

References



Index to References

Topic	Page
I. Connections Between Housing and Health	
IOM Report on Asthma and Indoor Air Exposures – 2000	1
IOM Report on Damp Indoor Spaces and Health – 2004	2
Updated Information on IOM Reports - 2012	3-4
WHO Report on Quantifying Disease from Inadequate Housing – 2006	5
CDC MMWR Report on Smoke-Free Home Rules – 2007	6
CDC Healthy People 2020 Goals Related to Housing – 2012	7-14
AHS – Selected Elements Related to Healthy Homes – 2011	15-21
AHS – About the American Housing Survey	22-26
AHS – Relationship Between Interior and Exterior Problems – 2011	27-28
NCHH Housing Interventions and Health: Review of the Evidence	29-30
CDC State of Childhood Asthma Report – 2006	31
CDC BRFSS Maps for Adult Asthma – 2010	32-33
EPA Map of Radon Zones	34
II. Laws, Rules and Codes for Healthier Housing	
Overview	35-36
Comparison of Regulatory Approaches	37
HUD Housing Quality Standards	38-42
International Property Maintenance Code	43-47
APHA Basic Principles of Healthful Housing	48-52
Uniform Residential Landlord and Tenant Act	53-56
Product Standards	57-58
Hazard Management Laws	59-61
EPA Renovation, Repair and Painting Rule Summary	62-70
HUD Guidance on Integrated Pest Management	71-75
HUD Guidelines on Bedbug Control & Prevention in Public Housing	76-81
HUD attachment on Prevention & Safe Removal of Bedbugs	82-84
HUD Guidelines on Addressing Infestations in HUD-insured and Assisted Multifamily Housing	85-92
CDC & EPA Joint Statement on Bedbug Control	93-99

References



Index to References

Topic	Page
III. Healthy Homes Assessment Tools	
Summary of National Green Building Programs	100-109
CDC/HUD Healthy Housing Inspection Manual – 2008	110-117
CEHRC Visual Survey Report and Instructions – 2004	118-125
NCHH Pediatric Environmental Home Assessment – 2009	126-143
NCHH Healthy Homes Maintenance Checklist – 2009	144-145
IV. General Resources and References	
CDC/HUD Healthy Housing Reference Manual – 2006	146-147
Endnotes for all modules	148-153

Summary of Two Key Institute of Medicine Reports Regarding Asthma, Indoor Air Quality, Damp Indoor Spaces, and Mold

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
Sufficient Evidence of a Causal Relationship			
<ul style="list-style-type: none"> House dust mite 	<i>No agents met this definition</i>	<ul style="list-style-type: none"> Cat Cockroach House dust mite 	<ul style="list-style-type: none"> ETS (in preschool-aged children)
Sufficient Evidence of an Association			
<i>No agents met this definition</i>	<ul style="list-style-type: none"> ETS (in preschool-aged children) 	<ul style="list-style-type: none"> Dog Fungi or molds Rhinovirus 	<ul style="list-style-type: none"> Nitrogen oxides (high-level exposures)¹
Limited or Suggestive Evidence of an Association			
<ul style="list-style-type: none"> Cockroach (in preschool-aged children) Respiratory Syncytial Virus 	<i>No agents met this definition</i>	<ul style="list-style-type: none"> Domestic birds <i>Chlamydia pneumoniae</i> <i>Mycoplasma pneumoniae</i> Respiratory Syncytial Virus 	<ul style="list-style-type: none"> ETS (in school aged and older children, & adults) Formaldehyde Fragrances
Inadequate or Insufficient Evidence to Determine Whether or Not an Association Exists			
<ul style="list-style-type: none"> Cat, Dog, Domestic Birds Rodents Cockroaches (except for preschool-aged children) Endotoxins Fungi or molds <i>Chlamydia pneumoniae</i> <i>Mycoplasma pneumoniae</i> <i>Chlamydia trachomatis</i> Houseplants Pollen 	<ul style="list-style-type: none"> Nitrogen oxides Pesticides Plasticizers Volatile organic compounds (VOCs) Formaldehyde Fragrances ETS (in older children and adults) 	<ul style="list-style-type: none"> Rodents (as pets or feral animals)² <i>Chlamydia trachomatis</i> Endotoxins Houseplants Pollen exposure in indoor environments Insects other than Cockroaches 	<ul style="list-style-type: none"> Pesticides Plasticizers Volatile organic compounds (VOCs)
Limited or Suggestive Evidence of No Association			
<ul style="list-style-type: none"> Rhinovirus (adults) 	<i>No agents met this definition</i>	<i>No agents met this definition</i>	<i>No agents met this definition</i>

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.

- **Sufficient Evidence of a Causal Relationship:** Evidence fulfills association criteria and in addition satisfies criteria regarding the strength of association, biologic gradient (dose-response effect), consistency of association, biologic plausibility and coherence, and temporality used to assess causality.
- **Sufficient Evidence of an Association:** Association has been observed in studies in which chance, bias, and confounding factors can be ruled out with reasonable confidence (e.g. several small bias free studies showing an association that is consistent in magnitude and direction)
- **Limited or Suggestive Evidence of an Association:** Evidence is suggestive of an association but is limited because chance, bias, and confounding cannot be ruled out with confidence (e.g. one high quality study shows association, but results of other studies are inconsistent)
- **Inadequate or Insufficient Evidence to Determine Whether or Not an Association Exists:** Available studies are of insufficient quality, consistency, or statistical power to permit a conclusion; or no studies exist
- **Limited or Suggestive Evidence of No Association:** Several adequate studies are mutually consistent in not showing an association (but limited to the conditions, level of exposure, and length of observation covered in the study).

Summary of Two Key Institute of Medicine Reports Regarding Asthma, Indoor Air Quality, Damp Indoor Spaces, and Mold

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/.

- **Sufficient Evidence of a Causal Relationship:** Evidence is sufficient to conclude that a causal relationship exists between the agent and the outcome. That is, the evidence fulfills the criteria for “sufficient evidence of an association” and, in addition, satisfies the following criteria: strength of association, biologic gradient, consistency of association, biologic plausibility and coherence, and temporally correct association.
- **Sufficient Evidence of an Association:** Evidence is sufficient to conclude that there is an association. That is, an association between the agent and the outcome has been observed in studies in which chance, bias, and confounding can be ruled out with reasonable confidence.
- **Limited or Suggestive Evidence of an Association:** Evidence is suggestive of an association between the agent and the outcome but is limited because chance, bias, and confounding cannot be ruled out with confidence.
- **Inadequate or Insufficient Evidence to Determine Whether an Association Exists:** The available studies are of insufficient quality, consistency, or statistical power to permit a conclusion regarding the presence of an association. Alternatively, no studies exist that examine the relationship.

Updated information on associations between rodents, dampness and mold and certain health outcomes:

1. Stronger evidence on the association between asthma and mice:

The 2000 IOM report said there was inadequate or insufficient evidence to determine if an association exists between asthma and rodents.

A study published that year (Phipatanakul et al. 2000) concluded that mouse allergen may be an important indoor allergen in inner-city children with asthma. The study stated that “we believe that mouse allergen is likely to be an important indoor allergen that has thus far been underrecognized.”

Another study published in 2006 (Matsui et al. 2006) came to the same conclusion. That paper stated that “In mouse-sensitized inner-city children, exposure to mouse allergen may be an important cause of asthma morbidity.

2. Stronger evidence on the association between asthma and rats:

The 2000 IOM report said there was inadequate or insufficient evidence to determine if an association exists between asthma and rodents.

A study published in 2003 (Perry et al 2003) concluded that rat allergen sensitization and exposure are associated with increased asthma morbidity in inner-city children.

Updated information from the 2009 World Health Organization Guidelines for Indoor Air Quality (on Dampness and Mould)

Here are updates on the link between dampness and/or mold and certain health outcomes:

1. Dampness/mold and Asthma exacerbation (or asthma symptoms in sensitized persons) stays in the **Sufficient Evidence of an Association**.

Note that the Guidelines state that: “For . . . asthma exacerbation, we consider the evident to be sufficient to document an association and almost sufficient to document causality of dampness-related factors. A number of newly available studies added to the evidence of an association between dampness and asthma exacerbation.” (pgs 70 – 71).

2. Dampness/mold and Asthma development moves from:

Limited or Suggestive Evidence of an Association to Sufficient Evidence of an Association

3. Dampness/mold and Current asthma (not evaluated in 2004) is placed in **Sufficient Evidence of an Association**.

4. Dampness/mold and Respiratory infections (not evaluated in 2004) is placed in **Sufficient Evidence of an Association**.
5. Dampness/mold and Upper respiratory tract symptoms, cough, and wheeze all stay in the **Sufficient Evidence of an Association**.
6. Dampness/mold and Shortness of breath (dyspnoea) moves from:
Limited or Suggestive Evidence of an Association to Sufficient Evidence of an Association
7. Mold and Hypersensitivity pneumonitis stays in the **Sufficient Evidence of an Association**.
8. Mold and Humidifier fever and inhalation fevers move from:
Limited or Suggestive Evidence of an Association to Sufficient Evidence of an Association
9. Dampness/mold and Allergic rhinitis and bronchitis is placed in **Limited or Suggestive Evidence of an Association**.
10. Lung function, allergy or atopy, and “asthma, ever” is placed in **Inadequate or Insufficient Evidence to Determine Whether or Not an Association Exists**.

World Health Organization Regional Office for Europe Quantifying Disease from Inadequate Housing

Housing Inadequacy	Disease
<i>Linkages with sufficient evidence for estimating burden of disease</i>	
Heat	Related cardiovascular effects and/or excess mortality
Cold indoor temperatures	Winter excess mortality
Energy efficiency of housing	Health
Radon exposure in dwellings	Cancer
Neighbourhood and building noise	Related health effects
Environmental tobacco smoke in dwellings	Respiratory and allergic effects
Lead in paint, dust, soil, and drinking water	Lead-related health effects
Humidity and mould in dwellings	Related health effects
Hygrothermal conditions	House dust mite exposure & respiratory disease
Building and equipment factors	Injuries / domestic accidents
Injury Database on domestic accidents	Injuries
Multifamily housing, high-rise housing, and housing quality	Mental health
<i>Linkages with some evidence for estimating burden of disease</i>	
Ventilation in the dwelling	Respiratory and allergic effects
Volatile organic compounds	Respiratory, cardiovascular and allergic effects
Cockroaches and rodents in dwellings	Respiratory and allergic effects
Cats, dogs, and mites in dwellings	Respiratory and allergic effects
Pets and mites	Respiratory, allergic or asthmatic effects
Sanitation and hygiene conditions	Related physical health effects
Social conditions of housing	Fear / fear of crime
Poverty and social exclusion	Related health effects
Crowding	Related health effects
Social factors / social climate	Mental health
<i>Linkages with insufficient evidence for estimating burden of disease</i>	
Lighting conditions in the dwelling	Mental and other health effects
Particulate matter in indoor air	Respiratory and allergic effects

Summary Report prepared by National Center for Healthy Housing from the “Report on the WHO technical meeting on quantifying disease from inadequate housing,” Bonn, Germany, 28-30 November, 2005. See www.euro.who.int/Document/HOH/EBD_Bonn_Report.pdf. For more information on WHO Regional Office for Europe’s work on housing and health, see www.euro.who.int/Housing/20060519_2.

Percentage of Households reporting smoke-free home rules, by state/area -
Current population Survey, United States, 1992-93, 1998-99, and 2003

State/Area	1992 - 1993	1998 - 1999	2003	% change from 1992-1993 to 2003
Utah	69.6	81.1	88.8	27.6
California	59.1	72.7	84.4	42.9
Arizona	54.4	71.6	82.4	51.5
Oregon	50.0	68.0	81.2	62.4
Hawaii	51.5	65.0	79.7	54.9
Nevada	45.5	63.7	79.6	74.9
Colorado	48.3	65.2	79.3	64.3
Washington	54.3	68.9	79.3	46.2
Idaho	50.6	70.3	78.8	55.9
Texas	46.3	65.3	78.5	69.5
Florida	50.2	66.0	78.5	56.4
Georgia	41.8	61.9	77.4	85.4
Maryland	43.0	64.3	75.9	76.6
Alaska	50.9	60.9	75.8	48.8
Massachusetts	40.3	60.1	75.5	87.6
New Mexico	45.6	62.7	75.5	65.8
New Hampshire	38.4	56.5	74.6	94.4
New Jersey	45.5	61.3	74.0	62.5
Connecticut	44.7	60.1	73.4	64.2
Virginia	39.3	58.4	72.7	85.1
Minnesota	39.7	61.5	71.5	80.1
South Dakota	36.8	57.1	71.1	93.2
Alabama	38.9	59.1	70.9	82.1
New York	41.6	58.3	70.5	69.5
Montana	43.1	61.0	70.0	62.5
Rhode Island	38.9	60.4	69.8	79.6
Delaware	40.1	55.4	69.7	73.7
Mississippi	41.2	54.9	69.6	69.1
Vermont	39.1	59.7	69.3	77.5
Nebraska	39.9	59.5	69.2	73.3
Maine	39.4	54.4	69.0	75.1
Louisiana	37.3	58.2	68.6	83.9
North Dakota	41.2	56.4	68.2	65.7
District of Columbia	41.4	56.6	68.1	64.7
Iowa	36.1	52.9	68.0	88.6
Pennsylvania	39.9	56.3	67.5	69.0
South Carolina	40.2	58.6	67.5	67.9
Kansas	39.9	59.3	66.9	67.8
Wisconsin	36.7	55.4	66.4	81.1
Wyoming	38.6	58.0	65.5	69.8
North Carolina	34.3	53.0	65.4	90.8
Illinois	38.6	54.6	64.8	68.0
Oklahoma	39.2	54.1	64.7	64.9
Tennessee	34.1	52.0	64.2	88.3
Missouri	34.5	53.7	64.0	85.7
Indiana	33.9	47.9	62.7	85.2
Ohio	35.1	51.4	60.8	73.2
Michigan	35.4	51.2	60.7	71.7
Arkansas	33.2	53.0	60.1	81.0
West Virginia	27.8	42.8	57.1	105.5
Kentucky	25.7	38.9	53.4	107.9
<i>Minimum</i>	25.7	38.9	53.4	27.6
<i>Maximum</i>	69.6	81.1	88.8	107.9
<i>Range</i>	43.9	42.3	35.4	80.2
<i>Median</i>	39.9	58.6	69.8	71.7
Total	43.2	60.2	72.2	67.1

U.S. Centers for Disease Control and Prevention, Morbidity Mortality Weekly Report,
May 25, 2007, 56(20);501-504. See
www.cdc.gov/mmwr/preview/mmwrhtml/mm5620a3.htm.



There are nearly 600 objectives in Healthy People 2020 with more than 1,300 measures. Each Healthy People 2020 objective has a:

Reliable data source

Baseline measure

Target for specific improvements to be achieved by the year 2020

Objectives 2020

Toxics and Waste

EH-8 Reduce blood lead levels in children

EH-8.1 EH-8.1

[Eliminate elevated blood lead levels in children](#) [Eliminate elevated blood lead levels in children](#)

Baseline:

0.9 percent of children had elevated blood lead levels in 2005–08

Target:

Not applicable

Data Source:

National Health and Nutrition Examination Survey (NHANES), CDC, NCHS

More Information:




[Data from the HHS Health Indicators Warehouse](#)

The HP2010 objective with the same definition was 8-11.

[View on DATA2010](#)


EH-8.2 Reduce the mean blood lead levels in children

Baseline:	1.5 µg/dL average blood lead level in children aged 1 to 5 years in 2005–08
Target:	1.4 µg/dL average blood lead level in children aged 1 to 5 years
Target-Setting Method:	10 percent improvement
Data Source:	National Health and Nutrition Examination Survey (NHANES), CDC, NCHS
More Information:	 Data from the HHS Health Indicators Warehouse

EH-10 Reduce pesticide exposures that result in visits to a health care facility

[Close Details ▼](#)


[View Details ▼](#)

Baseline:	15,965 pesticide exposures resulted in visits to a health care facility in 2008
Target:	10,377 pesticide exposures
Target-Setting Method:	Modeling/projection
Data Source:	National Poison Data System, American Association of Poison Control Centers.
More Information:	 Data from the HHS Health Indicators Warehouse The HP2010 objective with the same definition was 8-13. View on DATA2010


Healthy Homes and Healthy Communities

EH-13 Reduce indoor allergen levels


EH-13.1 Reduce indoor allergen levels: cockroach

Baseline:	0.51 units of cockroach allergen/ gram of settled dust were reported in 2006
Target:	0.46 units of cockroach allergen/ gram of settled dust
Target-Setting Method:	10 percent improvement
Data Source:	American Healthy Homes Survey (AHHS), HUD
More Information:	 Data from the HHS Health Indicators Warehouse

EH-13.2 Reduce indoor allergen levels: mouse

Baseline:	0.16 micrograms of mouse allergen/ gram of settled dust were reported in 2006
Target:	0.14 micrograms of mouse allergen/ gram of settled dust
Target-Setting Method:	10 percent improvement
Data Source:	American Healthy Homes Survey (AHHS), HUD
More Information:	 Data from the HHS Health Indicators Warehouse

EH-14 Increase the number of homes with an operating radon mitigation system for persons living in homes at risk for radon exposure

Baseline:	10.2 percent (788,000 of 7.7 million homes) of homes with radon levels of 4 pCi/L or more prior to mitigation had installed a radon mitigation system in 2007.
Target:	30 percent (3.1 million of 9.2 million homes) of homes with radon levels at or above 4 Pico curies per liter of air (pCi/L).
Target-Setting Method:	Consistency with national programs/regulations/policies/laws
Data Source:	Annual Report to EPA by Radon Vent Fan Manufacturers, EPA, Indoor Environments Division
More Information:	 Data from the HHS Health Indicators Warehouse

EH-15 Increase the percentage of new single family homes (SFH) constructed with radon-reducing features, especially in high-radon-potential areas

Baseline:	28.6 percent (62,900) of SFH homes built (220,000) in high-radon-potential areas included radon-reducing features in 2007.
Target:	100 percent of homes in high-radon-potential areas built to include radon-reducing features
Target-Setting Method:	Consistency with national programs/ regulations/policies/laws
Data Source:	Builder Practices Report: Radon-Resistant Construction Practices in New U.S. Homes 2008, Annual Builder and Consumer Practices Surveys, National Association of Home Builders Research Center, Inc. as reported to EPA, Indoor Environments Division.

