

Version 5-12-09
Version 2.2

We do not provide an outline slide in this module. Your goal should be to jump right into the materials so you grab their attention with these big picture items. You can review the course at the end. But you should understand the basic flow of the module. Here it is:

Part A – Why are healthy homes important? – Slides 2-7

Part B – Health and Housing Connection – Slides 8-12 & Exercise #1 of Slide 12

Part C – Holistic Approach / Seven Principles – Slides 13-22

Part D – Basic Stats – American Housing Survey – Slides 23-31 & Exercise #2 on Slide 30

Part E – Can we make change? – Slides 32-36

Part F – Codes – slides 37-43 & Exercise #3

Part G – Priorities – Slides 44-46

Part H – Training Overview – Slides 47-50.

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. BMJ, 1991, 303, 838-840



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The role of housing as a contributor to health has been known for decades, while new agents and pathways continue to be discovered and explored. ^[2]

In the early 1800s, the relation between housing conditions and health was recognized among public health practitioners in the United States and Europe and led to the rise of the sanitary reform movement. Slum clearance and improving the quality of housing and sanitation were important components of 19th and 20th century campaigns to control typhus, tuberculosis, and other infectious diseases. Interest in housing as a determinant of health has fluctuated in response to housing-related infectious disease outbreaks (e.g. cholera in New York City in the 1830s), social unrest and class conflict, industrial interest in maintaining a healthier workforce, and economic downturns leading to crises in housing availability and quality. ^[3]

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



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The 70% comes from an 2008 EPA report providing the basis of exposure assessments for children 1 to 6. See <http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=199243>.

The physical home environment as a determinant of health is gaining renewed attention. ^[2,3] Researchers have linked indoor air pollution and other exposures in homes to acute and chronic diseases, including cancer. ^[4]

Today, we know that the primary exposure setting for most Americans is the indoor environment. Most of us, especially children, spend more time inside than outside. The air we breathe and things we touch inside matter. Yet the primary focus of health and environmental regulations are on the outside environment.

Housing is a multi-dimensional construct, which affects health both directly and indirectly. A significant body of research acknowledges and supports the case that housing conditions have a direct effect on health. Research also points to the health dangers associated with overcrowding, excessive expenditures on shelter, and homelessness. Inside the home, there is the potential for physical, chemical and biological exposures. Housing is also seen as a component of general well-being – it confers a sense of security, privacy, and control. It also is related to one's perception of social status, in both individual and community contexts.

A range of health problems result from these hazards including injuries, asthma and other respiratory illnesses, carbon monoxide poisoning, cancers, and childhood lead poisoning.

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.



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Here are some estimates of the costs associated with unhealthy housing.

\$54.9 billion estimate is likely low because it considers only four categories of illness.^[8]

The total does not include the cost of lost days from school and work.

