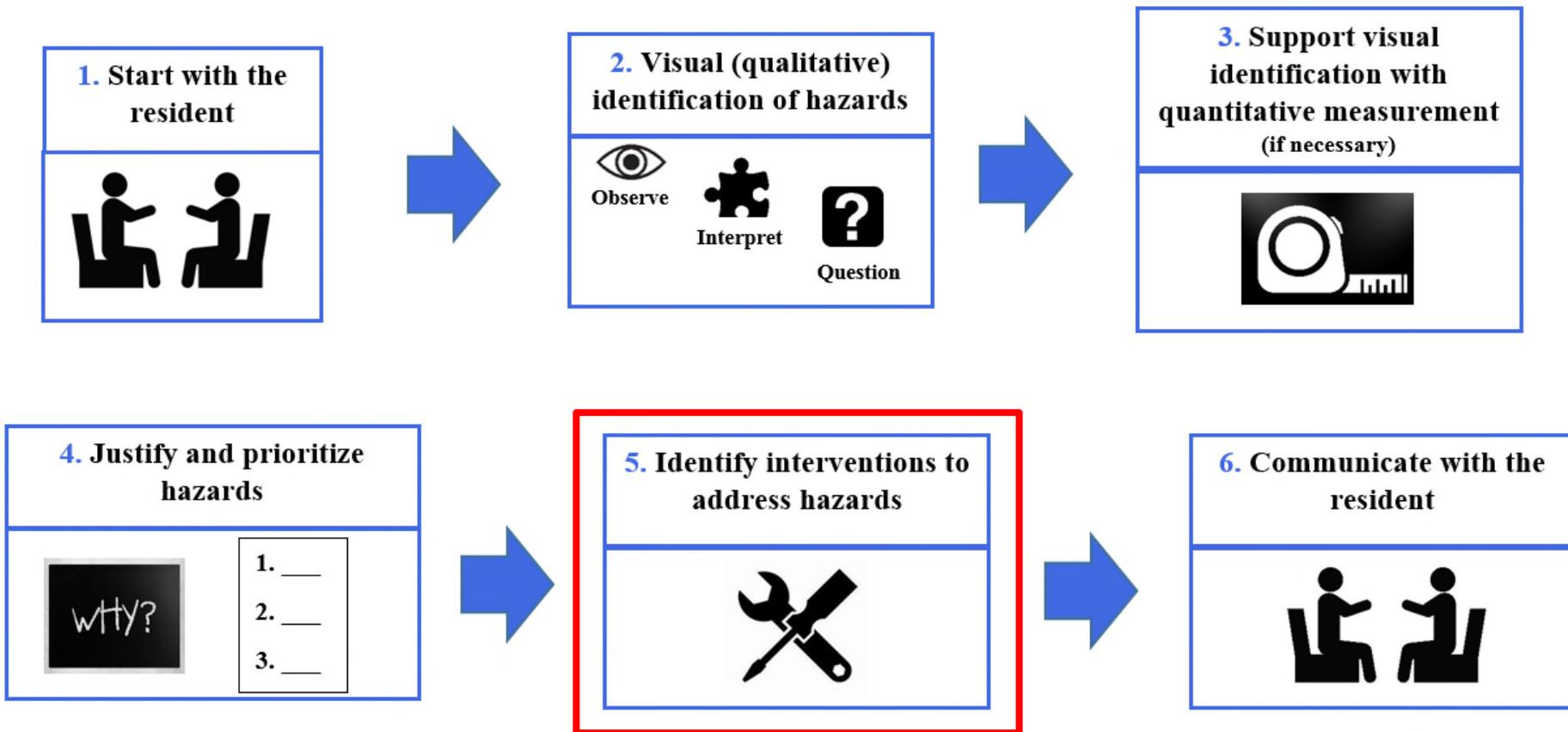


# Module 7

## Step 5: Identify Interventions to Address Hazards



# KEY STEPS



# KEY STEPS

## 5. Identify interventions to address hazards

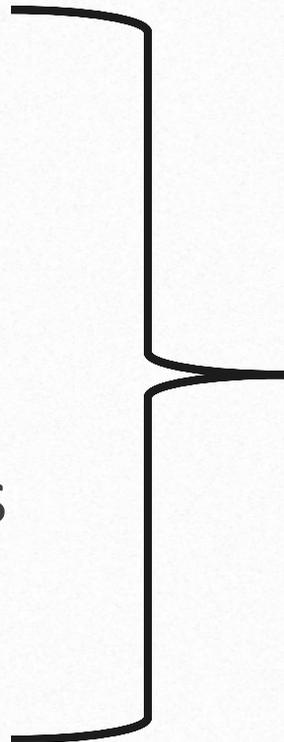


- Intervention resources
- Review of interventions by Keep it principle
  - Focus on Integrated Pest Management



# Health impacts of housing hazards in eight categories:

1. Moisture
2. Sanitation
3. Pests
4. Ventilation
5. Safety
6. Contaminants
7. Maintenance
8. Comfort



-  1. Dry
-  2. Clean
-  3. Pest-Free
-  4. Ventilated
-  5. Safe
-  6. Contaminant-Free
-  7. Maintained
-  8. Climate Controlled



# SOURCE OF RESOURCES & REFERENCES

Promote  
evidence, not  
opinion



making homes  
*healthier*



# NATIONAL RESOURCES



# INTERVENTIONS

Healthy Homes Issues:  
**Residential Assessment**  
 July 2012



U.S. Department of Housing and Urban Development  
 Office of Healthy Homes and Lead Hazard Control

HEALTHY HOMES  
 PART OF A HEALTHY COMMUNITY

**Table 3. Overview of Assessment Strategies for Selected Residential Hazards**

Residential Hazard	Assessment Strategy				
	Visual Assessment	Occupant Survey	Environmental Sampling		Building Performance Testing
			Dust	Air	
<b>Biological Hazards</b>					
Dust mite allergens	X <sup>6</sup>		X <sup>1</sup>		
Cockroach allergens	X <sup>6</sup>	X	X <sup>1</sup>	X	
Rodent allergens	X <sup>6</sup>		X <sup>2</sup>	X <sup>2</sup>	
Pet allergens	X <sup>6</sup>	X	X <sup>2</sup>	X <sup>2</sup>	
Mold	X <sup>6</sup>	X <sup>3</sup>	X <sup>2</sup>	X <sup>2</sup>	
Bacterial endotoxins	X <sup>6</sup>		X	X	
<b>Chemical Hazards</b>					
Pesticides					
Carbon monoxide	X	X <sup>4</sup>	X <sup>2</sup>	X <sup>2</sup>	
VOCs, including formaldehyde	X <sup>6</sup>	X <sup>4</sup>		X	X
Lead					
Radon					
Particulate Matter (e.g., PM <sub>2.5</sub> )			X	X	
NO <sub>2</sub>				X	
<b>Structural Hazards</b>					
Structural defects				X	
Excess moisture	X	X <sup>2</sup>			
Poor ventilation	X	X <sup>2</sup>			
Unhygienic conditions	X				X <sup>7</sup>
Carbon dioxide (CO <sub>2</sub> , fresh air indicator)	X	X		X	X
Slip, trip, fall hazards					
Un-cleanable surfaces	X			X	X
Missing/malfunctioning safety devices (e.g., smoke and CO alarms)	X				
<b>Behavioral Hazards</b>					
Cigarette smoking/2nd- & 3rd-hand smoke					
Poor safety practices (e.g., no childproofing)	X	X		X	
Lack of supervision of children	X	X			
Unsafe use of products and appliances	X	X <sup>4</sup>			