More Information:



[Data from the HHS Health Indicators Warehouse](#)

[Close Details ▲](#)

EH-17 (Developmental) Increase the proportion of persons living in pre-1978 housing that has been tested for the presence of lead-based paint or related hazards

EH-17.1 Increase the proportion of pre-1978 housing that has been tested for the presence of lead-based paint

[Close Details ▼](#) [View Details ▼](#)

Potential Data Source:

Potential source: National Health Interview Survey (NHIS), CDC

EH-17.2 Increase the proportion of pre-1978 housing that has been tested for the presence of paint-lead hazards

[Close Details ▼](#) [View Details ▼](#)

Potential Data Source:

Potential source: National Health Interview Survey (NHIS), CDC

EH-17.3 Increase the proportion of pre-1978 housing that has been tested for the levels of lead in dust

[Close Details ▼](#) [View Details ▼](#)

Potential Data Source:

Potential source: National Health Interview Survey (NHIS), CDC

EH-17.4 Increase the proportion of pre-1978 housing that has been tested for the presence of lead in soil

[Close Details ▼](#) [View Details ▼](#)

Potential Data Source:

National Health Interview Survey, CDC, NCHS

EH-18 Reduce the number of U.S. homes that are found to have lead-based paint or related hazards

EH-18.1 Reduce the number of U.S. homes that are found to have lead-based paint

Baseline:	37 million homes were found to have lead-based paint in 2005–06
Target:	3.7 million fewer homes with lead-based paint
Target-Setting Method:	10 percent improvement
Data Source:	American Healthy Homes Survey (AHHS), U.S. Department of Housing and Urban Development (HUD), Office of Healthy Homes and Lead Hazard Control
More Information:	 Data from the HHS Health Indicators Warehouse


[Close Details ▲](#)

EH-18.2 Reduce the number of U.S. homes that have paint-lead hazards


Baseline:	15.3 million homes had paint-lead hazards in 2005–06
Target:	1.5 million fewer homes with paint-lead hazards
Target-Setting Method:	10 percent improvement
Data Source:	American Healthy Homes Survey (AHHS), U.S. Department of Housing and Urban Development (HUD), Office of Healthy Homes and Lead Hazard Control
More Information:	 Data from the HHS Health Indicators Warehouse

EH-18.3 Reduce the number of U.S. homes that have dust-lead hazards

Baseline:	13.7 million homes had dust-lead hazards in 2005–06
-----------	---


Target:	1.4 million fewer homes with dust-lead hazards
Target-Setting Method:	10 percent improvement
Data Source:	American Healthy Homes Survey (AHHS), U.S. Department of Housing and Urban Development (HUD), Office of Healthy Homes and Lead Hazard Control
More Information:	 Data from the HHS Health Indicators Warehouse

EH-18.4 Reduce the number of U.S. homes that have soil-lead hazards

Baseline:	3.8 million homes had soil-lead hazards in 2005–06
Target:	380,000 fewer homes with soil-lead hazards
Target-Setting Method:	10 percent improvement
Data Source:	American Healthy Homes Survey (AHHS), U.S. Department of Housing and Urban Development (HUD), Office of Healthy Homes and Lead Hazard Control
More Information:	 Data from the HHS Health Indicators Warehouse

EH-19 Reduce the proportion of occupied housing units that have moderate or severe physical problems

Baseline:	5.2 percent of housing units had moderate or severe physical problems in 2007
-----------	---

Target:	4.2 percent
Target-Setting Method:	Modeling/projection
Data Source:	American Housing Survey, U.S. Department of Commerce, Bureau of the Census
More Information:	 Data from the HHS Health Indicators Warehouse The HP2010 objective with the same definition was 8-23. View on DATA2010

**American Housing Survey - Selected Elements Related to Healthy Homes
National Data 2011**

<i>Characteristic</i>	<i>Occupied</i>	<i>Owner Occupied</i>	<i>Rental</i>	<i>Severe Problems</i>	<i>Moderate Problems</i>	<i>Below Poverty</i>	<i>Central City</i>
Total Occupied Units(,000)	114,907	76,091	38,816	2,103	4,126	16,060	33,161
GENERAL							
Owner occupied(,000)	76,091	76,091	.	907	1,568	6,166	16,552
Renter occupied(,000)	38,816	.	38,816	1,196	2,558	9,894	16,609
Owner occupied	66.2%	100%	<0.1%	43.1%	38.0%	38.4%	49.9%
Renter occupied	33.8%	<0.1%	100%	56.9%	62.0%	61.6%	50.1%
<hr/>							
Units in Structure							
1, detached	64.2%	82.4%	28.6%	44.3%	39.6%	42.7%	49.3%
1, attached	5.9%	5.4%	6.8%	5.1%	3.4%	6.1%	7.9%
2 to 4	7.8%	1.9%	19.4%	14.8%	17.8%	13.6%	12.9%
5 to 9	4.7%	0.8%	12.3%	6.9%	10.3%	8.5%	7.4%
10 to 19	4.4%	0.7%	11.6%	8.1%	7.3%	6.9%	6.5%
20 to 49	3.2%	0.5%	8.5%	6.5%	6.9%	5.8%	6.1%
50 or more	3.6%	1.0%	8.8%	7.0%	7.0%	6.1%	8.7%
Manufactured /mobile home or trailer	6.3%	7.5%	3.9%	7.4%	7.8%	10.3%	1.3%
<hr/>							
Year Structure Built							
Post-2000	13.8%	15.6%	10.2%	5.0%	4.4%	9.3%	10.9%
Post-1980	38.7%	42.1%	32.2%	21.1%	22.4%	31.1%	27.7%
Pre-1980	61.3%	57.9%	67.8%	78.9%	77.6%	68.9%	72.3%
Pre-1960	30.9%	29.5%	33.4%	47.2%	45.7%	34.6%	42.7%
Pre-1940	14.7%	12.8%	18.5%	27.4%	24.4%	17.2%	22.6%

Foundation (for 1-unit not manufactured)

<i>Characteristic</i>	<i>Occupied</i>	<i>Owner Occupied</i>	<i>Rental</i>	<i>Severe Problems</i>	<i>Moderate Problems</i>	<i>Below Poverty</i>	<i>Central City</i>
1-Unit not manufactured(,000)	80,505	66,752	13,753	1,040	1,772	7,844	18,949
With a basement under all of house	32.7%	34.4%	24.0%	32.2%	22.1%	27.3%	31.9%
With a basement under part of house	10.6%	11.3%	7.2%	7.9%	8.7%	7.3%	8.1%
With a crawl space	22.1%	21.4%	25.3%	24.1%	40.2%	25.9%	20.2%
On a concrete slab	33.1%	31.5%	41.1%	29.7%	23.7%	36.4%	38.2%
In some other way	1.6%	1.4%	2.4%	6.1%	5.3%	3.2%	1.6%

EXTERIOR

External Building Conditions(non multiunit)

Sagging roof	2.0%	1.8%	2.9%	9.0%	11.4%	3.8%	2.4%
Missing roofing material	3.6%	3.4%	4.1%	9.9%	14.3%	5.8%	3.8%
Hole in roof	1.5%	1.3%	2.4%	7.6%	11.9%	3.4%	1.9%
Missing bricks, siding, other outside wall material	2.5%	2.2%	3.9%	10.7%	14.2%	5.0%	3.2%
Sloping outside walls	1.2%	1.0%	2.2%	5.9%	8.4%	2.3%	1.5%
Boarded up windows	1.0%	0.9%	1.6%	4.5%	6.1%	2.6%	1.5%
Broken windows	4.2%	3.7%	6.6%	14.1%	18.1%	8.6%	4.8%
Bars on windows	2.9%	2.7%	3.8%	4.2%	7.5%	4.8%	8.9%
Foundation crumbling or has open crack or hole	5.4%	5.1%	6.8%	15.0%	18.5%	8.4%	6.4%
None of the above	82.0%	83.2%	76.8%	64.2%	50.3%	72.3%	75.3%
None of the above(excluding bars)	84.2%	85.2%	79.5%	66.3%	53.3%	75.6%	81.9%
Water Leakage During Last 12 Months							
With leakage from outside structure	11.0%	11.5%	9.8%	17.4%	29.4%	11.6%	11.6%
Roof	5.7%	6.1%	4.9%	10.0%	16.8%	6.5%	5.9%

<i>Characteristic</i>	<i>Occupied</i>	<i>Owner Occupied</i>	<i>Rental</i>	<i>Severe Problems</i>	<i>Moderate Problems</i>	<i>Below Poverty</i>	<i>Central City</i>
Basement leak	2.8%	3.4%	1.4%	2.5%	5.1%	1.9%	2.6%
Walls, closed windows, or doors leak	2.2%	1.8%	3.0%	4.7%	8.9%	2.8%	2.9%
Other or Unknown exterior Leak	1.2%	1.1%	1.3%	2.9%	3.3%	1.3%	1.4%
<hr/>							
INTERIOR							
Damage							
Holes in floors	1.0%	0.7%	1.6%	7.2%	9.9%	2.1%	1.3%
Open cracks or holes	5.2%	4.2%	7.1%	18.1%	29.9%	8.6%	6.7%
Broken plaster or peeling paint	2.1%	1.5%	3.1%	8.3%	18.6%	3.4%	3.2%
<hr/>							
Water Leakage During Last 12 Months							
With leakage from inside structure	8.5%	7.2%	11.2%	16.2%	25.1%	11.0%	10.0%
Fixtures backed up or overflowed	1.9%	1.7%	2.3%	4.9%	6.6%	2.2%	2.2%
Pipes leaked	3.6%	2.9%	4.9%	8.4%	12.5%	5.1%	4.5%
Broken water heater	0.8%	0.9%	0.8%	1.4%	2.0%	1.0%	0.7%
Other or Unknown	2.4%	1.8%	3.6%	3.2%	6.0%	3.0%	2.9%
<hr/>							
Rodents							
Signs of rats in last 3 mon.	1.0%	0.9%	1.3%	3.3%	3.6%	1.8%	1.4%
Signs of mice in last 3 mon.	11.1%	11.7%	10.0%	17.7%	20.0%	12.5%	9.9%
Signs of rodents, not sure which kind in last 3 mon.	0.6%	0.5%	0.8%	1.5%	1.6%	1.0%	0.7%
<hr/>							
Electrical							

<i>Characteristic</i>	<i>Occupied</i>	<i>Owner Occupied</i>	<i>Rental</i>	<i>Severe Problems</i>	<i>Moderate Problems</i>	<i>Below Poverty</i>	<i>Central City</i>
No electrical wiring	0.1%	0.1%	0.2%	3.2%	0.1%	0.3%	0.1%
Exposed wiring	1.6%	1.3%	2.1%	6.2%	3.9%	2.5%	1.6%
Rooms without electric outlets	0.8%	0.6%	1.2%	6.5%	2.2%	1.4%	1.0%
Fuses/breakers blown in last 3 mon.	9.4%	9.4%	9.4%	14.7%	15.1%	9.1%	9.6%
<hr/>							
Sanitation							
Lacking complete kitchen facilities	1.7%	0.6%	4.0%	8.4%	44.4%	3.3%	2.8%
Lacking some or all plumbing facilities	1.3%	0.8%	2.1%	68.2%	<0.1%	2.1%	1.8%
Water not safe to drink	8.3%	6.2%	12.3%	14.7%	14.9%	13.1%	10.1%
Water stoppage in last 3 mon.	4.0%	3.5%	5.1%	8.3%	9.4%	4.8%	4.0%
No flush toilets working some time in last 3 mon.	1.9%	1.1%	3.4%	5.7%	9.8%	3.4%	2.5%
With sewage disposal breakdowns in last 3 mon.	1.4%	1.2%	1.7%	3.7%	5.0%	2.0%	1.6%
Septic tank, cesspool, chemical toilet	19.6%	25.7%	7.5%	15.6%	16.1%	14.7%	1.3%
With septic tank or cesspool breakdowns in last 3 mon.	0.3%	0.3%	0.2%	0.8%	0.8%	0.4%	<0.1%
 HEATING/FUEL							
Main Heating Equipment							
Warm-air furnace	64.1%	67.9%	56.7%	47.8%	39.1%	57.3%	62.8%
Steam or hot water system	11.0%	9.7%	13.5%	18.6%	14.0%	10.9%	15.6%
Electric heat pump	11.8%	12.9%	9.6%	7.1%	4.8%	9.7%	8.5%
Built-in electric units	4.2%	2.6%	7.4%	5.2%	5.6%	5.9%	3.9%
Floor, wall, or other built-in hot air without ducts	3.9%	2.4%	6.9%	7.0%	5.6%	6.7%	5.2%
Room heaters with flue	0.8%	0.7%	1.0%	1.1%	1.1%	1.4%	0.6%

<i>Characteristic</i>	<i>Occupied</i>	<i>Owner Occupied</i>	<i>Rental</i>	<i>Severe Problems</i>	<i>Moderate Problems</i>	<i>Below Poverty</i>	<i>Central City</i>
Room heaters without flue	1.0%	0.8%	1.2%	2.5%	25.2%	2.2%	0.7%
Portable electric heaters	1.2%	0.9%	1.8%	3.9%	2.0%	3.0%	1.4%
Stoves	0.9%	1.2%	0.5%	4.0%	1.0%	1.2%	0.1%
Fireplace with inserts	0.2%	0.2%	<0.1%	0.1%	0.1%	0.1%	<0.1%
Fireplace without inserts	0.1%	0.1%	<0.1%	0.2%	0.1%	0.1%	<0.1%
Other	0.3%	0.3%	0.4%	1.1%	0.3%	0.7%	0.3%
No heating equipment	0.4%	0.3%	0.7%	1.1%	0.7%	0.6%	0.7%
Cooking stove	0.1%	<0.1%	0.1%	0.2%	0.3%	0.2%	0.1%
<hr/>							
Water Heating Fuel							
Electricity	41.3%	39.0%	45.7%	38.7%	39.0%	46.9%	31.9%
Gas, LP/bottled gas	54.3%	56.6%	49.7%	53.8%	55.2%	49.2%	62.8%
Fuel oil	4.1%	4.0%	4.3%	6.5%	5.1%	3.6%	5.0%
Kerosene or other liquid fuel	<0.1%	<0.1%	<0.1%	<0.1%	0.1%	<0.1%	<0.1%
Other	0.4%	0.4%	0.2%	1.0%	0.5%	0.3%	0.2%
Clothes Dryer(,000)	93,052	72,397	20,655	1,139	2,344	9,825	21,908
Have Clothes Dryer	81.0%	95.1%	53.2%	54.2%	56.8%	61.2%	66.1%
Electricity	78.1%	76.4%	84.0%	78.9%	82.5%	82.1%	74.3%
Gas, LP gas (liquid propane)	21.8%	23.5%	15.8%	21.0%	17.5%	17.8%	25.6%
Other	0.1%	<0.1%	0.1%	0.1%	<0.1%	0.1%	0.1%
<hr/>							
Heating Problems							
Uncomfortably cold for 24 hours or more last winter	9.1%	7.7%	12.5%	43.7%	22.2%	13.7%	10.1%
Heating equipment breakdowns	2.3%	1.9%	3.2%	31.2%	4.1%	3.8%	3.0%
Other causes	5.9%	5.5%	6.7%	11.0%	15.4%	8.0%	6.0%
Utility interruption	1.9%	2.3%	1.1%	1.5%	1.9%	1.6%	1.1%
Inadequate heating capacity	1.1%	0.7%	2.0%	3.9%	5.4%	2.2%	1.7%
Inadequate insulation	1.1%	0.7%	1.8%	3.1%	5.0%	2.0%	1.4%

<i>Characteristic</i>	<i>Occupied</i>	<i>Owner Occupied</i>	<i>Rental</i>	<i>Severe Problems</i>	<i>Moderate Problems</i>	<i>Below Poverty</i>	<i>Central City</i>
Cost of heating	1.0%	1.0%	1.1%	1.7%	2.8%	1.3%	0.8%
Other	1.3%	1.2%	1.6%	3.5%	3.2%	1.8%	1.6%

SELECTED PHYSICAL PROBLEMS

Severe Physical Problems(,000)	2,103	907	1,196	2,103	.	522	909
Severe physical problems	1.8%	1.2%	3.1%	100%	.	3.3%	2.7%
Plumbing	1.2%	0.8%	2.1%	68.2%	.	2.1%	1.8%
Heating	0.5%	0.3%	0.9%	28.6%	.	1.1%	0.8%
Electric	0.1%	0.1%	<0.1%	3.1%	.	0.1%	<0.1%
Hallways	<0.1%	<0.1%	<0.1%	<0.1%	.	<0.1%	<0.1%
Upkeep	<0.1%	<0.1%	0.1%	2.5%	.	0.1%	0.1%
Moderate Physical Problems(,000)	4,126	1,568	2,558	.	4,126	1,170	1,628
Moderate physical problems	3.6%	2.1%	6.6%	.	100%	7.3%	4.9%
Plumbing	0.2%	0.1%	0.4%	.	5.2%	0.4%	0.3%
Heating	0.9%	0.8%	1.1%	.	25.2%	2.1%	0.7%
Upkeep	1.6%	0.5%	3.7%	.	44.4%	2.9%	2.6%
Hallways	<0.1%	<0.1%	<0.1%	.	<0.1%	<0.1%	<0.1%
Kitchen	1.0%	0.7%	1.7%	.	28.2%	2.3%	1.6%

OVERALL OPINION OF STRUCTURE

1(worst)	0.6%	0.3%	1.1%	3.4%	3.0%	1.5%	0.7%
2	0.3%	0.1%	0.7%	1.9%	1.6%	0.9%	0.5%
3	0.7%	0.4%	1.2%	3.5%	2.9%	1.6%	1.0%
4	1.0%	0.6%	1.8%	2.7%	3.3%	1.9%	1.2%
5	4.7%	3.3%	7.5%	9.6%	11.8%	8.6%	5.8%
6	5.0%	3.7%	7.7%	7.1%	10.5%	6.4%	6.2%

<i>Characteristic</i>	<i>Occupied</i>	<i>Owner Occupied</i>	<i>Rental</i>	<i>Severe Problems</i>	<i>Moderate Problems</i>	<i>Below Poverty</i>	<i>Central City</i>
7	13.9%	12.0%	17.6%	16.5%	15.5%	14.5%	16.1%
8	27.2%	26.8%	27.8%	21.2%	21.9%	24.4%	28.4%
9	16.0%	17.7%	12.7%	11.1%	10.6%	11.3%	15.0%
10(best)	30.6%	35.1%	21.9%	23.0%	19.0%	28.9%	25.2%

See <http://healthyhousingsolutions.com/hhtc/ahs-data/> for more info.

American Housing Survey: A Healthy Homes Perspective

Overview

The survey is conducted by the Bureau of the Census for the Department of Housing and Urban Development (HUD). The results and details are available at www.census.gov/hhes/www/housing/ahs/.

The American Housing Survey (AHS) collects data on the Nation's housing, including apartments, single-family homes, mobile homes, vacant housing units, household characteristics, income, housing and neighborhood quality, housing costs, equipment and fuels, size of housing unit, and recent movers. National data are collected in odd numbered years, and data for each of 47 selected Metropolitan Areas are collected currently about every six years. The national sample covers an average 55,000 housing units. Each metropolitan area sample covers 4,100 or more housing units.

The AHS returns to the same housing units year after year to gather data; therefore, this survey is ideal for analyzing the flow of households through housing.

