



U.S. Department of Housing and Urban Development

Office of Lead Hazard Control and Healthy Homes

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

FR-6200-N-15

Application Due Date: 06/13/2018

Lead and Healthy Homes Technical Studies Grant Program Pre- and Full Application
FR-6200-N-15

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U.S. Department of Housing and Urban Development

Program Office:	Office of Lead Hazard Control and Healthy Homes
Funding Opportunity Title:	Lead and Healthy Homes Technical Studies Grant Program Pre- and Full Application
Announcement Type:	Initial
Funding Opportunity Number:	FR-6200-N-15
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Due Date for Applications:	06/13/2018

Overview

For Further Information Regarding this NOFA: Please direct questions regarding the specific program requirements of this Program Notice of Funding Availability (NOFA) to the agency contact identified in Section VII.

OMB Approval Number(s): 2539-0015

I. Funding Opportunity Description.

A. Program Description.

1. Purpose

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. Key hazards are discussed in Appendix A, Key Residential Health and Safety Hazards, of this NOFA. A list of references that serves as the basis for the information provided in this NOFA is provided as Appendix B, Relevant Publications, Guidelines and Other Resources. Priority research topics of particular interest to HUD are identified in section III.C.3.a.

Both the Lead and Healthy Homes Technical Studies Programs are important for the achievement of research goals identified in both HUD's Healthy Homes Strategic Plan (available at: http://portal.hud.gov/hudportal/documents/huddoc?id=hhstratplan_7_9_09.pdf) and the federal healthy homes strategic plan, Advancing Healthy Housing : A Strategy for Action(available at: http://portal.hud.gov/hudportal/HUD?src=/program_offices/healthy_homes/advhh).

a. General Goals

(1). Lead Technical Studies

The overall goal of the Lead Technical Studies 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 lead technical studies projects can be found on HUD's website at 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 lead technical studies 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

The overall goal of the Healthy Homes Technical Studies 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). 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.).
- (e). Analysis of existing data or generation of new data to improve knowledge regarding the prevalence and severity of specific hazards in various classes of housing, with a focus on low-income housing.
- (f). 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 NOFA generally limits 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 outcomes focus, and the impact of improvements to IEQ on health outcomes can be inferred where the evidence base is sufficient, such as from other research making the specific exposure – health outcome link.

The Healthy Homes Technical Studies 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. 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 more subtle 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 NOFA 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 a number of 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.

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. HUD encourages applicants to consider using elements of a community based participatory research (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.

CBPR is characterized by substantial community input in all phases of a study (i.e., design, implementation, data interpretation, conclusions, and communication of results).

2. Changes from Previous NOFA.

The following is a summary of the major changes in this NOFA relative to the Fiscal Year (FY) 2017 Lead and Healthy Homes Technical Studies NOFA. This is not intended to be an exhaustive list, so applicants should be sure to read the entire NOFA.

- a. Under this announcement, \$2 million will be available for Lead Technical Study Grant Program and \$5 million for the Healthy Homes Technical Study Grant Program. The estimated number of awards are approximately 3 to 6 awards for the Lead Technical Studies Grant Program and approximately 5 to 8 awards for the Healthy Homes Technical Studies Grant Program.
- b. The maximum award amount for the Lead Technical Studies Grant Program has been increased to \$700,000.
- c. The maximum award amount for the Healthy Homes Technical Studies Grant Program has been increased to \$1,000,000. (Note: Healthy Home Technical Studies Grant Program applicants requesting an award of \$800,000 or more must describe how this level of funding would allow them to propose a study design that would produce more definitive findings compared to the maximum award for this NOFA of \$700,000 in Fiscal Year 2017. See section V.A.1.b.(3).(a).(i)).
- d. The set-aside for new applicants has been extended to Lead Technical Studies Grant Program applicants.
- e. HUD has modified the list of priority research topics as well as the topics that the Department **will not fund** under the Healthy Homes Technical Studies Grant Program in FY 2018 (see sections III.E.1 and III.E.2).
- f. Forms HUD-96012 and HUD-96015 are not required.

3. Definitions.

a. Standard Definitions

Analysis of Impediments to Fair Housing Choice (AI) is a review of impediments or barriers that affect the rights related to fair housing choice pursuant to the Fair Housing Planning Guide issued in 1996, and pertains to program participants in jurisdictions operating under a current Consolidated Plan and public housing agencies operating under a PHA Plan.

Assessment of Fair Housing (AFH) is the analysis undertaken pursuant to [24 CFR 5.154](#). AFH includes an analysis of fair housing data, an assessment of fair housing issues and contributing factors, the prioritization of contributing factors, and the identification of fair housing goals. AFH is conducted and submitted to HUD using the applicable Assessment Tool. Entities obligated to prepare and submit an AFH are: (1) Jurisdictions and Insular Areas are required to submit Consolidated Plans for the following programs: (i) The Community Development Block Grant (CDBG) program (see 24 CFR part 570, subparts D and I); (ii) The Emergency Solutions Grants (ESG) program (see 24 CFR part 576); (iii) The HOME Investment Partnerships (HOME) program (see 24 CFR part 92); and (iv) The Housing Opportunities for Persons With AIDS (HOPWA) program (see 24 CFR part 574); and (2)

Public housing agencies (PHAs) receiving assistance under sections 8 or 9 of the United States Housing Act of 1937 (42 U.S.C. 1437f or 42 U.S.C.1437g).