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

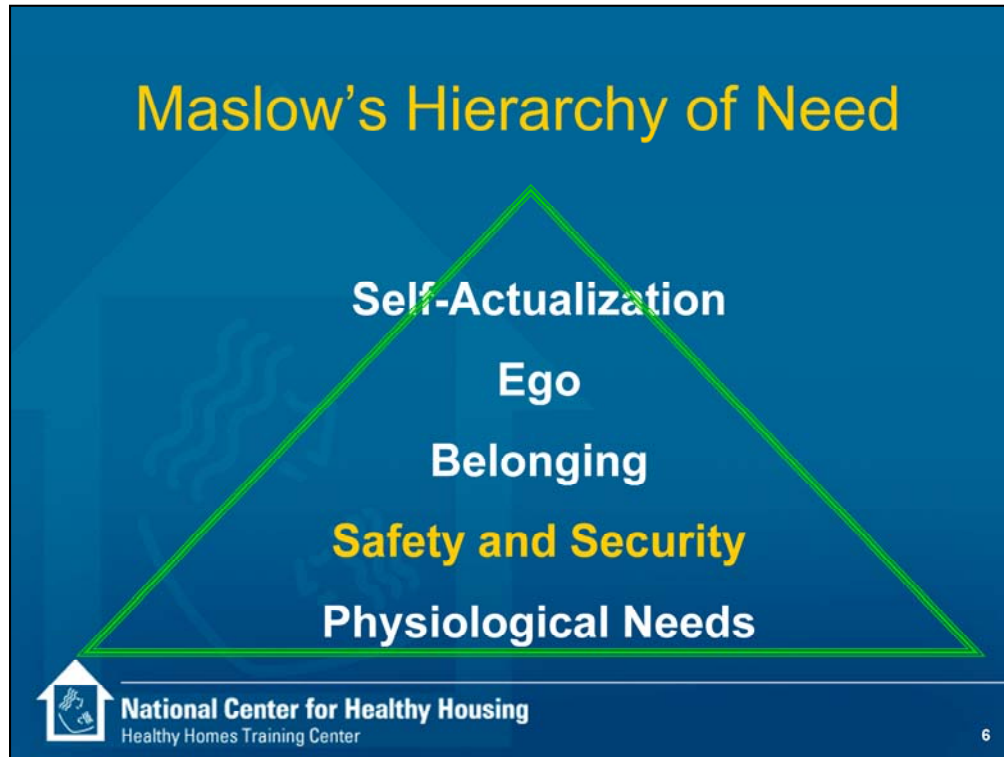


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The CDC set a goal of reducing the number of occupied homes with severe and moderate physical problems by more than 50% from 1995 to 2010 to reach a goal of 3.1 million homes. In 2007 we were far from the goal but saw significant progress between 2005 and 2007.

CDC uses the American Housing Survey to measure progress to this goal. See Page 13 of 29 Reference Tab Connections Section.



In the broadest sense, housing is the right not just to basic shelter but to “adequate housing,” in terms of legal security of tenure; availability of services, materials, facilities, and infrastructure; affordability; habitability; accessibility; and location and cultural adequacy.

This graphic illustrates Maslow's Hierarchy of Needs (1943-1954). Housing is related to safety and security. The key message is that you must satisfy basic needs first then you can get to the other needs. For people to be contributing members of society, we need to address their safety and security concerns – that means they must be safe and secure in their home.

Physiological needs include basic necessities such as air, water, food, sleep.


Safety and Security needs include keeping ourselves out of danger and from feeling threatened; such as by having shelter to protect us from the environment and feeling safe when walking in the neighborhood.

Belonging: Humans have a desire to belong to groups: clubs, work groups, religious groups, family because we need to feel loved and desired by others.

Ego: Humans have:

- Esteem needs to achieve, be competent, gain approval and recognition.
- Cognitive needs include the need to know, to understand, and explore.
- Aesthetic needs or a desire for symmetry, order, and beauty.

Self-actualization: Human need to find self fulfillment and realize one's full potential.



Home is where the heart is.
Pliny

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

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


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

Where thou art, that is home.
Emily Dickinson

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

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

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

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Use this slide to emphasize the very special place a home has in our history and our emotions. While the Maslow's Hierarchy of Need makes analytical sense, it misses the emotional mark.

This page was developed by Deb Millette at CDC. The quotes come up with each click of the mouse. The first one – by William Pitt – captures the information perfectly – it may have serious physical problems but it is still home.

Institute of Medicine - 2000

Association Between Biological and Chemical Exposures in the Home and Development of Asthma in Sensitive Individuals			
Biological Agents	Chemical Agents	Biological Agents	Chemical Agents
Sufficient Evidence of a Causal Relationship			
• House dust mite	No agents met this definition	• Cat • Cockroach • House dust mite	• ETS (in preschool-aged children)
Sufficient Evidence of an Association			
No agents met this definition	• ETS (in preschool-aged children)	• Dog • Fungi or molds • Rhinovirus	• Nitrogen oxides (high-level exposures) ¹
Limited or Suggestive Evidence of an Association			
• Cockroach (in preschool-aged children) • Respiratory Syncytial Virus	No agents met this definition	• Domestic birds • Chlamydia pneumoniae • Mycoplasma pneumoniae • Respiratory Syncytial Virus	• ETS (in school aged and older children, & adults) • Formaldehyde • Fragrances
Inadequate or Insufficient Evidence to Determine Whether or Not an Association Exists			
• 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 • Plasticizers • Volatile organic compounds (VOCs) • Formaldehyde • Fragrances • ETS (in older children and adults)	• Rodents (as pets or feral animals) ² • Chlamydia trachomatis • Endotoxins • Houseplants • Pollen exposure in indoor environments • Insects other than Cockroaches	• Pesticides • Plasticizers • Volatile organic compounds (VOCs)
Limited or Suggestive Evidence of No Association			
• 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. ISBN 0-309-06496-1 See www.nap.edu/books/0309064961/html/

¹ At concentrations that may occur only when gas appliances are used in poorly ventilated kitchens.



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You need to help people understand in depth the summary tables from the two key IOM studies. For your ease, we put the tables in the PowerPoint so you are not jumping around between PDFs and PowerPoints. You should have the students go the Reference Tab of the book and look at the full size version so they can take notes.

The 2000 IOM report called “Clearing the Air” addresses the connection between asthma and exposures in the home. It laid the foundation for the healthy homes effort. It is on second page in the Reference Tab.

