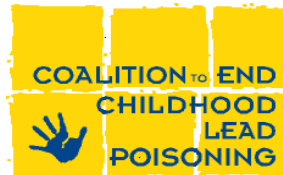




Green & Healthy Homes Initiative

GHHI Comprehensive Environmental Health & Housing Assessment Tool

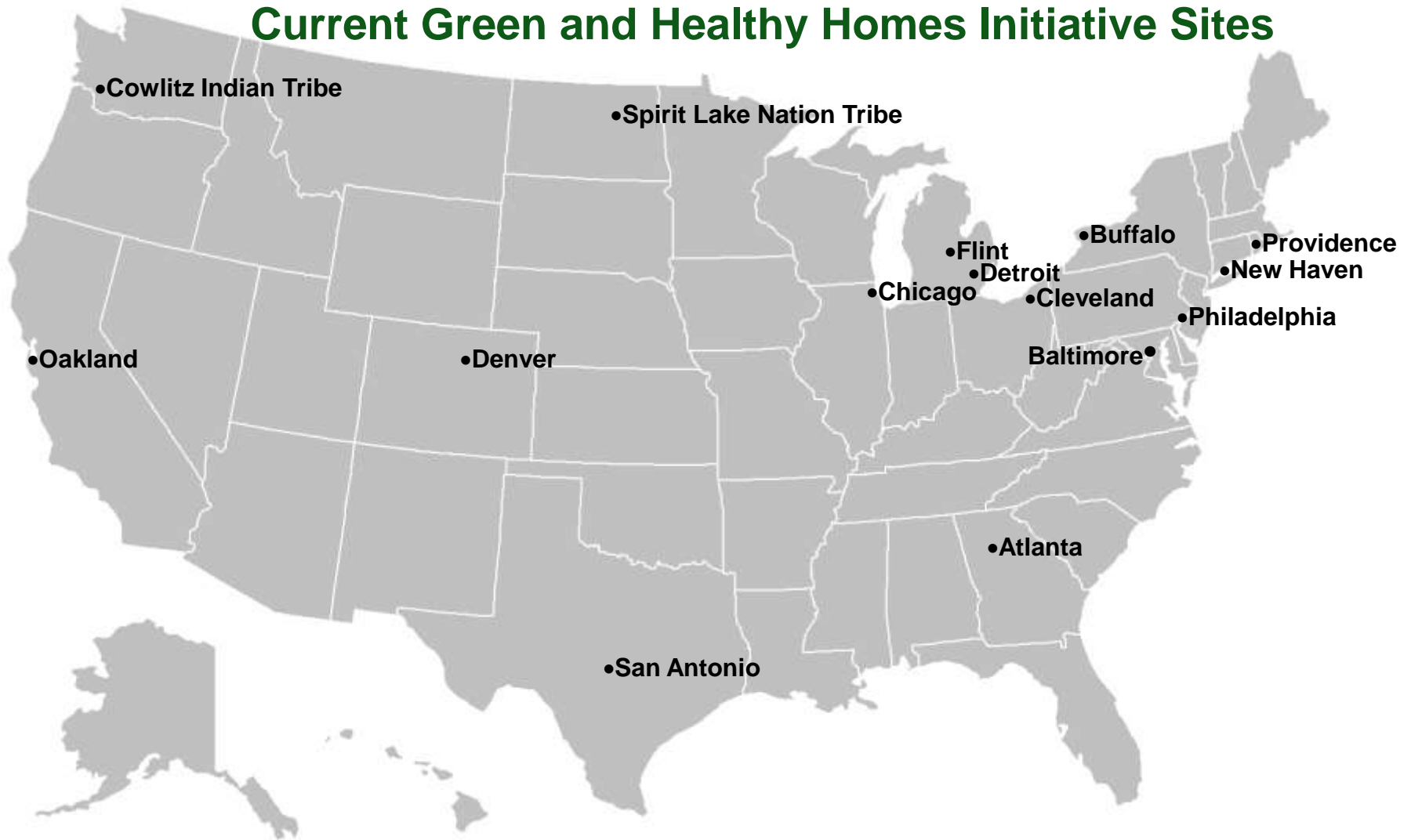
June 2011



Objectives

1. The House as a System
2. Review of the Healthy Housing Rating Tool
3. Description of the Comprehensive Assessment Form
4. Tools required for a Comprehensive Assessment
5. The Comprehensive Environmental Health and Safety Assessment process combined with an Energy Audit