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. Award, as used in this NOFA means a federal, grant, cooperative agreement, loan, or loan guarantee.

Catalog of Federal Domestic Assistance (CFDA) is a directory of the various Federal listings, projects, services and activities offering financial and non-financial assistance and benefits to the American public. CFDA Number is the unique number assigned to each program, project, service or activity listed in the Catalog of Federal Domestic Assistance (CFDA).

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 more information about the Consolidated Plan and related Annual Action Plan).

Contract means a legal instrument by which a non-Federal entity purchases property or services needed to carry out the project or program under a Federal award. The term as used in this NOFA does not include a legal instrument, even if the non-Federal entity considers it a contract, when the substance of the transaction meets the definition of a Federal award or subaward (See 2 CFR 200.22.)

Contractor means an entity receiving a contract.

Deficiency is information missing or omitted within a submitted application. Deficiencies typically involve missing documents, information on a form, or some other type of unsatisfied information requirement (e.g., an unsigned form, unchecked box, etc.). Depending on specific criteria, deficiencies may be either curable or non-curable.

- Curable Deficiency – Applicants may correct a curable deficiency 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 able to be remedied within the time frame specified in the notice of deficiency.

- Non-Curable Deficiency – An applicant cannot correct a non-curable deficiency after the submission deadline.

Non-curable deficiencies are deficiencies 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 identification number assigned to a business or organization by Dun & Bradstreet and provides a means of identifying business entities on a location-specific basis. Requests for a DUNS number can be made by visiting the Online DUNS Request Portal.

Eligibility requirements are mandatory requirements for an application to be eligible for funding. Deficiencies in meeting an eligibility requirement may be categorized as either curable or non-curable.

Federal Awardee Performance and Integrity Information System (FAPIIS) is a database that has been established to track contractor misconduct and performance.

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 in Grants.gov is required for submission of applications to prospective agencies.

NOTE: Passwords expire every 60 days. Accounts inactive for 1 year or more result in removal of all account roles. For more account management information, review the [Applicant FAQs](#) contained on the grants.gov web page.

Non-Federal Entity means a state, local government, Indian tribe, institution of higher education (IHE), or non-profit organization carrying out a Federal award as a recipient or subrecipient.

Personally identifiable information (PII), as defined by the [Office of Management and Budget M-07-16](#), is any information which can be used to distinguish or trace an individual's identity, such as their name, social security number, biometric records, alone, or when combined with other personal or identifying information which is linked or linkable to a specific individual, such as date and place of birth, mother's maiden name, etc.

Point of Contact (POC) is the person who may be contacted with questions about the application submitted by the AOR. The point of contact is listed in item 8F on the SF424.

Promise Zones are federally-designated, high-poverty urban, rural and tribal communities where the Federal government will partner with and invest in communities to accomplish these goals: create jobs, leverage private investment, increase economic activity, expand educational opportunities, and reduce violent crime.

Promotores/Promotoras are Spanish-speaking Community Health Workers who work in their communities to reduce barriers to health services and make health care systems more responsive.

Recipient means a non-Federal entity receiving an award directly from HUD to carry out an activity under a HUD program.

Section 3 Business Concern means a business concern (1) 51 percent or more owned by Section 3 residents; or (2) of which at least 30 percent of permanent, full-time employees are currently Section 3 residents, or were Section 3 residents within three years of the date of first employment with the business concern; or (3) provides evidence of a commitment to subcontract over 25 percent of the dollar award of all subcontracts to be awarded to business concerns meeting the qualifications in this definition.

Section 3 Residents means: 1) Public housing residents; or 2) Low and very-low income persons, as defined in 24 CFR 135.5, who live in the metropolitan area or non-metropolitan county where Section 3 covered assistance is expended.

Standard Form 424 (SF424) Application for Federal Assistance Programs, required by discretionary grant programs.

Subaward means an award provided by a recipient to a subrecipient for the subrecipient to carry out part of a Federal award received by the recipient. It does not include payments to a contractor or payments to an individual's beneficiary of a Federal program. A subaward may be

provided through any form of legal agreement, including an agreement that the recipient considers a contract.

Subrecipient means a non-Federal entity receiving a subaward from a recipient to carry out part of a HUD program; but does not include an individual's beneficiary of such program.

A subrecipient may also receive other Federal awards directly from a Federal awarding agency (including HUD).

System for Award Management (SAM), is an official website of the U.S. government. You can access the website at Sam.gov There is no cost to use SAM. SAM is the official U.S.

Government system that consolidated the capabilities of Central Contractor Registry (CCR), Excluded Parties List System (EPLS) and the Online Representations and Certifications Application (ORCA). Registration with Sam.gov is required for submission of applications via Grants.gov.

Threshold Requirement – Threshold requirements are a type of eligibility requirement.

Threshold requirements must be met for an application to be reviewed. Threshold requirements are not curable, except for documentation of applicant eligibility. Threshold requirements are listed in Section III.C. of this NOFA.

Applicants must ensure their application package addresses threshold requirements. Please check your application carefully!