Tell students that they need to memorize the first two rows – the ones that say “sufficient evidence” and know whether it is on the left half of the page – causing asthma (development) – or on the right-half – triggering asthma attack (exacerbation). They don’t need to know whether it is biological or chemical or whether there is causal evidence or just an association. You should drill them on this information throughout the course.

This slide is a good chance to introduce the students to the Reference Tab of the Binder. It consists of five parts. The four main parts (after the index) are separated by colored sheets of paper.

- Index – one page

- Connections – 29 pages as of 4-22-09. It contains the references that address health hazards and the connections between health and housing.

- Codes – 48 pages as of 4-22-09. It summarizes various codes that relate to healthy homes and gives the extracts to key ones. HUD’s HQS starts at page The IPMC starts at page 9. The last 11 pages compare the four national green building programs.

- Assessment – 32 pages as of 4-22-09. It provides information on the various assessment tools that are available starting with the HUD/CDC Healthy Housing Inspection Manual. The CEHRC Visual Survey – which is used in the last exercise of the course and one of the tasks to get the Healthy Homes Specialist Credential is at page 9.

- Resources – 27 pages as of 4-22-09. It provides an introduction to the Healthy Homes Reference Manual, the references used to develop the course and a series of HUD facts sheets on specific healthy homes issues.

Institute of Medicine - 2004

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

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/0309091934.html/



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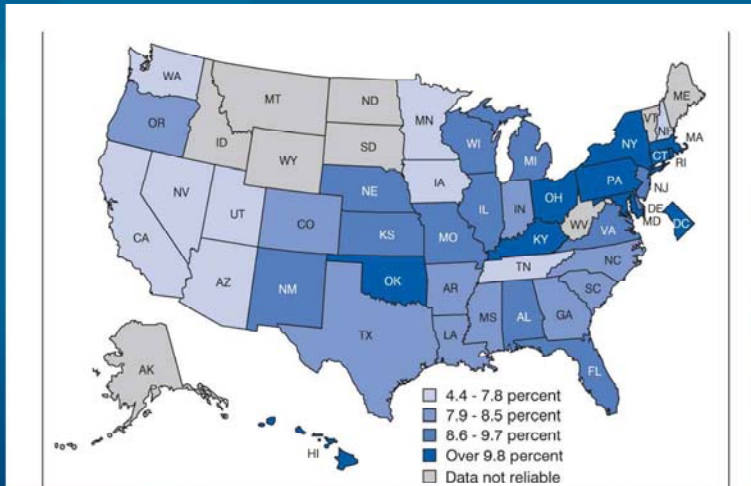
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This is the second IOM report. It was published in 2004 and evaluates the connection between dampness and health.

For your ease, we put the tables in the PowerPoint so you are not jumping around between PDFs and PowerPoints. You should have the students go the Reference Tab of the book and look at the full size version so they can take notes.

The table is on page 2 of 29 in the Reference Tab Connections Section. While they are looking at the Reference section, you could point them to page 3 of 29 in the Section. It is a WHO report from Europe exploring the evidence that shows the evidence of quantifiable linkages between diseases and housing. It is not an official WHO report though.

Childhood Asthma 1980 to 2005



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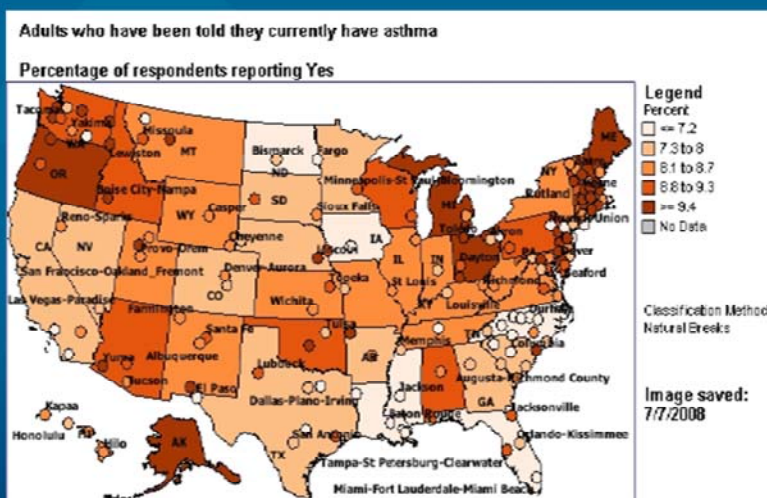
10

For your ease, we put this chart in the PowerPoint so you are not jumping around between PDFs and PowerPoints. You should have the students go the Reference Tab of the book and look at the full size version.

The chart is on page 26 of 29 in the Connections Section of the Reference Tab. It is in color.