Current Green and Healthy Homes Initiative Sites





Green & Healthy Homes Initiative

Smith Family – 5004 Alhambra Avenue (Homeowner)

- Family of five with a son, age 6, who has severe asthma
- History of repeated asthma episodes resulting in hospitalizations on average of three times per year since birth (Average stay 1 week each time)

Triggers: Asthma triggers (rodents, dust mites, excessive moisture, VOCs, poor weatherization, poor indoor air quality)

GHHI Intervention Cost: \$8,826

Non- GHHI Process: \$10,615 (Net projected savings of \$1,879)

Programs Engaged: HUD OHHLHC, MEA, CDBG, CSBG, Foundations

Results: Son has not been hospitalized due to asthma triggers in the home since the intervention in 2009, resulting in savings of avoided medical costs of \$48,300 in first year alone

- Allergens and lead hazards remediated
- Home weatherized and energy consumption costs reduced by 32%



Housing-related Health and Safety Hazards

- Lead poisoning
- Fire hazards
- Injuries & accidents
- Pest allergens and diseases
- Second-hand cigarette smoke
- Carbon monoxide poisoning
- Mold allergens
- Asbestos & radon exposure
- VOCs poisoning
- Others...

Weatherization/energy efficiency needs

The House as a System

- The house is a system of components that interact with each other.
 - Building envelope
 - Space conditioning equipment and distribution system (Indoor Air flow)
 - Electrical systems (Appliances)
 - Heating & cooling (HVAC)
 - Water
 - Ventilation