Key Definitions Related to Healthy Homes

1. **Broken plaster or peeling paint (interior).** The area of peeling paint or broken plaster must be on the inside walls or ceilings and at least one area of broken plaster or peeling paint must be larger than 8 inches by 11 inches.
2. **Electric fuses and circuit breakers.** These statistics are presented for occupied housing units. The data show whether an electric fuse has blown or circuit breaker has tripped in the home in the 3 months prior to the interview, or while the household was living in the unit if less than 3 months. A blown fuse or tripped breaker switch results in the temporary loss of electricity until the fuse is replaced or the breaker switch reset. Blown fuses inside major pieces of installed equipment (such as some air conditioners) are counted as blown fuses or tripped breaker switches. The item may identify inadequate wiring, but it also happens commonly when people move into houses and are unfamiliar with which items can be turned on at the same time.
3. **Electric wiring.** A housing unit is classified as having exposed electric wiring if the unit has any wiring that is not enclosed, either in the walls or in metal or plastic coverings. Excluded are appliance cords, extension cords, chandelier cords, and telephone, antenna, or cable television wires.
4. **Electric wall outlets.** A housing unit is classified as having rooms without electric wall outlets if there is not at least one working electric wall outlet in each room of the unit. A working electric wall outlet is one that is in operating condition; that is, it can be used when needed. If a room does not have an electric wall outlet, an extension cord used in place of a wall outlet is not considered to be an electric wall outlet.
5. **Flush toilet and flush toilet breakdowns.** A privy or chemical toilet is not considered a flush toilet. Flush toilets outside the unit were not counted. The statistics on breakdowns of flush toilet are shown for housing units with at least one flush toilet for the household's use only. The flush toilet may be completely unusable because of a faulty flushing mechanism, broken pipes, stopped up sewer pipe, lack of water supplied to the flush toilet, or some other reason. For households with more than one toilet, the question asked about times when *all* toilets were unusable.
6. **Foundation.** This item is restricted to one-unit buildings and excludes mobile homes. A structure has a basement if there is an enclosed space at least partially underground in which a person can walk upright under all or part of the building. The basement is under all the building if it is under the entire main

American Housing Survey: A Healthy Homes Perspective

structure, excluding garages, car-ports, and porches. Crawl space is space between the ground and the first floor of the house, but it is not high enough for a person to walk upright. A house is built on a concrete slab if it is built on concrete that has been poured on the ground. The “other” category refers to a house built on stilts or pilings (for example, beach houses), boats, and motor homes. housing unit is still too cold for the occupants. *Inadequate insulation* refers to air drafts through window frames, electrical outlets, or walls that are cold. *Cost of heating* refers to the occupants turning down their thermostat or turning the equipment off altogether to save money. This category includes utilities/fuels that are unavailable due to unpaid bills.

7. **Holes in floors.** Respondents were asked about holes in the interior floors of the unit. The holes may or may not go all the way through to a lower floor or to the exterior of the unit. The holes are only counted if large enough for someone to trip in.
8. **Light fixtures in public halls.** These statistics are presented for housing units in two-or-more-unit structures. Data include whether or not there are light fixtures in the public halls and whether or not some, none, or all of the light fixtures are in working order. Light fixtures include wall lights, ceiling lights, or table lamps in the public halls of the building. Public halls are used by the occupants and guests to get to their apartment doors.
9. **Open cracks or holes (interior).** Statistics are presented on open cracks or holes in the interior wall or ceilings of the housing unit. Included are cracks or holes that do not go all the way through to the next room or to the exterior of the housing unit. Hairline cracks or cracks that appear in the walls or ceilings but are not large enough to insert the edge of a dime, are not counted. Very small holes caused by nails or other similar objects are also not counted.
10. **Plumbing facilities.** The category “With all plumbing facilities” consists of housing units that have hot and cold piped water as well as a flush toilet and a bathtub or shower. For units with less than two full bathrooms, the facilities are only counted if they are for the exclusive use of the occupants of the unit. Plumbing facilities need not be in the same room. Lacking some plumbing facilities or having no plumbing facilities for exclusive use means that the housing unit does not have all three specified plumbing facilities (hot and cold piped water, flush toilet, and bathtub or shower) inside the housing unit, or that the toilet or bathing facilities are also for the use of the occupants of other housing units. See also the definitions “Complete bathrooms,” “Flush toilet and flush toilet breakdowns,” and “Sewage disposal and sewage disposal breakdowns.”
11. **Signs of mice or rats.** The statistics on signs of mice or rats refer to respondents who reported seeing mice or rats or signs of mice or rats inside the house or building during the 3 months prior to interview or while the household was living in the unit if less than 3 months. Signs of mice or rats include droppings, holes in the wall, or ripped or torn food containers.
12. **Water leakage during last 12 months.** Data on water leakage are shown if the leakage occurred in the 12 months prior to the interview or while the household was living in the unit if less than 12 months. Housing units with water leakage are classified by whether the water leaked in from inside or outside the building and by the most common areas (roof, basement, walls, closed windows, or doors) or reasons (fixtures backed up or over-flowed or pipes leaked) of water leakage.
13. **Room heater without flue** refers to any room heater that burns kerosene, gas, or oil, and that does not connect to flue, vent, or chimney.

American Housing Survey: A Healthy Homes Perspective

AHS's Rating System for Physical Problems

Physical Problems	Severe (any one of 5 categories)	Moderate (any one of 5 categories but none severe)
Plumbing	Lacking hot or cold piped water or a flush toilet, or lacking both bathtub and shower, all inside the structure (and for the exclusive use of the unit, unless there are two or more full bathrooms).	On at least three occasions during the last 3 months, all the flush toilets were broken down at the same time for 6 hours or more.
Heating	<ol style="list-style-type: none"> 1. Having been uncomfortably cold last winter for 24 hours or more because the heating equipment broke down, and 2. It broke down at least three times last winter for at least 6 hours each time. 	Having unvented gas, oil, or kerosene heaters as the primary heating equipment.
Electric for Severe / Kitchen for Moderate	<ol style="list-style-type: none"> 1. Having no electricity, or 2. All of the following three electric problems: <ol style="list-style-type: none"> a. Exposed wiring, b. A room with no working wall outlet, and c. Three blown fuses or tripped circuit breakers in the last 90 days. 	Lacking a: <ol style="list-style-type: none"> 1. kitchen sink, 2. Refrigerator, or 3. Cooking equipment (stove, burners, or microwave oven) inside the structure for the exclusive use of the unit.
Hallways	Having all of the following four problems in public areas: <ol style="list-style-type: none"> 1. No working light fixtures, 2. Loose or missing steps, 3. Loose or missing railings, and 4. No working elevator. 	Having any three of the four problems listed under “Physical problems—severe” under Hallways.
Upkeep	Having any five of the following six maintenance problems: <ol style="list-style-type: none"> 1. Water leaks from the outside, such as from the roof, basement, windows, or doors; 2. Leaks from inside structure such as pipes or plumbing fixtures; 3. Holes in the floors; 4. Holes or open cracks in the walls or ceilings; 5. More than 8 inches by 11 inches of peeling paint or broken plaster; or 6. Signs of rats in the last 90 days. 	Having any three or four of the six problems listed under “Physical problems—severe” under Upkeep.

American Housing Survey: A Healthy Homes Perspective

Potential Errors in American Housing Survey

All numbers from the American Housing Survey (AHS), except for sample size, are estimates. As in other surveys, errors come primarily from the following:

- **Incomplete data** – Incomplete data are adjusted by assuming that the respondents are similar to those not answering, and the size of these errors is estimated.
- **Wrong answers** – The U.S. Census Bureau does not adjust for wrong answers and does not estimate the size of the errors.
- **Sampling** – Sampling errors are not adjusted and the size of the error is estimated.

WRONG ANSWERS

Wrong answers happen because people misunderstand questions, cannot recall the correct answer, or do not want to give the right answer. The table below shows which items have been measured for inconsistency when people are reinterviewed after a few weeks. The actual survey did not catch and reconcile these inconsistencies and continuously occurring errors are not measured at all. Thus, a high rate of wrong answers remains for some items. The Census Bureau categorizes these levels of inconsistency into three ranges:

1. Less than 20 is considered a low level of inconsistency.
2. Between 20 and 50 is considered a moderate level of inconsistency.
3. Greater than 50 is considered a high level of inconsistency indicating that responses are not reliable.

Table Y
Different Answers a Month Apart

HIGH LEVEL OF INCONSISTENCY	
Other kinds of heating equipment (central warm-air)	91
Water came in from other places	81
Difficulty hearing with or without a hearing aid	72
Water safe for drinking	66
Other kinds of heating equipment (none)	63
Peeling paint on the ceiling	63
Other kinds of heating equipment (unvented room)	62
Electric fuses or breaker switches blown	58
Open cracks or holes in building	58
Other major repairs over \$500 each—repair done	57
Central air conditioning/dehumidifier	56
Broken plaster or peeling paint	55
Water came in from walls, doors, windows	55
A working electric wall outlet	55
Other kinds of heating equipment (fireplace with no insert)	54
Broken plaster on the ceiling	53
Water came in from roof	53
Other major repairs over \$500 each	
—someone in household did the work	51
Rate the place (10 categories)	51

American Housing Survey: A Healthy Homes Perspective

MODERATE LEVEL OF INCONSISTENCY

Holes in the floors	50
Other kinds of heating equipment (other built-in electric)	50
Central air fuel	50
Other kinds of heating equipment (portable electric)	47
Water came in from basement	45
Water leaked into home from outdoors	43
Other kinds of heating equipment (fireplace with insert)	43
Heat breakdown	41
Heating equipment broke down for 6 hours or more	41
Other kinds of heating equipment (stove)	36

LOW LEVEL OF INCONSISTENCY

Heating equipment broke	18
Clothes dryer fuel	12
Source of water	8

Relationship Between Interior Problems and Exterior Problems-

Based on the American Housing Survey - 2011 National Data for Occupied Non-Multiunit 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	1,752.4	2.4	3.6	5.1	2.7	3.3	3.6	6.8	8.3	8.0	7.3
Missing roofing material	3,086.5	2.1	3.3	3.7	2.1	2.4	2.2	4.9	6.3	6.4	4.6
Hole in roof	1,291.0	2.5	6.3	8.4	2.4	3.8	4.5	7.3	13.5	9.4	9.7
Sloping outside walls	1,055.6	3.2	3.4	5.3	2.4	4.0	3.3	8.6	15.6	9.7	7.1
Missing bricks, siding, other outside wall material	2,169.4	2.9	3.0	3.8	2.4	3.4	3.1	6.7	11.9	9.4	6.9
Broken windows	3,640.8	2.7	2.4	3.9	2.2	3.0	3.1	5.5	8.7	6.9	5.4
Boarded up windows	880.1	2.8	2.3	4.3	2.3	2.7	5.0	5.9	9.9	9.3	7.8
Foundation crumbling or has open crack or hole	4,684.7	2.1	2.6	3.6	1.9	2.5	2.0	5.7	9.7	6.2	4.6
One or more ext. problem	12,648.7	2.4	3.2	3.3	2.2	2.8	2.6	6.4	10.5	7.4	4.4
Two or more ext. problem	3,511.3	3.0	4.0	5.2	2.6	3.8	3.8	8.7	14.8	11.1	8.8
Three or more ext. problem	1,385.5	3.5	4.5	8.6	3.0	4.9	4.9	11.2	19.6	14.3	12.8
Four or more ext. problem	571.8	3.8	4.5	12.5	3.0	5.0	5.6	12.7	25.8	19.9	18.7
Five or more ext. problem	263.5	4.2	5.4	15.7	3.3	5.6	6.1	15.1	32.0	25.7	23.5
Six or more ext. problem	111.0	4.6	5.6	21.4	3.1	5.8	6.6	16.6	35.7	33.3	25.0
Seven or more ext. problem	51.7	4.8	5.4	15.5	3.8	5.4	6.7	18.4	51.1	29.5	26.9
Eight or more ext. problem	16.9	2.3	4.5	16.5	3.0	2.1	4.0	17.1	39.8	30.4	15.7

* 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 2.4 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. Only statistically significant likelihoods are presented (p-value < 0.05).

Relationship Between Interior Problems and Exterior Problems

The National Center for Healthy Housing developed the table to help communities make homes healthier by giving them a better understanding of the direct relationship between exterior problems such as a sloping outside wall and interior problems such as rats, large holes in the floor, and water damage that can impact resident health and safety. With this understanding, communities can more effectively and efficiently identify homes with serious health and safety threats and set priorities for assessments of the interior. The table is based on the American Housing Survey (AHS). The AHS tracks some but not all items related to health. For example, it does not track cockroaches, radon, lead-based paint, and carbon monoxide levels.

Background on American Housing Survey

The AHS is conducted by the Bureau of the Census for the Department of Housing and Urban Development (HUD) to describe the condition of the Nation's housing. The AHS includes apartments, single-family homes, mobile homes, and vacant housing units. It describes household characteristics, income, housing and neighborhood quality, housing costs, equipment and fuels, size of housing unit, and recent movers. National data are collected in odd numbered years, and data for each of 47 selected Metropolitan Statistical Areas (MSA) are collected currently about every six years. The national sample covers an average 55,000 housing units. Each metropolitan area sample covers 4,100 or more housing units. The AHS returns to the same housing units year after year to gather data; therefore, this survey is ideal for analyzing the flow of households through housing. For more information, go to www.census.gov/hhes/www/housing/ahs/ahs.html.

Key Definitions Related to Healthy Homes

- **Leaks – Interior or Exterior:** Resident reported leakage that occurred in the 12 months prior to the interview or while the household was living in the unit if less than 12 months. Housing units with water leakage are classified by whether the water leaked in from outside the building (roof, basement, walls, closed windows, or doors) or inside of the building (fixtures backed up or overflowed or pipes leaked).
- **Rodents – Rats or Mice:** Resident reported mice or rats if they saw mice or rats or signs of mice or rats inside the house or building during the 3 months prior to interview or while the household was living in the unit if less than 3 months. Signs of mice or rats include droppings, holes in the wall, or ripped, or torn food containers.
- **Heating – Heating Problems:** Resident reported that the home was uncomfortably cold for 24 hours or more during the winter prior to the interview for any reason.
- **Heating – Fire / CO Danger:** Resident reported using as primary heating source either room heater without flue (i.e., any room heater that burns kerosene, gas, or oil, and that does not connect to flue, vent, or chimney or a stove or oven for heat), portable electric heater, stove, cooking stove, fireplace without insert or no heat.
- **Structural – Cracks in Walls:** The resident reported open cracks or holes in the interior wall or ceilings of the housing unit. Included are cracks or holes that do not go all the way through to the next room or to the exterior of the housing unit. Hairline cracks or cracks that appear in the walls or ceilings but are not large enough to insert the edge of a dime, are not counted. Very small holes caused by nails or other similar objects are also not counted.
- **Structural – Holes in Floors:** The resident reported holes in the interior floors of the unit. The holes may or may not go all the way through to a lower floor or to the exterior of the unit. The holes are only counted if large enough for someone to trip in.
- **Structural – Paint / Plaster:** The resident reported peeling paint or broken plaster. The area of peeling paint or broken plaster must be on the inside walls or ceilings and at least one area of broken plaster or peeling paint must be larger than 8 inches by 11 inches.
- **Resident Dissatisfied:** The resident rated structure based on a scale from 1 to 10, where 10 is the best and 1 is the worst. Resident is dissatisfied if the structure is rated 1, 2 or 3.



National Center for Healthy Housing

Housing Interventions and Health: A Systematic Review of the Evidence

In December 2007, a panel of experts met in Atlanta, Georgia through a cooperative agreement between the Centers for Disease Control and Prevention (CDC) National Center for Environmental Health / Agency for Toxic Substances and Disease Registry and the National Center for Healthy Housing (NCHH). The panel conducted an exhaustive review of healthy housing intervention research. The panel of experts found sufficient evidence to determine that following interventions were effective. See <http://www.nchh.org/Portals/0/Contents/Housing%20Interventions%20and%20Health.pdf> for more details.

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.

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.

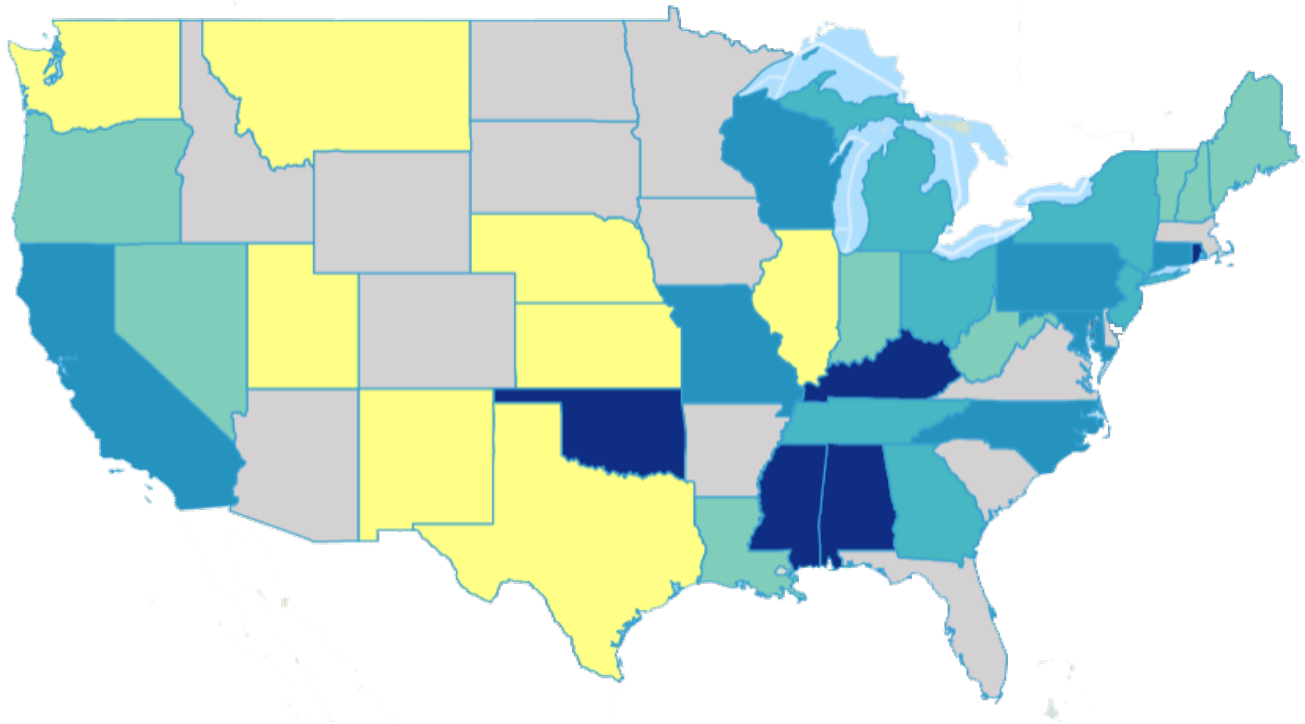
J. Reducing Scald Burns:
Pre-set safe temperature hot water heaters

The following were also found to be ineffective:

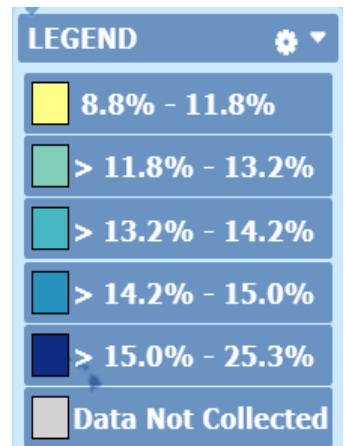
- Portable air cleaning filtration systems are ineffective in controlling exposures to environmental tobacco smoke and also formaldehyde, although it is possible that there may be some modest decline in exposure.
- “Air cleaners” that produce large amounts of ozone should not be used, because they result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

Childhood Asthma

Asthma Prevalence Among Children 2014 -
BRFSS data

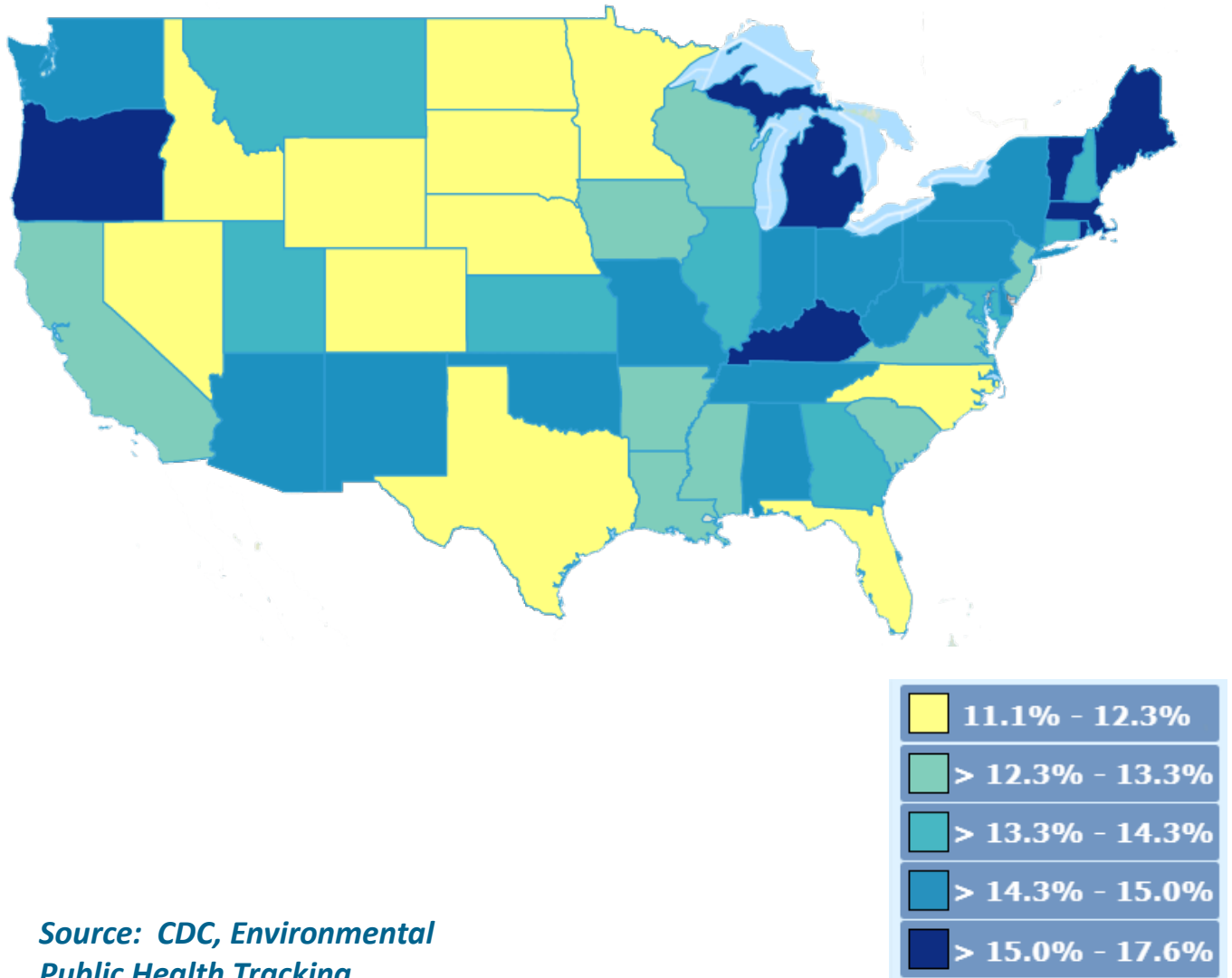


Source: CDC, Environmental
Public Health Tracking
(www.cdc.gov/ephtracking)



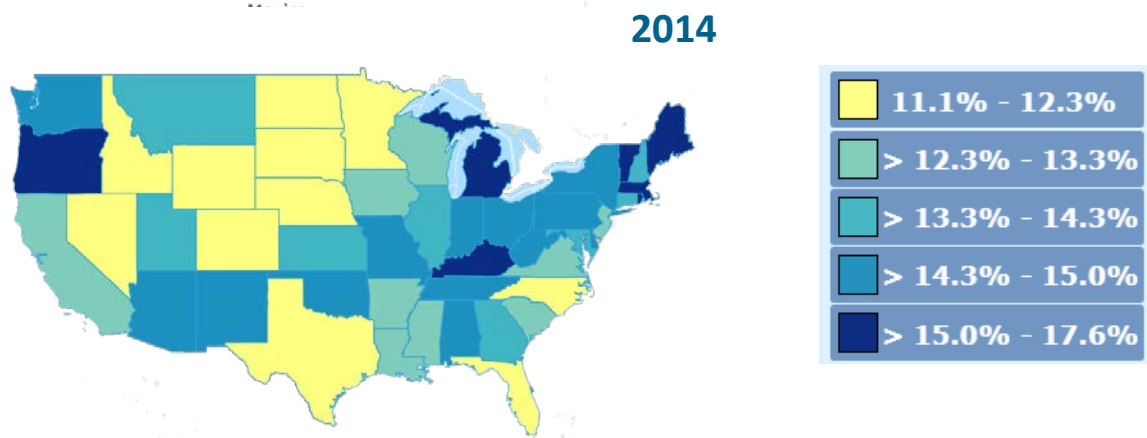
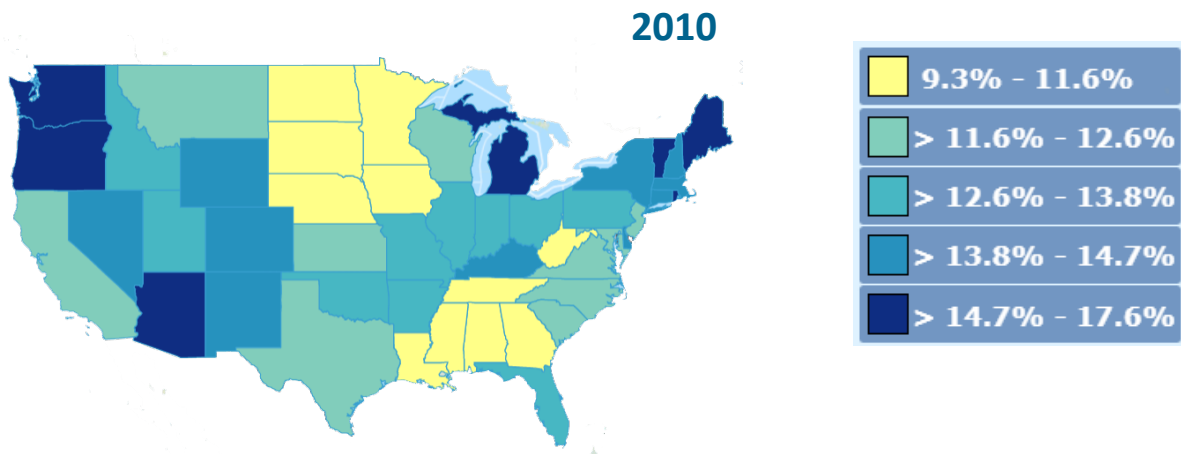
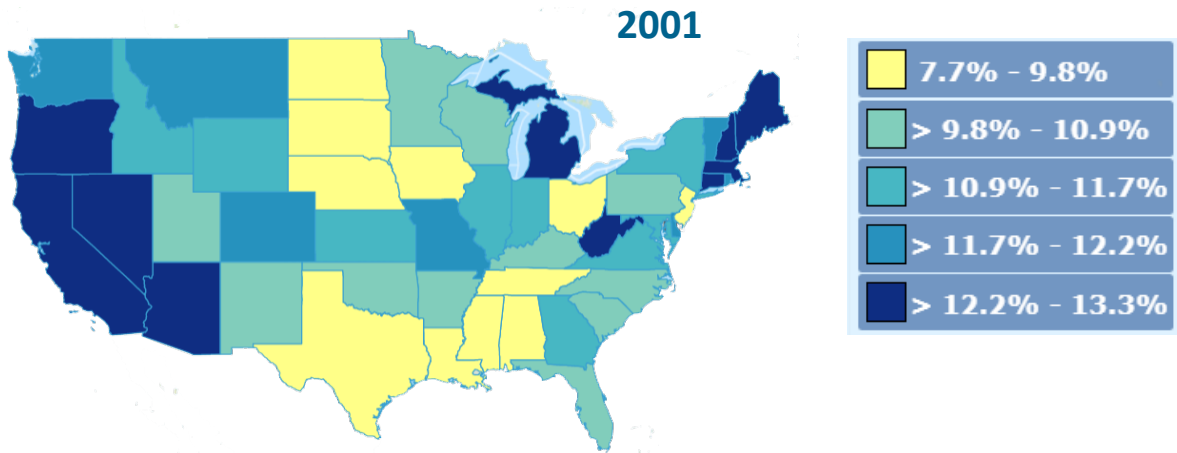
Adult Asthma

Current Prevalence, 2014 - BRFSS data



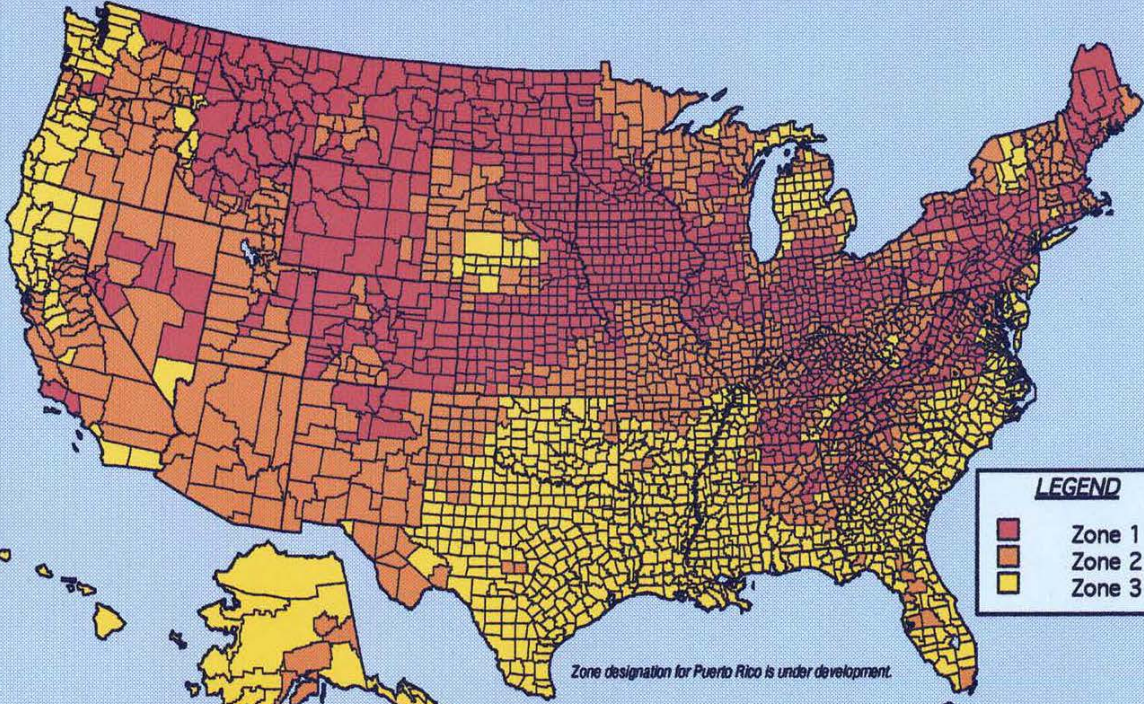
Source: CDC, Environmental
Public Health Tracking
(www.cdc.gov/ephtracking)

Adult asthma - current prevalence over time



Current asthma prevalence among adults varies across states.

EPA Map of Radon Zones



LEGEND

- Zone 1
- Zone 2
- Zone 3

Zone designation for Puerto Rico is under development.

The purpose of this map is to assist National, State, and local organizations to target their resources and to implement radon-resistant building codes. This map is not intended to be used to determine if a home in a given zone should be tested for radon. Homes with elevated levels of radon have been found in all three zones. All homes should be tested regardless of geographic location.

IMPORTANT : Consult the EPA Map of Radon Zones document (EPA-402-R-93-071) before using this map. This document contains information on radon potential variations within counties. EPA also recommends that this map be supplemented with any available local data in order to further understand and predict the radon potential of a specific area.

Guam - Preliminary Zone designation

National Healthy Homes Training Center and Network

Laws, Rules, and Codes for Healthier Homes: Review of Approaches Affecting Existing Homes

The National Center for Healthy Housing has identified five different, complementary regulatory approaches used to make existing homes healthier and safer. This analysis focuses on regulatory approaches that address current conditions in existing homes. It does not address new construction or how rehabilitation must be conducted in existing homes.

1. Housing/Property Maintenance Code:

The U.S. Department of Housing and Urban Development (HUD) sets standards for housing receiving federal assistance. For example, housing funded through Housing Choice Vouchers (formerly known as Tenant-Based Section 8 Voucher) must comply with Housing Quality Standards (HQS). See Part A (following) for more information on HQS. HUD also sets general standards for housing covered by mortgage insurance. For all other housing, there are no national codes for existing housing or property maintenance. HUD sets standards for the design and construction of manufactured housing and housing receiving federal assistance but does not regulate the maintenance of that housing.

While all states have a code for new construction or major rehabilitation projects, few states have adopted standards mandating minimum conditions in or requiring maintenance of existing housing. In the absence of state standards, most urban and many suburban local jurisdictions adopted a housing or property maintenance code. The nation's model housing or property maintenance code is the International Property Maintenance Code (IPMC), which is managed by the International Code Council (ICC). Two states – New York and Virginia – and more than 600 local jurisdictions have adopted the IPMC with modifications. See Part B (following) for more information on the IPMC.

2. Health/Sanitation Code:

There is no national health code for housing. State and local agencies, mostly in the Northeast, have adopted health or sanitation codes that address health and safety hazards in housing. Many urban areas have also adopted vector control programs generally focused on rodents and mosquito harborage. The leading example of a state health or sanitation code is the State Sanitary Code for the State of Massachusetts. The only model health or sanitation code was adopted by the American Public Health Association (APHA) in 1938 and has not been updated. The U.S. Centers for Disease Control and Prevention (CDC) used this model code as the foundation for its Healthy Homes Reference Manual. See Part C (following) for more information on the APHA model health/sanitation code.

3. Landlord-Tenant Law:

There is no national landlord-tenant law for rental housing. The Federal Lead Hazard Disclosure adopted by both the U.S. Environmental Protection Agency (EPA) and HUD requires landlords, sellers and their agents to disclose potential and known lead hazards in housing built before 1978. HUD also enforces the Fair Housing Law, which requires reasonable accommodations for people with disabilities. Most states and, in the absence of state action, many urban jurisdictions have adopted laws establishing minimum roles and responsibilities for landlords and tenants in rental housing. These codes typically require both parties to comply with the applicable health or housing code. The parties can enforce this requirement through the courts in a private civil suit. The nation's model landlord-tenant law is the Uniform Residential Landlord and Tenant Act (URLTA) managed by the Uniform Law Commission. Twenty-five states have adopted URLTA. See Part D (following) for more information on the URLTA.

4. Product Standards:

The federal government is primarily responsible for setting standards for products in commerce that may impact health and safety. These standards reduce the dangers posed by these products by banning their use in housing, requiring safer designs, or specifying label requirements. EPA regulates pesticides and does not allow them to be sold or used with prior approval. The Consumer Product Safety Commission (CPSC) regulates most other consumer products related to housing but requires only compliance with general requirements. In response to specific problems, CPSC adopts specific standards to address the problem such as banning lead containing paint. HUD sets standards for formaldehyde in wood in manufactured housing. The HUD label has been widely used as a voluntary standard beyond manufactured housing. In addition, several national associations including the Underwriters Laboratories (UL), International Standards Organization (ISO), National Fire Protection Association (NFPA), and the American National Standards Institute (ANSI) adopt voluntary industry consensus standards. States and local jurisdictions can set standards only when there are no federal standards or when their actions are consistent with or the same as federal standards. See Part E (following) for more information on these federal product standards.

5. Hazard Management Laws:

The federal, state, and local government set a wide mix of requirements for the management of specific hazards in existing housing. EPA sets standards for asbestos, lead-based paint, and pesticides and has the authority to set standards for radon. HUD sets standards for lead-based paint in federally assisted housing. States and local jurisdictions set standards similar to or more stringent than the federal government. They also act in the absence of federal action such as requiring carbon monoxide alarms, requiring treatment of arsenic-treated lumber, or licensing mold or radon assessors or remediators. See Part F (following) for more information on federal hazard management laws. See Part G (following) for more information on EPA's Renovation, Repair, and Painting Rule.

Table 1
Comparison of Regulatory Approaches to Healthy Homes

	Housing/Property Maintenance Code	Health/ Sanitation Code	Landlord-Tenant Law	Product Standards	Hazard Management Law
National Requirements	Yes, for federally assisted housing. No, for other housing.	No.	Lead disclosure and fair housing.	Yes, for specific products and general standards.	Yes, for specific hazards such as lead, asbestos, and pesticides.
State Requirements	Several states.	Several states.	Most states.	Yes, for pesticides. All must be consistent with federal.	Generally yes for specific hazards in addition to federal , such as carbon monoxide and radon.
Local Requirements	Common, except in rural areas.	Common, but limited in scope.	Common in large urban areas.	Uncommon.	Larger community for specific hazards in addition to federal and state.
Current National Models	Yes, International Property Maintenance Code (IPMC).	No.	Yes, Uniform Residential Landlord and Tenant Act (URLTA).	Industry Consensus Standards.	Federal government and some associations issue guidelines to address specific hazards.
For More Information	Part A: Housing Quality Standards Part B: IPMC	Part C: For American Public Health (APHA) Association 1938 Principles	Part D: URLTA	Part E	Part F Part G: EPA's Renovation, Repair, and Painting Rule

A. HUD Housing Quality Standards

I. Overview

The U.S. Department of Housing and Urban Development (HUD) sets standards for housing receiving federal assistance. The primary standards are the Housing Quality Standards (HQS) at 24 CFR 982.401. The HQS were adopted in 1995 and last revised in 1999. All housing funded through HUD's Housing Choice Vouchers (formerly known as Tenant-Based Section 8 Voucher) must comply HQS as a condition of receiving funding. Local public housing authorities conduct initial and annual inspections to ensure compliance with the HQS.¹

The HQS form the basis for HUD's Uniform Physical Condition Standards and its Public Housing Assessment System that applies to public housing and to Project-Based Section 8 Housing (also known as Housing Assistance Payment Program).²

II. HQS's Provisions

(a) Performance and acceptability requirements

- (1) This section states the housing quality standards (HQS) for housing assisted in the programs.
- (2)
 - (i) The HQS consist of:
 - (A) Performance requirements; and
 - (B) Acceptability criteria or HUD approved variations in the acceptability criteria.
 - (ii) This section states performance and acceptability criteria for these key aspects of housing quality:
 - (A) Sanitary facilities;
 - (B) Food preparation and refuse disposal;
 - (C) Space and security;
 - (D) Thermal environment;
 - (E) Illumination and electricity;
 - (F) Structure and materials;
 - (G) Interior air quality;
 - (H) Water supply;
 - (I) Lead-based paint;
 - (J) Access;
 - (K) Site and neighborhood;
 - (L) Sanitary condition; and
 - (M) Smoke detectors.
- (3) All program housing must meet the HQS performance requirements both at commencement of assisted occupancy, and throughout the assisted tenancy.