# HEALTHY HOUSING MANUALS / RESOURCES

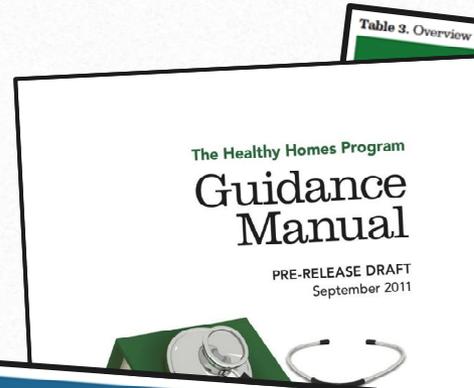
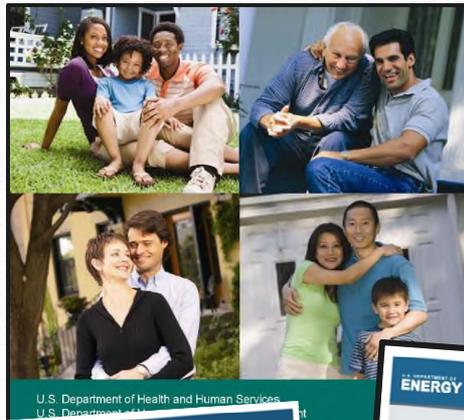
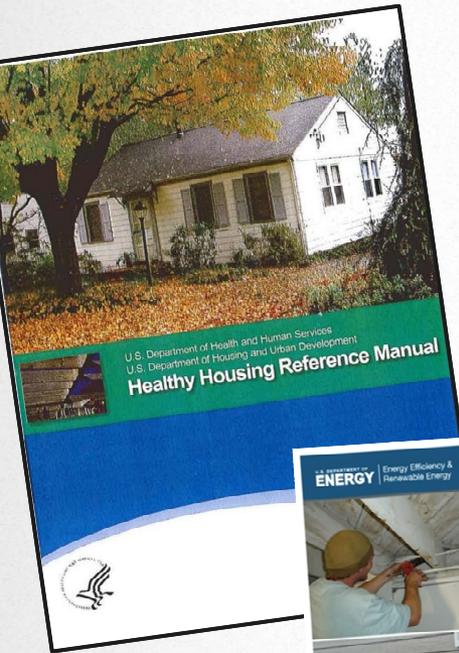
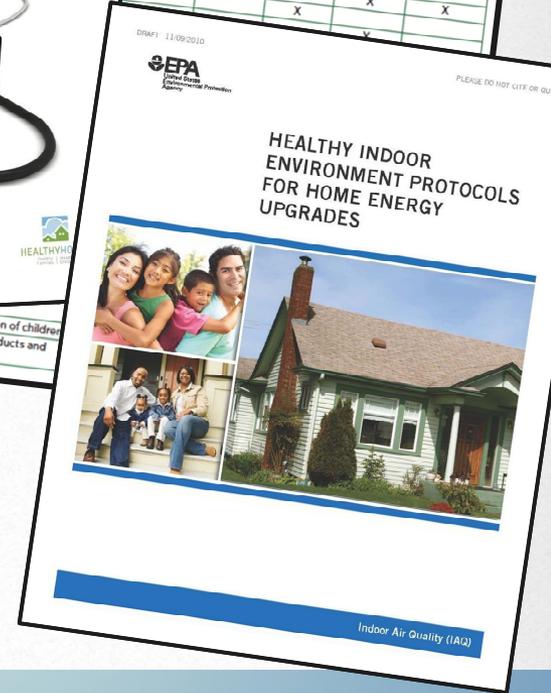
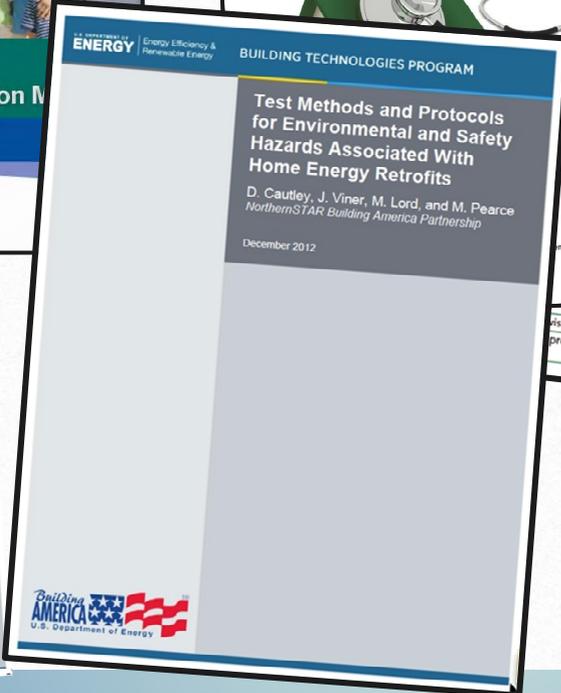
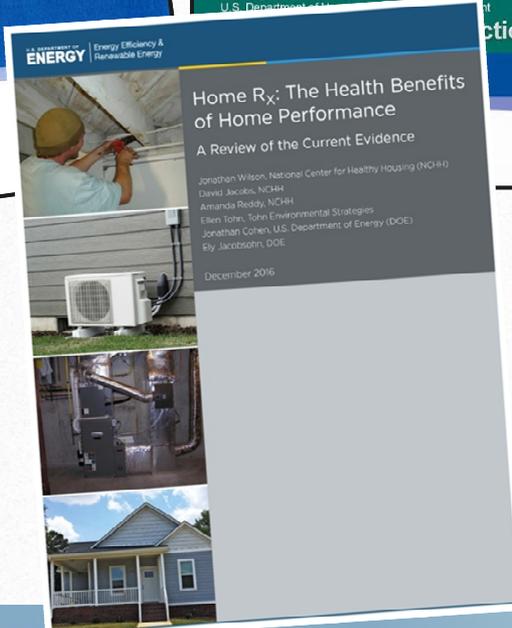
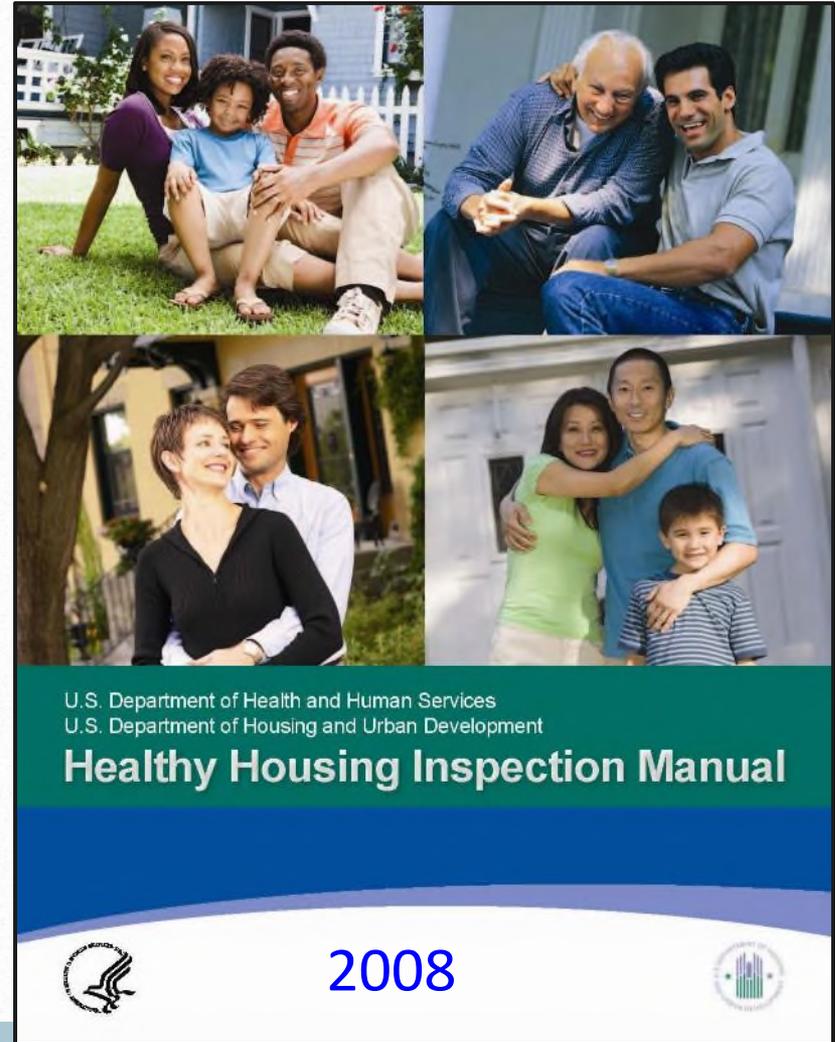
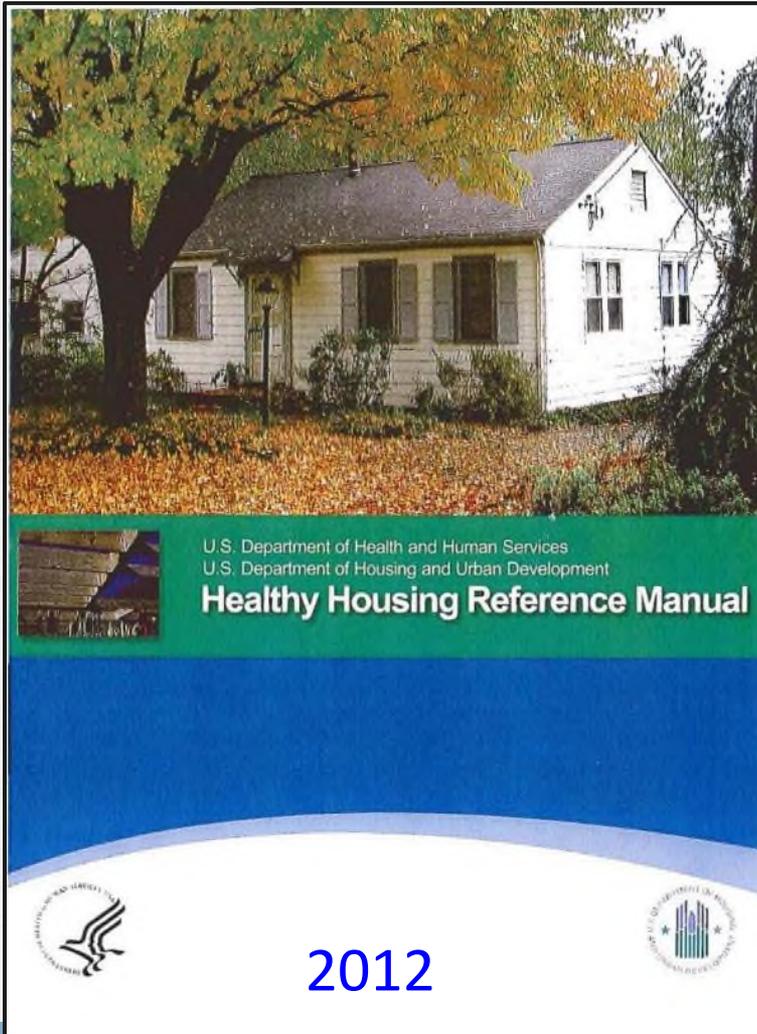


Table 3. Overview of Assessment Strategies for Selected Residential Hazards

Visual Assessment	Occupant Survey	Assessment Strategy			Building Performance Testing
		Environmental Sampling			
		Dust	Air		
X <sup>1</sup>		X <sup>1</sup>	X		
X <sup>2</sup>	X	X <sup>1</sup>	X		
X <sup>3</sup>		X <sup>2</sup>	X <sup>2</sup>		
X <sup>4</sup>	X	X <sup>2</sup>	X <sup>2</sup>		
X <sup>5</sup>	X <sup>3</sup>	X <sup>2</sup>	X <sup>2</sup>		
		X	X		
X	X <sup>4</sup>	X <sup>2</sup>	X <sup>2</sup>		
X	X <sup>5</sup>		X	X	
X <sup>6</sup>	X <sup>6</sup>		X	X	



