

# Essentials for Healthy Homes Practitioners

## Overview



**National Center for Healthy Housing**  
Healthy Homes Training Center

1

## Link Between Housing & Health



**“The connection between health and the dwelling of the population is one of the most important that exists”**

***Florence Nightingale***

Cited in Lowry, S. BMI, 1991, 303, 838-840



**National Center for Healthy Housing**  
Healthy Homes Training Center

2

## Why Do We Care?



Young children spend about 70% of the time in their home.

Housing affects health both directly and indirectly:

- Physical, chemical, biological exposures
- Psychological



**National Center for Healthy Housing**  
Healthy Homes Training Center

3

## Why Do We Care?

- Annual costs for environmentally attributable childhood diseases in the U.S: \$54.9 billion.
  - \$43.9 Billion from Lead Poisoning
  - \$ 9.2 Billion from Neurobehavioral Disorders
  - \$ 2.0 Billion from Asthma
  - \$ 0.3 Billion from Childhood Cancer
- Additional costs from asthma care stem from the more than 10 million missed school days a year.
- Asthma contributes to approximately 3% of total health care costs.



**National Center for Healthy Housing**  
Healthy Homes Training Center

4

## How Significant is the Problem?

Occupied Housing Units	Severe Physical Problems	Moderate Physical Problems	Total
2005	2.0 million	4.2 million	6.2 million (5.7%)
2007	1.8 million	4.0 million	5.8 million (5.2%)
Healthy People 2010 Goal			3.1 % from 6.5% in 1995



**National Center for Healthy Housing**  
Healthy Homes Training Center

5

## Maslow's Hierarchy of Need


Self-Actualization  
Ego  
Belonging  
**Safety and Security**  
Physiological Needs



**National Center for Healthy Housing**  
Healthy Homes Training Center

6

National Healthy Homes Training Center and Network  
Overview – Essentials for Healthy Homes Practitioners Course



**Home is where the heart is.**  
Pliny

**One of our deepest needs is to be at home.**  
Timothy Radcliffe

**Where thou art, that is home.**  
Emily Dickinson


**There's no place like home.**  
Dorothy, Wizard of Oz

**Home is the place where, when you have to go there, They have to take you in.**  
Robert Frost

**It may be frail; its roof may shake; the wind may blow through it; the storms may enter; the rain may enter – but the King of England cannot enter; all his forces dare not cross the threshold of the ruined tenement.**  
William Pitt

**The strength of a nation derives from the integrity of the home.**  
Confucius

**He is happiest, be he king or peasant, who finds peace in his home.**  
Johann Wolfgang von Goethe



**National Center for Healthy Housing**  
Healthy Homes Training Center


7

## Institute of Medicine - 2000

Association Between Biological and Chemical Exposures in the Home and			
Development of Asthma in Sensitive Individuals		Exacerbation of Asthma in Sensitive Individuals	
Biological Agents	Chemical Agents	Biological Agents	Chemical Agents
• House dust mite	No agents met this definition	• Cat • Cockroach • House dust mite	• ETS (in preschool-aged children)
No agents met this definition	• ETS (in preschool-aged children)	• Dog • Fungi on moldy • Rhinovirus	• Nitrogen oxides (high-level exposures) <sup>1</sup>
<i>Limited or Suggestive Evidence of an Association</i>			
• Cockroach (in preschool-aged children)	No agents met this definition	• Domestic birds • Chlamydia pneumoniae • Mycoplasma pneumoniae • Respiratory Syncytial Virus	• ETS (in school-aged children & adults) • Formaldehyde • Fragrances
<i>Inadequate or Insufficient Evidence to Determine Whether or Not an Association Exists</i>			
• Cat, Dog, Domestic birds • Rodents • Cockroaches (except for preschool-aged children) • Endotoxins • Fungi or molds • Chlamydia pneumoniae • Mycoplasma pneumoniae • Chlamydia trachomatis • Houseplants • Pollen	• Nitrogen oxides • Pesticides • Herbicides • Volatile organic compounds (VOCs) • Formaldehyde • Fragrances • ETS (in school children and adults)	• Mice (in pets or test animals) <sup>2</sup> • Chlamydia trachomatis • Endotoxins • Houseplants • Pollen exposures in indoor environments • Insects other than Cockroaches	• Herbicides • Plasticizers • Volatile organic compounds (VOCs)
<i>Limited or Suggestive Evidence of No Association</i>			
• Rhinovirus (adults)	No agents met this definition	No agents met this definition	No agents met this definition

Source: National Academies Press, 2000. Clearing the Air: Asthma and Indoor Air Exposures. Executive Summary. Institute of Medicine. (2000). 0-309-07496-1. [www.nap.edu/books/0309074961/html/](http://www.nap.edu/books/0309074961/html/)

<sup>1</sup> All concentrations that may occur in only other (non-application) areas used in study were labeled "high-level."