¹ See www.hud.gov/offices/pih/programs/hcv/about/fact_sheet.cfm for more information on the Housing Choice Voucher program.

² See www.hud.gov/offices/pih/programs/hcv/semmap/semmap.cfm for HUD's Section 8 Management Assessment Program.

(4)

- (i) In addition to meeting HQS performance requirements, the housing must meet the acceptability criteria stated in this section, unless variations are approved by HUD.
- (ii) HUD may approve acceptability criteria variations for the following purposes:
 - (A) Variations which apply standards in local housing codes or other codes adopted by the PHA; or
 - (B) Variations because of local climatic or geographic conditions.
- (iii) Acceptability criteria variations may only be approved by HUD pursuant to paragraph (a)(4)(ii) of this section if such variations either:
 - (A) Meet or exceed the performance requirements; or
 - (B) Significantly expand affordable housing opportunities for families assisted under the program.
- (iv) HUD will not approve any acceptability criteria variation if HUD believes that such variation is likely to adversely affect the health or safety of participant families, or severely restrict housing choice.

(b) Sanitary facilities

- (1) *Performance requirements.* The dwelling unit must include sanitary facilities located in the unit. The sanitary facilities must be in proper operating condition, and adequate for personal cleanliness and the disposal of human waste. The sanitary facilities must be usable in privacy.
- (2) *Acceptability criteria.*
 - (i) The bathroom must be located in a separate private room and have a flush toilet in proper operating condition.
 - (ii) The dwelling unit must have a fixed basin in proper operating condition, with a sink trap and hot and cold running water.
 - (iii) The dwelling unit must have a shower or a tub in proper operating condition with hot and cold running water.
 - (iv) The facilities must utilize an approvable public or private disposal system (including a locally approvable septic system).

(c) Food preparation and refuse disposal

- (1) *Performance requirement.*
 - (i) The dwelling unit must have suitable space and equipment to store, prepare, and serve foods in a sanitary manner.
 - (ii) There must be adequate facilities and services for the sanitary disposal of food wastes and refuse, including facilities for temporary storage where necessary (e.g. garbage cans).
- (2) *Acceptability criteria.*
 - (i) The dwelling unit must have an oven, and a stove or range, and a refrigerator of appropriate size for the family. All of the equipment must be in proper operating condition. The equipment may be supplied by either the owner or the family. A microwave oven may be substituted for a tenant-supplied oven and stove or range. A microwave oven may be substituted for an owner-supplied oven and stove or range if the tenant agrees and microwave ovens are furnished instead of an oven and stove or range to both subsidized and unsubsidized tenants in the building or premises.
 - (ii) The dwelling unit must have a kitchen sink in proper operating condition, with a sink trap and hot and cold running water. The sink must drain into an approvable public or private system.
 - (iii) The dwelling unit must have space for the storage, preparation, and serving of food.
 - (iv) There must be facilities and services for the sanitary disposal of food waste and refuse, including temporary storage facilities where necessary (e.g., garbage cans).

(d) Space and security

- (1) *Performance requirement.* The dwelling unit must provide adequate space and security for the family.
- (2) *Acceptability criteria.*
 - (i) At a minimum, the dwelling unit must have a living room, a kitchen area, and a bathroom.
 - (ii) The dwelling unit must have at least one bedroom or living/sleeping room for each two persons. Children of opposite sex, other than very young children, may not be required to occupy the same bedroom or living/sleeping room.
 - (iii) Dwelling unit windows that are accessible from the outside, such as basement, first floor, and fire escape windows, must be lockable (such as window units with sash pins or sash locks, and combination windows with latches). Windows that are nailed shut are acceptable only if these windows are not needed for ventilation or as an alternate exit in case of fire.
 - (iv) The exterior doors of the dwelling unit must be lockable. Exterior doors are doors by which someone can enter or exit the dwelling unit.

(e) Thermal environment

- (1) *Performance requirement.* The dwelling unit must have and be capable of maintaining a thermal environment healthy for the human body.
- (2) *Acceptability criteria.*
 - (i) There must be a safe system for heating the dwelling unit (and a safe cooling system, where present). The system must be in proper operating condition. The system must be able to provide adequate heat (and cooling, if applicable), either directly or indirectly, to each room, in order to assure a healthy living environment appropriate to the climate.
 - (ii) The dwelling unit must not contain unvented room heaters that burn gas, oil, or kerosene. Electric heaters are acceptable.

(f) Illumination and electricity

- (1) *Performance requirement.* Each room must have adequate natural or artificial illumination to permit normal indoor activities and to support the health and safety of occupants. The dwelling unit must have sufficient electrical sources so occupants can use essential electrical appliances. The electrical fixtures and wiring must ensure safety from fire.
- (2) *Acceptability criteria.*
 - (i) There must be at least one window in the living room and in each sleeping room.
 - (ii) The kitchen area and the bathroom must have a permanent ceiling or wall light fixture in proper operating condition. The kitchen area must also have at least one electrical outlet in proper operating condition.
 - (iii) The living room and each bedroom must have at least two electrical outlets in proper operating condition. Permanent overhead or wall-mounted light fixtures may count as one of the required electrical outlets.

(g) Structure and materials

- (1) *Performance requirement.* The dwelling unit must be structurally sound. The structure must not present any threat to the health and safety of the occupants and must protect the occupants from the environment.
- (2) *Acceptability criteria.*
 - (i) Ceilings, walls, and floors must not have any serious defects such as severe bulging or leaning, large holes, loose surface materials, severe buckling, missing parts, or other serious damage.
 - (ii) The roof must be structurally sound and weathertight.

- (iii) The exterior wall structure and surface must not have any serious defects such as serious leaning, buckling, sagging, large holes, or defects that may result in air infiltration or vermin infestation.
- (iv) The condition and equipment of interior and exterior stairs, halls, porches, walkways, etc., must not present a danger of tripping and falling. For example, broken or missing steps or loose boards are unacceptable.
- (v) Elevators must be working and safe.

(h) Interior air quality

- (1) *Performance requirement.* The dwelling unit must be free of pollutants in the air at levels that threaten the health of the occupants.
- (2) *Acceptability criteria.*
 - (i) The dwelling unit must be free from dangerous levels of air pollution from carbon monoxide, sewer gas, fuel gas, dust, and other harmful pollutants.
 - (ii) There must be adequate air circulation in the dwelling unit.
 - (iii) Bathroom areas must have one openable window or other adequate exhaust ventilation.
 - (iv) Any room used for sleeping must have at least one window. If the window is designed to be openable, the window must work.

(i) Water supply

- (1) *Performance requirement.* The water supply must be free from contamination.
- (2) *Acceptability criteria.* The dwelling unit must be served by an approvable public or private water supply that is sanitary and free from contamination.

(j) Lead-based paint performance requirement

The Lead-Based Paint Poisoning Prevention Act (42 U.S.C. 4821–4846), the Residential Lead-Based Paint Hazard Reduction Act of 1992 (42 U.S.C. 4851–4856), and implementing regulations at part 35, subparts A, B, M, and R of this title apply to units assisted under this part.

(k) Access performance requirement

The dwelling unit must be able to be used and maintained without unauthorized use of other private properties. The building must provide an alternate means of exit in case of fire (such as fire stairs or egress through windows).

(l) Site and Neighborhood

- (1) *Performance requirement.* The site and neighborhood must be reasonably free from disturbing noises and reverberations and other dangers to the health, safety, and general welfare of the occupants.
- (2) *Acceptability criteria.* The site and neighborhood may not be subject to serious adverse environmental conditions, natural or manmade, such as dangerous walks or steps; instability; flooding, poor drainage, septic tank back-ups or sewage hazards; mudslides; abnormal air pollution, smoke or dust; excessive noise, vibration or vehicular traffic; excessive accumulations of trash; vermin or rodent infestation; or fire hazards.

(m) Sanitary condition—

- (1) *Performance requirement.* The dwelling unit and its equipment must be in sanitary condition.
- (2) *Acceptability criteria.* The dwelling unit and its equipment must be free of vermin and rodent infestation.

(n) Smoke detectors performance requirement—

- (1) Except as provided in paragraph (n)(2) of this section, each dwelling unit must have at least one battery-operated or hard-wired smoke detector, in proper operating condition, on each level of the dwelling unit, including basements but excepting crawl spaces and unfinished attics. Smoke detectors must be installed in accordance with and meet the requirements of the National Fire Protection Association Standard (NFPA) 74 (or its successor standards). If the dwelling unit is occupied by any hearing-impaired person, smoke detectors must have an alarm system, designed for hearing-impaired persons as specified in NFPA 74 (or successor standards).
- (2) For units assisted prior to April 24, 1993, owners who installed battery-operated or hard-wired smoke detectors prior to April 24, 1993 in compliance with HUD's smoke detector requirements, including the regulations published on July 30, 1992, (57 FR 33846), will not be required subsequently to comply with any additional requirements mandated by NFPA 74 (i.e., the owner would not be required to install a smoke detector in a basement not used for living purposes, nor would the owner be required to change the location of the smoke detectors that have already been installed on the other floors of the unit).

B. International Property Maintenance Code

I. Overview

The International Code Council³ (ICC) published the first edition of the *International Property Maintenance Code* in 1998. ICC's three charter members of the International Code Council – Building Officials and Code Administrators International, Inc. (BOCA), International Conference of Building Officials (ICBO) and Southern Building Code Congress International (SBCCI) – developed the IPMC as a comprehensive set of regulations for existing buildings that was consistent with the existing model property maintenance codes at the time.. A new edition is promulgated every three years.

The *International Property Maintenance Code* is founded on principles that the IPMC must:

1. Adequately protect public health, safety and welfare;
2. Not unnecessarily increase construction costs;
3. Not restrict the use of new materials, productions or methods of construction; and
4. Not give preferential treatment to particular types or classes of materials, products or methods of construction.

Adoption

The *International Property Maintenance Code* is available for adoption and use by jurisdictions internationally. Its use within a governmental jurisdiction is intended to be accomplished through adoption by reference. At the time of adoption, jurisdictions should insert the appropriate information in provisions requiring specific local information, such as the name of the adopting jurisdiction. These locations are shown in bracketed words in small capital letters in the code and in the sample ordinance.

To find out whether the *International Property Maintenance Code* or any of the other ICC Codes have been adopted in your community, go to www.iccsafe.org/government/adoption.html.

Maintenance

The *International Property Maintenance Code* is kept up to date through the review of proposed changes submitted by code enforcing officials, industry representatives, design professionals and other interested parties. Proposed changes are carefully considered through an open code development process in which all interested and affected parties may participate. The contents of the code are subject to change both through the Code Development Cycles and the governmental body that enacts the code into law. For more information regarding the code development process, contact the Code and Standard Development Department of the International Code Council.

While the development procedure of the *International Property Maintenance Code* assures the highest degree of care, ICC and the founding members of ICC—BOCA, ICBO, SBCCI—their members and those participating in the development of the code do not accept any liability resulting from compliance or noncompliance with the provisions because ICC and its founding members do not have the power or authority to police or enforce compliance with the contents of the code. Only the governmental body that enacts the code into law has such authority.

³ www.iccsafe.org.

Relationship to Other ICC Codes

The *International Property Maintenance Code* complements and is fully compatible with all the *International Codes* (“I-Codes”) published by the International Code Council (ICC), including the:

1. International Building Code;
2. ICC Electrical Code;
3. International Energy Conservation Code;
4. International Existing Building Code;
5. International Fire Code;
6. International Fuel Gas Code;
7. International Mechanical Code;
8. ICC Performance Code;
9. International Plumbing Code;
10. International Private Sewage Disposal Code;
11. International Residential Code;
12. International Urban-Wildland Interface Code; and
13. International Zoning Code.

All but three other states have adopted one or more of these model codes – most likely the International Building Code.

II. IPMC’s Provisions Related to Healthy Homes

EXTERMINATION. The control and elimination of insects, rats or other pests by eliminating their harborage places; by removing or making inaccessible materials that serve as their food; by poison spraying, fumigating, trapping or by any other approved pest elimination methods.

HABITABLE SPACE. Space in a structure for living, sleeping, eating or cooking. Bathrooms, toilet rooms, closets, halls, storage or utility spaces, and similar areas are not considered habitable spaces.

INFESTATION. The presence, within or contiguous to, a structure or premises of insects, rats, vermin or other pests.

302.1 Sanitation. All exterior property and premises shall be maintained in a clean, safe and sanitary condition. The occupant shall keep that part of the exterior property which such occupant occupies or controls in a clean and sanitary condition.

302.2 Grading and drainage. All premises shall be graded and maintained to prevent the erosion of soil and to prevent the accumulation of stagnant water thereon, or within any structure located thereon.

302.5 Rodent harborage. All structures and exterior property shall be kept free from rodent harborage and infestation. Where rodents are found, they shall be promptly exterminated by approved processes which will not be injurious to human health. After extermination, proper precautions shall be taken to eliminate rodent harborage and prevent reinfestation.

304.2 Protective treatment. All exterior surfaces, including but not limited to, doors, door and window frames, cornices, porches, trim, balconies, decks and fences shall be maintained in good condition. Exterior wood surfaces, other than decay-resistant woods, shall be protected from the elements and decay by painting or other protective covering or treatment. Peeling, flaking and chipped paint shall be eliminated and surfaces repainted. All siding and masonry joints as well as those between the building envelope and the perimeter of windows, doors, and skylights shall be maintained weather resistant and water tight. All metal surfaces subject to rust or corrosion shall be coated to inhibit such rust and corrosion and all surfaces with rust or corrosion shall be stabilized and coated to inhibit future rust and corrosion. Oxidation stains shall be removed from exterior surfaces. Surfaces designed for stabilization by oxidation are exempt from this requirement.

304.5 Foundation walls. All foundation walls shall be maintained plumb and free from open cracks and breaks and shall be kept in such condition so as to prevent the entry of rodents and other pests.

304.6 Exterior walls. All exterior walls shall be free from holes, breaks, and loose or rotting materials; and maintained weatherproof and properly surface coated where required to prevent deterioration.

304.7 Roofs and drainage. The roof and flashing shall be sound, tight and not have defects that admit rain. Roof drainage shall be adequate to prevent dampness or deterioration in the walls or interior portion of the structure. Roof drains, gutters and downspouts shall be maintained in good repair and free from obstructions. Roofwater shall not be discharged in a manner that creates a public nuisance.

304.14 Insect screens. During the period from [DATE] to [DATE], every door, window and other outside opening required for ventilation of habitable rooms, food preparation areas, food service areas or any areas where products to be included or utilized in food for human consumption are processed, manufactured, packaged or stored, shall be supplied with approved tightly fitting screens of not less than 16 mesh per inch (16 mesh per 25 mm) and every swinging door shall have a self-closing device in good working condition.

Exception: Screens shall not be required where other approved means, such as air curtains or insect repellent fans, are employed.

304.17 Guards for basement windows. Every basement window that is openable shall be supplied with rodent shields, storm windows or other approved protection against the entry of rodents.

305.1 General. The interior of a structure and equipment therein shall be maintained in good repair, structurally sound and in a sanitary condition. Occupants shall keep that part of the structure which they occupy or control in a clean and sanitary condition. Every owner of a structure containing a rooming house, housekeeping units, a hotel, a dormitory, two or more dwelling units or two or more nonresidential occupancies, shall maintain, in a clean and sanitary condition, the shared or public areas of the structure and exterior property.

305.3 Interior surfaces. All interior surfaces, including windows and doors, shall be maintained in good, clean and sanitary condition. Peeling, chipping, flaking or abraded paint shall be repaired, removed or covered. Cracked or loose plaster, decayed wood and other defective surface conditions shall be corrected.

307.1 Accumulation of rubbish or garbage. All exterior property and premises, and the interior of every structure, shall be free from any accumulation of rubbish or garbage.

308.1 Infestation. All structures shall be kept free from insect and rodent infestation. All structures in which insects or rodents are found shall be promptly exterminated by approved processes that will not be injurious to human health. After extermination, proper precautions shall be taken to prevent reinfestation.

308.2 Owner. The owner of any structure shall be responsible for extermination within the structure prior to renting or leasing the structure.

308.3 Single occupant. The occupant of a one-family dwelling or of a single-tenant nonresidential structure shall be responsible for extermination on the premises.

308.4 Multiple occupancy. The owner of a structure containing two or more dwelling units, a multiple occupancy, a rooming house or a nonresidential structure shall be responsible for extermination in the public or shared areas of the structure and exterior property. If infestation is caused by failure of an occupant to prevent such infestation in the area occupied, the occupant shall be responsible for extermination.

308.5 Occupant. The occupant of any structure shall be responsible for the continued rodent and pest-free condition of the structure.

Exception: Where the infestations are caused by defects in the structure, the owner shall be responsible for extermination.

403.1 Habitable spaces. Every habitable space shall have at least one openable window. The total openable area of the window in every room shall be equal to at least 45 percent of the minimum glazed area required in Section 402.1.

Exception: Where rooms and spaces without openings to the outdoors are ventilated through an adjoining room, the unobstructed opening to the adjoining room shall be at least 8 percent of the floor area of the interior room or space, but not less than 25 square feet (2.33m²). The ventilation openings to the outdoors shall be based on a total floor area being ventilated.

403.2 Bathrooms and toilet rooms. Every bathroom and toilet room shall comply with the ventilation requirements for habitable spaces as required by Section 403.1, except that a window shall not be required in such spaces equipped with a mechanical ventilation system. Air exhausted by a mechanical ventilation system from a bathroom or toilet room shall discharge to the outdoors and shall not be recirculated.

403.4 Process ventilation. Where injurious, toxic, irritating or noxious fumes, gases, dusts or mists are generated, a local exhaust ventilation system shall be provided to remove the contaminating agent at the source. Air shall be exhausted to the exterior and not be recirculated to any space.