4. Program Definitions

5. Web Resources

The resources indicated provide details for the application process

- [Affirmatively Furthering Fair Housing](#)
- [Code of Conduct list](#)
- [Do Not Pay](#)
- [Dun & Bradstreet](#)
- [Request a DUNS Number](#)
- [Equal Participation of Faith-Based Organizations](#)
- [Federal Awardee Performance and Integrity Information System](#)
- [Federal Subaward Reporting System\) FSRS](#)
- [Grants.gov](#)
- [Grants.gov support](#)
- [Healthy Homes Strategic Plan](#)
- [Healthy Housing Reference Manual](#)
- [HUD Funds available](#)
- [HUD's Strategic Plan](#)
- [HUD Grants](#)
- [Limited English Proficiency](#)
- [NOFA webcasts](#)
- [Procurement of recovered materials](#)
- [Promise Zones](#)
- [Section 3 Business Registry](#)

- [State Point of Contact List](#)
- [System for Award Management \(SAM\)](#)
- [Real Property Acquisition and Relocation](#)
- [USASpending](#)

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 for this NOFA is provided by the Consolidated Appropriations Act, 2018 approved March 23, 2018 (Public Law 115-141).

II. Award Information.

A. Available Funds

Funding of up to **\$7,000,000** is available through this NOFA.

Additional funds may become available for award under this NOFA as a result of HUD's efforts to recapture unused funds, use carryover funds, or because of the availability of additional appropriated funds. Use of these funds is subject to statutory constraints. All awards are subject to the applicable funding restrictions contained in this NOFA.

B. Number of Awards.

HUD expects to make approximately 11 awards from the funds available under this NOFA. For each of the grant programs funded under this announcement, HUD expects to make the following awards: approximately 3 to 6 awards for the Lead Technical Studies Grant Program and approximately 5 to 8 awards for the Healthy Homes Technical Studies 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 NOFA, 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 Lead Technical Studies Grant Program and \$300,000 to a maximum of \$1,000,000 for the Healthy Homes Technical Studies Grant Program.

2. Note for New Applicants.

1. If supported by the majority of the Application Review Panel, HUD will make an award of up to \$700,000 under the Lead Technical Studies Grant Program or \$1,000,000 under the Healthy Homes Technical Studies 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 85 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 Lead and Healthy Homes Technical Studies 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(d)(2), as applicable, and the OLHCHH Program Guide (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:	10/01/2018
Estimated Project End Date:	09/30/2021
Length of Project Periods:	36-month project period with three 12-month budget periods

Length of Project Periods Explanation of Other:

E. Type of Funding Instrument.

Funding Instrument Type: 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.

III. Eligibility Information.

A. Eligible Applicants.

State governments

County governments

City or township governments

Special district governments

Independent school districts

Public and State controlled institutions of higher education

Native American tribal governments (Federally recognized)

Public housing authorities/Indian housing authorities

Native American tribal organizations (other than Federally recognized tribal governments)

Nonprofits having a 501(c)(3) status with the IRS, other than institutions of higher education

Nonprofits without 501(c)(3) status with the IRS, other than institutions of higher education

Private institutions of higher education

For profit organizations other than small businesses

Small businesses

Applications to supplement existing projects are eligible to compete with applications for new awards. Federal agencies are not eligible to submit applications.

If your organization received an award under the FY 2017 Lead and Healthy Homes Technical Studies Grant Programs cycle, you are not eligible to apply unless you apply with a different Principal Investigator (PI).

HUD does not award grants to individuals and will not evaluate applications from ineligible applicants.

B. Cost Sharing or Matching.

This Program does not require cost sharing, matching or leveraging.

Note: However, under the full application rating factor 4, applicants that provide evidence of significant resource leveraging will receive points (see Leveraging Resources under Section V.A.1.b.(4)).

C. Threshold 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. Timely Submission of Applications – Applications submitted after the deadline stated

within this NOFA 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 also Section IV Application and Submission Information, part D. Application Submission Dates and Times

D. 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 ([click here](#)).

Resolution of Civil Rights Matters

Outstanding Delinquent Federal Debts

Debarments and/or Suspensions

Pre-selection Review of Performance

Sufficiency of Financial Management System

False Statements

Mandatory Disclosure Requirement

Prohibition Against Lobbying Activities

Equal Participation of Faith-Based Organizations in HUD Programs and Activities

E. Program Specific Requirements.

1. Priority Research Topics

HUD is particularly interested in the following research topic areas; however, you are not limited to addressing only topic areas listed below in your application (see section III.C.3.a.(8)). Applications that focus on one of the following topics will receive 1 point under rating factor 2 for both pre- and full applications (see sections V.A.1.a.(2) and V.A.1.b.(2)).

a. Healthy Homes Technical Studies

(1). Assessing or improving the efficacy of current methods for residential Integrated Pest Management (IPM). (See e.g., Integrated Pest Management, A Guide for Affordable Housing, available at: www.stoppests.org and the Centers for Disease Control and Prevention's (CDC) IPM web page, <https://www.cdc.gov/nceh/ehs/learn/vcehp.html>).

Topics of interest within the IPM topic area include but are not limited to:

- (a). Identification and evaluation of specific practices and processes such as contract specifications/language or monitoring of performance and effectiveness procedures that help overcome current challenges/obstacles and enhance the adoption of IPM by multi-family housing owners and managers.
 - (b). Assessing the potential economic advantages of using IPM as compared to traditional pest control methods.
 - (c). Conducting applied research in identifying mechanisms through which human activities/behaviors influence bed bug infestations and control and how behaviors that interfere with successful control can be effectively addressed.
- (2). Developing easily replicable, cost-effective methods for identifying, preventing, and

controlling mold and excess moisture in various types of residential buildings. 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).