There are also many forces at work in a house



Structural loading



Effect of snow



Flow of wind



Human behavior & activities



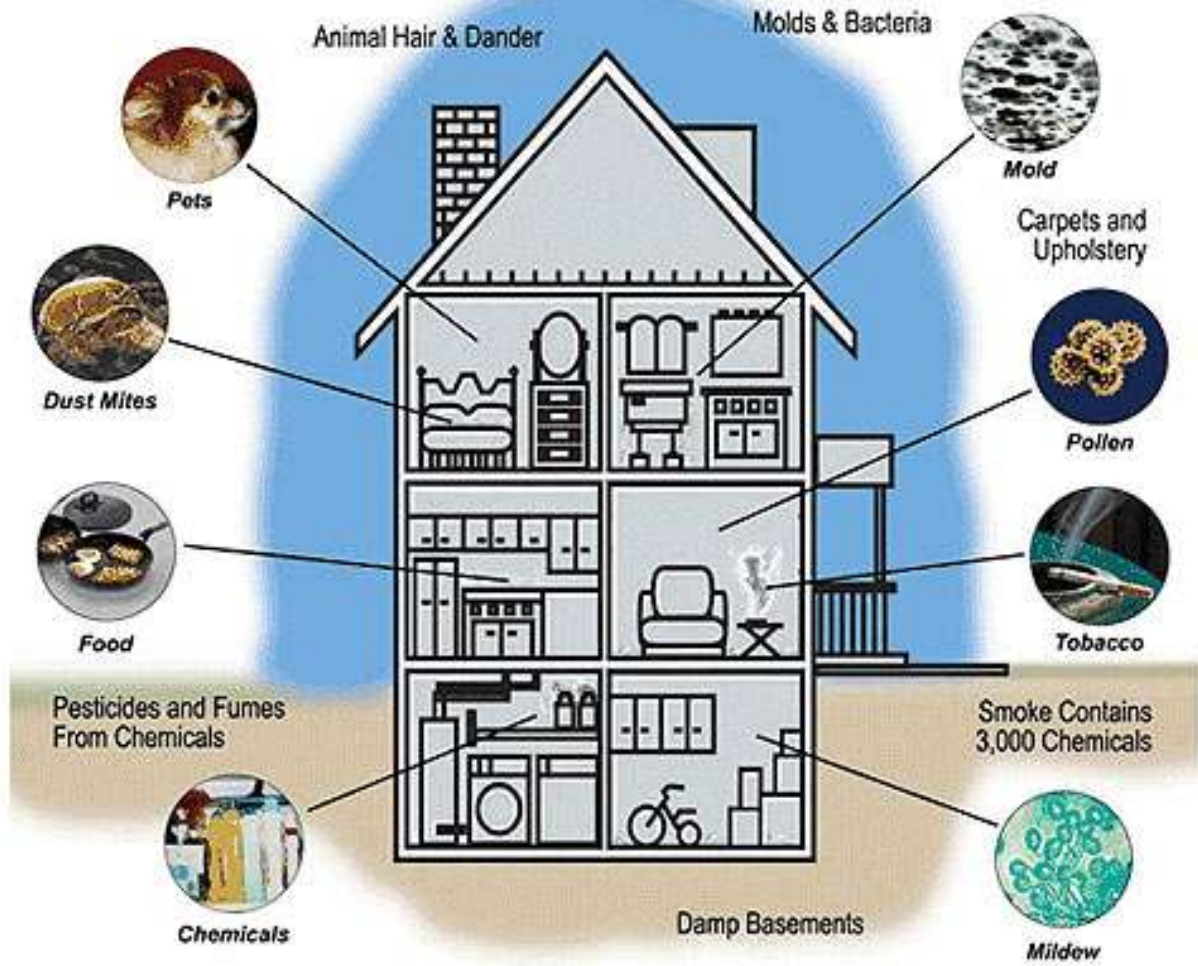
Effect of rain



Seismic



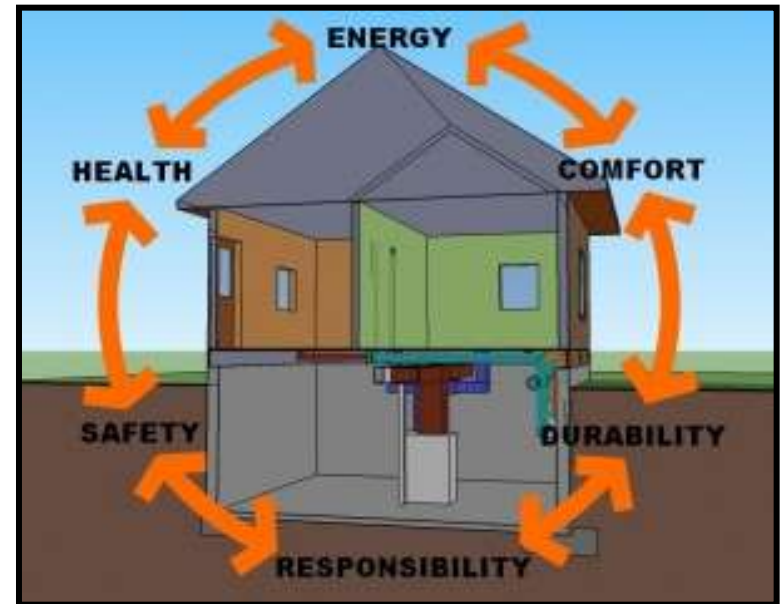
The House as a System





The House as a System

- How these house components and forces interact will determine the home's performance
 - Energy costs
 - Humidity levels
 - Durability
 - Structural integrity
- A home's performance impacts the occupant's satisfaction
 - Health
 - Safety
 - Comfort



Comprehensive Home Assessment Process

Benefits

- Ability to complete combined activities during a single visit
- Less contact lost between visits
- Less visits
- Less client drop-out
- One integrated scope of work is produced
- Multi-faceted interventions can then be completed by one team of workers
- Allows for lessons & best practices to be analyzed, evaluated, and documented



Assessment Team

- **Community Environmental/Health Educator**
 - *Coordinate pre and post client health surveys*
 - *Conduct resident educations*
 - *Develop recommended action plans for the residents*
 - *Coordinate follow-up client services*
 - *Conduct outreach and education*
- **Environmental Assessment Technician-Energy Auditor**
 - *Conduct pre-intervention environmental assessments*
 - *Conduct energy audits*
 - *Develop scopes of work for the properties*
 - *Oversee intervention activities in the property*
 - *Conduct post intervention assessments and audits*



