contaminants into secondary pollutants, some of which may be more hazardous than the original pollutant (Matt et al., 2011). HUD-funded research also found that the presence of smokers in a home was a significant predictor of both children's blood-lead levels and surface dust-lead loading (Dixon et al., 2009; Gaitens et al., 2009). Exposure to THS occurs most often by inhalation, but may also occur through ingestion of contaminated dust, or through dermal contact with surfaces that have residual contamination. While this is an emerging area of research with relatively sparse information to date, there is initial evidence to suggest that THS may be a concern, particularly for children who have a higher frequency of hand-to-mouth activity that might increase their exposure by ingestion and dermal routes, in addition to inhalation. Matt et al. (2010) reported that THS residue persisted in homes even after they had been cleaned and prepared for the next tenant.

**Unintentional Injuries/Fire:** In 1997, nearly 7 million persons in the U.S. were disabled for at least one full day by unintentional injuries received at home; for children younger than 15 years of age, unintentional injury is now the leading cause of death and disability. A HUD-supported study of deaths among US children and adolescents from 1985 to 1997 found that an average of 2,822 unintentional deaths occurred annually from residential injuries (Nagaraja et al., 2005). The highest death rates were attributable to fires, submersion or suffocation, and poisoning. Black children were two times more likely to die from residential injuries than white children. The elderly are also at an elevated risk for residential injuries. Home visitation protocols have been shown to be effective in reducing exposure to injury 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 (e.g., smoke alarms, electrical socket covers, etc.). DiGuseppi et al. (2010) reported on an expert panel review of seventeen interventions intended to reduce injuries due to residential deficiencies. Installed and properly working smoke detectors were determined to be an effective intervention that should be implemented for reducing fire-related injuries. This panel deemed four-sided pool enclosures efficacious and pre-set safe hot waters heaters sufficient for reducing residential-based injuries.

## **APPENDIX B: Relevant Publications, Guidelines and Other Resources**

The sources below are provided for informational purposes only. By inclusion in this Appendix, HUD is not necessarily endorsing any of the research, findings, or policies. To secure any of the documents listed, call the telephone number provided. If you are a hearing-or speech-impaired person, you may reach the telephone numbers through TTY by calling the toll-free Federal Relay Service at 800-877-8339. A number of these references are provided on HUD's CD, Residential Lead Desktop Reference, 3rd Edition. Several of these references can be downloaded from the Internet without charge from the HUD Office of Lead Hazard Control and Healthy Homes Internet site, [https://www.hud.gov/program\\_offices/healthy\\_homes](https://www.hud.gov/program_offices/healthy_homes).

### **1. REGULATIONS:**

**Worker Protection:** Occupational Safety and Health Administration (OSHA) publications listed below can be purchased by calling either OSHA Regulations at 202-693-1888(OSHA Regulations) (this is not a toll-free number) or the Government Printing Office (GPO) at 202-512-1800(this is not a toll-free number). OSHA standards and other publications can be downloaded or purchased (as applicable) from OSHA's publication web page, [www.osha.gov /pls/publications/pubindex.list](http://www.osha.gov/pls/publications/pubindex.list). A broad range of information on construction and other worker protection requirements and guidelines is available from OSHA's home page, [www.osha.gov/](http://www.osha.gov/) and from [www.osha.gov/SLTC/lead/](http://www.osha.gov/SLTC/lead/).

**Waste Disposal:** A copy of the EPA regulations at 40 CFR parts 260-268 can be purchased by calling 800-424-9346, or, from the Washington, DC, metropolitan area, 703-412-9810(this is not a toll-free number). The regulations can also be downloaded without charge from the EPA website at [www.epa.gov/lead/pubs/fslbp.htm](http://www.epa.gov/lead/pubs/fslbp.htm).