**National Center for Healthy Housing**  
Healthy Homes Training Center

8

## Institute of Medicine - 2004

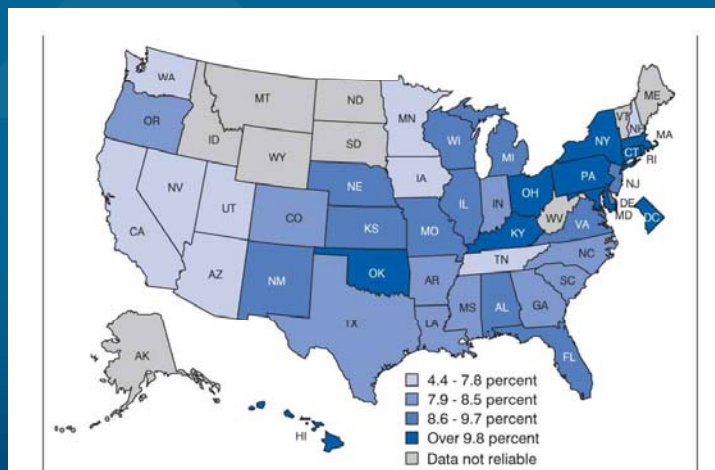
Exposure to Damp Indoor Environments	Presence of Mold or Other Agents in Damp Indoor Environments
<b>Sufficient Evidence of a Causal Relationship</b>	
<b>Sufficient Evidence of an Association</b>	
<ul style="list-style-type: none"> <li>Upper respiratory (nasal and throat) tract symptoms</li> <li>Cough</li> <li>Wheeze</li> <li>Asthma symptoms in sensitized persons</li> </ul>	<ul style="list-style-type: none"> <li>Upper respiratory (nasal and throat) tract symptoms</li> <li>Cough</li> <li>Hypersensitivity pneumonitis in susceptible persons</li> <li>Wheeze</li> <li>Asthma symptoms in sensitized persons</li> </ul>
<b>Limited or Suggestive Evidence of an Association</b>	
<ul style="list-style-type: none"> <li>Dyspnea (shortness of breath)</li> <li>Lower respiratory illness in otherwise healthy children</li> <li>Asthma development</li> </ul>	<ul style="list-style-type: none"> <li>Lower respiratory illness in otherwise healthy children</li> </ul>
<b>Inadequate or Insufficient Evidence to Determine Whether or Not an Association Exists</b>	
<ul style="list-style-type: none"> <li>Airflow obstruction (in otherwise healthy persons)</li> <li>Skin symptoms</li> <li>Mucous membrane irritation syndrome</li> <li>Gastrointestinal tract problems</li> <li>Chronic obstructive pulmonary disease</li> <li>Fatigue</li> <li>Inhalation fevers (nonoccupational exposures)</li> <li>Neuropsychiatric symptoms</li> <li>Lower respiratory illness in otherwise healthy adults</li> <li>Cancer</li> <li>Acute idiopathic pulmonary hemorrhage in infants</li> <li>Reproductive effects</li> <li>Rheumatologic and other immune diseases</li> </ul>	<ul style="list-style-type: none"> <li>Dyspnea (shortness of breath)</li> <li>Skin symptoms</li> <li>Asthma development</li> <li>Gastrointestinal tract problems</li> <li>Airflow obstruction (in otherwise healthy persons)</li> <li>Fatigue</li> <li>Mucous membrane irritation syndrome</li> <li>Neuropsychiatric symptoms</li> <li>Chronic obstructive pulmonary disease</li> <li>Cancer</li> <li>Inhalation fevers (nonoccupational exposures)</li> <li>Reproductive effects</li> <li>Lower respiratory illness in otherwise healthy adults</li> <li>Rheumatologic and other immune diseases</li> <li>Acute idiopathic pulmonary hemorrhage in infants</li> </ul>

Source: National Academies Press, 2004. *Damp Indoor Spaces and Health*. Tables ES-1 and ES-2. Institute of Medicine of the National Academies, ISBN 0-309-09246-9. See [www.nap.edu/books/0309092469/html/](http://www.nap.edu/books/0309092469/html/)