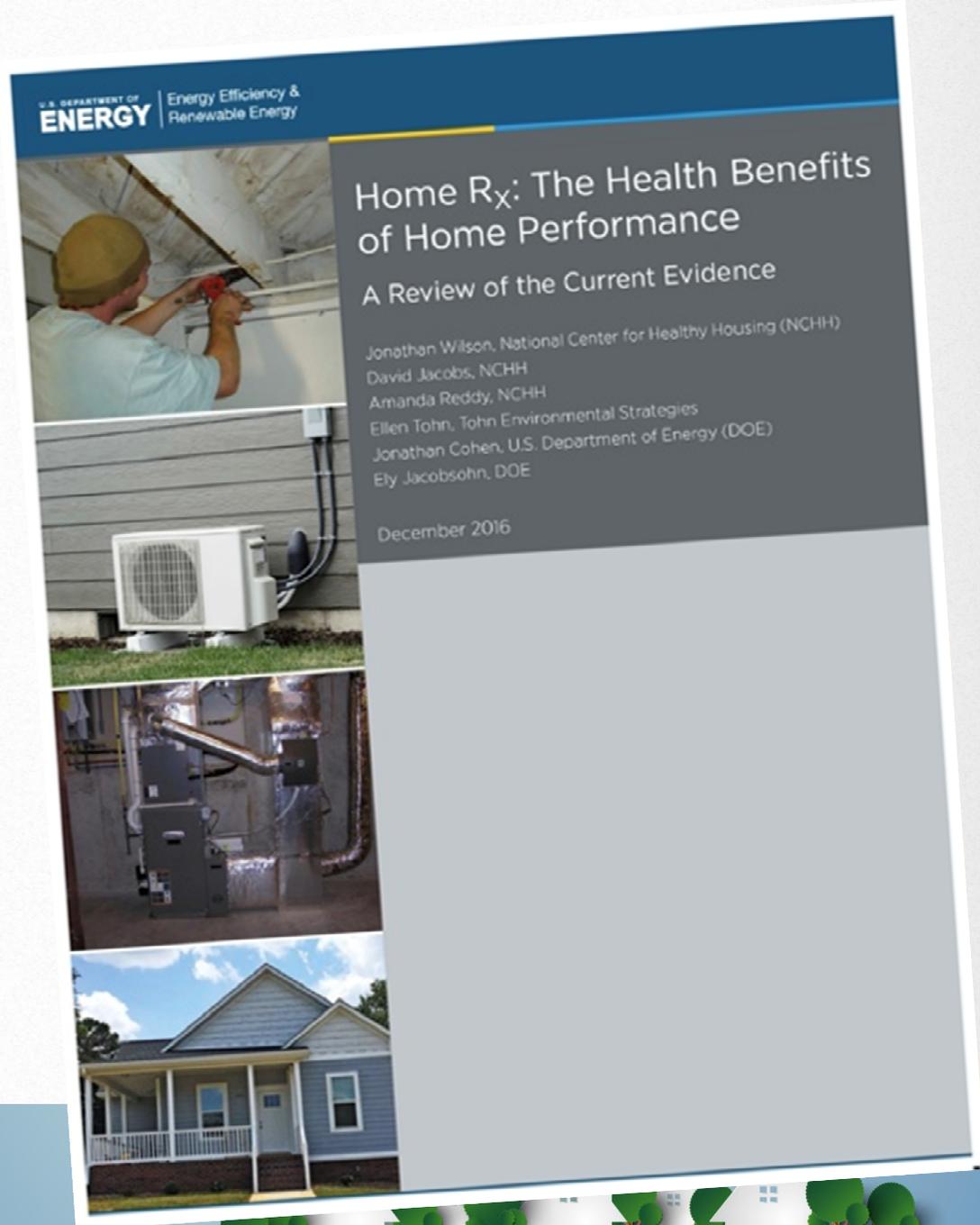
# HEALTHY HOUSING MANUALS / RESOURCES



# New EPA Home RX - The Health Benefits of Home Performance

Research and justification

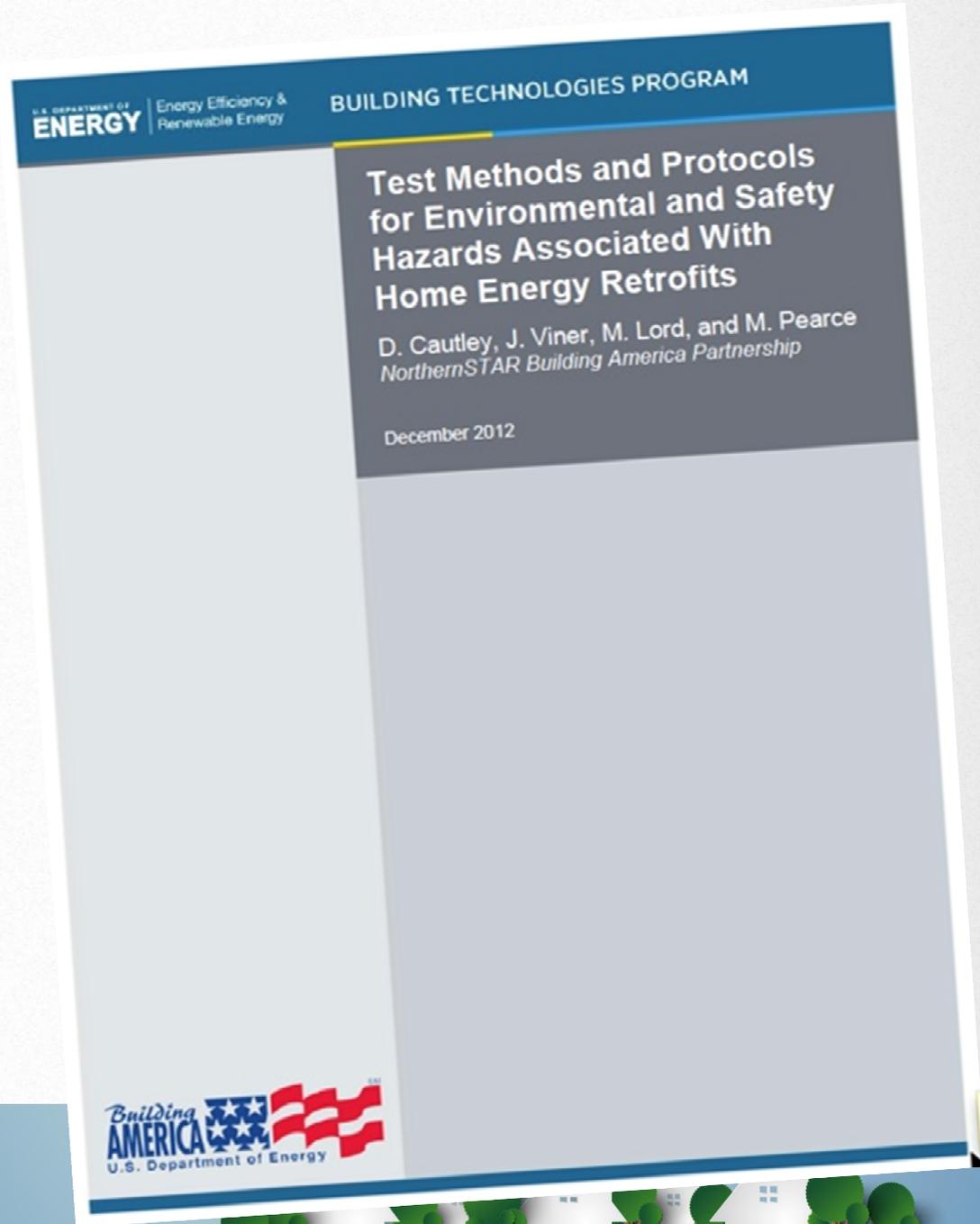
- Health & Energy
- Health Outcomes
- Case studies



# Test Methods and Protocols for Environmental and Safety Hazards Associated With Home Energy Retrofits

## Testing

- Qualitative
- Quantitative
- Familiar tests related to health risk



# A GUIDE FOR HEALTHY HOME PROGRAM DEVELOPMENT AND OPERATIONS

Fully comprehensive guide

- Program overview
- Interview tools
- Diagnostic guidance

<http://portal.hud.gov/hudportal/HUD?mode=dispage&id=HHGUIDANCEMANUAL>



making homes  
*healthier*

The Healthy Homes Program

## Guidance Manual

PRE-RELEASE DRAFT  
September 2011



U.S. Department of Housing and Urban Development  
Office of Healthy Homes and Lead Hazard Control



# HUD HEALTHY HOME INTERVENTION PRIORITIES

Table 4.1 Priority List of Better Homes for Asthma (adapted from Seattle/King County Health Department)

- High priority items are indicated with an [A]
- Lower-priority items with [B] or [C].

Vent clothes dryer to exterior using rigid metal ducting, not flexible
Repair plumbing leaks [A]
Correct mold problems [A]
Clean evaporator pan under refrigerator [A]
Install range hoods that vent to exterior [A for gas; B for electric]
Repair dry floor drain traps if sewer gases detected [A]
Assure that at least one window in each room can open [A]
Remove basement, bath and kitchen wall to wall carpet [A]
Install smoke and carbon monoxide alarms [A]
Repair deteriorated bath and tub caulk [B or C]
Install pleated filter in forced-air heating system. [A]
In the crawl space, seal /cover soil with poly. [A]
Seal crawl space from house air. [A]



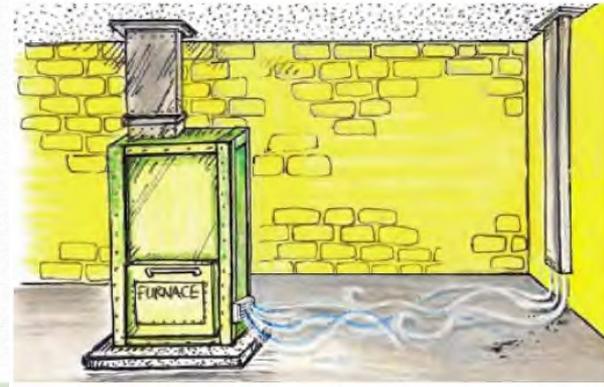
# The Healthy Homes Program Guidance Manual: Interventions Related to Keep it Dry and Ventilated

## Figure 5.2 Key Structural Controls for Moisture

1. Limit water entry (e.g., maintain gutter systems).
2. Dehumidify damp spaces such as basements.
3. Repair leaks and assure that drains work properly.
4. Clean or properly remove wet or moldy building components.
5. Manage ventilation systems so that moisture is removed at the source.