(3). Improving indoor air quality, such as through cost-effective approaches to upgrading residential ventilation or improving control/management of combustion appliances, or through either improved ventilation and/or the use of green construction and finishing materials during housing rehab. This includes studies of practical approaches to mitigate the health impacts from infiltration of ambient air pollution (e.g., respirable particles) due to motor vehicle emissions from roadways and transportation hubs such as bus terminals, etc. Applicants proposing research on methods to reduce indoor concentrations of respirable particles should refer to guidance published by the Lawrence Berkeley National Laboratory (Chan and Singer, 2014);

(4). 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 injury prevention measures into residential programs, including green renovation and rehabilitation programs.

(5). Improving methods for the control of lead in drinking water within the home: Lead in drinking water can be an important source of lead exposure, especially for infants and young children. HUD is interested in supporting research on cost effective interventions within the home to reduce the risk of exposure to lead in drinking water. (Note: HUD cannot support research on the control of lead in drinking water within the distribution system before the water enters pipes within a residential structure).

(6). 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 Healthy Homes Technical Studies projects and grantee contact information can be found on the HUD website at https://www.hud.gov/program_offices/healthy_homes/hhi/hhts.

(7). Other Focus Areas that are Consistent with the Overall Goals of HUD's Healthy Homes Technical Studies Program. HUD will consider funding applications for technical studies on other topics that are consistent with the overall goals and objectives of the Healthy Homes Technical Studies program, as described above. In such instances, it is important that the applicant describe in sufficient detail how the proposed study is consistent with the overall healthy homes technical studies program goals and objectives.

b. Lead Technical Studies

(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) 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 floor dust-lead levels for up to 12 years (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. Furthermore, because there is no recognized safe level of lead exposure for children, which is reflected by the action of the U.S. Centers for Disease Control and Prevention in adopting a "reference value" for lead in children's blood based on the blood lead level distribution in the children's population, vs. their previous "level of concern" approach, the ability of interim controls to maintain low dust-lead levels in treated homes has assumed even greater importance.

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 $10 \mu\text{g}/\text{ft}^2$ for floors and $100 \mu\text{g}/\text{ft}^2$ for window sills that are required for HUD's Lead Hazard Control Program grantees) (HUD OLVCHH Policy Guidance Number 2017-01 Rev 1, February 16, 2017).

(2). 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.

(3). Other Focus Areas that are Consistent with the Overall Goals of HUD's Lead Technical Studies Program. HUD will consider funding applications for technical studies on other topics that are consistent with the overall goals and objectives of the Lead Technical Studies program, as described above. In such instances, it is important that the applicant describe in sufficient

detail how the proposed study is consistent with the overall lead technical studies program goals and objectives.

2. HUD will not fund applications that involve laboratory testing on living organisms with the exception of 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 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 within the Lead Technical Studies program or the Healthy Homes Technical Studies 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 outcomes 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 Hazard Control or Lead Hazard Reduction

Demonstration grants, which are widely distributed throughout the United States. Information on current grantees is available at http://portal.hud.gov/hudportal/HUD?src=/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 - 265 (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 NOFA).

d. Restricted Use of Funds. HUD Lead and Healthy Homes Technical Studies 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) 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 before 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 is 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, LEP, 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 (LEP). 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 can be found on the OLHCHH website at: http://portal.hud.gov/hudportal/documents/huddoc?id=DOC_12539.pdf.

m. Requirements for peer review of scientific data in accordance with the Office of Management and Budget Information Quality Guidelines. All HUD-sponsored research is subject to the 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's 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's organization.

F. Criteria for Beneficiaries.

N/A

IV. Application and Submission Information.

A. Obtaining an Application Package.

Instructions for Applicants.

You must download both the Application Instruction and the Application Package from Grants.gov. To ensure you are using the correct Application Package and Application Instructions, you must verify the CFDA Number and CFDA Description on the first page of the Application Package, and the Opportunity Title and the Funding Opportunity Number match the Program and NOFA to which you are applying.

The Application Package contains the Adobe forms created by Grants.gov. The Instruction Download contains official copies of the NOFA, and forms necessary for a complete application. The Instruction Download may include Microsoft Word, Microsoft Excel 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 is not deemed 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 HUD does not receive your written request at least 15 days before the application deadline or if you do not demonstrate good cause. An email request sent 15 days before the application will also be considered. If HUD waives the requirement, HUD must receive your paper application or email request before the deadline of this NOFA. To request a waiver and receive a paper copy of the application materials, you must contact:

J. Kofi Berko, Jr.

Email: j.kofi.berko@hud.gov

Office of Lead Hazard Control & Healthy Homes

451 7th Street, S.W. Rm 8236

Washington, DC 20410

Applicants should submit their requests for a waiver of electronic submission of their application in writing using email.

Grants.gov provides customer support information on its website at <http://www.grants.gov/contactus/contactus.jsp>. 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. (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 take some conversation with the Grants.gov Support Customer Service Representative.

B. Content and Form of Application Submission.

You must verify boxes 11, 12, and 13 on the SF424 match the NOFA 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 CFDA and Funding Opportunity Number is a curable deficiency.

1. Content.

Forms for your package include the forms outlined below:

Forms / Assurances / Certifications	Submission Requirement	Notes / Description
Certification Regarding Lobbying (SFLLa)	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.
HUD Applicant Recipient Disclosure Report (HUD) 2880 Applicant/Recipient Disclosure/Update Report	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.
Disclosure of Lobbying Activities (SFLLL), if applicable	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.
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.
Assurances for Non-Construction Programs(SF-424B)	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.