Phases of the Home Assessment Process

- Pre-assessment phase (Check list)
- Home owner/tenant interview phase
- Walk through/visual inspection phase
- Environmental health and safety education phase
- Health & safety audit phase
- Energy audit phase
- Reporting phase
- Scope of work



The Assessment Process

1. Pre-Assessment Phase





Pre-Assessment Phase

Assessment Tools

- Best tools for the Environmental Health, Safety and Energy Auditor/assessor
 - Senses
 - Judgment
 - Experience
 - Training





Pre-Assessment Phase

Assessment Tools

Comprehensive Environmental Health & Housing Assessment Form

- **Purpose:** To permit trained individuals to assess a house for health, safety, and energy efficiency **all at the same time**



Pre-Assessment Phase

Assessment Tools

- **Safety Audit Tools**
 - CO monitor
 - Natural gas sensor
 - Humidity meter
 - Thermometer
- **Energy Audit Tools**
 - Combustible gas meter
 - Blower door
 - Manometer
 - Thermal imaging camera
- **Personal Protection (PPE)**
 - Steel toe boots
 - Safety glasses
 - Air filter mask
 - Utility gloves & knee pads
- **General Tools**
 - Camera
 - Flashlight
 - Power drill
 - Laser distance meter

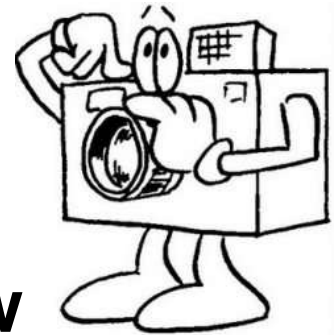
Assessment Tools

Personal Protection Equipment



Assessment Tools Safety & Energy





The Assessment Process

2. Home Owner/Tenant Interview

Rationale & Purpose

- The Assessor only takes a snapshot of the conditions in a home at a particular time and season of the year.
- Provides a more complete picture on the condition of the home through time.
- Provides the history or background on particular issues affecting the home.
- Provides information on previous attempts at solving particular issues.



The Assessment Process

Home Owner/Tenant Interview

- General characteristics of the home
 - Age of property, type, floors lived in, type of ownership
- Demographic information
 - Time of residence and number of people inhabiting the home
 - Health insurance and emergency care information



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The Assessment Process

Home Owner/Tenant Interview

- Lead hazard issues & history (*key questions for the owner*)
 - Has the residence been tested for lead?
 - Has any renovation, repairs, or paint work taken place?
 - Have the children been tested for lead?
 - History of EBLs?
 - Is anyone pregnant in the home?
- Asthma issues & history
 - Does anyone suffer from asthma?



The Assessment Process

Home Owner/Tenant Interview



Indoor Pollutants

(Indoor Air Quality)

- Mold/moisture issues & history
- Tobacco smoke practices
- Pest issues
- Pesticide usage
- Knowledge/history of asbestos in the home
- Knowledge/history of radon in the home
- Other irritants: VOCs, etc.

The Assessment Process

Home Owner/Tenant Interview

- Indoor Hazards Management
 - Cleaning practices
 - Ventilation issues
 - Heating issues
 - Usage of stove as heating system
 - Usage or not of the thermostat
 - Usage of combustion space heaters
 - Air Conditioning in the home
 - Is there any AC in the home? Type? Condition?





The Assessment Process

3. Walk Through Phase

- Interior & exterior visual inspection of the home together with occupant
- Serves to connect the information provided by home owner/tenant during the interview directly with the issues currently affecting the home
- Opportunity to pinpoint & check safety devices such as smoke detectors and CO alarms
- Starts when you get out of the car
 - Exterior temperature
 - Ambient CO level
 - Condition of the exterior of the home



The Assessment Process

Walk Through Phase

- Have a system
 - From the general to the specific
 - From floor to ceiling
 - From structure to appliances
 - Open closet doors and cabinet doors
 - Raise blinds
 - Check for friction surfaces (lead hazards)
 - Ask questions if issues are identified



The Assessment Process Walk Through Phase

What are we looking for?