403.5 Clothes dryer exhaust. Clothes dryer exhaust systems shall be independent of all other systems and shall be exhausted in accordance with the manufacturer's instructions.

503.4 Floor surface. In other than dwelling units, every toilet room floor shall be maintained to be a smooth, hard, nonabsorbent surface to permit such floor to be easily kept in a clean and sanitary condition.

505.4 Water heating facilities. Water heating facilities shall be properly installed, maintained and capable of providing an adequate amount of water to be drawn at every required sink, lavatory, bathtub, shower and laundry facility at a temperature of not less than 110°F (43°C). A gas-burning water heater shall not be located in any bathroom, toilet room, bedroom or other occupied room normally kept closed, unless adequate combustion air is provided. An approved combination temperature and pressure-relief valve and relief valve discharge pipe shall be properly installed and maintained on water heaters.

602.2 Residential occupancies. Dwellings shall be provided with heating facilities capable of maintaining a room temperature of 68°F (20°C) in all habitable rooms, bathrooms and toilet rooms based on the winter outdoor design temperature for the locality indicated in Appendix D of the *International Plumbing Code*. Cooking appliances shall not be used to provide space heating to meet the requirements of this section.

Exception: In areas where the average monthly temperature is above 30°F (-1°C), a minimum temperature of 65°F (18°C) shall be maintained.

602.3 Heat supply. Every owner and operator of any building who rents, leases or lets one or more dwelling unit, rooming unit, dormitory or guestroom on terms, either expressed or implied, to furnish heat to the occupants thereof shall supply heat during the period from [DATE] to [DATE] to maintain a temperature of not less than 68°F (20°C) in all habitable rooms, bathrooms, and toilet rooms.

Exceptions:

1. When the outdoor temperature is below the winter outdoor design temperature for the locality, maintenance of the minimum room temperature shall not be required provided that the heating system is operating at its full design capacity. The winter outdoor design temperature for the locality shall be as indicated in Appendix D of the *International Plumbing Code*.
2. In areas where the average monthly temperature is above 30°F (-1°C) a minimum temperature of 65°F (18°C) shall be maintained.

603.2 Removal of combustion products. All fuel-burning equipment and appliances shall be connected to an approved chimney or vent.

Exception: Fuel-burning equipment and appliances which are labeled for unvented operation.

603.5 Combustion air. A supply of air for complete combustion of the fuel and for ventilation of the space containing the fuel-burning equipment shall be provided for the fuel-burning equipment.

603.6 Energy conservation devices. Devices intended to reduce fuel consumption by attachment to a fuel-burning appliance, to the fuel supply line thereto, or to the vent outlet or vent piping therefrom, shall not be installed unless labeled for such purpose and the installation is specifically approved.

607.1 General. Duct systems shall be maintained free of obstructions and shall be capable of performing the required function.

C. APHA’s Basic Principles of Healthful Housing

I. Overview

In 1938, the American Public Health Association⁴ (APHA) formulated Basic Principles of Healthful Housing (Principles),⁵ to promote the “physical, mental and social health” essential in housing. For each of the 30 Principles, APHA also identified Specific Requirements, and the Methods of Attainment considered at that time to be the “more important means” by which to achieve the Principle’s objectives.

II. How The Principles Have Been Applied

The Principles continue to inform the dialogue about, and development of policies to promote, healthy housing. For example, U.S. federal agencies endorse the Principles in the *Healthy Housing Reference Manual (HH Manual)*.⁶ The CDC also modeled its original basic housing inspection manual after the Principles. In the U.K., the University of Warwick used the Principles as a foundational document in the development of the Health and Housing Rating System, the nation’s housing inspection system. The Principles comport with modern tenets of healthy housing, *i.e.*: keep housing dry, clean, ventilated, and pest free; avoid contaminants; and properly maintain housing.

III. APHA’s Principles

The 30 Principles fall into four categories:

- a. **Fundamental Physiological Needs** (e.g., for illumination, heat, cooling, space, chemical purity, quiet);
- b. **Fundamental Psychological Needs** (e.g., for privacy, adequate space, cleanliness, peace-of-mind, normal family and household activity);
- c. **Protection Against Contagion** (e.g., from disease, vermin, sewage, contaminated water, over-crowding, food decay); and
- d. **Protection Against Accidents** (e.g., from falls, fire, burns, gas, mechanical injuries, electrical shock, building collapse, traffic).

The Principles are summarized below, along with analysis excerpted from the *HH Manual*. The number of each Principle as identified in APHA’s 1938 report is indicated by “P#.”

⁴ www.apha.org.

⁵ APHA, Committee on the Hygiene of Housing, *Basic Principles of Healthful Housing*. (Preliminary Report, March 1938). www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1529239 or www.ajph.org/cgi/reprint/28/3/351

⁶ The manual is published by the U.S. Department of Health and Human Services and U.S. Department of Housing and Urban Development. www.cdc.gov/nceh/publications/books/housing/cha02.htm

Fundamental Physiological Needs (8 Principles⁷)

1. A thermal environment to *avoid undue* heat loss (P1) -- and *permit adequate* heat loss (P2).

The lack of adequate heating and cooling systems in homes can contribute to respiratory illnesses or even lead to death from extreme temperatures. . . . [A] majority of today's homes [can] maintain healthy temperatures, although many houses still lack adequate insulation.

2. An atmosphere of "reasonable chemical purity" (P3).
3. Provision of:
 - a. adequate *daylight* illumination and avoidance of undue daylight glare (P4);
 - b. direct sunlight (P5); and
 - c. adequate *artificial* illumination and avoidance of glare (P6).

Research has revealed a strong relationship between light and human physiology. . . . one of the physiologic responses . . . is the production of vitamin D. . . . It affects body rhythms and psychological health. . . . Adequate lighting is important . . . to see unsanitary conditions and to prevent injury . . . Improper indoor lighting can also contribute to eyestrain

4. Protection against excessive noise (P7).

Noise has physiologic impacts aside from the potential to reduce hearing ability. . . . elevated blood pressure; negative cardiovascular effects; increased breathing rates, digestion, and stomach disturbances; ulcers; negative effects on developing fetuses; difficulty sleeping after the noise stops; plus the intensification of the effects of drugs, alcohol, aging, and carbon monoxide. . . . [and cause other adverse effects].

5. Provision of adequate space for exercise and for the play of children (P8).

Healthful housing should include the provision of safe play and exercise areas. Many American neighborhoods are severely deficient, with no area for children to safely play. . . . [no] sidewalks or street lighting, nor are essential services available by foot

Fundamental Psychological Needs (7 Principles)

6. Provision of:
 - a. adequate privacy for the individual (P9);
 - b. opportunities for normal family life (P10) – and normal community life (P11);
 - c. facilities to make performing household tasks possible without undue physical and mental fatigue (P12);
 - d. facilities for "the maintenance of cleanliness of the dwelling and the person" (P13); and
 - e. "possibilities for reasonable esthetic satisfaction in the home and its surroundings" (P14).
7. "Concordance with prevailing social standards of the local community" (P15).

⁷ The *HH Manual* adds a new Principle #1, "protection from the elements"; and does not discuss APHA Principle #3, "reasonable chemical purity."

Privacy is a necessity to most people Ideally, everyone would have their own rooms excepting married couples and small children. . . . Bedrooms and bathrooms should be accessible directly from halls or living rooms crowding can lead to poor school performance in children.”

A wholesome atmosphere requires adequate living room space and adequate space for withdrawal. . . . This includes easy communication with centers of culture and business”

Protection Against Contagion (8 Principles)

8. Provision of:

- a. A safe and sanitary water supply (P16);
- b. protection of the water supply system against pollution (P17); and
- c. toilet facilities that minimize the danger of transmitting disease (P18).

[Approximately] 42 million Americans (mostly in rural America) get their water from private wells or other small, unregulated water systems. The presence of adequate water, sewer, and plumbing facilities is central to the prevention, reduction, and possible elimination of water-related diseases. . . . Water-related diseases can be organized into four categories:

- f* Waterborne diseases [*i.e.*, those caused by contamination from chemical, human, and animal wastes, such as cholera, typhoid, shigella, polio, meningitis, and hepatitis A and E].
- f* Water-based diseases [*i.e.*, from aquatic organisms that become parasites. These are rare in the U.S.]
- f* Water-related vector diseases [*i.e.*, those linked to vectors that breed and live in/near water; primarily mosquitoes that carry malaria, yellow fever, *etc.* The West Nile virus is a vectorborne disease. In the U.S. in 2003, there were 9,862 human cases of West Nile virus, with 264 deaths.]
- f* Water-scarce diseases [*i.e.*, diseases that flourish where sanitation is poor due to a scarcity of fresh water, including diphtheria, leprosy, tuberculosis. These conditions are essentially absent from the U.S.]

9. Protection against sewage contamination of interior surfaces (P19) – and avoidance of unsanitary conditions near the dwelling (P20).

In 2000 . . . 1.4% of U.S. homes lacked plumbing facilities. . . . The containment of household sewage is instrumental in protecting the public from waterborne and vectorborne diseases. . . .

Nationally, 74.8% of homes are served by a public sewer, with 24.1% served by a septic tank or cesspool, and the remaining 1.1% using other means.”

10. Exclusion of vermin which may play a part in the transmission of disease (P21).

Vermin, such as rodents, have long been linked to property destruction and disease. Integrated pest management, along with proper housing construction, has played a significant role in reducing vermin around the modern home. Proper food storage, rat-proofing construction, and ensuring good sanitation outside the home have served to eliminate or reduce rodent problems in the 21st century home.

11. Provision of facilities for keeping milk and food fresh (“undecomposed”)(P22).

Facilities to properly store milk and food [has] been instrumental in reducing . . . foodborne diseases

12. Provision of sufficient space in sleeping rooms to minimize the danger of infection (P23).

Much improvement has been made in the adequacy of living space for the U.S. family over the last 30 years. . . . Excessive crowding in homes has the potential to increase. . . communicable disease transmission [and] the stress level of occupants

Protection Against Accidents (7 Principles)⁸

13. Erection of the dwelling with materials and methods to minimize danger of accidents due to collapse of any part of the structure (P24).

14. Control of conditions likely to *cause* fires or promote their spread (P25).

Between 1992 and 2001, an average of 4,266 Americans died annually in fires and nearly 25,000 were injured. . . . The [US] has one of the highest fire death rates in the industrialized world, with 13.4 deaths per million people. At least 80% of all fire deaths occur in residences. . . . Apartment fires most often start in the kitchen

Cooking is the leading cause of home fires, usually a result of unattended cooking and human error rather than mechanical failure of the cooking units. The leading cause of fire deaths in homes is careless smoking, which can be significantly deterred by smoke alarms and smolder-resistant bedding and upholstered furniture. . . .

Manufactured homes can be susceptible to fires. More than one-fifth of residential fires in these facilities are related to the use of supplemental room heaters, such as wood- and coal-burning stoves, kerosene heaters, gas space-heaters, and electrical heaters. Most fires related to supplemental heating equipment “result from improper installation, maintenance, or use of the appliance.”

15. Provision of adequate facilities for *escape* in the case of fire (P26).

Three key elements can contribute to a safe exit from a home during the threat of fire. The first . . . is a working smoke alarm system. . . . By 1995, 93% of all single-family and multifamily homes, apartments, nursing homes, and dormitories were equipped with alarms. . . .

A second element . . . is a properly installed fire-suppression system. . . . Currently, few homes are protected by residential sprinkler systems. . . . Sprinkler systems can be installed for a reasonable price. These systems can be retrofitted to existing construction . . .

The final element in escaping from a residential fire is having a fire [escape] plan.”

⁸ The *HH Manual* does not discuss Principle # 24, dwelling construction, or # 30, traffic.

16. Protection against danger of electrical shocks and burns (P27).

Electrical distribution equipment was the third-leading cause of home fires and the second-leading cause of fire deaths in the [U.S.] between 1994 and 1998. . . . 38,300 home electrical fires occurred in 1998, which resulted in 284 deaths, [and] 1,184 injuries

Electrical fires are one of the leading types of home fires in manufactured homes. . . . [M]any electrical fires in homes are associated with improper installation of electrical devices by do-it-yourselfers.”

17. Protection against gas poisonings (P28).

In 2001 an estimated 130 deaths occurred as a result of CO poisoning from residential sources; this decrease in deaths [down from about 600 in 1998] is related to the increased use of CO detectors. In addition, approximately 10,000 cases of CO-related injuries occur each year.

18. Protection against falls and other mechanical injuries in the home (P29).

The leading causes of home injury deaths in 1998 were falls and poisonings, which accounted for 6,756 and 5,758 deaths, respectively. . . . Overall, falls were the leading cause of nonfatal, unintentional injuries occurring at home and accounted for 5.6 million injuries. . . . 48% of households have windows on the second floor or above, but only 25% have window locks or bars to prevent children from falling out. . . .

19. Protection of the neighborhood against automobile traffic hazards (P30).

D. Uniform Residential Landlord and Tenant Act

I. Overview

The Uniform Residential Landlord and Tenant Act (URLTA) was completed by the Uniform Law Commission (ULC) in 1972.⁹

The ULC Drafting Process

A “uniform” state law is one in which uniformity of the provisions of the act among the various jurisdictions is a principal and compelling objective. To draft an act, ULC appoints a drafting committee from among the ULC membership (attorneys from diverse practice areas). Each draft receives at least two years consideration. The drafting process draws on the expertise of state-appointed commissioners, legal experts, and advisors and observers representing the views of other legal organizations or interests that will be subject to the proposed laws.

Draft acts are submitted for initial debate of the entire ULC at an annual meeting. Each act must be considered section-by-section, at no less than two annual meetings, by all commissioners. Once approved, the final step is a vote by states. A majority of the states present, and no less than 20 states, must approve an act before it can be officially adopted.¹⁰

URLTA

URLTA establishes the landlord and tenant relationship on the basis of contract (rather than property law) and, thus, gives the parties contractual rights and remedies. As of 2012, URLTA has been adopted by 25 states¹¹:

Alabama	Iowa	Kansas	Ohio
Alaska	Kentucky		Oklahoma
Arizona	Mississippi		Oregon
Arkansas	Montana		Rhode Island
Connecticut	Nebraska		South Carolina
Delaware	New Mexico		Tennessee
Hawaii	North Carolina		Virginia
Indiana			Washington
			West Virginia

⁹ See National Conference of Commissioners on Uniform State Laws (NCCUSL) at www.nccusl.org/Update/. NCCUSL’s electronic archives is maintained by the University of Pennsylvania Law School at www.law.upenn.edu/bll/archives/ulc/ulc_final.htm#final.

¹⁰ See www.nccusl.org/Update/DesktopDefault.aspx?tabindex=5&tabid=61.

¹¹ See <http://www.ncsl.org/documents/Environ/STUniformLandlord-tenantActs.pdf>

II. URLTA's Property Maintenance Obligations

URLTA is intended to “encourage landlords and tenants to maintain and improve the quality of housing,” and clarify the “rights and obligations of landlords and tenants.” URLTA § 1.102.

Landlord Obligations

Generally, URLTA requires that a landlord:

- comply with applicable building and housing codes affecting health and safety;
- “make all repairs and do whatever is necessary to put and keep the premises in a fit and habitable condition”;
- keep all common areas in a clean and safe condition;
- maintain electrical, plumbing, sanitary, heating, ventilating, air-conditioning, and other facilities and appliances in “good and safe working order and condition”;
- provide and maintain appropriate receptacles for removal of garbage and other waste, and arrange for their removal; and
- supply running water and reasonable amounts of hot water at all times and reasonable heat (between October 1 and May 1), except where the law does not require the building be so equipped, or heat or hot water is generated by an installation controlled by the tenant.

Under certain circumstances, a landlord and tenant may agree to have the tenant perform repairs and maintenance. URLTA § 2.104.

URLTA prohibits rental agreements that allow landlords to receive rent free of the obligation to comply with the code's maintenance obligations. URLTA § 1.404; § 2.104(a).

Tenant Obligations

Also, URLTA requires that a tenant:

- comply with all obligations primarily imposed upon tenants by applicable building and housing codes;
- keep the tenant's premises “as clean and safe as the condition of the premises permit”;
- dispose of garbage, rubbish and other wastes from the dwelling unit “in a clean and safe manner”;
- keep plumbing fixtures in the tenant's dwelling unit “as clear as their condition permits”; and
- use “in a reasonable manner” all electrical, plumbing, sanitary, heating, ventilating, air-conditioning, and other facilities and appliances. URLTA § 3.101.

III. URLTA Provisions Related to Property Maintenance¹²

§ 1.102. [Purposes; Rules of Construction]

- (a) This Act shall be liberally construed and applied to promote its underlying purposes and policies.
- (b) Underlying purposes and policies of this Act are
 - (1) to simplify, clarify, modernize, and revise the law governing the rental of dwelling units and the rights and obligations of landlords and tenants;
 - (2) to encourage landlords and tenants to maintain and improve the quality of housing; and
 - (3) to make uniform the law with respect to the subject of this Act among those states which enact it.

§ 1.404. [Separation of Rents and Obligations to Maintain Property Forbidden]

A rental agreement, assignment, conveyance, trust deed, or security instrument may not permit the receipt of rent free of the obligation to comply with Section 2.104(a).

§ 2.104. [Landlord to Maintain Premises]

- (a) A landlord shall:
 - (1) Comply with the requirements of applicable building and housing codes materially affecting health and safety;
 - (2) Make all repairs and do whatever is necessary to put and keep the premises in a fit and habitable condition;
 - (3) Keep all common areas of the premises in a clean and safe condition;
 - (4) Maintain in good and safe working order and condition all electrical, plumbing, sanitary, heating, ventilating, air-conditioning, and other facilities and appliances, including elevators, supplied or required to be supplied by him;
 - (5) Provide and maintain appropriate receptacles and conveniences for the removal of ashes, garbage, rubbish, and other waste incidental to the occupancy of the dwelling unit and arrange for their removal; and
 - (6) Supply running water and reasonable amounts of hot water at all times and reasonable heat [between [October 1] and [May 1]] except where the building that includes the dwelling unit is not required by law to be equipped for that purpose, or the dwelling unit is so constructed that heat or hot water is generated by an installation within the exclusive control of the tenant and supplied by a direct public utility connection.
- (b) If the duty imposed by paragraph (1) of subsection (a) is greater than any duty imposed by any other paragraph of that subsection, the landlord's duty shall be determined by reference to paragraph (1) of subsection (a).
- (c) The landlord and tenant of a single family residence may agree in writing that the tenant perform the landlord's duties specified in paragraphs (5) and (6) of subsection (a) and also specified repairs, maintenance tasks, alterations, and remodeling, but only if the transaction is entered into in good faith.
- (d) The landlord and tenant of any dwelling unit other than a single family residence may agree that the tenant is to perform specified repairs, maintenance tasks, alterations, or remodeling only if

¹² See www.law.upenn.edu/bll/archives/ulc/fnact99/1970s/urlta72.htm or www.law.upenn.edu/bll/archives/ulc/ulc_final.htm#final.