Childhood asthma is one of the issues that brought the need for healthy homes into focus. Note where the levels are high and where there is no data. There are more factors than housing involved so avoid overstating the case.

Adult Asthma - 2006



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For your ease, we put this chart in the PowerPoint so you are not jumping around between PDFs and PowerPoints. You should have the students go the Reference Tab of the book and look at the full size version.

The chart is on page 27 and 28 of 29 in the Connections Section of the Reference Tab. It is in color.

The charts on pages 27 and 28 are from the 2006 Behavioral Risk Factors Surveillance System (BRFSS). The states and many cities (note the small circles) conduct the BRFSS survey of adults on a wide range of health related issues. The chart on this slide is from page 27. It shows the residents who said they currently have asthma. The chart of page 28 looks similar but it is for adults who report ever having asthma. We included this one since current asthma is more relevant.

Exercise #1

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



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Walk them through Exercise #1. See Exercise Tab. See Instructor's Guide to conduct exercise.

Holistic Approach

Integrated approach that considers:

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

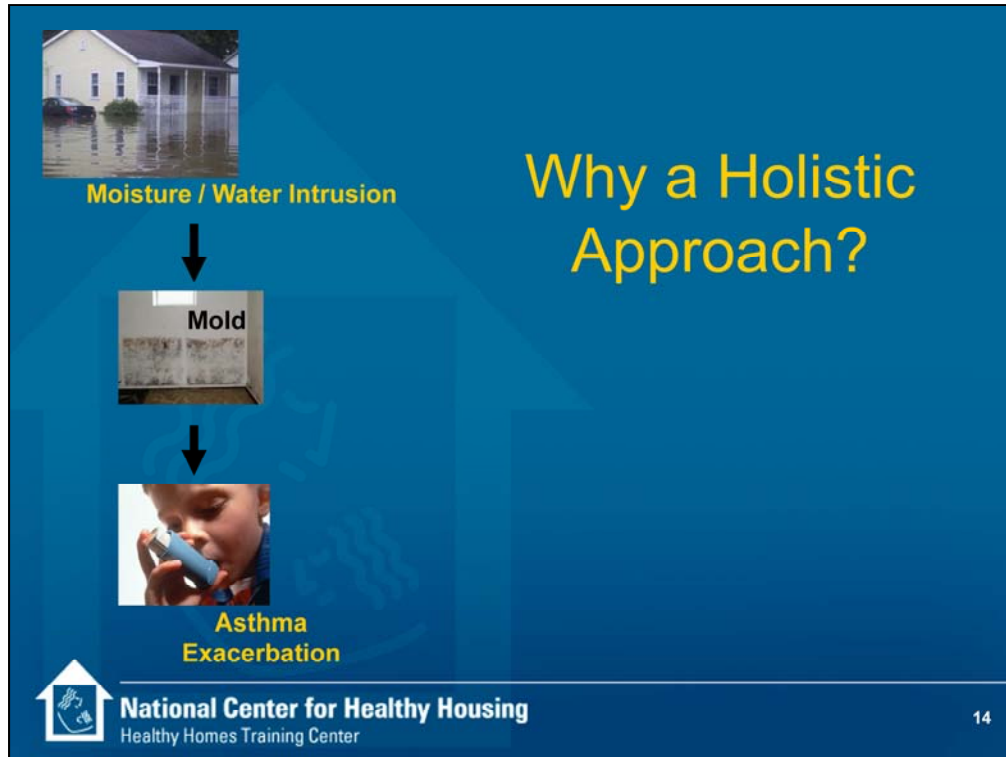


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Today we are introducing a different way of thinking about the home environment. We are proposing that instead of using a categorical approach, we should be using a holistic approach. This is an integrated approach that considers the people living in the home, the structure, and the potential health hazards. Considering health and housing problems together in a coordinated way is more efficient and prevention-effective.

Healthy Homes programs offer a comprehensive and coordinated approach by promoting interagency collaboration, community participation, and cross training.



Deb Millette of CDC developed these charts to emphasize the connections between the problems. Asthma exacerbation means trigger an asthma attack is a sensitized person. The next charts develop the connections.

Use these slides to reaffirm the connections developed from Exercise #1 and why a holistic approach is necessary.