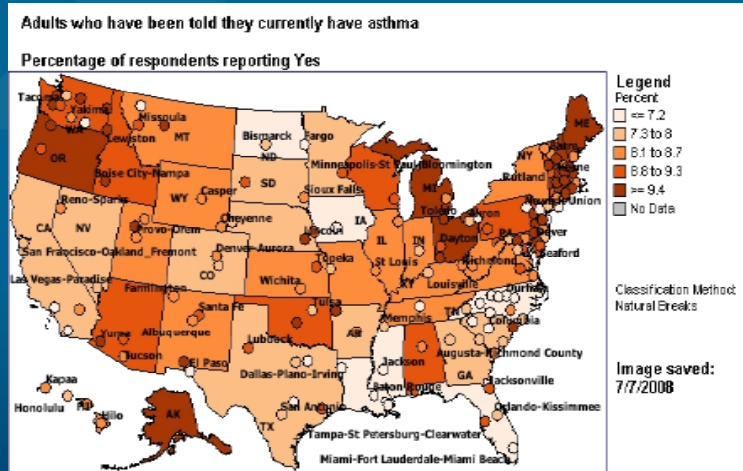
**National Center for Healthy Housing**  
 Healthy Homes Training Center

## Childhood Asthma 1980 to 2005



**National Center for Healthy Housing**  
 Healthy Homes Training Center

## Adult Asthma - 2006



**National Center for Healthy Housing**  
 Healthy Homes Training Center

## Exercise #1

<u>Health Impacts</u>	<u>Housing Hazards</u>	<u>Corrective Action</u>	<u>Resources</u>



**National Center for Healthy Housing**  
 Healthy Homes Training Center

## Holistic Approach

Integrated approach that considers:

- People living in the home
- The structure
- Potential health hazards



**National Center for Healthy Housing**  
Healthy Homes Training Center

13



Moisture / Water Intrusion



Asthma  
Exacerbation

## Why a Holistic Approach?



**National Center for Healthy Housing**  
Healthy Homes Training Center

14

*National Healthy Homes Training Center and Network  
Overview – Essentials for Healthy Homes Practitioners Course*

**Moisture / Water Intrusion** → **Structural Damage**

The diagram features two photographs. On the left, a house is partially submerged in floodwater. An arrow points from this image to the right, where a house is shown with significant structural damage, including a collapsed porch and a sagging roofline. The background is a dark blue gradient with a faint white outline of a house.

**National Center for Healthy Housing**  
Healthy Homes Training Center

15

**Structural Damage**

- **Pests** (includes images of a mouse and a cockroach)
- **Lead Poisoning** (includes image of lead paint chips)
- **Fire** (includes image of flames)
- **Injuries** (includes image of a person in a hospital gown)

The diagram features a central photograph of a house with structural damage. A bracket on the left side of this image connects to four categories: Pests, Lead Poisoning, Fire, and Injuries. Each category is accompanied by a small representative image. The background is a dark blue gradient with a faint white outline of a house.

**National Center for Healthy Housing**  
Healthy Homes Training Center

16



National Healthy Homes Training Center and Network  
Overview – Essentials for Healthy Homes Practitioners Course

Asthma and Allergy Exacerbation

Pests

Pesticide

**National Center for Healthy Housing**  
Healthy Homes Training Center

17

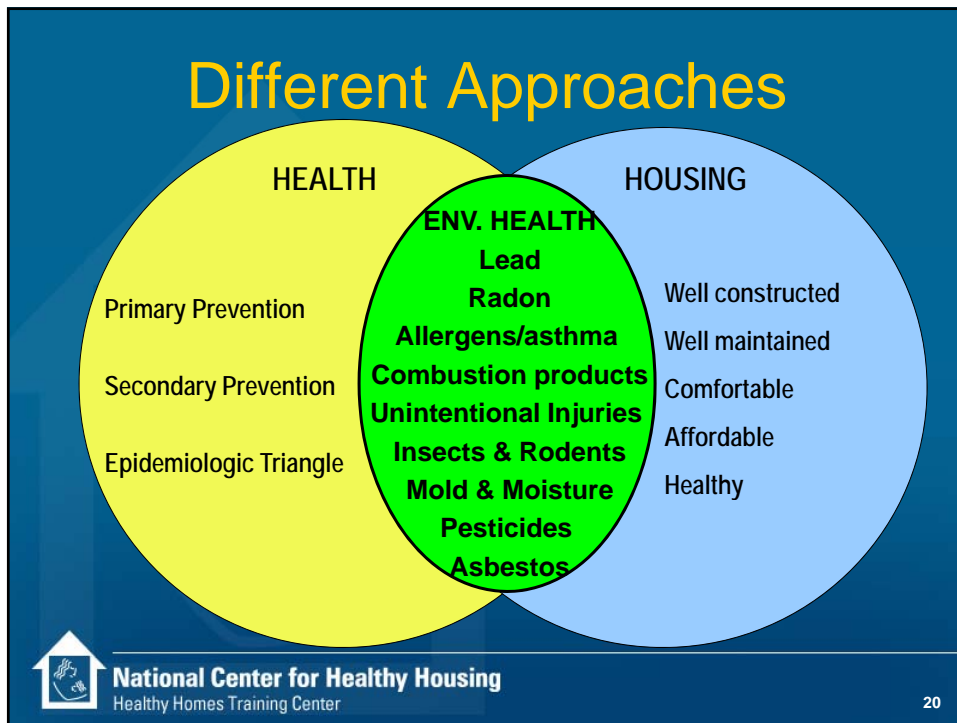
The diagram illustrates the relationship between pests, pesticides, and asthma/allergy exacerbation. On the left, a child is shown using an inhaler, with the text 'Asthma and Allergy Exacerbation'. In the center, under the heading 'Pests', are images of a mouse and a cockroach. On the right, under the heading 'Pesticide', are images of a 'HOT SHOT' spray can and a 'Spectracide BUG STOP INDOOR FOGGER' box. Arrows point from the pests to the pesticides, and from the pesticides to the child with the inhaler.