### **Lead**

a. U.S. Environmental Protection Agency. Requirements for Lead-Based Paint Activities in Target Housing and Child-Occupied Facilities; Final Rule: 40 CFR part 745 (EPA) (Lead Hazard Standards, Work Practice Standards, EPA and State Certification and Accreditation Programs for those engaged in lead-based paint activities) can be purchased by calling the Toxic Substances Control Act (TSCA) Assistance Service at 202-554-1404(this is not a toll-free number). The rule and guidance can be downloaded from the Internet without charge at [www.epa.gov/lead/pubs/leadcert.htm](http://www.epa.gov/lead/pubs/leadcert.htm).

b. HUD. Requirements for Notification, Evaluation and Reduction of Lead-Based Paint Hazards in Federally Owned Residential Property and Housing Receiving Federal Assistance; Final Rule: 24 CFR part 35, subparts B through R, published September 15, 1999 (64 FR 50201) (HUD) can be purchased by calling the NLIC's toll-free number (800-424-LEAD) or downloaded without charge from the HUD website

at [https://www.hud.gov/program\\_offices/healthy\\_homes/enforcement/lshr](https://www.hud.gov/program_offices/healthy_homes/enforcement/lshr).

c. HUD. Requirements for Disclosure of Information Concerning Lead-Based Paint in Housing, 24 CFR Part 35, Subpart A (HUD, Lead-Based Paint Disclosure Rule) by calling the NLIC's toll-free number (800-424-LEAD). The rule, guidance, pamphlet and disclosure formats can be downloaded from the HUD website at [https://www.hud.gov/program\\_offices/healthy\\_homes/enforcement/lshr](https://www.hud.gov/program_offices/healthy_homes/enforcement/lshr).

d. HUD. Requirements for Notification, Evaluation and Reduction of Lead-Based Paint Hazards in Federally Owned Residential Property and Housing Receiving Federal Assistance; Response to Elevated Blood Lead Levels. Final rule. 82 FR 4151-4172; January 13, 2017. <https://www.federalregister.gov/d/2017-00261>.

e. U.S. Environmental Protection Agency. Lead; Identification of Dangerous Levels of Lead; Final Rule at 66 FR 1205-1240 (January 5, 2001). This rule and guidance can be obtained without charge by calling the NLICs toll-free number (800-424-LEAD) or by calling the TSCA Assistance Service at: 202-554-1404 (this is not a toll-free number). The rule and guidance can be downloaded from the EPA website at [www.epa.gov/lead/pubs/leadhaz.htm](http://www.epa.gov/lead/pubs/leadhaz.htm).

f. U.S. Environmental Protection Agency. Lead; Renovation, Repair, and Painting Program; Final Rule at 73 FR 21692- 21769 (April 22, 2008). As of April 22, 2011, the rule was fully implemented. This rule and guidance can be obtained without charge by calling the NLIC's toll-free number (800-424-LEAD) or by calling the TSCA Assistance Service at: 202- 554-1404 (this is not a toll-free number). The rule and guidance can be downloaded from the EPA website at [www.epa.gov/lead/pubs/renovation.htm](http://www.epa.gov/lead/pubs/renovation.htm).

## **2. GUIDELINES AND OTHER RESOURCES:**

### **Lead**

Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing; HUD. The Guidelines can be downloaded from the HUD website without charge at [www.hud.gov/program\\_offices/healthy\\_homes/lbp/hudguidelines](http://www.hud.gov/program_offices/healthy_homes/lbp/hudguidelines).

Preventing Lead Poisoning in Young Children; Centers for Disease Control, August 2005. These guidelines can be obtained without charge by calling the CDC toll free number at 888-232-6789. The guidelines can also be downloaded from [www.cdc.gov/nceh/lead/publications/PrevLeadPoisoning.pdf](http://www.cdc.gov/nceh/lead/publications/PrevLeadPoisoning.pdf).