- (1) The agreement of the parties is entered into in good faith and is set forth in a separate writing signed by the parties and supported by adequate consideration;
 - (2) The work is not necessary to cure noncompliance with subsection (a)(1) of this section; and
 - (3) The agreement does not diminish or affect the obligation of the landlord to other tenants in the premises.
- (e) The landlord may not treat performance of the separate agreement described in subsection (d) as a condition to any obligation or performance of any rental agreement.

§ 3.101. [Tenant to Maintain Dwelling Unit]

A tenant shall:

- (1) Comply with all obligations primarily imposed upon tenants by applicable provisions of building and housing codes materially affecting health and safety;
- (2) Keep that part of the premises that he occupies and uses as clean and safe as the condition of the premises permit;
- (3) Dispose from his dwelling unit all ashes, garbage, rubbish, and other waste in a clean and safe manner;
- (4) Keep all plumbing fixtures in the dwelling unit or used by the tenant as clear as their condition permits;
- (5) Use in a reasonable manner all electrical, plumbing, sanitary, heating, ventilating, air-conditioning, and other facilities and appliances including elevators in the premises;
- (6) Not deliberately or negligently destroy, deface, damage, impair, or remove any part of the premises or knowingly permit any person to do so; and
- (7) Conduct himself and require other persons on the premises with his consent to conduct themselves in a manner that will not disturb his neighbors' peaceful enjoyment of the premises.

E. Product Standards

I. Overview

The federal government is primarily responsible for setting standards for products in commerce that may impact health and safety. These standards reduce the dangers posed by these products by banning their use in housing, requiring safer designs, or specifying label requirements.

EPA regulates pesticides and does not allow them to be sold or used with prior approval. The Consumer Product Safety Commission (CPSC) regulates most other consumer products related to housing but requires only compliance with general requirements. In response to specific problems, CPSC adopts specific standards to address the problem such as banning lead containing paint. HUD sets standards for formaldehyde in wood in manufactured housing. The HUD label has been widely used as a voluntary standard beyond manufactured housing.

II. EPA Pesticide Registration

The U.S. Environmental Protection Agency sets product standards for pesticides.¹³ A pesticide is broadly defined as any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. Pests are living organisms that occur where they are not wanted or that cause damage to crops or humans or other animals. Therefore, a pesticide includes herbicides, insecticides, and fungicides. Products which contain certain low-risk ingredients, such as garlic and mint oil, have been exempted from Federal registration requirements, although State regulatory requirements may still apply.

No pesticide can be sold without first being registered by EPA pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). For a pesticide to be registered, EPA must affirmatively determine that the product does not pose an unreasonable risk to human health and the environment when used consistent with the label. The label becomes the law that must be followed when used the pesticide. Anyone, even a consumer, who does not follow the product label are violating the law.

Through the registration process, EPA can restrict the sale or use of a pesticide including its use in housing. It can require that only licensed pest control operators use the pesticides by classifying it as a “restricted use” pesticide. During the past few years, EPA has removed once common pesticides such as chlorpyrifos¹⁴ and diazinon¹⁵ from consumer use and restricted access to the products.

In May 2008, EPA took the unusual step of limiting the use and sale of rodenticides because of pervasive misuse.¹⁶ More than 3000 children required treatment for accidental exposure to a type of rodenticide that acts as an anticoagulant in mammals. These second generation anticoagulants kill rodents with just one feeding and persist in body tissues. EPA required that all rodenticide bait products be sold to consumers only in tamper resistant bait stations. Loose bait such as pellets would be prohibited.

¹³ See www.epa.gov/pesticides.

¹⁴ See www.epa.gov/pesticides/reregistration/REDS/factsheets/chlorpyrifos_fs.htm

¹⁵ See www.epa.gov/pesticides/reregistration/diazinon/

¹⁶ See www.epa.gov/opp00001/reregistration/rodenticides/

See www.epa.gov/pesticides for more information.

III. CPSC Hazardous Substances Laws

The Consumer Product Safety Commission sets product standards pursuant to the Consumer Product Safety Act and the Federal Hazardous Substance Act.¹⁷ The CPSC has adopted mandatory products standards for the following items related to housing, furniture, and appliances:

- [Safety standard for walk-behind power lawn mowers](#): 16 CFR Part 1205
- [Safety standard for swimming pool slides](#): 16 CFR Part 1207
- [Safety standard for automatic residential garage door operators](#): 16 CFR Part 1211
- [Safety standard for entrapment hazards in bunk beds](#): 16 CFR Part 1213
- [Ban of unstable refuse bins](#): 16 CFR Part 1301
- [Ban of extremely flammable contact adhesives](#): 16 CFR Part 1302
- [Ban of lead-containing paint and certain consumer products bearing lead-containing paint](#): 16 CFR Part 1303
- [Ban of consumer patching compounds containing respirable free-form asbestos](#): 16 CFR Part 1304
- [Ban of artificial emberizing materials \(ash and embers\) containing respirable free-form asbestos](#): 16 CFR Part 1305
- [Self pressurized consumer products containing chlorofluorocarbons](#): 16 CFR Part 1401
- [CB base station antennas, TV antennas, and supporting structures](#): 16 CFR Part 1402
- [Cellulose insulation](#): 16 CFR Part 1404
- [Coal and wood burning appliances--notification of performance and technical data](#): 16 CFR Part 1406
- [Requirements for full-size baby cribs](#): 16 CFR Part 1508
- [Requirements for non-full-size baby cribs](#): 16 CFR Part 1509
- [Requirements for bunk beds](#): 16 CFR Part 1513
- [Standard for the flammability of vinyl plastic film](#) 16 CFR Part 1611
- [Standard for the surface flammability of carpets and rugs \(FF 1-70\)](#) 16 CFR Part 1631
- [Standard for the surface flammability of small carpets and rugs \(FF 2-70\)](#) 16 CFR Part 1631
- [Standard for the flammability of mattresses and mattress pads \(FF 4-72, amended\)](#) 16 CFR Part 1632
- [Standard for the flammability \(open flame\) of mattress sets \(Eff. 7-1-07\)](#) 16 CFR Part 1633
- [Standard for devices to permit the opening of household refrigerator doors from the inside](#) 16 CFR Part 1750

For a complete list sorted by product, go to www.cpsc.gov/businfo/reg1.html.

It also requires labeling of products and bans products containing hazardous substances if they could injure a child.

See www.cpsc.gov for more information.

¹⁷ See www.cpsc.gov.

F. Hazard Management Laws

The U.S. Environmental Protection Agency (EPA) has promulgated regulations to govern asbestos, lead-based paint (LBP), and pesticide use (as well as manufacture and sale). EPA also possesses, but has not exercised, rulemaking authority for radon.

I. **Asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP)**¹⁸

The asbestos NESHAP¹⁹ applies to residential buildings with more than four dwelling units (and to other buildings), and imposes requirements for handling Regulated Asbestos-Containing Material (RACM) during demolition and renovation projects. RACM includes *friable* asbestos material; and *non-friable* material that has, or likely will become, friable (*e.g.*, will be subject to sanding or grinding, or likely will be crumbled or pulverized).

The NESHAP requires that:

- Prior to demolition or renovation, a certified inspector must inspect all affected areas; and EPA must be notified ten (10) days prior to the start of work for:
 - any “demolition” (*i.e.*, removal of load bearing member or structure), *even if asbestos may not be present*, and
 - any “renovation” that involves removal or disturbance of >260 linear feet or 160 ft² of RACM.
- Certified workers remove all RACM, a certified supervisor be present, and required work practices be followed (*e.g.*, wet methods, and no visible emissions).
- The collection, transport, and disposal of waste comport with regulatory requirements.

II. **Lead-based Paint (LBP)**

The federal government has several legal authorities pertaining to LBP and LBP hazards:

- The Disclosure Rule^{20,21};
- The Lead Safe Housing Rule (LSH Rule)²²;
- The Toxic Substances Control Act (TSCA), and regulations thereunder:
 - The Pre-renovation Education Rule (PRE Rule);
 - The Renovation, Repair and Painting Rule (RRP Rule) (issued by EPA on April 22, 2008 and fully effective on April 22, 2010); and
 - The Lead-based Paint Activities, Certification and Training Rule (LBP Activities Rule);²³ and
- The Resource Conservation and Recovery Act (RCRA) Section 7003.²⁴

¹⁸ NESHAP Fact Sheet for Renovation and Demolition Projects.

<http://yosemite.epa.gov/R10/OWCM.NSF/webpage/Asbestos+in+Demolition+and+Renovation>.

¹⁹ 40 C.F.R. Part 61, Subpart M.

²⁰ 24 C.F.R. Part 35, Subpart A (HUD) and 40 C.F.R. Part 745, Subpart F (EPA).

²¹ 42 U.S.C. §§ 4851-4853a (known also as the Residential Lead-based Paint Hazard Reduction Act of 1992).

²² 24 C.F.R. Part 35, Subparts B-R. The U.S. Department of Housing and Urban Development (HUD) administers and enforces the LSH Rule.

²³ 15 U.S.C. §§ 2601-2692; 40 C.F.R. Part 745, Subparts E and L.

²⁴ 42 U.S.C. § 6973.

Generally, these laws establish disclosure obligations, and performance standards for activities that disturb LBP – but do *not* impose an affirmative obligation to perform LBP risk reduction work and do *not* empower federal authorities to demand such work. There are two exceptions:

- The LSH Rule applies to federally owned or assisted pre-1978 housing (approximately 3 percent of pre-1978 housing). The rule requires disclosure, and various evaluation and risk reduction measures based upon the classification of the housing, as determined by the level of federal assistance, age of housing, ownership, and other factors.
- RCRA Section 7003 empowers EPA to order a responsible person to take action “as may be necessary” to protect human health and the environment when a “solid waste,” including a LBP hazard, presents an “imminent and substantial endangerment.”

See Part G for more information on EPA’s Renovation, Repair and Painting Rule.

III. Pesticide Use

Integrated Pest Management (IPM)²⁵

EPA promotes the use of IPM in residential settings, through outreach and education, and its Pesticide Environmental Stewardship Program (PESP).²⁶

IPM is a *series* of pest management evaluations, decisions and controls, generally using a four-tiered approach in the following sequence:

- Set Action Thresholds, *i.e.*, decide the point at which pest populations or environmental conditions indicate that pest control action is required;
- Monitor and Identify Pests, *i.e.*, ensure that pesticides are really needed, and that the correct pesticide will be used;
- Prevention, *i.e.*, manage the indoor space to prevent pests from becoming a threat; and
- Control, *i.e.*, use less risky pest controls first (*e.g.*, highly targeted chemicals, such as pheromones) or mechanical control (*e.g.*, trapping); use additional methods if necessary (*e.g.*, targeted spraying); use broadcast spraying of non-specific pesticides as a last resort.

Pesticide Labeling²⁷

Pesticide labels constitute the law concerning the proper use of a pesticide. Failure to use a pesticide by a professional or by a consumer in accordance with the label requirements and prohibitions is a violation of the law and may be grounds for an enforcement action. To promote proper pesticide use by consumers, EPA employs outreach and education, and voluntary programs.²⁸

The “Directions for Use” section of a label reflects EPA’s “determination that the use of the product in such a manner does not cause unreasonable adverse effects on the environment.” (Other sections explain the ingredients, effects, and other facts.) Generally, the Directions for Use section states the:

- Pest(s) the product may be used to control,
- Sites where the product may be used;

²⁵ *Integrated Pest Management (IPM) Principles*. www.epa.gov/pesticides/factsheets/ipm.htm

²⁶ See www.epa.gov/pesp.

²⁷ See *Label Review Manual*, Directions for Use. www.epa.gov/oppfead1/labeling/lrm/chap-11.htm

²⁸ See *e.g.*, *Read the Label First* and *Consumer Labeling Initiative*. www.epa.gov/pesticides/label/index.html.

- Required or preferred application methods, and prohibited methods;
- Proper application of the pesticide and the rate of application;
- Restrictions on use for factors such as weather, season, contamination of sensitive areas;
- Limits on how often the pesticide should or may be applied;
- Maximum applicable rates; and
- Any other requirements as necessary

IV. **Radon**²⁹

The 1988 Indoor Radon Abatement Act (IRAA)³⁰ established the national goal that air within buildings in the U.S. “should be as free of radon as the ambient air outside.” IRAA does not explicitly *require* EPA to promulgate regulations, but Section 310 *authorizes* EPA to issue “regulations as may be necessary” to carry out the statute. IRAA also authorizes EPA to provide grants to states to support testing and reducing radon in homes.

EPA relies on voluntary programs to promote radon awareness, testing, and reduction. The program sets an “Action Level” of 4 picocuries per liter (pCi/l) of air for indoor radon. This level “is *not* the maximum safe level for radon in the home” but, rather, is the point at which EPA has deemed the cost to the homeowner to fix the problem is warranted by the risk. EPA works with homeowners, home builders, building code organizations, and others to promote awareness, make new homes more radon resistant, and encourage radon testing when existing homes are sold.

In June 2008, EPA’s Inspector General (IG) announced that radon exposure has increased since 1988, and that EPA’s voluntary program has not achieved the IRAA’s national goal.³¹ The IG recommended that EPA:

- “Develop a strategy” for achieving IRAA’s goal using the rulemaking authority of section 310 – or “explain its alternative strategy”;
- “Identify limitations” in its statutory authority, and report these to Congress;
- Provide “metrics that will better measure the magnitude of the potential radon problem in relation to the number of homes at risk”; and
- Revise how EPA reports Indoor Radon Program results in its accountability reports.

²⁹ Source: www.epa.gov/radiation/radionuclides/radon.html#epadoing

³⁰ Title III of the Toxic Substances Control Act, 15 U.S.C. §§ 2661-2671.

³¹ EPA Office of the Inspector General, *More Action Needed to Protect Public from Indoor Radon Risks*. www.epa.gov/oig/

G. EPA's New Renovation, Repair, and Painting Rule

When is Compliance with the EPA Renovation, Repair, and Painting Rule Required?

Scope of Rule: Renovation, repair, and painting activities on *target housing* or any *child-occupied facility* built before 1978 performed for compensation after April 22, 2010. *Renovation* is any modification of any existing structure or portion of an existing structure that results in disturbance of painted surfaces.

- Target Housing:** Housing constructed prior to 1978, except:
 - Housing for the elderly or persons with disabilities (unless one or more children less than six years of age resides, spends significant amount of time, or is expected to reside in such housing for the elderly or persons with disabilities); or
 - Any zero-bedroom dwelling.

- Child-Occupied Facility:** Building, or portion of a building, constructed prior to 1978, visited regularly by the same child, under six years of age, on at least two different days within any week (Sunday through Saturday period), provided that each day's visit lasts at least three hours and the combined weekly visits last at least six hours; and that the combined annual visits last at least 60 hours. It also encompasses:
 - Only those common areas that are routinely used by children under age 6, such as restrooms and cafeterias, not simply passed through.
 - Exteriors sides of the building immediately adjacent to the child-occupied facility or the common areas routinely used by children under age six.

Activities that are exempt from compliance with the requirements:

- Abatement:** Activities conducted under abatement rules by certified abatement contractor. Abatement involves work where the *primary intent* of the job is to remove lead hazards.

- Minor Repair or Maintenance Activities:** Activities that will disturb less than the following square feet of paint surfaces in 30 calendar days (counting all paint on a removed component):
 - 6 square feet per room for interior activities; or
 - 20 square feet for exterior activities.However, this exemption does *not* apply to the following:
 - Window replacement.
 - Demolition of painted surface areas.
 - Using any of the following:
 - Open-flame burning or torching;
 - Machines to remove paint through high-speed operation without HEPA exhaust control; or
 - Operating a heat gun at temperatures at or above 1100 degrees Fahrenheit.

- No Lead-Based Paint Will Be Disturbed:** If one of the following methods is used to determine that the paint on the component to be disturbed was not lead-based paint:
 - Written determination by certified lead inspector or risk assessor; or
 - Paint chip sampling by a certified renovator (unless specifically excluded by State regulation); or
 - Proper use of EPA-recognized test kit by certified renovator (unless specifically excluded by State regulation). There are currently three test kits approved by the EPA for use (one of which is only permitted for use in Massachusetts).

G. EPA's New Renovation, Repair, and Painting Rule

Note that when either of the last two methods is utilized, the person contracting for renovation and tenant, when applicable, must be informed of the following by certified renovator within 30 days after renovation complete, or delivery of invoice. This information must be provided to both parties free of charge.

- Manufacturer and model of test kit
- Description of component tested, including location
- Results of testing
- Laboratory where samples were sent for analysis (paint chip sampling only)
- Dimensions of sample area (paint chip sampling only)

- Do-It-Yourself:** Work performed by owners themselves in dwellings in which they personally reside.

EPA's RRP RULE DOES NOT PREEMPT OTHER RULES INCLUDING HUD, STATE, AND LOCAL REQUIREMENTS

- Twelve states have been authorized to administer and enforce the provisions of the RRP rule.** The authorized states are Alabama, Georgia, Iowa, Kansas, Massachusetts, Mississippi, North Carolina, Oregon, Rhode Island, Utah, Washington, and Wisconsin. These states may have additional restrictions and requirements under their own RRP Legislation. For more information visit the following websites:
- Alabama: www.adph.org/lead/
 - Georgia: www.gaepd.org/Documents/lpb_leadpaint.html#lbprtq
 - Iowa: <http://idph.iowa.gov/lpp>
 - Kansas: www.kshealthyhomes.org/lead_regulations.htm
 - Massachusetts: www.mass.gov/lwd/labor-standards/lead-program/
 - Mississippi: www.deq.state.ms.us/MDEQ.nsf/page/Air_Lead-BasedPaint
 - North Carolina: <http://epi.publichealth.nc.gov/lead/lhmp.html>
 - Oregon: public.health.oregon.gov/Pages/Home.aspx
 - Rhode Island: www.health.ri.gov/healthrisks/poisoning/lead/index.php
 - Utah: www.airquality.utah.gov/HAPs/lead/index.htm
 - Washington: <http://www.commerce.wa.gov/>
 - Wisconsin: www.dhs.wisconsin.gov/lead/
- A few states have laws pre-dating the RRP Rule and therefore have additional training requirements.** These states include New Jersey, Illinois, Ohio, and California.
- The RRP Rule requires certain documentation to be completed, filed, and in some cases presented to the client.** The following documents must be kept for three years after the completion of the job:
- Proof of pre-renovation education
 - Non-certified renovator training and skills reviewed
 - EPA test kit and/or paint chip sampling documentation
 - Post renovation report

G. EPA's New Renovation, Repair, and Painting Rule

- Certificates for both the renovator assigned to the job and the commissioned firm (which must be kept at the work site during renovation activities)

Limits on Scope of Rule:

- Emergency Renovations Not Due to Elevated Blood Level:** Exempt from information distribution, warning signs, containment, waste handling, training, and certification requirements to extent necessary to respond to emergency. However, cleaning requirements, cleaning verification, and recordkeeping are still required. The nature of the emergency must be documented in the post renovation report. An emergency renovation is one that:
 - Is a sudden, unexpected event, and, +
 - If not immediately attended to:
 - Presents a safety or public health hazard; or
 - Threatens equipment and/or property with significant damage.