Pesticide

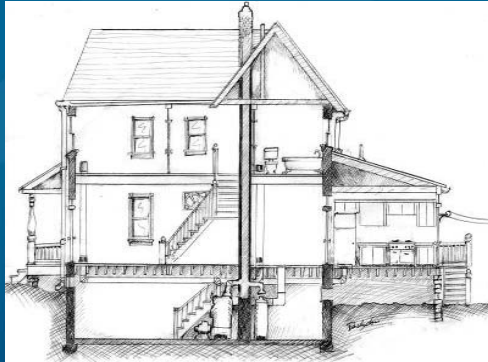
**National Center for Healthy Housing**  
Healthy Homes Training Center

18

The diagram illustrates the link between pesticides and food consumption leading to asthma/allergy exacerbation. At the top, under the heading 'Pesticide', are images of a 'HOT SHOT' spray can and a 'Spectracide BUG STOP INDOOR FOGGER' box. Below these, on the left, are images of a child eating a cookie and a child eating a sandwich. On the right, under the heading 'Food', is an image of a plate of various fruits and vegetables. Arrows point from the pesticides to the child eating the cookie, from the pesticides to the child eating the sandwich, and from the food to the child eating the sandwich.



## Healthy Homes Principles



### Keep It:

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



**National Center for Healthy Housing**  
Healthy Homes Training Center

21

## What is Healthy Housing?

Healthy Housing is

- Designed,
- Constructed,
- Maintained, and
- Rehabilitated

in a manner that is conducive to good occupant health.



**National Center for Healthy Housing**  
Healthy Homes Training Center

22

## American Housing Survey

- Conducted by the U.S. Census Bureau
- Funded by HUD
- Conducted:
  - Every two years since the 1980s
  - Periodically for 46 Metropolitan Statistical Areas (MSA)
  - Consistent set of homes
  - Phone survey since 1997



**National Center for Healthy Housing**  
Healthy Homes Training Center

23

## Exercise #2

Write the number for each characteristic listed in the left-hand column on the line for closest number or percentage in the right-hand column. See example for rats. Some numbers or percentages are used more than once. See [www.healthyhomestraining.org/117-117\\_National\\_2007\\_Fall\\_12-31\\_08.pdf](http://www.healthyhomestraining.org/117-117_National_2007_Fall_12-31_08.pdf) for answers.

1. # of homes with severe physical problems	_____	About 1,800 homes
2. # of homes with moderate physical problems	_____	About 4,000 homes
3. # of homes with either severe or moderate problems	_____	About 6,000 homes
4. % of homes with exterior physical problems	_____	About 10,000 homes
5. % of homes with exterior water leakage in past 12 months	_____	About 1,800,000 homes
6. % of homes with interior water leakage in past 12 months	_____	About 4,000,000 homes
7. % of homes with signs of rats in past 3 months	_____	About 6,000,000 homes
8. % of homes with signs of mice in past 3 months	_____	About 10,000,000 homes
9. % of rental homes built before 1980	_____	About 0.5 - 1.5% homes
10. % of homes with a septic tank, cesspool or chemical toilet	_____	About 5 - 6% of homes
11. % of homes with fuel-burning room heaters without a flue as main heating equipment	_____	About 7.5-12.5% of homes
12. % of homes with gas-fired warm-air furnaces	_____	About 17 - 25% of homes
13. % of homes with piped gas for water heating	_____	About 30 - 35% of homes
14. % of homes with piped gas for clothes dryer	_____	About 50 - 55% of homes
15. % of homes with residents with severe problems rating home 8, 9, or 10 with 10 as best	_____	About 60 - 70% of homes
16. % of homes with severe problems caused by plumbing	_____	About 80 - 85% of homes
	_____	About 90 - 92% of homes
	_____	About 95 - 97% of homes
	_____	About 99 -100% of homes

Checkmark the most common cause of each type of problem.