See Handout

Figure 5.5 Unhealthy Heating System Using Basement Air



## Figure 5.7 Ventilation Interventions

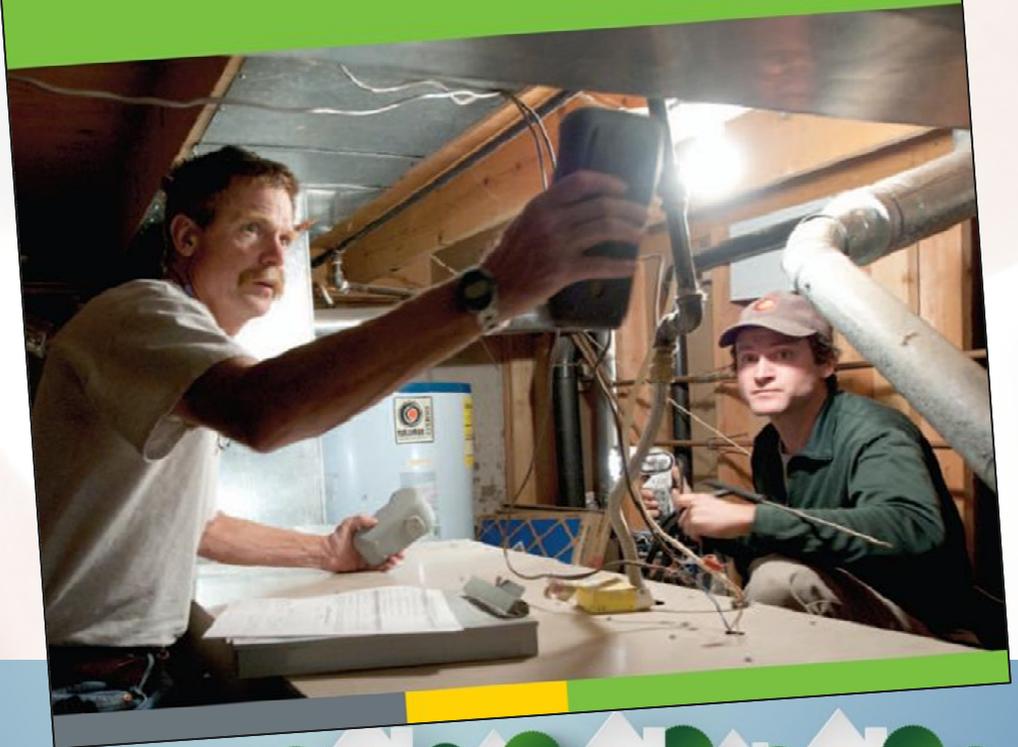
- Remove airborne contaminants through proper exhaust ventilation.
- Supply fresh air through dilution ventilation.
- Test for and conduct radon remediation as needed.



# SWS- HELPFUL GUIDANCE FOR SOME IMPORTANT INTERVENTIONS

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

## Workforce Guidelines for Home Energy Upgrades



NATIONAL HEALTHY HOMES  
**TRAINING CENTER™**  
& NETWORK

making homes  
*healthier*

[www.healthyhousingsolutions.com/training](http://www.healthyhousingsolutions.com/training)



# INTERVENTION RESOURCES

**NREL**  
NATIONAL RENEWABLE ENERGY LABORATORY

Home | About | Help | My Account | Sign In

Standard Work Specifications Tool

Search All Topics

Health & Safety | Air Sealing | Insulation | Heating & Cooling | Ventilation | Baseload

## Standard Work Specifications for Home Energy Upgrades

Standard Work Specifications (SWS) are a major component of the Guidelines for Home Energy Professionals project and define the minimum requirements to ensure that the work performed during home energy upgrades is effective, durable, and safe. The SWS can be used as an industry guide for workers, training instructors, homeowners, and program administrators involved in the home performance industry.

**Intro**  
Read an introduction to the Standard Work Specifications

**Maintenance**  
Learn how the Standard Work Specifications are maintained

Health and Safety section <https://sws.nrel.gov/spec/2>



# National Renewable Energy Laboratory: Standard Work Specifications Tool – Section 2 Health and Safety

## Section 2 Health and Safety

### 2.01 Safe Work Practices

- 2.0100 [Safe Work Practices](#)
- 2.0103 [Air Sealing](#)
- 2.0104 [Insulation](#)
- 2.0105 [Heating and Cooling Equipment](#)
- 2.0106 [Ventilation Equipment](#)
- 2.0107 [Baseload](#)
- 2.0110 [Material Safety](#)
- 2.0111 [Basements and Crawl Spaces](#)

### 2.02 Combustion Safety

- 2.0201 [Combustion Safety Testing-General](#)
- 2.0202 [Unvented Space Heaters](#)
- 2.0203 [Vented Gas Appliances](#)
- 2.0204 [Isolation](#)
- 2.0205 [Gas and Oil-Fired Equipment](#)
- 2.0299 [Additional Resources](#)

### 2.03 Safety Devices

- 2.0301 [Combustion Safety Devices](#)
- 2.0302 [Cooling Equipment](#)

### 2.04 Moisture

- 2.0401 [Air Sealing](#)
- 2.0402 [Drainage](#)
- 2.0403 [Vapor Barriers](#)
- 2.0404 [Space Conditioning](#)

### 2.05 Radon

- 2.0501 [Air Sealing](#)
- 2.0502 [Testing and Evaluation](#)

### 2.06 Electrical

- 2.0601 [Knob and Tube Wiring](#)
- 2.0602 [Electric Hazards](#)

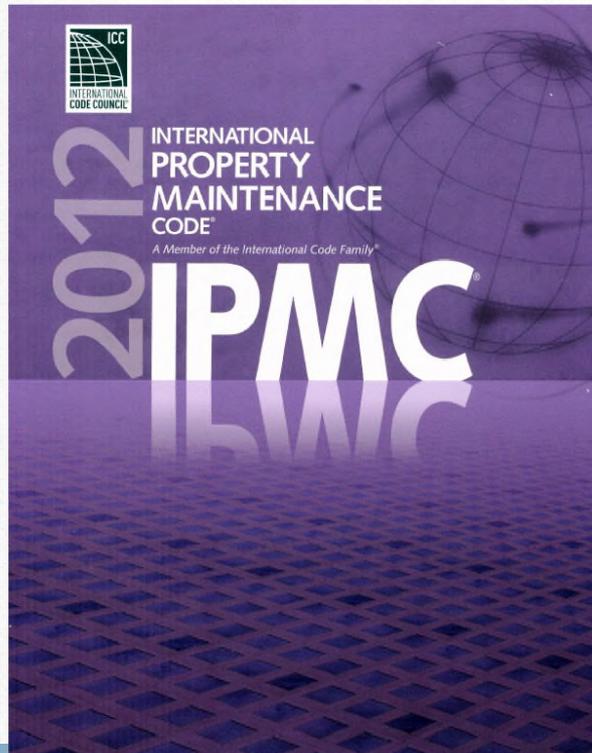
### 2.07 Occupant Education and Access

- 2.0701 [Basements and Crawl Spaces](#)
- 2.0702 [Installed Equipment](#)
- 2.0703 [Insulation](#)



# INTERVENTION RESOURCES

## ICC International Property Maintenance Code



### SECTION 304 EXTERIOR STRUCTURE

**304.1 General.** The exterior of a structure shall be maintained in good repair, structurally sound and sanitary so as not to pose a threat to the public health, safety or welfare.

**304.1.1 Unsafe conditions.** The following conditions shall be determined as unsafe and shall be repaired or replaced to comply with the *International Building Code* or the *International Existing Building Code* as required for existing buildings:

1. The nominal strength of any structural member is exceeded by nominal loads, the load effects or the required strength;
2. The *anchorage* of the floor or roof to walls or columns, and of walls and columns to foundations is not capable of resisting all nominal loads or load effects;
3. Structures or components thereof that have reached their limit state;
4. Siding and masonry joints including joints between the building envelope and the perimeter of windows, doors and skylights are not maintained, weather resistant or water tight;

4. Siding and masonry joints including joints between the building envelope and the perimeter of windows, doors and skylights are not maintained, weather resistant or water tight;



# DOES THIS VIOLATE THE IPMC?



© Pecoraro, EthincGraphicVO



# KEY PROVISIONS OF CODES

- Structural Integrity
- Weatherproof
- Maintenance
- Cracks & Holes
- Loose or Rotting Materials
- Dampness & Deterioration
- Peeling Paint
- Ventilation / Windows
- Infestation
- Sanitation & Trash
- Cleanability
- Clothes Dryer
- Space Heater



# CODES RELATED TO HEALTHY HOMES

- Health / Sanitation Codes
- Housing / Property Maintenance Codes
- Landlord-Tenant Laws
- Product Standards
- Hazard Management Laws

## Housing v. Building v. Zoning Codes



# LANDLORD-TENANT LAWS

## Rights and Responsibilities

## Common Requirements

- Certificate of Occupancy
- Duty to Pay Rent
- Withholding Rent to Make Repairs
- Retaliation

## Eviction and Enforcement

wear and tear and the premises shall be free of all personal property and trash not belonging to OWNER. It is agreed that all dirt, holes, tears, burns, and stains of any size or amount in the carpets, drapes, walls, fixtures, and/or any other part of the premises, do not constitute reasonable wear and tear.

6. OCCUPANTS: Guest(s) staying in the rental for more than 7 consecutive days, or a total of over 20 days in any 12 month period, is considered a resident. If done so without the written consent of OWNER shall be considered a breach of this agreement. ONLY the following individuals and/or animals, AND NO OTHERS shall occupy the subject residence for more than 20 days unless the expressed written consent of OWNER obtained in advance \_\_\_\_\_

**LEASE**

**BASIC RENTAL AGREEMENT OR RESIDENTIAL LEASE**

This Rental Agreement or Residential Lease shall evidence the complete terms and conditions under which the parties whose signatures appear below have agreed.

Landlord/Lessor/Agent \_\_\_\_\_ shall be referred to as "OWNER" and Tenant(s)/Lessee \_\_\_\_\_ shall be referred to as "RESIDENT." As consideration for this agreement, OWNER agrees to rent/lease to RESIDENT and RESIDENT agrees to rent/lease from OWNER for use solely as a private residence, the premises located at \_\_\_\_\_ in the city of \_\_\_\_\_.