Moisture / Water Intrusion

Structural
Damage



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**Structural
Damage**



Pests



Lead Poisoning



Fire



Injuries



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**Asthma and
Allergy
Exacerbation**



Pests



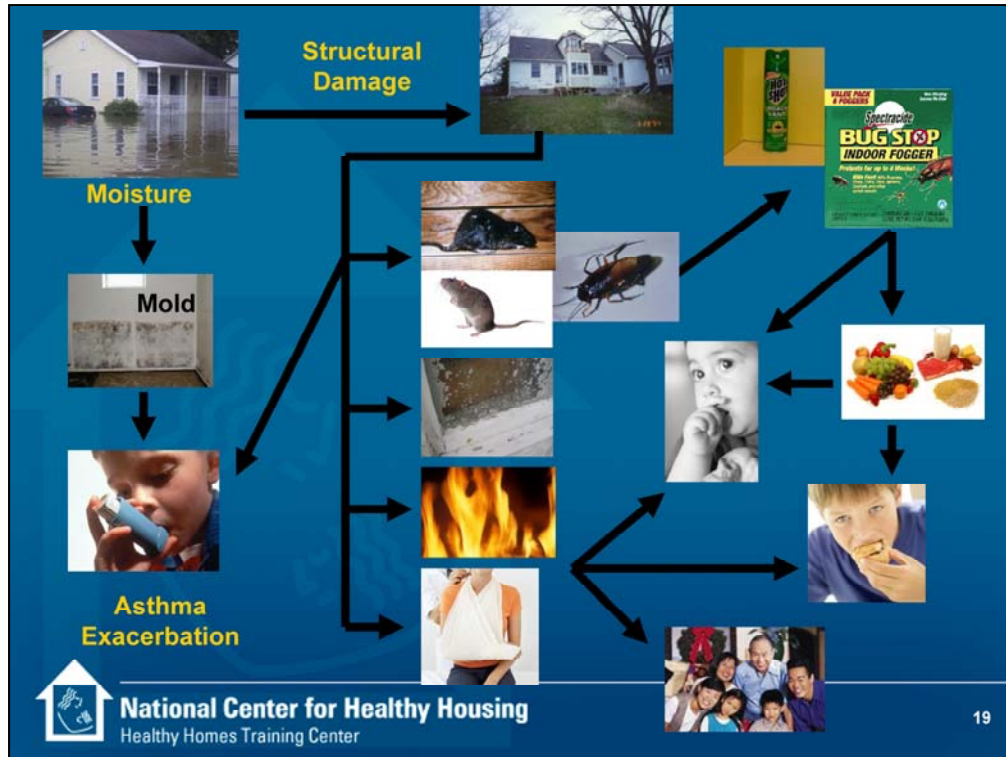
Pesticide



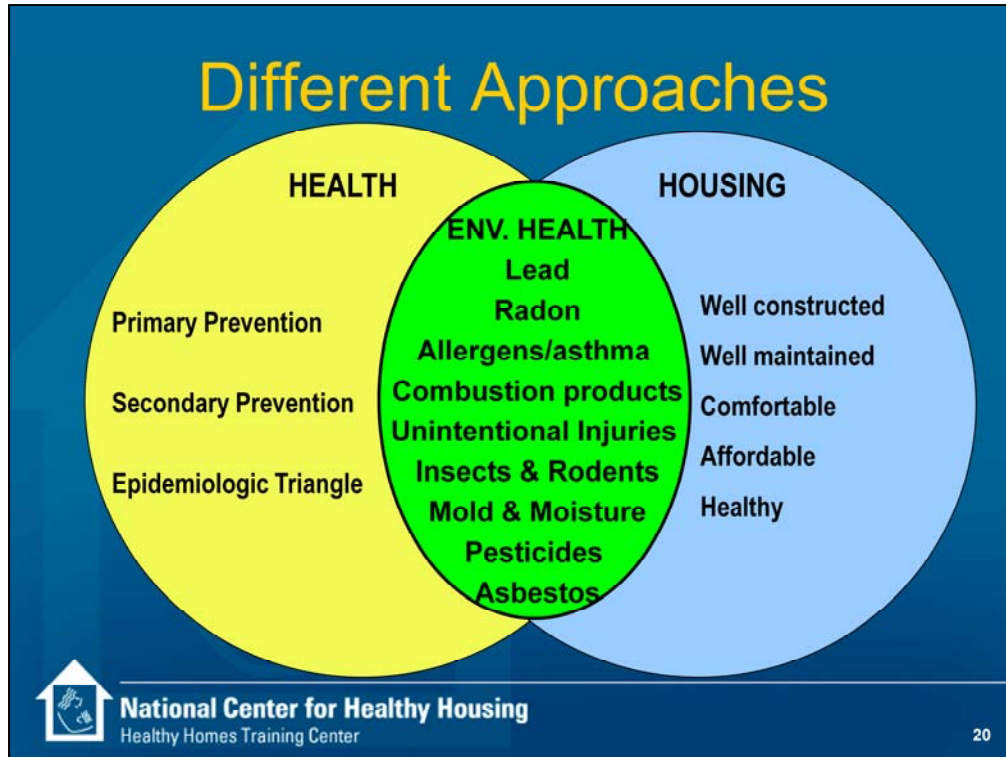
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This chart is the summary of the previous slides. It is designed to be confusing – to show the interconnections. Don't go over it in detail.