Exterior water leakage problems	Interior water leakage	Severe Physical Prob.	Moderate Physical Prob.
<input type="checkbox"/> Walls or window problems	<input type="checkbox"/> Leaking pipes	<input type="checkbox"/> Plumbing	<input type="checkbox"/> Plumbing
<input type="checkbox"/> Basement problems	<input type="checkbox"/> Broken fixtures	<input type="checkbox"/> Heating	<input type="checkbox"/> Heating
<input type="checkbox"/> Roof problems	<input type="checkbox"/> Broken water heater	<input type="checkbox"/> Electric	<input type="checkbox"/> Upkeep
<input type="checkbox"/> Other / Unknown	<input type="checkbox"/> Other / Unknown	<input type="checkbox"/> Upkeep	<input type="checkbox"/> Kitchen



**National Center for Healthy Housing**  
Healthy Homes Training Center

24

## AHS National - 2007

### Demographics

- 110 million homes
- 32% - rental
- 65% - single-family detached homes
- 64% - built pre-1980
- 30% - basement

### Exterior Problems

- 17.5% - exterior physical problems
- 4.6% - missing roofing material
- 10.3% - exterior water leakage



**National Center for Healthy Housing**  
Healthy Homes Training Center

25

## AHS National - 2007

### Interior Problems

- 7.9% - interior water leakage
- 4.8% - open cracks or holes
- 3.4% - pipes leaked
- 5.5% - mice
- 9.1% blown fuses or breakers

### Safety Devices

- 7.6% - no working smoke alarm
- 56% - more than two-year old fire extinguisher
- 67% - no carbon monoxide alarm



**National Center for Healthy Housing**  
Healthy Homes Training Center

26

## AHS National - 2007

### Heating

- 63% - warm air furnace
- 1.1% - room heater without flue
- 0.9% - stove as main heating equipment
- 8.2% - uncomfortably cold



**National Center for Healthy Housing**  
Healthy Homes Training Center

27

## Your Community

- Healthy Homes Profiles
  - Comparison to similarly situated housing
- Interior-Exterior Relationships
  - Likelihood in interior problem if exterior problem is present.
- More Detailed Snapshot



**National Center for Healthy Housing**  
Healthy Homes Training Center

28

# National Healthy Homes Training Center and Network Overview – Essentials for Healthy Homes Practitioners Course

Characteristic	Outside Central City					Central City				
	Owner-Occupied		Rental			Owner-Occupied		Rental		
	Number/Percent	National	Number/Percent	National	National	Number/Percent	National	Number/Percent	National	
Number of units	449,400	-	257,600	-	59,200	-	89,500	-	-	
Percent of Area	63.6%	-	36.4%	12,765,700	39.5%	-	60.2%	-	-	
Median year of construction	1968	-	1965	-	1944	-	1950	-	-	
% Pre-1940	9.5%	-	13.5%	-	43.1%	25.5%	38.2%	-	-	
% Post-1979	27.3%	-	18.1%	29.6%	15.0%	-	5.3%	17.7%	-	
% Below poverty	8.1%	-	3.7%	18.0%	13.5%	9.6%	8.3%	25.6%	-	
<b>Basic Housing Quality</b>	-	-	-	-	-	-	-	-	-	
Severe physical problems	0.9%	-	3.5%	2.4%	1.1%	1.6%	6.5%	4.6%	-	
Moderate physical problems	2.2%	-	6.8%	-	2.7%	-	9.7%	-	-	
<b>Interior Problems</b>	-	-	-	-	-	-	-	-	-	
Holes in floors	0.2%	0.6%	1.9%	1.4%	0.7%	-	3.0%	-	-	
Open cracks or holes in walls	7.4%	3.5%	10.8%	6.2%	9.3%	5.0%	13.4%	-	-	
Broken plaster/peeling paint	2.2%	1.6%	6.4%	3.4%	4.4%	2.5%	10.8%	5.7%	-	
Signs of rats	1.8%	0.6%	1.8%	1.0%	3.2%	1.0%	3.4%	2.2%	-	
Signs of mice	0.4%	-	8.1%	5.6%	7.9%	5.6%	10.1%	-	-	
Water leaks from inside	10.9%	8.0%	17.4%	11.7%	10.1%	-	17.4%	-	-	
Water leaks from outside	17.7%	12.8%	16.1%	9.4%	30.3%	14.3%	18.4%	10.6%	-	
Water supply stoppage	5.0%	-	5.9%	5.3%	2.4%	-	5.5%	-	-	
Flush toilet breakdown	2.7%	1.7%	6.8%	4.6%	1.9%	-	6.0%	-	-	
Sewage disposal breakdown	2.1%	1.3%	3.8%	2.1%	2.3%	-	3.8%	2.5%	-	
Lacking complete plumbing	1.6%	0.8%	1.9%	-	2.6%	1.2%	2.5%	-	-	
Heating equip breakdown	2.4%	1.5%	4.4%	2.3%	1.5%	2.0%	6.9%	4.3%	-	
Space heater w/o flues	0.9%	2.8%	1.9%	3.8%	0.7%	3.0%	4.8%	-	-	
Exposed wiring in unit	0.2%	0.5%	1.0%	-	0.6%	0.5%	1.3%	0.8%	-	
Rooms w/o working elect. outlet	0.9%	-	2.7%	-	2.2%	1.3%	5.4%	2.4%	-	
Lacking kitchen facilities	0.9%	0.5%	4.0%	-	1.2%	0.6%	6.6%	4.8%	-	
<b>Exterior Problems</b>	-	-	-	-	-	-	-	-	-	
Roofing problems	8.3%	4.5%	11.5%	7.0%	11.1%	6.1%	12.9%	7.1%	-	
Siding problems	3.8%	2.0%	8.3%	4.0%	0.1%	2.7%	9.9%	5.2%	-	
Window problems	4.6%	2.9%	7.4%	4.8%	8.3%	4.5%	11.7%	7.1%	-	
Foundation problems	3.1%	1.9%	4.6%	3.0%	5.4%	3.0%	5.8%	4.0%	-	
<b>Any Identified Problem</b>	46.3%	-	56.5%	-	57.4%	39.7%	60.5%	-	-	