Acknowledgment of Application Receipt (HUD2993), if applicable	This form is applicable only to applications submitted on paper, following receipt of a waiver of electronic submission.	This form is not required but is available for applicants who want confirmation that their hard-copy application was received by HUD. The form must be submitted with the application, in accordance with the application submission instructions included in the waiver of electronic submission.
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Additionally, your complete application must include the following narratives and non-form attachments.

Pre-Applications:

The preliminary application must be formatted as per section IV.B.2.a below. Any description/narrative in excess of 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 in excess of 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 (be sure to correctly identify the NOFA 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.

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 on line at www.grants.gov/web/grants/applicants/apply-for-grants.html. The required items are:

a. 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.

b. Response to Rating Factors. A project description/narrative statement addressing the rating factors for award, which are identified in section V.A.1. The narrative statement must be identified in accordance with each factor for award (Rating Factors 1 through 5). 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 in excess of 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.

c. 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 principal investigator 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.

d. Additional Information. The additional optional materials must not exceed 20 pages. Any pages in excess of this limit will not be read. Do not include additional narrative information that is an extension of or expands upon any of your rating factor responses. Such narrative will not be considered.

e. Budget. Include a total budget using form HUD424CBW (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 below. In completing the budget forms and justification, you should address the following elements: (1). 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);
- (2). 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;
 - (3). A separate budget form and justification for each sub-recipient receiving more than 10 percent of the total federal budget request;
 - (4). 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.

a. Pre-Application:

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:

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 Dun and Bradstreet Universal Numbering System (DUNS) Number.

1. SAM Registration Requirement

Applicants must be registered with SAM before submitting their application. In addition, applicants must maintain an active SAM registration with current information while they have an active Federal award or an application or plan under consideration by HUD.

2. DUNS Number Requirement.

Applicants must provide a valid DUNS number, registered and active at SAM, in the application. DUNS numbers may be obtained for free from [Dun & Bradstreet](#).

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 EBiz Point of Contact 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 submit an application through Grants.gov. Complete registration instructions and guidance are provided at Grants.gov. See also Section IV.B for necessary form and content information.

D. Application Submission Dates and Times.

The application deadline is 11:59:59 p.m. Eastern time on **06/13/2018**. Applications must be received no later than the deadline.

Submit your application to Grants.gov unless a waiver has been issued allowing you to submit your application in paper form. 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. Then Grants.gov assigns an application tracking number and **date-and time-stamps** 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 submitting an application.

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

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 as 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 Notice of Funding Awards 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, or 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 NOFA deadline date that does not meet the Grace Period requirements will be marked late and will not be received by HUD for funding consideration. Improper or expired registration and password issues are not causes that allow HUD to accept applications after the deadline.

4. Corrections to Deficient Applications.

HUD will not consider information from applicants after the application deadline. HUD may contact the applicant to clarify other items in its application. HUD will uniformly notify

applicants of each curable deficiency. A curable deficiency is an error or oversight that if **corrected** it would not alter, in a positive or negative fashion, the review and rating of the application. See curable deficiency in definitions section. 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 representative. The email is the official notification of a curable deficiency. Each applicant must provide accurate email addresses for receipt of these notifications and must monitor their email accounts to determine whether a deficiency notification has been received. The applicant must carefully review the request for cure of deficiency and must provide the response in accordance with the instructions contained in the deficiency notification.

Applicants must email corrections of curable deficiencies to applicationsupport@hud.gov within the time limits specified in the notification. The time allowed to correct deficiencies will not exceed 14 calendar days or be less than 48 hours 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 must state: **Technical Cure** and include the Grants.gov application tracking number (e.g., Subject: Technical Cure - GRANT123456). 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. This only applies to certain programs and responses should be sent to the NOFA specific program.

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 DUNS number as having a curable deficiency. Failure to correct the deficiency and meet the requirement to have a DUNS number and active registration in SAM will render the application ineligible for funding.

5. Authoritative Versions of HUD NOFAs. The version of these NOFAs as posted on Grants.gov are the official documents HUD uses to solicit applications.

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 in excess of \$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 located 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 NOFA are limited to what is necessary to conduct the proposed research and subject to the limitations cited in section IV.F.7.a and IV.F.7.b.
 - a. The amount of Healthy Homes Technical Studies 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 Healthy Homes Technical Studies grant shall be spent for interventions not intended for lead hazard control.
 - b. The amount of Lead Technical Studies 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 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.

Nongovernmental organizations and Indian tribal 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 you have never received a Federally negotiated indirect cost rate and elect 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 an organization elects to use the de minimis rate, the organization must apply this methodology consistently for all Federal awards until the organization chooses to negotiate for 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 federal funding, 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 federal funding and your department or agency unit has prepared and maintains documentation supporting an indirect rate proposal in accordance with 2 CFR part 200, appendix VII, you may use the rate and distribution base specified in your indirect cost rate proposal. Alternatively, if your department or agency unit receives no more than \$35 million in federal funding and has never received a Federally negotiated indirect cost 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 you choose 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.

1. Application Certifications and Assurances

By signing the SF424 either through electronic submission or in paper copy submission (for those granted a waiver), applicant affirms certifications and assurances associated with the application are material representations of the facts upon which HUD will rely when making an award to the applicant. If it is later determined the signatory to the application submission knowingly made a false certification or assurance or did not have the authority to make a legally binding commitment for the applicant, the applicant may be subject to criminal prosecution, and 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, and those applicable to applicants other than federally-recognized Indian tribes. All program-specific certifications and assurances are included in the program Instructions Download on Grants.gov.