1. TERMS: RESIDENT agrees to pay in advance \$ \_\_\_\_\_ per month on the \_\_\_\_\_ day of each month. This agreement shall commence on \_\_\_\_\_ and continue: (check one)  
A. \_\_\_\_\_ until \_\_\_\_\_ as a leasehold. Thereafter it shall become a month-to-month tenancy. If RESIDENT should move from the premises prior to the expiration of this time period, he shall be liable for all rent due until such time that the Residence is occupied by an OWNER approved paying RESIDENT and/or expiration of said time period, whichever is shorter.  
B. \_\_\_\_\_ until \_\_\_\_\_ on a month-to-month tenancy until either party shall terminate this agreement by giving a written notice of intention to terminate at least 30 days prior to the date of termination.

2. PAYMENTS: Rent and/or other charges are to be paid at such place or method designated by the owner as follows: \_\_\_\_\_. All payments are to be made by check or money order and cash shall be acceptable. OWNER acknowledges receipt of the First Month's rent of \$ \_\_\_\_\_, and a Security Deposit of \$ \_\_\_\_\_, and additional charges/fees for \_\_\_\_\_ for a total payment of \$ \_\_\_\_\_. All payments are to be made payable to \_\_\_\_\_.

3. SECURITY DEPOSITS: The total of the above deposits shall secure compliance with the terms and conditions of this agreement and shall be refunded to RESIDENT within \_\_\_\_\_ days after the premises have been completely vacated less any amount necessary to pay OWNER: a) any unpaid rent, b) cleaning costs, c) key replacement costs, d) cost for repair of damages to premises and/or common areas above ordinary wear and tear, and e) any other amount legally allowable under the terms of this agreement. A written accounting of said charges shall be presented to RESIDENT within \_\_\_\_\_ days of move-out. If deposits do not cover such costs and damages, the RESIDENT shall immediately pay said additional costs for damages to OWNER.

4. LATE CHARGE: A late fee of \$ \_\_\_\_\_ (not to exceed \_\_\_\_\_% of the monthly rent), shall be added and due for any payment of rent made after the \_\_\_\_\_ of the month. Any dishonored check shall be treated as unpaid rent, and subject to an additional fee of \$ \_\_\_\_\_.

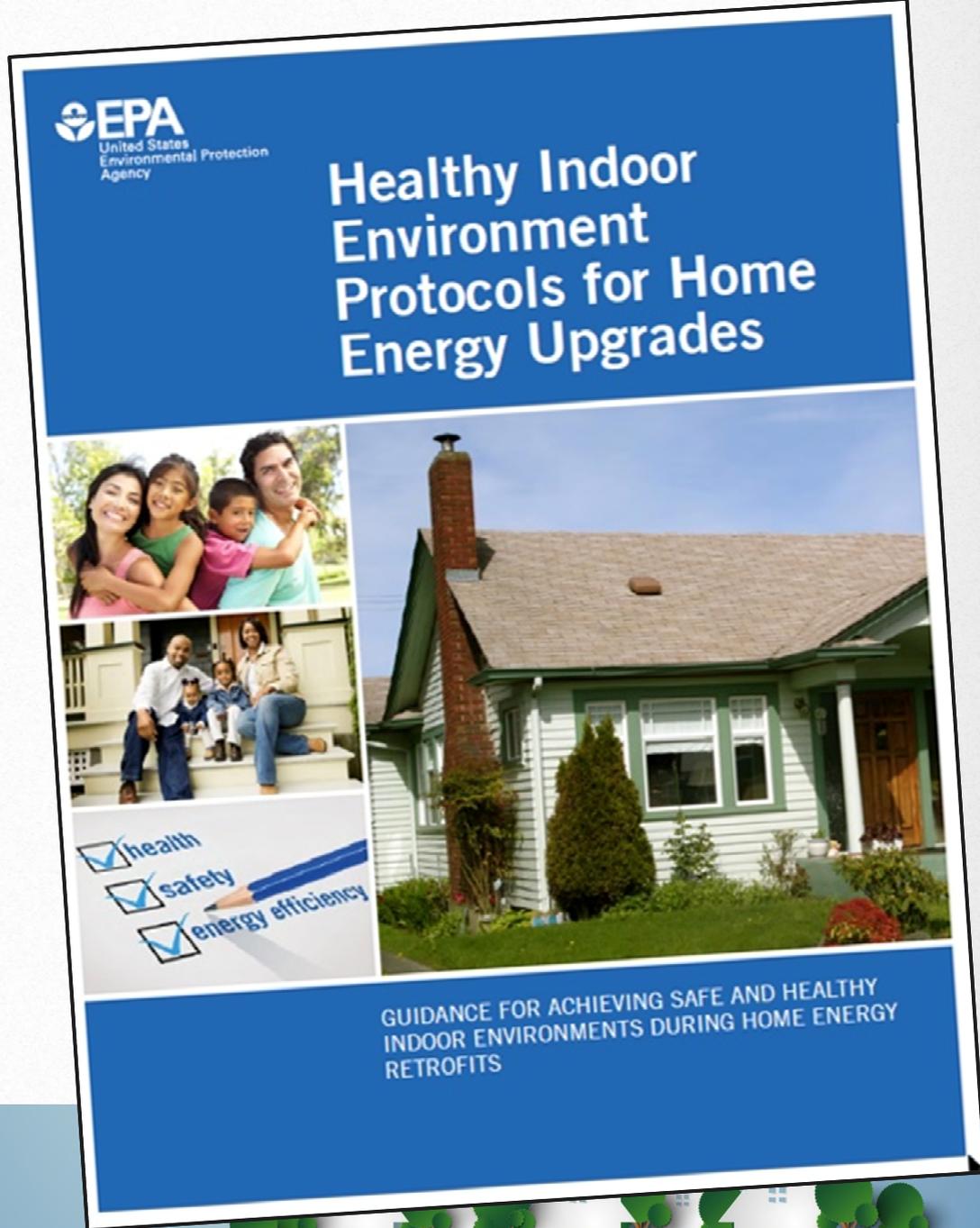
5. UTILITIES: RESIDENT agrees to pay all utilities and/or services based upon occupancy of the premises except \_\_\_\_\_.



# EPA Indoor Environmental Protocols for Energy Audits

Voluntary Guidelines  
Include:

- Protocols
- Minimum Actions
- Expanded Actions



# WHAT TO LOOK FOR DURING THE HOME ENERGY AUDIT

## ASSESSMENT PROTOCOL

HEALTHY

## Minimum Actions

### ASSESSMENT PROTOCOLS

Measures to help home energy retrofit contractors identify common indoor air quality and safety concerns in homes. This document is not a guide to diagnosing occupant health problems or building-related illnesses.

### Minimum Actions

Critical actions intended to ensure work does not potentially cause or worsen indoor air quality or safety problems for occupants or workers (i.e., "Do No Harm"). EPA recommends these protections for ALL retrofit projects.

### Expanded Actions

Additional actions to promote healthy indoor environments that can be taken during energy-efficiency retrofit projects. EPA recommends considering these improvements when feasible.



# WHAT TO LOOK FOR DURING THE HOME ENERGY AUDIT

## ASSESSMENT PROTOCOL

HEALTHY

## Minimum Actions

### SOURCE VENTILATION

Determine whether the home complies with the local exhaust requirements for kitchens and baths of ASHRAE Standard 62.2-2010, Section 5 and Appendix A, as applicable. Determine whether kitchen and bath exhausts are present and vent to the outdoors.



**Table 1: Radon Testing Options and Reduction Strategies**

Pre-Work Test Result and Precautionary Measures	Post-Work Test Result	Minimum Actions	Expanded Actions
<b>&lt;2 pCi/L</b> <i>Consider precautionary radon-reduction actions as part of energy upgrade work, especially covering exposed earth, air sealing open sumps, ensuring floor drains have traps and that traps are not dry.</i>	<2 pCi/L	No action.	
	>2 and <4 pCi/L	Complete foundation air sealing strategies.	For post-work radon levels between 2 and 4 pCi/L, refer client to EPA's Citizen's Guide to Radon and Consumer's Guide to Radon Reduction and/or mitigate in accordance with ASTM E2121.
	≥4 pCi/L ≥4 pCi/L	Mitigate in accordance with ASTM E2121.	
<b>&gt;2 and &lt;4 pCi/L</b> <i>Take precautionary radon-reduction actions: complete foundation air sealing strategies as part of energy upgrade work.</i>	<4 pCi/L and NOT higher than pre-work level.	No further minimum action.	For post-work radon levels between 2 and 4 pCi/L, refer client to EPA's Citizen's Guide to Radon and Consumer's Guide to Radon Reduction and/or mitigate in accordance with ASTM E2121.
	<4 pCi/L AND higher than pre-work level.	Verify that foundation air sealing strategies were completed appropriately and correct deficiencies.	For post-work radon levels between 2 and 4 pCi/L, refer client to EPA's Citizen's Guide to Radon and Consumer's Guide to Radon Reduction and/or mitigate in accordance with ASTM E2121.
	≥4 pCi/L	Mitigate in accordance with ASTM E2121.	
<b>≥4 pCi/L</b> <i>Complete all foundation air sealing strategies as part of energy upgrade work.</i>	<4 pCi/L	No further minimum action.	For post-work radon levels between 2 and 4 pCi/L, refer client to EPA's Citizen's Guide to Radon and Consumer's Guide to Radon Reduction and/or mitigate in accordance with ASTM E2121.
	≥4 pCi/L but NOT higher than pre-work level.	Refer client to EPA's Citizen's Guide to Radon and recommend radon mitigation.	Mitigate in accordance with ASTM E2121.
<b>≥4 pCi/L but NOT higher than pre-work level.</b>		<b>Refer client to EPA's Citizen's Guide to Radon and recommend radon mitigation.</b>	
<b>≥4 pCi/L AND higher than pre-work level.</b>		<b>Mitigate in accordance with ASTM E2121.</b>	



# INTERVENTIONS

## Keep it:

- Clean
- Pest-free
- Safe
- Contaminant-free
- Maintained



# INTERVENTIONS START WITH EDUCATION



# KEEP IT CLEAN INTERVENTIONS

- Surfaces must be not just clean, but cleanable
- Major benefits:
  - Reduced exposure to various contaminants
  - Reduced harborage for pests



# KEEP IT CLEAN INTERVENTIONS

1. Dust mite control
2. Floor choices and vacuums
3. HVAC systems / duct cleaning
4. Clutter
5. Cleaning agents
6. Portable air cleaners



# EXERCISE 7: KEEP IT CLEAN INTERVENTIONS

## Group 1:

- A. Dust mite control
- B. HVAC systems/duct cleaning
- C. Cleaning agents



## Group 2:

- A. Floor choices and vacuums
- B. Clutter
- C. Portable air cleaners



# KEEP IT SAFE INTERVENTIONS



# TRIPS AND FALLS INTERVENTIONS

What  
intervention  
does the  
picture show?