**National Center for Healthy Housing**  
Healthy Homes Training Center

29

### Relationship Between Interior Problems and Exterior Problems-

Based on the American Housing Survey - 2007 National Data for Occupied Housing

Exterior Problem	Homes (000s)	Likelihood of Finding an Interior Problem if an Exterior Problem is Reported Compared to the Likelihood of Finding an Interior Problem if an Exterior Problem is Not Reported*										
		Leaks		Rodents		Heating		Structural				Resident Dissatisfied
		From Interior	From Exterior	Rats	Mice	Heating Problem	Fire/CO Danger	Cracks in Walls	Holes in Floors	Paint/plaster		
Sagging roof	1,860.8	2.7	3.6	5.0	3.0	3.5	3.2	6.8	12.1	9.1	10.7	
Missing roofing material	3,846.2	1.8	2.3	3.7	2.2	2.0	2.3	3.8	6.0	5.1	5.8	
Hole in roof	1,288.3	2.8	5.5	5.4	3.2	3.3	4.3	7.6	18.6	11.0	11.9	
Sloping outside walls	1,172.6	2.3	3.0	3.9	3.1	3.4	3.9	7.7	13.9	8.9	15.6	
Missing bricks, siding, other outside wall material	2,116.4	2.5	2.8	6.5	2.7	2.8	3.7	5.3	8.3	7.9	9.7	
Broken windows	2,947.8	2.7	2.5	6.0	2.8	3.1	3.3	5.4	13.2	8.1	7.0	
Boarded up windows	806.6	1.9	2.3	8.3	2.8	2.8	4.5	6.4	11.8	10.3	9.5	
Foundation crumbling or has open crack or hole	2,147.4	2.1	3.5	5.2	2.7	2.8	2.3	7.3	11.9	7.5	8.2	
One or more ext. problem	10,086.0	2.3	2.9	4.2	2.6	2.6	2.7	5.9	11.8	7.4	7.5	
Two or more ext. problem	3,250.9	2.5	3.8	6.3	3.2	3.5	3.9	8.3	15.3	10.9	11.5	
Three or more ext. problem	1,434.1	2.9	4.4	9.0	3.7	3.9	4.9	9.9	20.3	14.6	18.8	
Four or more ext. problem	656.6	3.0	4.2	14.2	4.1	4.5	5.7	10.5	22.6	17.1	21.7	
Five or more ext. problem	364.7	3.1	3.6	12.3	4.3	4.8	5.8	10.0	23.6	19.7	24.8	
Six or more ext. problem	202.5	3.0	3.3	13.4	3.5	4.5	5.9	9.8	24.6	18.4	28.7	
Seven or more ext. problem	127.2	2.1	2.8	15.1	4.1	3.5	5.6	7.1	23.7	13.1	20.5	
Eight or more ext. problem	64.1	-	-	5.7	-	-	4.3	3.6	13.2	7.2	8.2	

\* A home is L times as likely to have a specific interior problem (column heading) if the exterior problem is reported (row heading) than if the exterior problem is not reported. For example, a home is 2.7 times as likely to have a leak from the interior if it has a sagging roof than if it does not have a sagging roof.