2. 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, when required by regulation or policy, 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).

V. Application Review Information.

A. Review Criteria.

1. Rating Factors.

a. Rating Factors for PRELIMINARY Applications

Threshold Requirements. Pre-applications that meet all of 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 of 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 of key study personnel that is relevant to the proposed study. 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 (15 points).

(b) Concise description of the qualifications and relevant professional experience of any partner organizations included in your proposal (note: these points will be redistributed to subfactor V.A.1.a.(1)(a) if no partner organizations 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 that it addresses a key research gap on a priority healthy homes or lead-based paint hazard issue as discussed in section III.C.3.a, citing 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 you are proposing research on a topic identified in Section III.C.3.a of this NOFA, you will be awarded one point under this rating factor.

(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 research and 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. Include sufficient detail to demonstrate feasibility and the likelihood that you will achieve the stated objectives. If appropriate, describe your plans for community involvement and for obtaining Institutional Review Board approval.

(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 type of statistical analysis that will be conducted 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 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 pre-

application submittal, your response to them will not be rated. If your pre-application submittal includes the pre- and full-application rating factors, and is longer than the pre-application length limit (see section V.A.1.a), any description/narrative in excess of the pre-application limit will not be reviewed (see section IV.B.1).

Each of the five factors is weighted as indicated by the number of points that are assigned to it. The maximum score that can be attained is 100 points. 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 of 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 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 Principal Investigator must directly represent and be compensated directly by the applicant for his or her 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 NOFA. 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, 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. Please do not include the Social Security Numbers (SSN) of any staff members. You must also submit an organizational chart that shows the key players in the project and their reporting relationships. The chart may be submitted as an attachment and will not count towards the 25-page maximum.

(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 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). You should also discuss the degree to which the results from past research have been used to develop new or improved methods or tools for residential hazard assessment or control.

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 NOFA required that grantees provide HUD with a draft manuscript for publication as a final work product (i.e., NOFAs 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 = 20

This factor addresses the extent to which there is a 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.C.3.a. 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 keeping 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.C.3.a. Specific issues to be addressed for this factor include:

(a) 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 NOFA; identify which NOFA 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 you are proposing research on a topic identified in Section III.C.3.a of this NOFA, you will be awarded one point under this rating factor (10 points).

(b) 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. (6 points).

(c) 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. If applicable, indicate why the method/protocol that would be improved through your study would lead to improved practice and be widely adopted (e.g., low cost, easily replicated, lack of other options) or how the knowledge gained through your proposed study will provide an important contribution to the advancement of the “healthy homes” paradigm or improvement of residential health hazard control practices (4 points).

(3). Soundness of Approach: Maximum Points = 42

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

(a) Soundness of the study design (30 points).

(i) Clearly and thoroughly describe your proposed study and its design, and identify the major objectives. 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) in the community. If possible, your study should be designed to address testable hypotheses that you should state clearly and specifically. If you are requesting an award of \$800,000 or more under the Healthy Homes Technical Studies 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 (12 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" (3 points).

(iii) Your narrative should reflect 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).

(iv) 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 (3 points).

(v) Discuss your plans for data management, analysis, and archiving (3 points).

(vi) 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 NOFA, 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 (2 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 https://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 (1 point or NA).

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 www.hhs.gov/ohrp/.

(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 in regard to 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. Federally recognized Indian tribes and their instrumentalities are not required to comply with the requirement to affirmatively further fair housing, but may discuss it, if applicable. For projects involving limited construction or rehabilitation, examples of activities that affirmatively further fair housing include those that ensure that existing residents relocated (or temporarily relocated) to facilitate rehabilitation are afforded preference or right of first refusal for new units in the same location. For projects which involve community-based research and/or which include enrollment outreach, education and/or training, examples of activities that affirmatively further fair housing include:

(A) where appropriate, designing and implementing the research study so as 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 135. 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 (5 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 more than 10 percent of the federal budget request. Your application will be evaluated on the extent to which your resources are appropriate for the scope of your proposed study (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 provide an explanation of the basis for the major budget items. Separate narrative justifications should be submitted for partners that are submitting separate budgets (2 points).

(4). Leveraging Resources: Maximum Points = 6

This factor addresses your ability to obtain other resources that can be combined with HUD's funding to increase the effectiveness of the proposed study. To receive points, your proposal should demonstrate 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. Applicants that choose to use a lower indirect rate than their federally negotiated indirect rate can calculate and claim the difference as part of their total leverage.

The chart below identifies the points to be provided for leveraging, whether monetary and/or monetized under this rating factor.

Leverage	Points
Less than 1%	0
1% or more but less than 5%	2
5% or more but less than 10%	4

10% or more	6
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(a) Contributed resources must be shown to be specifically dedicated to and integrated into supporting study activities. Resources may include funding or in-kind contributions (such as direct labor, use of specialized facilities) allocated to the purpose(s) of your project. 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. However, HUD will award up to three points to applicants that can demonstrate that the potential impact of the proposed research would be magnified through (non-monetized) integration with existing research.

(b) In assigning points for monetized leveraging under this factor, HUD will consider the significance of the leveraging in the context of the amount of federal funds that you are requesting. As noted in the chart above, you must propose to contribute resources valued at 1% or more of the federal funds requested to receive points. Applicants can receive the maximum points under this factor through monetized leveraging alone or through a combination of monetized leveraging and non-monetized leveraging as described above.