Make sure area rugs are secure.



Install railings on stairways.



Install grab bars in bathrooms.



Install window guards on upper level windows.



Use safety gates to prevent children from falling down stairs.



# TRIPS AND FALLS INTERVENTIONS

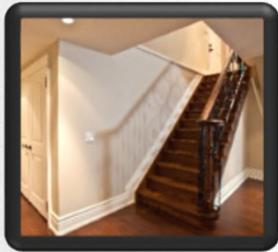
**What  
intervention  
does the  
picture  
show?**



Remove trip hazards (e.g. toys and other objects).



Repair broken stairs.



Increase lighting in stairwells, entryways and hallways.



Use nonskid surfaces in bathrooms.



Make sure toilets, showers and bath entries are an appropriate height.



# FIRE, HEAT AND RELATED INTERVENTIONS

Hint: I'm useful because, where there's \_\_\_\_\_, there may be fire.

Hint: this helps everybody in the house knows where to go if there is a fire.

Hint: Hot water should only get so hot.

Hint: A shocking problem should be fixed.

Hint: I'll know if you burn blue or yellow.

Hint: Put that fire out!

Hint: Dryers have to breathe too.

Hint: Pew, somebody throw away the rotten eggs.

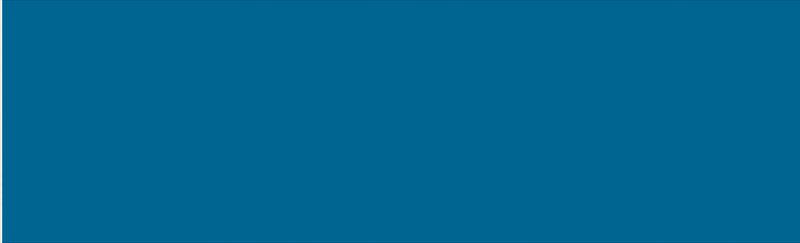


# FIRE, HEAT AND RELATED INTERVENTIONS

1. Make sure properly-placed smoke alarms are working.
2. Help residents create and practice evacuation plans.
3. Install anti-scald devices in the bathtub and shower.
4. Fix faulty wiring.
5. Install properly-placed carbon monoxide alarms.
6. Make sure residents have a working fire extinguisher.
7. Make sure dryer vents are unclogged.
8. Fix gas leaks.



# CHILD SAFETY INTERVENTIONS



# CHILD SAFETY INTERVENTIONS

1. Put child proof locks on cabinet doors if young children are present.
2. Secure the end of window curtain pull strings out of the way of children.
3. Install four-sided fencing around pools.
4. Keep firearms and ammunition securely locked away, or use a trigger lock.
5. Use corner and edge bumpers on furniture and fire places.
6. Use outlet covers and outlet plates to prevent electrocution.
7. Make sure that cribs meet up to date safety standards regarding rail placement.
8. Keep potentially toxic arts and crafts supplies out of the reach of children – or use nontoxic materials.
9. Place safety knobs on stoves and ovens in families with small children

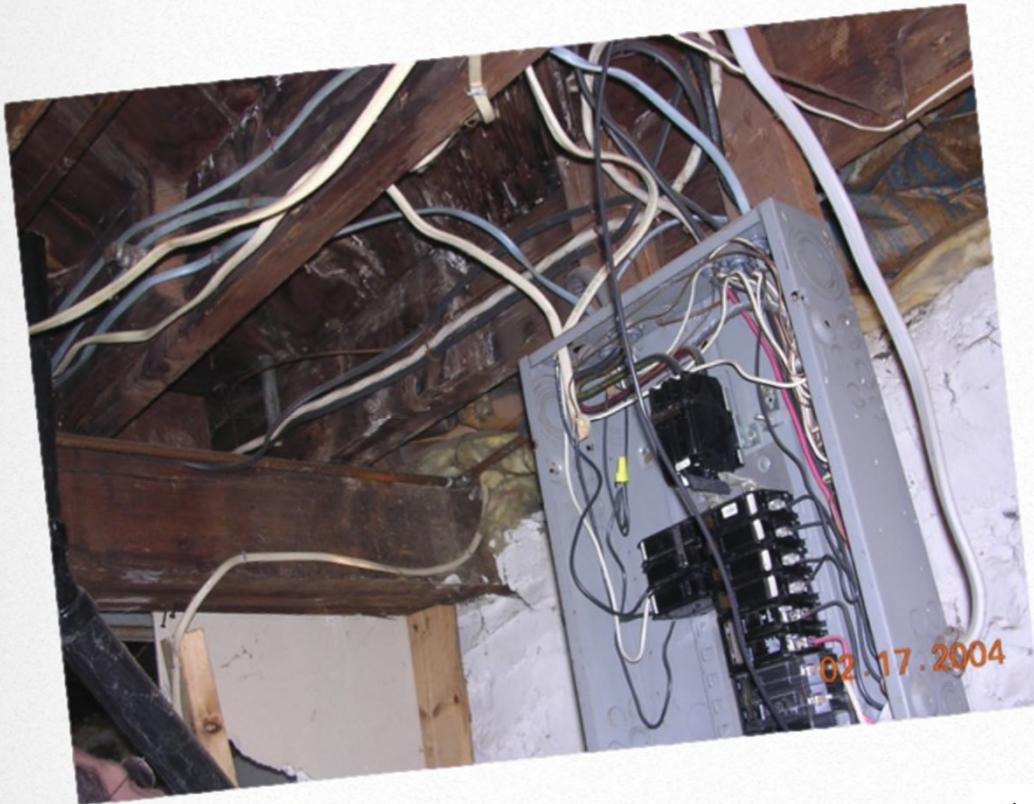


# WHAT SAFETY INTERVENTIONS WOULD YOU OFFER?



*Photo courtesy of the Center for Environmental Health, Children's Mercy Hospital, © 2010.*

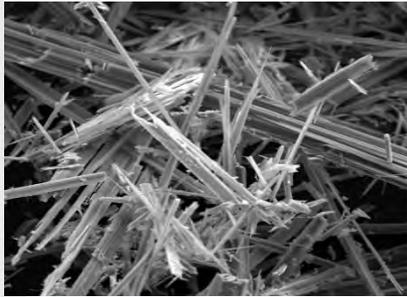
# WHAT DO YOU DO IF YOU SEE THESE SITUATIONS?



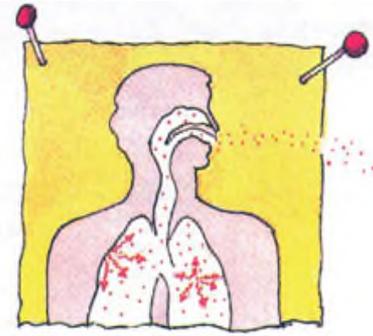
*Photo courtesy of the Center for Environmental Health, Children's Mercy Hospital, © 2010.*



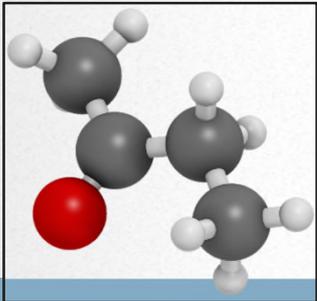
# KEEP IT CONTAMINANT-FREE INTERVENTIONS



## Asbestos



## Radon



## Volatile organic compounds

Common Household Contaminants: The Hazards and the Laws

**Table 2**  
Federal/State Requirements for Homes Regarding Common Household Contaminants

Contaminant	Sale or Use	In-Home Hazard Level	Disclosure to Resident	Renovation Work Practices	State Requirements
Asbestos	EPA banned sale in textured paint, patching / joint compounds, and thermal systems insulation in 1977. Note: EPA banned sale in most products reversed by court in 1991.	EPA - Friable asbestos containing material confirmed by lab to be asbestos. Note: Testing not required.	None	EPA requires	Most states require EPA work
Arsenic	EPA banned CCA lumber production in 2004.	None.			
Carbon Monoxide	Not applicable	CPSC - Alarm sounds at life-threatening conditions. Note: Alarm not required.			
Cockroaches	Not applicable	HUD HQS - Free of infestation			
Formaldehyde	HUD sets stds on wood products in manufactured housing.	None			
Lead	CPSC <input type="checkbox"/> Banned sale or application in new paint after 1977. <input type="checkbox"/> Strictly limited lead in children's products after 2/10/2009	EPA <input type="checkbox"/> Deteriorated lead-based paint. <input type="checkbox"/> High levels of lead in dust or soil. See Table 3 <input type="checkbox"/> No imminent & substantial endangerment. Note: HUD requires testing in federally-assisted housing. CPSC requires testing after 2/10/10.			