- Everything and anything
- Take notes on every observation of a defect/issue
- Housing defects and issues tend to be interconnected
 - **Example:** presence of mold and water leaks
 - **Example:** mice infestation and sanitation; Pest infestation and holes in the structure and/or clutter



The Assessment Process

4. Environmental Health and Safety Education

- Healthy Homes Resident Education on
 - Asthma triggers reduction
 - Household injury prevention,
 - Lead poisoning prevention
 - Other Healthy Homes topics
- Distribution and explanation of Healthy Homes Maintenance Kit
- Referrals to partnering organizations as appropriate for other Healthy Homes related services



The Assessment Process

5. Health, Safety & Energy Audit

- Approximately 12 million non-fatal residential injuries occur each year. Approximately 55% of unintentional deaths from injuries occur at home among youths under the age of 20 years old.
- Sequence of the Health, Safety & Energy Audit
 - Exterior
 - First floor
 - Second floor
 - Basement



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What do we look for?

Presence of lead hazards

- Chipping paint
- Friction surfaces
- Dust accumulation



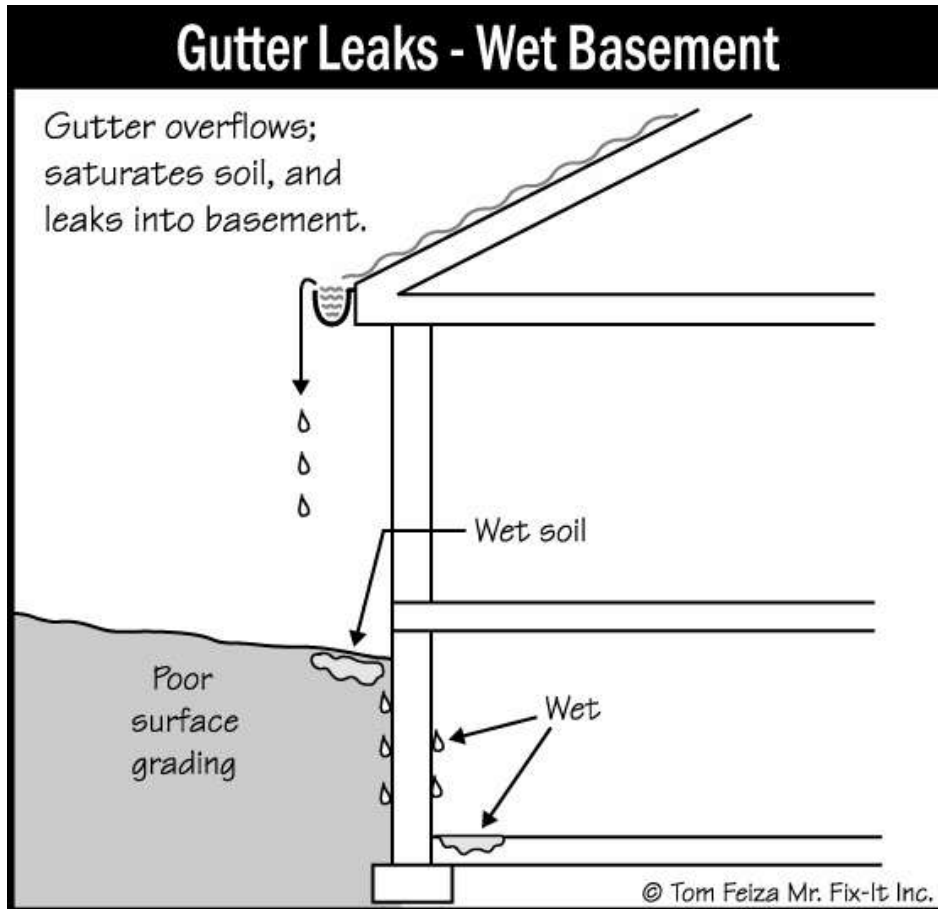
Signs of moisture & mold issues

- Water leaks & condensation



Signs of moisture & mold issues

- Gutters & downspouts



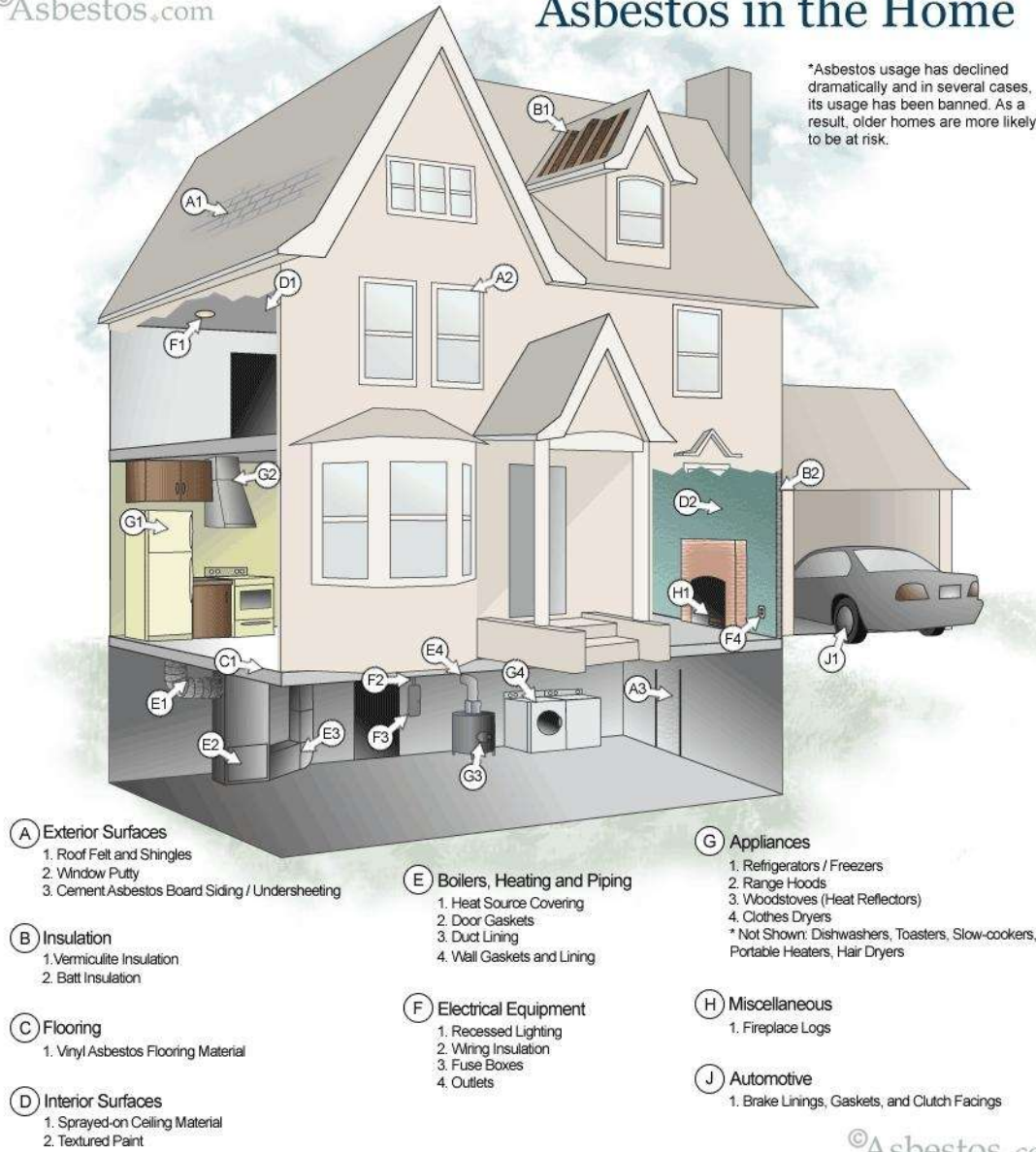
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Asbestos in the Home

*Asbestos usage has declined dramatically and in several cases, its usage has been banned. As a result, older homes are more likely to be at risk.