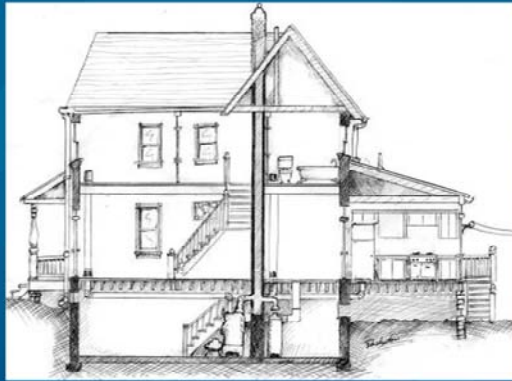


Health and housing - why is it together? This slide shows the amount of overlap between health and housing, illustrating why bringing the two disciplines together is essential. Understanding the landscape can help you navigate your public agencies providing health and housing services.

Health in this slide refers to public health, as well as environmental health. Often environmental health is a department within the department of public health. However, it may also be a stand-alone department.

Healthy Homes Principles

Keep It:



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



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While there is no recipe that can guarantee a healthy home, you'll be learning about key principles that can help create healthier indoor environments. You'll hear about these principles throughout the course of the training.

Healthy homes is a systems level approach. We have few programs that look at the **whole** home environment and the total needs of a family. In this training, we are introducing a new way of thinking about the home environment – an integrated approach that considers the people living in the home, the structure, and the potential health hazards. Considering health and housing problems together in a coordinated way is more efficient and prevention-effective.

“Healthy Homes” programs offer a comprehensive and coordinated approach by promoting interagency collaboration, community participation, and cross training. That is why we have convened this multi-disciplinary training. By design, we have recruited public health, housing, and environmental health professionals.

Many of the core healthy homes principles are captured in the codes and regulations designed to protect residents.

What is Healthy Housing?

Healthy Housing is

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

in a manner that is conducive to good occupant health.



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This is the definition of healthy housing that the National Center for Healthy Housing uses. There is not statutory or regulatory definition. Note that the definition brings in occupant health – starting with people.

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



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An overview of the American Housing Survey. See www.census.gov/hhes/www/housing/ahs/ahs.html. Refer the students to NCHH's summary of the 2007 National AHS data. See Page 13 to 23 of 29 in the Connections Section in the Reference Tab. Walk them through page-by-page (see below). Help them understand the sections on each page. Make sure you include the text at the end. It provides crucial context. You should have provided students the information on the nearest MSA provided by NCHH. Look for the seven-page table that provides similar information (but on one extra page to make it easier to read). Note that the hyphens on the MSA tables mean that the local data was not statistically different than the comparable national numbers.

Page 1 - General Description of Housing (including year built and type of foundation)

Page 2 - Exterior Problems (including exterior water leakage)

Page 3 - Interior Problems (including interior water leakage, rodents, and electrical)

Page 4 - Sanitation/Water Problems & Safety Devices (safety devices new in 2007)

Page 5 - Heating/Fuel (including main heating, water heating, clothes dryer, problems)

Page 6 - Selected Physical Problems & Overall Opinion of Structure

Page 7 - Overview and Key Definitions

Page 8 - More Definitions. Note the tests for holes in floors and open cracks at end

Page 9 - Rating System. Help the students understand what moderate and severe physical problems means. These homes have serious problems.

Page 10 - Potential Errors in AHS. Help the students understand that a high level of inconsistency means that they need to use caution using these numbers as being too precise.

Page 11 - Potential Errors in AHS (cont.). Note that people know whether their clothes dryer is gas or electric.

Page 12 - Table Showing Relationship Between Interior and Exterior Problems

Page 13 - Explanation of the Table.

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.healthyhometraining.org/1113/1113_National_2007_Fall_12-30-08.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	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



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Ask the students to complete Exercise #2. See Exercise 2 in the Exercise Tab. The first page provides the instructions. Page 2 provides the form listed above. You should have them work on it in small groups. See Study Guide with Answers to get the correct answers to the form.

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



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Review of highlights on the 2007 AHS National results. You may want to have the students compare their information to their community using the MSA tables you handed out to the students with the trainer supplies.

Do not expect the students to memorize a long list of numbers but there are some basic estimates to convey. It will help them on the exam.