(c) To receive points for leveraging from a partner or a source outside your organization, it must be documented with a letter of firm commitment, memorandum of understanding, and/or agreement to participate, including the monetary value of the contribution. Each document must include the organization's name, proposed level of commitment (with estimated monetary value) and responsibilities as they relate to specific activities or tasks of your proposed program. The commitment letter must also be signed by an official of the organization legally able to make commitments on behalf of the organization. Commitments for leverage to be supplied by your organization must be supported by a letter signed by the authorized official, whose signature appears on the SF424 detailing sources and uses of the committed leverage. The commitment documentation must mention this NOFA and have been signed on or after the date this NOFA was published. You must show that leverage contributions will be used specifically for allowable program costs and come from allowable non-federal sources - both the source of the funds and use of the funds must comply with the requirements of this NOFA. Letters that only indicate support of the proposed study are not sufficient and will not be considered in the awarding of points under this factor.

(d) No points will be awarded to applicants that identify leveraged resources for which adequate documentation is not provided (e.g., a letter of commitment as described in (c) above is needed but was not provided).

(e) Newly contributed resources, devoted to supporting proposed study activities will be fully credited. Resources included from previous work, previous data bases, or other concurrent work that is not federally funded and which would be completed regardless of this proposed study, will be valued at no more than 25 percent of their documented cost.

(f) You should make sure that your submittal regarding monetary and/or monetized leveraging is identified and is internally consistent in all the required places, i.e., forms SF424, HUD424CBW (budget), the budget justification, and the signed documentation. If for some reason you are not able to include your monetary and /or monetized leveraging in the budget forms, please provide an explanation as part of your response to this rating factor.

(5). 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) A management plan that provides 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. You should demonstrate that it is clearly feasible to complete the study within the proposed period of performance and successfully achieve your objectives. 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 (6 points).
- (b) 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 (3 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).

2. Preference Points.

Preference points are not available for this program.

B. Review and Selection Process.

1. Past Performance

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

- a. The ability to account for funds appropriately;
- b. Timely use of funds received from HUD;
- c. Timely submission and quality of reports submitted to HUD;
- d. Meeting program requirements;
- e. Meeting performance targets as established in the grant agreement;
- f. The applicant's organizational capacity, including staffing structures and capabilities;
- g. Time-lines for completion of activities and receipt of promised matching or leveraged funds; and
- h. The number of persons to be served or targeted for assistance.

HUD may deduct points from the rating score or establish threshold levels as specified under the Factors for Award in the NOFA. Each NOFA will specify how past performance will be rated or otherwise used in the determination of award amounts. Whenever possible, HUD will obtain past performance information from staff with the greatest knowledge and understanding of each applicant's performance. If this evaluation results in an adverse finding related to integrity or performance, HUD reserves the right to take any of the remedies provided in Section III.D 1. Pre-selection Review of Performance, above.

2. Assessing Applicant Risk

N/A

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 applicants' score is 85 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.

C. Anticipated Announcement and Award Dates.

1. Preliminary Applications. Anticipated announcement date of successful pre-applicants is approximately 40 days from the pre-application submission deadline date.
2. Full Application. Anticipated announcement date of successful applicants is approximately 60 days from the full application submission deadline date.

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.

1. Applicants who have been selected for award will be notified by letter from the OLHCHH Grant Officer. The letter will state the amount the applicant is eligible to receive, and the name of the Government Technical Representative (GTR). This letter 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 for HUD recipients

For this NOFA, the following General Administrative Requirements and Terms for HUD Financial Assistance Awards apply. Please [[click here](#)] to read the detailed description of each applicable requirement.

1. Compliance with Non-discrimination and Related Requirements.

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

2. Real Property Acquisition and Relocation.

3. Participation in HUD-Sponsored Program Evaluation.

4. OMB 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. Environmental Requirements.

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

1. Eligible Construction and Rehabilitation Activities. A FY 2018 Lead and Healthy Homes Technical Studies 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 Lead and Healthy Homes Technical Studies 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 NOFA.

Reasonable expenses incurred for compliance with these environmental requirements are eligible expenses under this NOFA. 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.

2. For all cooperative agreements under this NOFA, 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 NOFA (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.

3. All other activities not related to construction or rehabilitation activities are categorically excluded under 24 CFR 50.19 (b)(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.

C. Reporting.

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

1. Reporting Requirements and Frequency of Reporting. This NOFA and award agreement will specify the reporting requirements, including content, method of data collection, and reporting frequency. Applicants should be aware that if the total Federal share of your Federal award includes more than \$ 500,000 over the period of performance, you may be subject to post award reporting requirements reflected in Appendix XII to Part 200-Award Term and Condition for Recipient Integrity and Performance Matters.

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. NOFAs may specify the data collection and reporting requirements. Many programs use the Race and Ethnic Data U.S. Department of Housing OMB Approval No. 2535-0113 Reporting Form HUD-27061.

a. Final budget and work plans are due 60 days after the start date.

b. 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 (5) (see section V.A.1.b.(5)).

c. Tangible Personal Property Report: Grant recipients who purchase equipment in excess of \$5,000 a piece must complete the 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). 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.

d. Section 3: Grant recipients covered by Section 3 (see Section III.C.4 of this NOFA) 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 135, subpart E.

e. 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 NOFA may be issued when such regulations are promulgated. HUD anticipates that the terms and conditions to its FY 2018 awards will contain requirements related to meeting FFATA and Section 872 requirements.

f. Annual submission of Form HUD27061, if applicable, for reporting on racial and ethnic data on human subjects.

g. 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).

h. 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.