Presence of Asbestos

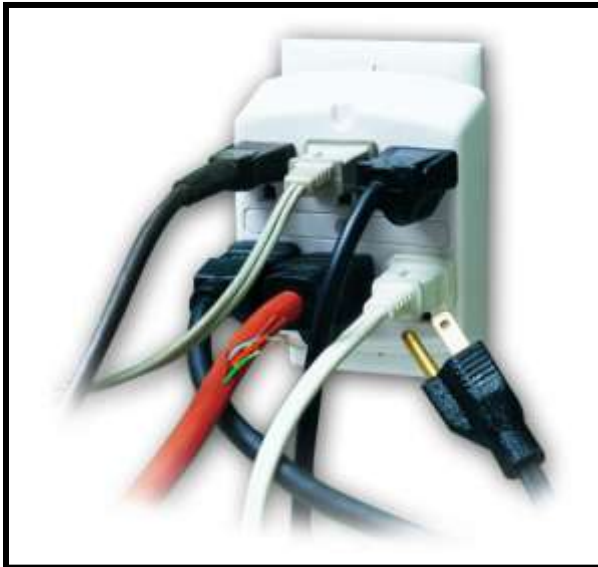


The Assessment Process

Health, Safety & Energy Audit

- Presence/absence of smoke alarms and CO detectors
 - Install or replace units
- Fire Exits
 - Are fire exits available?
 - Are fire exits functional?
 - Fire escape plan?





Electrical hazards

- Exposed wires
- Condition of electrical outlets





The Assessment Process Health and Safety Audit

Children safety

- Presence & location of crib
- Choking hazards
- Accessibility/storage of toxic products
- Covers for radiators
- Cabinet locks
- Safety covers for electric outlets
- Stability of big appliances (stove, refrigerator, TV)





The Assessment Process Health and Safety Audit

Clutter & Waste Management





Structural hazards

- Unsafe doors or windows
- Holes, unsafe stairs or handrails



Trip hazards

- Smooth floors or slippery floors?
- Worn-out areas





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Signs of pests infestation

ID signs of roaches, mice or rats





The Assessment Process

6. Energy Audit

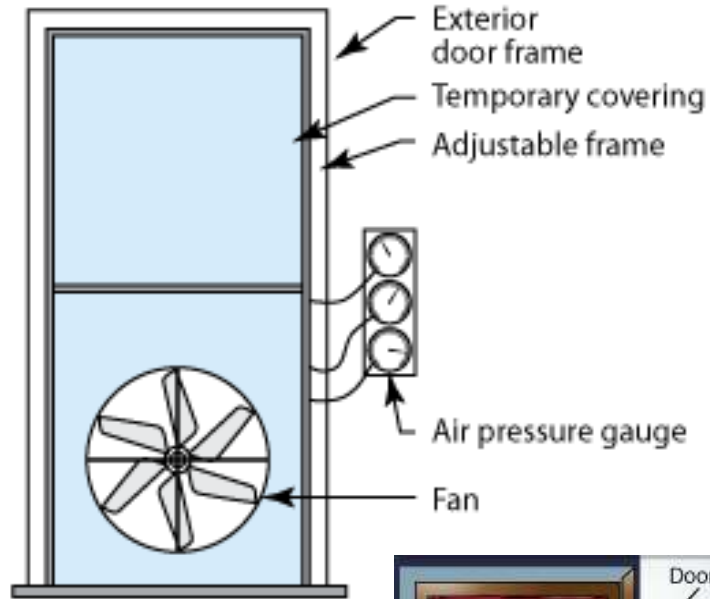
- A simultaneous energy audit is conducted by the Environmental Assessor to:
 - Determine areas where energy loss is occurring and/or
 - Where weatherization problems are contributing to unhealthy housing and high energy consumption.