- About 20% of homes had serious exterior physical problems (17.5% in 2007 / 18.2% in 2005)
- About 10% of homes had interior and exterior water leakage
 - Exterior – 10.3% in 2007 / 10.7% in 2005
 - Interior - 7.9% in 2007 / 8.3% in 2005
- About 5% of homes had mice (5.5% in 2007 / 5.6% in 2005)
- About 1% of homes had rats (0.7% in 2007 0.8% in 2005)

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



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Key data on the 2007 AHS National results. Safety Devices information was not available before 2007.

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



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Key data on the 2007 AHS National results. See reference.

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



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Summary of local MSA materials.

In your trainer's supplies, you received three sets of information on the MSA nearest you. You should have already reviewed the detailed snapshot. Now let's look at the communities numbers.

Characteristic	Outside Central City				Central City			
	Owner-Occupied		Rental		Owner-Occupied		Rental	
	Number/ Percent	National	Number/ Percent	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	39.8%	-	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%
Basic Housing Quality								
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%	-
Interior Problems								
Holes in floors	8.8%	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%	10.0%	5.7%
Signs of rats	1.8%	0.6%	1.8%	1.0%	2.2%	1.0%	3.4%	2.2%
Signs of mice	6.4%	-	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%	-	9.9%	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	1.5%	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%	6.0%	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%	-	0.0%	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%
Exterior Problems								
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%	6.1%	2.7%	9.9%	5.2%
Window problems	4.0%	2.9%	7.4%	4.8%	8.2%	4.5%	11.7%	7.1%
Foundation problems	3.1%	1.9%	4.6%	3.0%	5.4%	3.0%	8.8%	4.0%
Any Identified Problem	46.3%	-	56.5%	-	57.4%	39.7%	60.5%	-



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Healthy Homes Profile. See www.healthyhomestraining.org/ahs. The one-page profile compares various types of housing to national averages. Green is good. More green is better. Red is bad. More red is worse. This is one from a particular community but we cut off the name. We picked one with lots of red.

The hyphens mean the local information is close to the national average for similar housing. Where the number is significantly better or worse, the national number is listed.

See back side of reference for details on the form.

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		
		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
Missing roofing material	3,846.2	1.8	2.3	3.7	2.2	2.0	2.3	3.8	6.0	5.1
Hole in roof	1,288.3	2.8	5.5	5.4	3.2	3.3	4.3	7.6	18.6	11.0
Sloping outside walls	1,172.6	2.3	3.0	3.9	3.1	3.4	3.9	7.7	13.9	8.9
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
Broken windows	2,947.8	2.7	2.5	6.0	2.8	3.1	3.3	5.4	13.2	8.1
Boarded up windows	806.6	1.9	2.3	8.3	2.8	2.8	4.5	6.4	11.8	10.3
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
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
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
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
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
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
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
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
Eight or more ext. problem	64.1			5.7			4.3	3.6	13.2	7.2

* A home is 1. 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.

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See www.healthyhomestraining.org/ahs/

This table allows someone to understand the likelihood of have a problem inside the home if a problem is found on the outside. See [www.healthyhomestraining.org/ahs.](http://www.healthyhomestraining.org/ahs/) This table covers national numbers. But compare to their community. Note the numbers that are in double digits.

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%



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People like their home, even if it has serious problems. If you are trying to make homes healthier, you must realize this challenge.

The numbers come from the 2007 National American Housing Survey. See page 18 of 29 in the Reference Tab Connections Section. We grouped the numbers to make it more readable. Residents rate their home on a 1 to 10 scale. 1 is the worst. 10 is the best. Note the following:

- More than half of all groups rate their home 8 or better even those living below the poverty level. We think this means that people balance cost, health, comfort and other factors to make a decision. They also think there is no place like home.
- One in 8 people with incomes below poverty level rate their home the worst. That is significant. They need help and know it.

Compare the national numbers to the communities numbers from the MSA Tables.

Real World is Complex

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




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Even though the epidemiologic triangle give us a framework for thinking about healthy housing issues, it is often difficult to these issues. Part of the reason that this is so difficult is that the real world is extremely complex and many factors including the ones listed on this slide contribute to the complexity.

For example, we have to look at what we currently know and identify gaps in our knowledge. While we tend to focus on identifying health effects associated with exposure to one agent, often we don't know the health effects associated with exposure to several agents simultaneously.


Funding, social and cultural, and political issues also play a role in how we identify and address healthy housing issues.



Will Things Change?

Homes With “No Smoking” Rule

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



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Yes, we can make things change.

In 2007, CDC published how the country had improved on Smoke-Free Home Rules. These are homes where the residents made a rule – not a law – that smoking is not allowed inside the home. See page 4 of 29 in Reference Tab, Connections Section.

In 2008, CDC and NCHH convened an expert panel to evaluate the effectiveness of various healthy homes interventions. See page 24 and 25 of 29 in Reference Tab Connections Section for list.