National Center for Healthy Housing See [www.healthyhomestraining.org/ahs/](http://www.healthyhomestraining.org/ahs/)

## No Place Like Home!

### Resident Overall Opinion of Structure

American Housing Survey – National 2007

Worst ←————→ Best

Type of Resident	1	2 to 4	5 to 7	8	9	10
All	0.5%	1.9%	23%	28%	16%	27%
Renters	1.2%	4.1%	34%	27%	12%	18%
Severe Problems	4.1%	8.7%	36%	25%	11%	17%
Below Poverty	1.6%	4.8%	23%	24%	12%	25%



**National Center for Healthy Housing**  
Healthy Homes Training Center

31

## Real World is Complex


- Current knowledge
- Economic factors
- Social and cultural
- Political and legal factors
- “Do No Harm”



**National Center for Healthy Housing**  
Healthy Homes Training Center

32






## Will Things Change?

Homes With “No Smoking” Rule


- 43% in 1992-1993
- 72% in 2003

 **National Center for Healthy Housing**  
Healthy Homes Training Center

33

## Healthy Homes Interventions

- 2008 Expert Panel
- Convened by CDC and NCHH
- Categories
  - Effective
  - Needs More Field Evaluation
  - Needs Formative Research
  - No Evidence or Ineffective

 **National Center for Healthy Housing**  
Healthy Homes Training Center

34

## Healthy Homes Interventions

- A. Controlling Asthma Symptoms and Reducing Asthma Morbidity:**  
Multi-faceted in-home interventions for asthma tailored to the individual that include:
1. Home environmental assessment;
  2. Education;
  3. Use of mattress and pillow covers;
  4. Use of HEPA vacuums and HEPA air filters;
  5. Smoking cessation and reduction in environmental tobacco smoke exposure;
  6. Cockroach and rodent management;
  7. Minor repairs; and
  8. Intensive household cleaning.

**But the following were found to be ineffective:**  
Bedding encasement, sheet washing and upholstery cleaning each by themselves in isolation from other interventions.

- B. Reducing Asthma Triggers and Exposure to Asthma Triggers**  
When implemented together, eliminating moisture intrusion and leaks and removal of moldy items.

- C. Reducing Exposure to Pests and Pesticides:**  
Cockroach control through Integrated Pest Management (IPM). IPM includes:
1. Household cleaning and tool dispensing;
  2. Professional cleaning;
  3. Education of residents;
  4. Baits;
  5. Structural repairs; and
  6. When necessary, intensive application of low-toxicity, non-spray pesticides.

- D. Reducing Exposure to Pesticide Residues:**  
Integrated pest management (IPM) which includes:
1. Professional cleaning;
  2. Sealing of pest entry points;
  3. Application of low-toxicity pesticides; and
  4. Education.



## Healthy Homes Interventions

- E. Reducing Exposure to Radon in Air to Less than 4 pCi/L:**  
Active sub-slab depressurization systems in high-risk areas.

- F. Reducing Exposure to Environmental Tobacco Smoke**  
Elimination of environmental tobacco smoke.

**But the following were found to be ineffective:**  
Portable air cleaning filtration systems are ineffective in controlling exposures to environmental tobacco smoke and also formaldehyde, although it is possible that there may be some modest decline in exposure.

- G. Reducing Children's Blood Lead Levels, Deteriorated Lead-Based Paint and Dust Lead**  
Residential lead hazard control.

**But the following were found to be ineffective:**  
Single professional cleaning regimens have been shown to be ineffective in controlling long-term exposures to lead contaminated dust.

- H. Reducing Death and Injuries from Residential Fires:**  
Installed, working smoke alarms.

**But the following were found to be less effective:**  
Community programs that give away smoke alarms without taking steps to make sure they are actually installed are less effective than programs that actually install alarms, and have not been proven to reduce injuries.

- I. Preventing Drowning:**  
Isolation 4-sided pool fencing.

**But the following were found to be ineffective:**  
Use of three-sided pool fences instead of complete four-sided pool fencing is not effective and may actually increase risk, because care-givers may believe the incomplete fencing is adequate.

- J. Reducing Scald Burns:**  
Pre-set safe temperature hot water heaters.

**The following were also found to be ineffective:**

- Portable air cleaning filtration systems are ineffective in controlling exposures to environmental tobacco smoke and also formaldehyde, although it is possible that there may be some modest decline in exposure.
- "Air cleaners" that produce large amounts of ozone should not be used, because they result in increased exposure to ozone, which mimics the health effects of radiation exposure and is a known respiratory toxicant.





Until effective standards for the domestic environment are devised, it is likely that children will continue to be employed as biological indicators of substandard housing.



**National Center for Healthy Housing**  
Healthy Homes Training Center

37

## Codes Benefiting Healthy Homes

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


Housing v. Building v. Zoning Codes




**National Center for Healthy Housing**  
Healthy Homes Training Center

38

Does this Violate the IPMC?