The Assessment Process

Energy Audit

- Heating system & distribution system
- Type of cooling system
- Hot water system
- Combustible systems diagnostics
- Water conservation issues
- Ventilation issues
- Electric appliances audit
- Lighting assessment
- Air infiltration reduction - Blower door test



Energy Audit Blower Door Test



The Assessment Process

7. Scope of Work Development

- Develop a Comprehensive Scope of Work to address all four GHHI intervention components
 - Lead Hazard Reduction
 - Healthy Homes (asthma triggers, safety hazards)
 - Weatherization
 - Energy Efficiency



The Assessment Process

8. Quality Control

- Visual Lead hazard inspection
 - EPA & HUD approved protocol for visual lead hazard inspection
 - EPA's RRP and state lead safety trained personnel
 - Other: Lead-Based Paint Inspection/Lead Risk Assessment
- Integrated Pest Management (IPM)
 - Licensed pest control personnel
 - EPA, FDA, and MDA approved protocols for pest control and IPM



The Assessment Process

Quality Control

- Energy Audits & Weatherization
 - BPI or other approved Energy Audit protocols
 - Second blower door test after weatherization
 - Random inspections by BPI Energy Analyst
- Dust Sampling
 - HUD/EPA approved protocol for lead dust and indoor allergen sampling
 - Allergen and mold analysis 6 months post intervention
 - Use of a HUD approved analytical laboratory for allergen analysis (EMLAP)

What is the Healthy Homes Rating Tool?

- Risk assessment tool
- Based on the British Housing Health and Safety Rating System developed by David Ormandy in the UK
- Hazards are rated according to how serious they are and the effect they are having or could have on the occupants.
- A way of comparing the risks associated with different types of hazard.



What are the 29 Hazards?

Physiological Requirements

1. Damp and mold growth
2. Excess cold
3. Excess heat
4. Asbestos
5. Biocides
6. CO and fuel combustion products
7. Lead
8. Radon
9. Un-combusted fuel gas
10. VOCs



Psychological Requirements

11. Crowding and space
12. Entry by intruders
13. Lighting
14. Noise

Protection Against Infection

15. Domestic hygiene, pests and refuse
16. Food safety
17. Personal hygiene, sanitation and drainage
18. Water supply

Protection Against Infection

- 15. Domestic hygiene, pests and refuse
- 16. Food safety
- 17. Personal hygiene, sanitation and drainage
- 18. Water supply

Protection Against Accidents

19. Falling associated with baths, etc.
20. Falling on level surfaces
21. Falling on stairs, etc.
22. Falling between levels
23. Electrical hazards
24. Fire
25. Flames, hot surfaces, etc.
26. Collision and entrapment
27. Explosions
28. Position and operability of amenities, etc.
29. Structural collapse and falling elements



How are inspections carried out?

- Physical assessment of hazards
- When an assessor finds a hazard, two key tests are applied
 - What is the likelihood of a dangerous occurrence as a result of this hazard and
 - If there is such an occurrence, what would be the likely outcome?
- Dwellings are assessed against the average for the type and age of building for the region or area in which the dwelling is located.
- The assessor also judges whether the condition increases or lowers the likelihood of an occurrence



How is the score calculated?

- Most assessors will use a computer software program operated on a handheld computer or desktop pc back in the office to calculate the scores
- Likelihood is measured in ranges (e.g. 1 in 420 to 1 in 750)
- Risk (likelihood) x Outcome = Numerical Score
- Outcomes are grouped into four ranges:
 - Class I (death, lung cancer, coma, major burn injuries)
 - Class II (asthma, lead poisoning, loss of a hand or foot, serious fractures)
 - Class III (eye disorders, sleep disturbance, mild heart attack, concussion)
 - Class IV (severe discomfort, occasional mild pneumonia, broken finger, severe bruising to body, regular serious coughs or colds)



HUD's adoption of Healthy Homes Rating Tool (HHRT)

- HUD OHHLHC first began working with HHRT in the Healthy Homes Production awardees from 2010
- Training will be provided to all successful applicants for 2011 Healthy Homes Production Grants
- Software will be provided to awardees
- Information on HHRT listed in Appendix C of the current HUD NOFA application.

Additional Resources on Interventions

HUD FY 2010-2015 Strategic Plan

http://portal.hud.gov/portal/page/portal/HUD/program_offices/cfo/stratplan

The Surgeon General's Call to Action to Promote Healthy Homes

<http://www.surgeongeneral.gov/topics/healthyhomes/index.html>

CDC funded study: Housing Interventions and Health: A Review of the Evidence

<http://www.nchh.org/LinkClick.aspx?fileticket=2lvaEDNBldU%3d&tabid=229>



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