Healthy Homes Interventions

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



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In 2008, CDC and NCHH convened an expert panel to evaluate the effectiveness of various healthy homes interventions. See page 24 and 25 of 29 in Reference Tab Connections Section for list. See <http://www.nchh.org/Research/Archived-Research-Projects/Housing-Interventions-and-Health-Outcomes.aspx> for the full report.

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.



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It is helpful to walk the students through this list.

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.



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It is helpful to walk the students through this list.



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.



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Improving the quality of the nation's housing can form a foundation for the health and well-being of families across the country. Reducing the amount of substandard housing and creating healthier neighborhoods is a task that requires public health and housing officials to find 'a meeting place' for their shared interests – together they offer a powerful voice and the capacity to create large-scale system level change in the way we develop, deliver, and value housing in America.

Standards are in place to address some, but not all of the problems that result in unhealthy homes. The next section provides an overview of those codes and standards.

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



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These are different names for Housing and Health codes. See Reference Tab Code Section. It is after the first colored page behind the Reference Tab.

Read the first two pages to get an overview of the requirements.

Students should know the difference between housing, building and zoning codes.

- Zoning codes define what kind of buildings can go into a community.
- Building codes define how buildings must be built or rebuilt
- Housing codes define how buildings must be maintained.

Does
this
Violate
the
IPMC?



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Yes. Definitely. Have the students review the IPMC requirements and identify which sections are violated by the home featured in this photo. See pages 10 to 13 of 33 in Reference Tab Code Section (after the first colored page).

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



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These are common provisions in a housing or a health code. Review the local code (if any) that NCHH gave you to give to students.

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**



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These are the nation's model code as adopted by the International Code Council. See www.iccsafe.org. The IPMC is the most important one because it applies to all buildings.

When a state or community adopt a model code, they often modify it – adding, deleting or changing the requirements.

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



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Int'l Property Maintenance Code = IPMC

Landlord-Tenant Laws

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



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Landlord-Tenant laws are also an important part of healthy homes since rental property is generally in worse condition. Most states mandate that the lease require the landlord comply with the housing code.

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.



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The federal government through the Department of Health and Human Services set long-term objectives for the nation's health. The program is called Healthy People 2010. See www.healthypeople.gov. The measurable objectives use 1995 as a baseline and set a measurable target to achieve by 2010. The objectives listed above are those that directly relate to healthy homes.

See page 5 to 10 of 29 in the Connections Section of the Reference Tab for details on each objective.

- Page 5 – Cover page for the environmental health section of the 2005 Update of the Healthy People 2010 Program. This update restated some of the objectives and measurement tools
- Page 6 & 7 – Progress in reaching the objectives as of 2005. It also helps students see the other environmental health goals.
- Page 7-10 – The objectives related to healthy homes.

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)



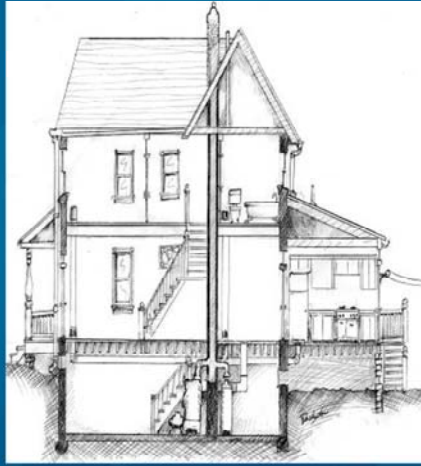
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There are four national programs driving green building. NCHH compared the healthy homes aspects of each of the four programs. See www.nchh.org/Portals/0/Contents/Green_Analysis_2-24-09.pdf.

The key section of the report is on page 34-45 of 45 in the Codes Section of the Reference Tab

Core Healthy Homes Principles



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



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While there is no recipe that can guarantee a healthy home, you'll be learning about key principles that can help create healthier indoor environments. You'll hear about these principles throughout the course of the training.

Healthy homes is a systems level approach. We have few programs that look at the **whole** home environment and the total needs of a family. In this training, we are introducing a new way of thinking about the home environment – an integrated approach that considers the people living in the home, the structure, and the potential health hazards. Considering health and housing problems together in a coordinated way is more efficient and prevention-effective.

“Healthy Homes” programs offer a comprehensive and coordinated approach by promoting interagency collaboration, community participation, and cross training. That is why we have convened this multi-disciplinary training. By design, we have recruited public health, housing, and environmental health professionals.

Many of the core healthy homes principles are captured in the codes and regulations designed to protect residents.

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.



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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.



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Course Outline

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



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It is a good time to walk the students through the course agenda if you have not already done it.

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.



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Good review at end of section