 **National Center for Healthy Housing**  
Healthy Homes Training Center

39

## Key Provisions of Codes

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

 **National Center for Healthy Housing**  
Healthy Homes Training Center

40

## Model Codes for Housing

- Building Construction – Int'l Building Code
- Residential Construction – Int'l Residential Code
- Rehab – Int'l Existing Building Code
- Electrical – ICC Electrical Code
- Fire – Int'l Fire Code and National Fire Protection Association
- Ventilation – Int'l Mechanical Code
- Plumbing – Int'l Plumbing Code
- Sewage – Int'l Private Sewage Disposal Code
- **All Buildings – Int'l Property Maintenance Code**



**National Center for Healthy Housing**  
Healthy Homes Training Center

41

## Int'l Property Maintenance Code

- Adopted in
  - More than 550 communities
  - Two states – New York & Virginia
  - Several states including Georgia & Oklahoma recommend it as a model for locals codes
- Applicability
  - Existing Buildings
  - Rental and Owner Occupied Homes
  - Local Variations
- Code Official Enforces



**National Center for Healthy Housing**  
Healthy Homes Training Center

42

## Landlord-Tenant Laws

- Rights and Responsibilities
- Common Requirements
  - Certificate of Occupancy
  - Duty to Pay Rent
  - Withholding Rent to Make Repairs
  - Retaliation
- Eviction and Enforcement



**National Center for Healthy Housing**  
Healthy Homes Training Center

43

## Federal Health Priorities: Healthy People 2010 Objectives

- Eliminate elevated blood lead levels in children.
- Reduce pesticide exposures that result in visits to a health care facility.
- Reduce indoor allergen levels.
- Increase the proportion of persons who live in homes tested for radon concentrations.
- Increase the number of homes constructed to be radon resistant.
- Increase the proportion of persons living in pre-1950s housing that has been tested for the presence of lead-based paint.
- Reduce the proportion of occupied housing units that have moderate or severe physical problems.



**National Center for Healthy Housing**  
Healthy Homes Training Center

44

## Green Building Priorities

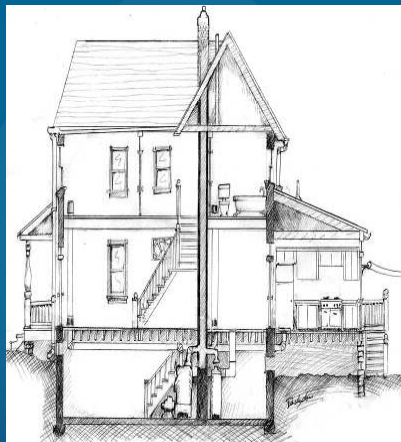
- NCHH Comparison – February 2009
- Major National Programs
  - Green Communities by Enterprise Community Partners
  - Leadership in Energy and Environmental Design for Homes (LEED for Homes) by U.S. Green Building Council (USGBC)
  - National Green Building Standard (ICC-700-2008) by the International Code Council (ICC) and National Association of Home Builders (NAHB)
  - Energy Star with Indoor Air Package by U.S. Environmental Protection Agency (EPA)



**National Center for Healthy Housing**  
Healthy Homes Training Center

45

## Core Healthy Homes Principles



- Start with People
- Keep It:
  - Dry
  - Clean
  - Pest-Free
  - Ventilated
  - Safe
  - Contaminant-Free
  - Maintained



**National Center for Healthy Housing**  
Healthy Homes Training Center

46

## National Healthy Homes Training Center & Network

- Brings together public health and housing practitioners to promote practical and cost-effective methods for making homes healthier.
- Serves as a forum for exchanging information on new research and best practices.

*Funded by a grant from the U.S. Centers for Disease Control & Prevention, with support from the U.S. Department of Housing & Urban Development, and the U.S. Environmental Protection Agency.*



**National Center for Healthy Housing**  
Healthy Homes Training Center

47

## Purpose of the Course

- Provide training for public health and housing practitioners in the assessment and treatment of housing related health hazards, with a focus on practical and cost-effective methods.
- Promote cross training of public health and housing practitioners.
- Create a forum for the exchange of practical guidance about healthy housing strategies among federal, state, tribal and local agency staff.
- Develop a mechanism for the ongoing introduction of new research findings into public health training and practice.
- Identify and optimize opportunities for networking, collaboration and partnerships.



**National Center for Healthy Housing**  
Healthy Homes Training Center

48



## Course Outline

- Overview
- Start with People
- House as a System
- Keep It:
  - Dry
  - Clean
  - Pest-Free
  - Ventilated
  - Safe
  - Contaminant-Free
  - Maintained
- Making It Work



**National Center for Healthy Housing**  
Healthy Homes Training Center

49

## Key Messages

- There is a link between housing and health.
- Certain groups are at greater risk for adverse health effects.
- There are basic public health and housing principles that can help us understand the link between housing and health.
- The “Healthy Homes” movement is a holistic approach to promote health through better housing.
- Codes and regulations are tools that can help you achieve healthier housing in your community.



**National Center for Healthy Housing**  
Healthy Homes Training Center

50