Common Household Contaminants: The Hazards and the Laws

**Table 3**  
Key Federal Work Practice Requirement for Asbestos and Lead-Based Paint  
Lead-Based Paint Renovation Work Practices

Agency Rule	Professional Licensing	Trigger for Requirements	Clearance Testing
EPA LPB Activities - 40 CFR 745 Subpart L - 8/29/1996	<input type="checkbox"/> <b>Dust Sampling Technician</b> - Conducts clearance. <input type="checkbox"/> <b>Inspector</b> - Determines if paint is lead-based paint. Conducts clearance. <input type="checkbox"/> <b>Risk Assessor</b> - Determines if paint is lead-based paint. Conducts clearance. Evaluates hazards and recommends corrections. <input type="checkbox"/> <b>Abatement Contractor, Supervisor, and Worker</b> - Conduct abatement.	Abatement - permanent elimination of lead-based paint hazards but not renovation. Pre-renovation notice to EPA (or authorized state).	Independent risk assessor or inspector must confirm levels less than: <input type="checkbox"/> 40 µg/ft <sup>2</sup> on floors; <input type="checkbox"/> 250 µg/ft <sup>2</sup> on window sills; <input type="checkbox"/> 100 µg/ft <sup>2</sup> in window trough (cleanup if window disturbed); <input type="checkbox"/> 100 ppm in soil in play area; and <input type="checkbox"/> 200 ppm in soil in other areas
HUD Lead-Safe Housing - 24 CFR Part 35 - 9/6/1996	None unless abatement required but HUD requires training for: <input type="checkbox"/> Supervisor and worker completes HUD-approved lead-safe work practices course; or <input type="checkbox"/> Supervisor completes Abatement Supervisor course and trains workers.	Federal subsidized property disturbing more than: <input type="checkbox"/> 2 ft <sup>2</sup> per interior room; <input type="checkbox"/> 20 ft <sup>2</sup> in exterior; or <input type="checkbox"/> 0% of component; of paint in pre-1978 housing.	Independent risk assessor, inspector, or dust sampling technician must confirm levels less than: <input type="checkbox"/> 40 µg/ft <sup>2</sup> on floors; <input type="checkbox"/> 250 µg/ft <sup>2</sup> on window sills; and <input type="checkbox"/> 100 µg/ft <sup>2</sup> in window trough (cleanup if window disturbed)
EPA Renovation, Repair & Painting - 40 CFR 745.91 - 4/22/2010	<input type="checkbox"/> <b>Certified Renovation Firm with Certified Renovator</b>	Renovation - Disturbing more than: <input type="checkbox"/> 35 ft <sup>2</sup> per interior room, <input type="checkbox"/> 20 ft <sup>2</sup> in exterior; or <input type="checkbox"/> Window replacement or paint demolition of paint in pre-1978 housing over 30 days.	<input type="checkbox"/> Certified renovation conducting post-cleaning verification comparing wipes to card. <input type="checkbox"/> Option for independent clearance testing per HUD rule.

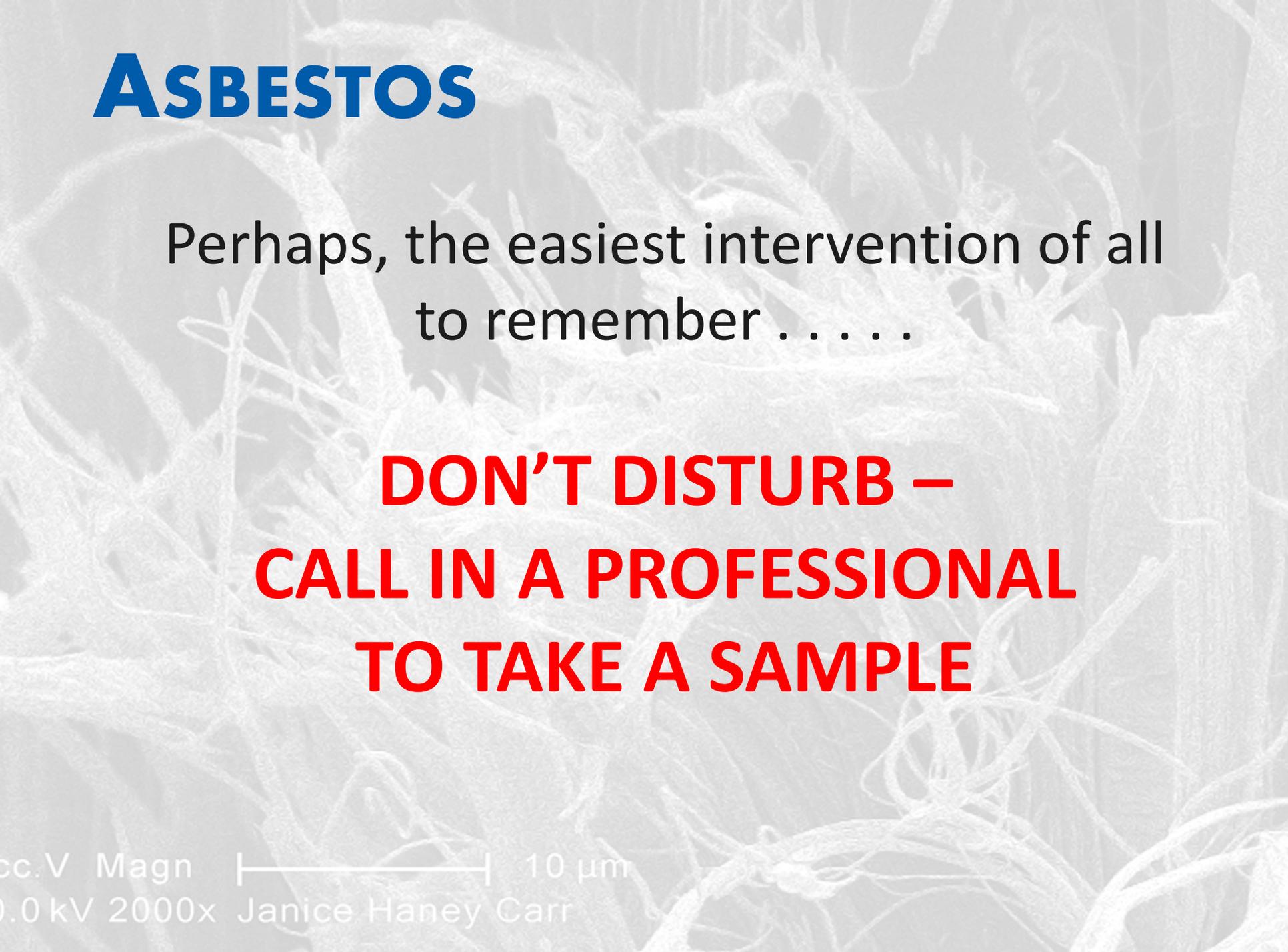
Essentials Manual



making homes healthier



# ASBESTOS

A scanning electron micrograph (SEM) showing a dense field of asbestos fibers. The fibers are long, thin, and highly branched, creating a complex, web-like structure. The background is a light gray, and the fibers are a darker gray, highlighting their intricate texture.

Perhaps, the easiest intervention of all  
to remember . . . . .

**DON'T DISTURB –  
CALL IN A PROFESSIONAL  
TO TAKE A SAMPLE**

# ASBESTOS

## When to call a professional:

- You suspect asbestos, **and**
- The resident plans to remodel the home, **or**
- Building material with possible asbestos is damaged

## What kind of professional?

- Asbestos inspectors
- Asbestos contractor
- Check state and local laws for requirements.
- State agencies have lists of accredited professionals.
- <https://www.epa.gov/asbestos/state-asbestos-contacts>



# FRIABLE ASBESTOS

Friable asbestos-containing material (friable ACM):

- any material with more than 1% asbestos by weight or area, depending on whether it is a bulk or sheet material **and**,
- can be crumbled, pulverized, or reduced to powder by the pressure of an ordinary human hand



# VERMICULITE

## What is vermiculite insulation?

Vermiculite is a naturally occurring mineral that has the unusual property of expanding into worm-like accordion shaped pieces when heated. The expanded vermiculite is a light-weight, fire-resistant, absorbent, and odorless material. These properties allow vermiculite to be used to make numerous products, including attic insulation.

## Do I have vermiculite insulation?

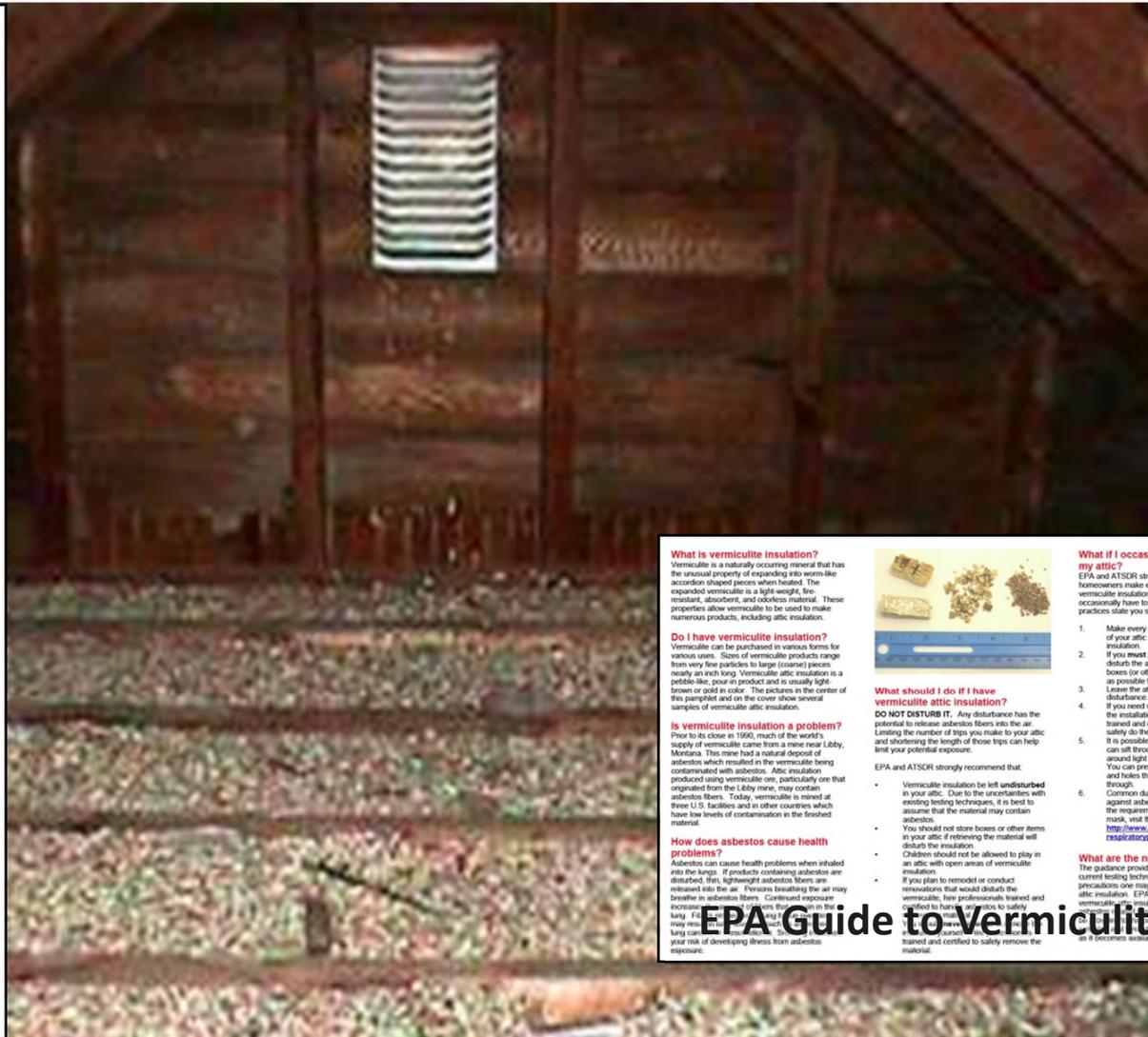
Vermiculite can be purchased in various forms for various uses. Sizes of vermiculite products range from very fine particles to large (coarse) pieces nearly an inch long. Vermiculite attic insulation is a pebble-like, pour-in product and is usually light-brown or gold in color. The pictures in the center of this pamphlet and on the cover show several samples of vermiculite attic insulation.