Screening Young Children for Lead Poisoning: Guidance for State and Local Public Health Officials, November 1997; Centers for Disease Control and Prevention (CDC). These guidelines can be obtained without charge by calling the CDC toll free number at 888-232-6789 or they can be downloaded from [www.cdc.gov/nceh/lead/publications/screening.htm](http://www.cdc.gov/nceh/lead/publications/screening.htm).

EPA's TRW Bioavailability Committee has developed the following guidance and documents on the use of soil treatments for Pb contamination;

<https://semsub.epa.gov/work/HQ/100000048.pdf>

<https://www.tandfonline.com/doi/pdf/10.1080/10937404.2013.825216>

OLEM 9200.2-164. EPA issued this memo to transmit the Technical Review Workgroup (TRW) for Metals and Asbestos technical documents entitled “Standard Operating Procedure for an In Vitro Bioaccessibility Assay for Lead and Arsenic in soil” and “Validation Assessment of In Vitro Arsenic Bioaccessibility Assay for Predicting Relative Bioavailability of Arsenic in Soils and Soil-like materials at superfund sites.” <https://clu-in.org/download/contaminantfocus/arsenic/arsenic-SOP-OLEM-9200.2-164.pdf>

### **Green Buildings**

U.S. Department of Energy. Building Energy Codes Programs. Available at: [www.energycodes.gov/development/green/codes](http://www.energycodes.gov/development/green/codes)

Enterprise Community Partners. Green Communities. Available at: [www.enterprisecommunity.org/solutions-and-innovation/green-communities](http://www.enterprisecommunity.org/solutions-and-innovation/green-communities)

National Association of Home Builders. National Green Building Programs Information. Available at: [www.nahb.org/en/nahb-priorities/green-building-remodeling-and-development/NAHB-toolkit-for-sustainability/national-green-building-program-information.aspx](http://www.nahb.org/en/nahb-priorities/green-building-remodeling-and-development/NAHB-toolkit-for-sustainability/national-green-building-program-information.aspx)

U.S. Environmental Protection Agency. Indoor air PLUS Program. Available at: [www.epa.gov/indoorairplus/](http://www.epa.gov/indoorairplus/).

U.S. Green Building Council. LEED for Homes. Available at: <https://new.usgbc.org/>.

### **IPM**

IPM: A Guide for Affordable Housing: <http://www.stoppests.org/what-is-ipm/>

### **Bed Bugs**

Collaborative Strategy on Bed Bugs. 2015. Prepared by The Federal Bed Bug Workgroup. <https://www.epa.gov/sites/production/files/2015-02/documents/fed-strategy-bedbug-2015.pdf>

## **3. REPORTS:**

### **Lead**

Putting the Pieces Together: Controlling Lead Hazards in the Nation's Housing, (Summary and Full Report); HUD, July 1995. A copy of this summary and report can be purchased by calling 800-245-2691 toll free

Preventing Lead Poisoning in Young Children, A Statement by the Centers for Disease Control and Prevention, Atlanta, GA, August. 2005. This can be downloaded from the Internet without charge at [www.cdc.gov/nceh/lead/publications/prevleadpoisoning.pdf](http://www.cdc.gov/nceh/lead/publications/prevleadpoisoning.pdf).

American Healthy Homes Survey II Lead Findings final Report. U.S. Department of Housing and Urban Development, Office of Lead Hazard Control and Healthy Homes. October 29, 2021

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### **Healthy Homes**

Healthy Housing Reference Manual; HUD/CDC, 2006. A copy of this manual can be downloaded from the CDC website without charge at [www.cdc.gov/nceh/publications/books/housing/housing\\_ref\\_manual\\_2012.pdf](http://www.cdc.gov/nceh/publications/books/housing/housing_ref_manual_2012.pdf)

The Healthy Homes Initiative: A Preliminary Plan (Summary and Full Report); HUD, July 1995. A copy of this summary and report can be downloaded from the HUD website without charge at [https://www.hud.gov/program\\_offices/healthy\\_homes](https://www.hud.gov/program_offices/healthy_homes).

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