3. 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.

N/A

D. Debriefing.

For a period of at least 120 days, beginning 30 days after the public announcement of awards under this NOFA, 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 official whose signature appears on the SF424 or by his or her successor in office, and be

submitted to the point of contact 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.

VII. Agency Contacts.

HUD staff will be available to provide clarification on the content of this NOFA. Questions regarding specific program requirements for this NOFA should be directed to the point of contact listed below.

J. Kofi Berko, Jr. PhD
(202) 402-7696
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 NOFA 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 Funds Available web page at

http://portal.hud.gov/hudportal/HUD?src=/program_offices/administration/grants/fundsavail.

For programmatic questions on the Lead and Healthy Homes Technical Studies program, you may contact Dr. Peter J. Ashley, Office of Lead Hazard Control & Healthy Homes, at 202-402-7595 or via email at Peter.J.Ashley@hud.gov. For grants administrative questions, you may contact Ms. Michelle M. Miller, Office of Lead Hazard Control & Healthy Homes, at telephone 202-402-5769 or via email at Michelle.M.Miller@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.

Appendices: Appendices A and B to this NOFA are available for downloading with the application at www.Grants.gov.

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

- (1) Cover sheet with the name and contact information
- (2) Abstract (limited to 200 words)

- (3) Pre-Application Rating Factor Responses (Total narrative response limited to 5 pages.)
 - (a) Capacity of the Applicant and Relevant Organizational Experience (20 points)
 - (b) Need for the Research (35 points)
 - (c) Soundness of Approach (35 points)
 - (d) Achieving Results and Project Management (10 points)
- (4) Required materials in response to rating factors (do not count towards the pre-application 5-page limit)
 - (a) Biographical sketches (up to one page per person) for up to three key personnel (do not include Social Security Numbers on sketches)
 - (b) List of references cited in the responses to the rating factors.
- (5) Additional materials not to exceed 3 pages
 - (a) Estimated total funding that would be requested
 - (b) Form SF424_Application_for_Federal_Assistance

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

- (1) Applicant Abstract (limited to 2 pages)
- (2) Full Application Rating Factor Responses (Total narrative response limited to 25 pages.)
 - (a) Capacity of the Applicant and Relevant Organizational Experience (20 points)
 - (b) Need for the Research (20 points)
 - (c) Soundness of Approach (42 points)
 - (d) Leveraging Resources (6 points)
 - (e) Achieving Results and Project Management (12 points)
- (3) Required materials in response to rating factors (do not count towards the full application 25-page limit)
 - (a) Resumes of Key Personnel (limited to 3 pages per resume; do not include Social Security Numbers on resumes)
 - (b) Organizational Chart
 - (c) 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.
 - (d) 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, you must include the applicable narrative discussed in that section in your application; failure to comply will result in the loss of points.
- (4) Optional material in support of the Rating Factors (20-page limit).
- (5) Forms SF-424, 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 (Breysse 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 NO₂ 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 NO₂ 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 NO₂ concentration in the kitchen and bedroom respectively ($p=0.01$, $p=0.01$); air purifier placement resulted in an immediate decrease in median NO₂ 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 NO₂ concentrations in either the kitchen or bedroom. Colton et. al. (2014) reported significant reductions in NO₂ in public housing apartments that were rehabbed using green methods, including replacing gas with electric stoves, compared with conventional units.

E-Cigarettes: 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 Generals' 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_{2.5} 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.

Based on results from the HUD funded American Healthy Homes Survey (Dewalt et al., 2015), it is estimated that approximately 35 percent of housing units (37 million) in the United States contain lead-based paint. It is further estimated that 23 percent of the nation's housing stock (22 million housing units) have one or more significant lead-based paint hazards (i.e., deteriorated lead-based paint, lead-contaminated dust, or lead-contaminated soil). 1.1 million housing units were found to pose the highest risk of lead poisoning because they housed low-income families with children 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 window sills 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 Atr* (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 variable*, 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.

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. A broad range of information on construction and other worker protection requirements and guidelines is available from OSHA's home page, www.osha.gov/ and from 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.

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.

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.

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.

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.

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.

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 -- <https://www.enterprisecommunity.org/solutions-and-innovation/green-communities>.

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.

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.

Green Buildings

American Lung Association of the Upper Midwest. Health House Builder Guidelines. Available at: [www.healthhouse.org/build/2008HH Hbuilderguidelines.pdf](http://www.healthhouse.org/build/2008HHbuilderguidelines.pdf).

U.S. Department of Energy. Builders Challenge: Requirements for Builders. Available at: www1.eere.energy.gov/buildings/challenge/requirements.html.

Enterprise Community Partners. Green Communities Criteria. Available at: <https://www.enterprisecommunity.org/solutions-and-innovation/green-communities/>.

National Association of Home Builders. Green Building Program. Available at: <https://www.nahb.org/en/research/nahb-priorities/green-building-remodeling-and-development.aspx/>.

U.S. Environmental Protection Agency. Indoor air PLUS Program. Available at: 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

Draft Federal Bed Bug Strategy developed by the Federal Bed Bug Work Group: www.regulations.gov/#!documentDetail;D=EPA-HQ-OPP-2013-0537-0002

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.

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.htm.

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

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