## Is vermiculite insulation a problem?

Prior to its close in 1990, much of the world's supply of vermiculite came from a mine near Libby, Montana. This mine had a natural deposit of asbestos which resulted in the vermiculite being contaminated with asbestos. Attic insulation produced using vermiculite ore, particularly ore that originated from the Libby mine, may contain asbestos fibers. Today, vermiculite is mined at three U.S. facilities and in other countries which have low levels of contamination in the finished material.

## How does asbestos cause health problems?

Asbestos can cause health problems when inhaled into the lungs. If products containing asbestos are disturbed, thin, lightweight asbestos fibers are released into the air. Persons breathing the air may breathe in asbestos fibers. Continued exposure increases the amount of fibers that remain in the lung. Fibers embedded in lung tissue over time may result in lung diseases such as asbestosis, lung cancer, or mesothelioma. Smoking increases your risk of developing illness from asbestos exposure.



### What is vermiculite insulation?

Vermiculite is a naturally occurring mineral that has the unusual property of expanding into worm-like accordion shaped pieces when heated. The expanded vermiculite is a light-weight, fire-resistant, absorbent, and odorless material. These properties allow vermiculite to be used to make numerous products, including attic insulation.

### Do I have vermiculite insulation?

Vermiculite can be purchased in various forms for various uses. Sizes of vermiculite products range from very fine particles to large (coarse) pieces nearly an inch long. Vermiculite attic insulation is a pebble-like, pour-in product and is usually light-brown or gold in color. The pictures in the center of the pamphlet and on the cover show several samples of vermiculite attic insulation.

### Is vermiculite insulation a problem?

Prior to its close in 1990, much of the world's supply of vermiculite came from a mine near Libby, Montana. This mine had a natural deposit of asbestos which resulted in the vermiculite being contaminated with asbestos. Attic insulation produced using vermiculite ore, particularly ore that originated from the Libby mine, may contain asbestos fibers. Today, vermiculite is mined at three U.S. facilities and in other countries which have low levels of contamination in the finished material.

### How does asbestos cause health problems?

Asbestos can cause health problems when inhaled into the lungs. If products containing asbestos are disturbed, thin, lightweight asbestos fibers are released into the air. Persons breathing the air may breathe in asbestos fibers. Continued exposure increases the amount of fibers that remain in the lung. Fibers embedded in lung tissue over time may result in lung diseases such as asbestosis, lung cancer, or mesothelioma. Smoking increases your risk of developing illness from asbestos exposure.



### What should I do if I have vermiculite attic insulation?

**DO NOT DISTURB IT.** Any disturbance has the potential to release asbestos fibers into the air. Limiting the number of trips you make to your attic and shortening the length of those trips can help limit your potential exposure.

- EPA and ATSDR strongly recommend that:
  - Vermiculite insulation be left undisturbed in your attic. Due to the uncertainties with existing testing techniques, it's best to assume that the material may contain asbestos.
  - You should not store boxes or other items in your attic if retrieving the material will disturb the insulation.
  - Children should not be allowed to play in an attic with open areas of vermiculite insulation.
  - If you plan to remodel or conduct renovations that would disturb the vermiculite, hire professionals trained and certified to handle asbestos to safely remove and dispose of the vermiculite. The EPA and ATSDR have issued guidance on how to hire trained and certified to safely remove the material.

### What if I occasionally have to go into my attic?

EPA and ATSDR strongly recommend that homeowners make every effort not to disturb vermiculite insulation in their attics. If you occasionally have to go into your attic, current best practices state you should:

- Make every effort to stay on the floored part of your attic and to not disturb the insulation.
- If you must perform activities that may disturb the attic insulation such as moving boxes (or other materials), do so as gently as possible to minimize the disturbance.
- Leave the attic immediately after the disturbance.
- If you need work done in your attic such as the installation of cable or utility lines, hire trained and certified professionals who can safely do the work.
- It is possible that vermiculite attic insulation can sift through cracks in the ceiling, around light fixtures, or around ceiling fans. You can prevent this by sealing the cracks and holes that insulation could pass through.
- Common dust masks are not effective against asbestos fibers. For information on the requirements for wearing a respirator mask, visit the following OSHA website: <http://www.osha-slc.gov/SLC/respiratorprotection/index.html>

**What are the next steps?**  
The guidance provided in this brochure reflects the current testing technology and knowledge of precautions one may take regarding vermiculite attic insulation. EPA is initiating further studies on vermiculite attic insulation and pursuing other research. For additional information visit [www.epa.gov/vermiculite](http://www.epa.gov/vermiculite) and the EPA and ATSDR website: [www.atsdr.cdc.gov/vermiculite](http://www.atsdr.cdc.gov/vermiculite)

## EPA Guide to Vermiculite



# How to “handle” suspected asbestos

## Educate your client



This fact sheet was written by the Agency for Toxic Substances and Disease Registry (ATSDR), a federal public health agency. ATSDR's mission is to serve the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent harmful exposure and disease related to toxic substances.

### Asbestos

### Asbestos and Health: Frequently Asked Questions

#### What is the purpose of this fact sheet?

The purpose of this fact sheet is to provide information about asbestos and health. This fact sheet will explain the following:

- Asbestos general information
- Asbestos exposure
- Health effects of asbestos exposure
- Tests to diagnose asbestos-related disease
- Treatment of asbestos-related disease
- Reducing your exposure to asbestos
- How to get more information

#### Asbestos

##### What is asbestos?

Asbestos is the name given to a group of six different fibrous minerals that occur naturally in the environment. Asbestos fibers are too small to be seen by the naked eye. They do not dissolve in water or evaporate. They are resistant to heat, fire, and chemical or biological degradation.

Asbestos is also used in many commercial products, including insulation, brake linings, and roofing shingles.

##### What are the types of asbestos?

The two general types of asbestos are chrysotile (fibrous serpentine) and amphibole. Chrysotile asbestos has flexible fibers. This type of asbestos is most commonly used in commercial products. Amphibole fibers are brittle, have a rod or needle shape, and are less common in commercial products. Although exposure to both types of asbestos increases the likelihood of developing asbestos-related diseases, amphibole fibers tend to stay in the lungs longer. They also are thought to increase the likelihood of illness, especially mesothelioma, to a greater extent than chrysotile asbestos.

### Asbestos Removal Procedures for Home Owners\*

## A Homeowner's Guide to Removing Sheet Vinyl Flooring with Asbestos Backing

**IMPORTANT:** Read these procedures from start to finish, making sure you thoroughly understand them, before any asbestos abatement is undertaken.

If you remove the siding intact, i.e., keeping breakage to a minimum, the removal, transport and disposal are not regulated by the Montana Department of Environmental Quality's Asbestos Administrative Rules of Montana (ARM). Contact your local landfill for disposal guidance and assistance as requirements vary landfill to landfill.

Asbestos Control Program  
Waste and Underground Storage Tank Bureau  
Department of Environmental Quality  
P.O. Box 200901, Helena, MT 59620-0901  
(406) 444-5300 • Fax: (406) 444-1374 • [www.Asbestos.mt.gov](http://www.Asbestos.mt.gov)

\* Note: Homeowner removal procedures apply to an unoccupied single-family residence in which the owner of the home lives, both prior to and after renovation activities. For other buildings, you must contact the Asbestos Control Program (ACP) prior to any demolition or renovation project. This publication is limited to the removal of sheet vinyl flooring, one of the three most common asbestos abatement projects undertaken by homeowners. ACP has two other guides in this series available: "Spray-on Popcorn Ceiling" and "Ceiling Asbestos Board Siding." For more information, contact ACP at 406-444-5300 or on the web at [www.Asbestos.mt.gov](http://www.Asbestos.mt.gov).



United States Environmental Protection Agency

Español | 中文 | 繁體版 | 中文 | 简体版 | Tiếng Việt | 한국어

Learn the Issues | Science & Technology | Laws & Regulations | About EPA

Search EPA.gov

Contact Us | Share

## Asbestos

### Learn About Asbestos



- What is asbestos?
- Where can I find asbestos?
- How can people be exposed to asbestos?
- Health effects from exposure to asbestos

### Protect Your Family



- Learn what to do
- Hire an asbestos professional
- Learn about vermiculite insulation

### Key Information



- Best Advice: Leave asbestos-containing material that is in good condition alone
- Top 20 questions
- State contacts
- EPA Regional contacts
- All frequent questions.

You may also use the printer friendly version of the Asbestos Frequently Asked Questions

### Related Topics

- Laws and regulations
- Naturally-occurring asbestos (7 pp, 85K, About PDF)
- Worker protection
- EPA recent research

### EPA Asbestos News

- EPA's Notification of Rules and Regulations

### School Buildings



- Learn federal requirements
- Find resources for schools and parents

### Building Owners/Managers



- Renovation and demolition requirements
- Operations and maintenance guidance

### Cleanup Sites



- Addressing asbestos at cleanup sites

### Asbestos Professionals



- Become a trained and accredited asbestos



making homes  
healthier