- Emergency Renovations in Response to Elevated Blood Lead in Resident Child:** Interim controls are exempt from advance information distribution requirements.

Milestones in EPA's Renovation, Repair, and Painting Rule

Deadlines	Training Firms	Renovation Firms	Certified Renovators (Individuals)	<i>Renovate Right</i> pamphlet	EPA-Recognized Test Kits
6/21/2008			Stop claims of training for EPA certification as renovator or dust sampling technician without accreditation.		EPA recognizes negative tests.
12/22/2008				New <i>Renovate Right</i> pamphlet must be used.	
4/22/2009	May apply for EPA accreditation.				
10/22/2009		May apply for EPA certification.			
4/22/2010	Compliance with Work Practices Required; training and certification not required.				
7/6/2010			Opt-out rule removed for all non-authorized states and those authorized states that adopt the rule by reference.		
10/4/2011	Changes in training requirements listed.		Paint chip sampling permitted for Certified Renovator; requirements for vertical containment listed.	Page 10 of pamphlet changed, explaining option for dust clearance testing.	
Possible Future Revisions			RRP for commercial units.		

G. EPA's New Renovation, Repair, and Painting Rule

Advance Information Distribution Requirements

40 CFR 745.84

	Inside Dwelling Units in Target Housing	In Common Areas of Multi-Unit Target Housing	In Child-Occupied Facilities (including in target housing)
When to Notify?	No more than 60 days before beginning work (7 days if mailing).		
What to Deliver?	EPA Pamphlet ¹	Either: 1. Written notice to each affected unit; ⁴ or 2. Post informational signs ⁶ and EPA Pamphlet. ^{1,5}	EPA Pamphlet ¹
Documentation of Delivery to Owner	Owner's signature on acknowledgment ² or certificate of mailing.		
Documentation of Delivery to Adult Occupant	Same as above (for owner) or certify in writing that attempt made but was unsuccessful. ³	<i>See Additional Documentation Below.</i>	If facility is not owner, then same as above or certify in writing that attempt made but was unsuccessful. ³
Notice to Parents or Guardians	<i>No additional notice required.</i>	<i>No additional notice required.</i>	Provide EPA pamphlet and renovation information to parents and guardians by either: 1. Mail; 2. Hand delivery; or 3. Post informational signs ⁶ and EPA Pamphlet. ^{1,5}
Notice of Changes to Scope, Locations and Dates of Work	<i>None Required</i>	If notice given to each affected unit, update notice before initiating work.	<i>None required</i>
Additional Documentation	<i>None Required</i>	Signed and dated statement of steps performed to notify all occupants and provide them with EPA pamphlet.	Signed and dated statement of steps performed to notify parents and guardians and provide them with EPA pamphlet.
Post-Renovation 30-Day Notice to Person Contracting for Renovation.	<input type="checkbox"/> If EPA-recognized test kits were used, provide manufacturer and model of test kit used, description and location of components tested, and test kit results. <input type="checkbox"/> If dust clearance sampling is performed in lieu of cleaning verification, provide copy of the dust sampling report.		

¹ EPA's new *Renovate Right: Important Lead Hazard Information for Families, Child Care Providers, and Schools*. The existing *Protect Your Family from Lead in Your Home* pamphlet may be used before 12/22/2008.

² Must acknowledge receipt of the EPA pamphlet prior to start of renovation and contain the address of unit undergoing renovation, name and signature of owner or occupant, and the date of signature. It must be in same language as contract for renovation for owner and for lease for occupant of non-owner occupied target housing.

³ Certification requires address of unit, date and method of delivery, names of person making delivery, reason for acknowledgement, signature of certified renovator; and date of signature.

⁴ Notice must describe the general nature and locations of the planned renovation activities, the expected starting and completion dates, and a statement of how occupant can get pamphlet at no charge from renovation firm.

⁵ If pamphlet is not posted, then provide information on how interested occupants can review a copy of the pamphlet or obtain a copy from renovation firm at no cost.

⁶ Signs must describe general nature and locations of the renovation and the anticipated completion date.

G. EPA's New Renovation, Repair, and Painting Rule

Required Work Practices for Renovations 40 CFR 745.85

	Interior Renovations	Exterior Renovations
Information Distribution 40 CFR 745.84	<i>See Previous Table</i>	
Work Area Identification	Physical area that the Certified Renovator establishes to contain the dust and debris generated by renovation.	
Occupant Protection		
<input type="checkbox"/> Where to post signs?	Entrance way to the room(s) where renovation is occurring.	Perimeter of work area.
<input type="checkbox"/> What to say on signs?	Warn occupants and others not involved in renovation to remain outside the work area. OSHA Lead Warning Sign is acceptable.	
<input type="checkbox"/> What language?	Primary language of occupants to extent practicable.	
<input type="checkbox"/> When to post signs?	Before beginning renovation until after post-renovation cleaning verification is completed or results from clearance testing have been received..	
Containing the Work Area		
<input type="checkbox"/> Isolate work area.	Take steps necessary to ensure no dust or debris leaves work area while renovation is under way.	
<input type="checkbox"/> Maintain integrity of containment.	Ensure plastic and other impermeable materials are not torn or displaced.	
<input type="checkbox"/> Emergency exit	Ensure containment installed so that it does not interfere with occupant and worker egress in an emergency.	
Preparing the Work Area		
<input type="checkbox"/> Objects in Work Area	Remove or cover with impermeable material with all seams and edges sealed.	<i>Not Required</i>
<input type="checkbox"/> Ducts Opening in Work Area	Close and cover all ducts with impermeable material.	<i>Not Required</i>
<input type="checkbox"/> Windows and Doors in Work Area	Close windows and doors. Cover doors with impermeable material.	Close doors and windows within 20', and, on multi-story buildings, all below renovation.
<input type="checkbox"/> Access Doors	If door is used while job is being performed, allow workers to pass through while confining dust and debris to work area.	
<input type="checkbox"/> Floors / Ground	Cover with taped-down impermeable material 6' beyond the perimeter of surfaces undergoing renovation or a sufficient distance to contain the dust, whichever is greater.	Cover with disposable impermeable material extending 10' beyond perimeter of surfaces undergoing renovation or a sufficient distance to collect falling paint debris, whichever is greater, unless the property line prevents 10' of such ground covering.
<input type="checkbox"/> Vertical Containment	May be used to decrease the distance of horizontal containment.	Required whenever renovation activities are within 10' of neighboring property line.
<input type="checkbox"/> Tools	Ensure all personnel, tools, waste containers, and other items are free of dust and debris before leaving the work area.	
Prohibited and Restricted Work Practices	The following must not be used in the work area: <input type="checkbox"/> Open-flame burning or torching; <input type="checkbox"/> Machines to remove paint through high-speed operation without HEPA exhaust control; or <input type="checkbox"/> Operating a heat gun at temperatures at or above 1100 degrees Fahrenheit.	
Waste from Renovations		
<input type="checkbox"/> During Work	Contain waste to prevent release of dust and debris before the waste is removed from the work area for storage or disposal. If a chute is used to remove waste from work area, it must be covered.	
<input type="checkbox"/> End of Day and End of Work	Collected waste must be stored under containment, in an enclosure, or behind a barrier that prevents release of dust and debris out of work area and prevents access to dust and debris.	
<input type="checkbox"/> Transporting Waste	Contain waste to prevent release of dust and debris.	

G. EPA’s New Renovation, Repair, and Painting Rule

Required Work Practices for Renovations

40 CFR 745.85

	Interior Renovations	Exterior Renovations
Cleaning the Work Area		
<input type="checkbox"/> Paint Chips and Debris	Collect and, without dispersing any of it, seal this material in a heavy-duty bag.	
<input type="checkbox"/> Plastic Sheeting	Leave sheeting to isolate contaminated rooms in place under after cleaning and removal of other sheeting. Mist protective sheeting before folding it. Fold the dirty side inward. Tape shut to seal or seal in heavy-duty bags.	
<input type="checkbox"/> General	Clean all objects and surfaces in work area and 2’ outside work area cleaning from higher to lower	
<input type="checkbox"/> Walls	Use HEPA vacuum ¹ or wipe with a damp cloth	
<input type="checkbox"/> Carpets and Rugs	Thoroughly vacuum with a HEPA vacuum ¹ equipped with a beater bar.	
<input type="checkbox"/> Remaining Surfaces	Thoroughly vacuum remaining surfaces and objects with a HEPA vacuum. ¹	
<input type="checkbox"/> Final Cleaning – Other Than Floors	Wipe remaining surfaces and objects, except for carpeted or upholstered surfaces, with a damp cloth.	
<input type="checkbox"/> Final Cleaning – Uncarpeted Floors	Mop floors thoroughly using a mopping method that keeps wash water separate from the rinse water or using a wet mopping system. ²	
Post Cleaning Verification	<i>See Next Table</i>	
<p>¹“HEPA vacuum” is a vacuum cleaner designed with a high-efficiency particulate (HEPA) filter as the last filtration stage. A HEPA filter is capable of capturing particles of 0.3 microns with 99.97% efficiency. The vacuum cleaner must be designed so that all the air drawn into the machine is expelled through the HEPA filter with none of the air leaking past it.</p> <p>²“Wet mopping system” means a device with the following: a long-handle, a mop head designed to be used with disposable absorbent cleaning pads, a reservoir for cleaning solution, and a built-in mechanism for distributing or spraying the cleaning solution onto a floor, or a method of equivalent efficacy.</p>		

G. EPA's New Renovation, Repair, and Painting Rule

Post-Renovation Cleaning Verification 40 CFR 745.85(b)

Activities	Windowsills	Uncarpeted Floors and Countertops in Work Area
Dust clearance testing is an option if contract or other rules require it.	<i>Optional.</i>	
Certified Renovator must personally perform all cleaning verification except recleaning. ¹	Required.	
Step 1: Visually inspect work area for dust, debris, and residue.		
Step 2: If failed visual, have it recleaned. ¹		
Step 3: Wipe with wet disposable cleaning cloth. ²	Required. Cloth must be damp to touch. One cloth per window sill.	Required. Cloth must be damp when used. One cloth per 40 square feet.
Step 4: Compare to cleaning verification card. ³ Passes if lighter than card.	Required.	
Step 5: If failed, have it recleaned. ¹	Required if failed first wipe.	
Step 6: Wipe surface again with new wet disposable cleaning cloth. ²	Required if failed first wipe. Can use clean surface of used wipe.	Required if failed first wipe.
Step 7: Compare to card. Passes if lighter than card.	Required if failed first wipe.	
Step 8: If failed, wait one hour or until dried completely whichever is longer.	Required if failed second wipe.	
Step 9: Wipe with dry, disposable cleaning cloth. ⁴	Required if failed second wipe. Passes even if darker than card.	
Notice to owner or occupant.	Results must be recorded in post renovation report.	
¹ <i>Recleaning</i> means: <ol style="list-style-type: none"> a. Thoroughly vacuum surfaces and objects in the work area with a HEPA vacuum. HEPA vacuum must have a beater bar when vacuuming carpets and rugs. b. Wipe all remaining surfaces and objects in the work area, except for carpeted or upholstered surfaces, with a damp cloth. c. Mop uncarpeted floors thoroughly using a mopping method that keeps wash water separate from the rinse water or using a wet mopping system (using disposable absorbent cleaning pads). ² <i>Wet disposable cleaning cloth</i> means a commercially available, premoistened, white disposable cloth designed to be used for cleaning hard surfaces. ³ <i>Cleaning verification card</i> means a card developed and distributed or otherwise approved by EPA for the purposes of determining whether post-renovation cleaning has been properly completed. ⁴ <i>Dry disposable cleaning cloth</i> means a commercially-available, dry, electrostatically-charged, white disposable cloth designed to be used for cleaning hard surfaces.		

G. EPA's New Renovation, Repair, and Painting Rule

Recordkeeping and Reporting Requirements

(40 CFR 745.86)

Firms performing renovations must retain and, if requested, make available to EPA all records necessary to demonstrate compliance with this subpart for a period of three years following completion of the renovation. This three-year retention requirement does not supersede longer obligations required by other provisions for retaining the same documentation, including any applicable State or Tribal laws or regulations.

Records that must be retained shall include (where applicable):

1. **Exemptions:**

- a. Reports certifying that a determination had been made by a lead inspector or risk assessor that lead-based paint is not present on the components affected by the renovation, as described in § 745.82(b)(1).
- b. Any signed and dated statements received from owner-occupants documenting that the requirements of § 745.85 do not apply. These statements must include a declaration that the renovation will occur in the owner's residence, a declaration that no children under age six reside there, a declaration that no pregnant woman resides there, a declaration that the housing is not a child-occupied facility, the address of the unit undergoing renovation, the owner's name, an acknowledgment by the owner that the work practices to be used during the renovation will not necessarily include all of the lead-safe work practices contained in EPA's Renovation, Repair, and Painting rule, the signature of the owner, and the date of signature. These statements must be written in the same language as the text of the renovation contract, if any. (This applies to work performed between 4/22/2010 and 7/6/2010 only).

2. **Information Distribution:**

- a. Signed and dated acknowledgments of receipt as described in § 745.84(a)(1)(i), (a)(2)(i), (b)(1)(i), (c)(1)(i)(A), and (c)(1)(ii)(A);
- b. Certifications of attempted delivery as described in § 745.84(a)(2)(i) and (c)(1)(ii)(A);
- c. Certificates of mailing as described in § 745.84(a)(1)(ii), (a)(2)(ii), (b)(1)(ii), (c)(1)(i)(B), and (c)(1)(ii)(B); and
- d. Records of notification activities performed regarding common area renovations, as described in § 745.84(b)(3) and (4), and renovations child-occupied facilities, as described in § 745.84(c)(2).

3. **Certified Renovator:** Documentation of compliance with the requirements of § 745.85, including documentation that certified renovator:

- a. Was assigned to the project;
- b. Provided on-the-job training for workers used on the project;
- c. Performed or directed workers who performed all of the tasks described in § 745.85(a);
- d. Performed the post-renovation cleaning verification described in § 745.85(b); and
- e. Carries or has on premises the certified renovator's training certificate.

4. **Work Practices:** Certification by the certified renovator assigned to the project that:

- a. Training was provided to workers (topics must be identified for each worker);
- b. Warning signs were posted at the entrances to the work area;

G. EPA's New Renovation, Repair, and Painting Rule

- c. If test kits were used, that the specified brand of kits was used at the specified locations and that the results were as specified;
 - d. If paint chip samples were collected, the samples were sent to a NLLAP-accredited laboratory, and that the name of laboratory and specified locations/dimensions of samples and results were as recorded;
 - e. The work area was contained by:
 - 1. Removing or covering all objects in the work area (interiors);
 - 2. Closing and covering all HVAC ducts in the work area (interiors).
 - 3. Closing all windows in the work area (interiors) or closing all windows in and within 20 feet of the work area (exteriors).
 - 4. Closing and sealing all doors in the work area (interiors) or closing and sealing all doors in and within 20 feet of the work area (exteriors).
 - 5. Covering doors in the work area that were being used to allow passage but prevent spread of dust.
 - 6. Covering the floor surface, including installed carpet, with taped-down plastic sheeting or other impermeable material in the work area six feet beyond the perimeter of surfaces undergoing renovation or a sufficient distance to contain the dust, whichever is greater (interiors); or covering the ground with plastic sheeting or other disposable impermeable material anchored to the building extending 10 feet beyond the perimeter of surfaces undergoing renovation or a sufficient distance to collect falling paint debris, whichever is greater, unless the property line prevents 10 feet of such ground covering, weighted by heavy objects (exteriors).
 - 7. Installing vertical containment if renovation work is performed within 10' of neighboring property line, or if work area is less than required amount.
 - f. Waste was contained onsite and while being transported offsite.
 - g. The work area was properly cleaned after the renovation by:
 - 1. Picking up all chips and debris, misting protective sheeting, folding it dirty side inward, and taping it for removal.
 - 2. Cleaning the work area surfaces and objects using a HEPA vacuum and/or wet cloths or mops (interiors).
 - h. The certified renovator performed the post-renovation cleaning verification (the results of which must be briefly described, including the number of wet and dry cloths used).
5. **Emergency Renovations:** If the renovation firm was unable to comply with all of the requirements of this rule due to an emergency as defined in § 745.82, the firm must document the nature of the emergency and the provisions of the rule that were *not* followed.



**U.S. Department of Housing and Urban Development
Office of Public and Indian Housing**

SPECIAL ATTENTION OF:

Regional Directors; State and Area
Coordinators; Public Housing Hub
Directors; Program Center Coordinators;
Troubled Agency Recovery Center Directors;
Special Applications Center Director;
Administrators; Offices of Native American
Programs; Public Housing Agencies; Public
Housing; Housing Choice Voucher/Section 8;
Tribally Designated Housing Entities;
Indian Tribes; Resident Management
Corporations

NOTICE: PIH-2011-22

Issued: April 26, 2011

Cross Reference:

24 CFR 903.7(e) (2)

24 CFR 990.165

7 U.S.C. 136r-1 Integrated Pest
Management

This Notice Supersedes

PIH Notice 2009-15, PIH Notice
2008-24, PIH Notice 2007-12

Subject: Promotion of Integrated Pest Management (IPM) as an environmentally-sound, economical and effective means to address a major resident concern.

1. **Purpose.** The purpose of this Notice is to promote and encourage the use of IPM by Public Housing Authorities (PHAs), Indian tribes, Tribal Designated Housing Entities (TDHEs), and owner/agents providing assistance through the HCV program. This notice provides guidance to Public Housing Authorities (PHAs) on the benefits of IPM, additional technical assistance and training opportunities for PHAs. Pest management is integral to the provision of safe and sanitary housing. In accordance with 24 CFR 903.7 (e) (2), PHAs must include in their PHA plans a description of any measures necessary for the prevention or eradication of pest infestations. IPM is an ecological approach using an array of methods to prevent and control pests with reduced reliance on pesticides. Procedures contained within this notice remain in effect until superseded by subsequent HUD Directive or guidance.
2. **Applicability.** This notice applies to PHAs administering the public housing and project based Section 8 program, and may be of interest to Indian tribes/TDHEs as well as owners/agents providing assisted housing through the Housing Choice Voucher (HCV) Program. The decision to use IPM techniques in their ongoing pest control effort is under PHA, Indian tribes/TDHE discretion. 24 CFR 990.165(a) covers cost associated with Project Expense Level (PEL) such as maintenance expenses. IPM is a maintenance expense.
3. **Background.** The goal of IPM as defined by the Environmental Protection Agency (EPA) is to control pests by the most economical long term means, and with the least possible hazard to people, property, and the environment. To undertake IPM, project managers should be committed to ongoing or continuous monitoring and record keeping, educational outreach to residents and staff as well as implementing good communication strategies between residents and building managers. IPM methods include: restricted pest access to

food/water; vigilant sanitation and waste management; mechanical control; physical barriers; structural maintenance; and, where necessary, the judicious use of pesticides.

4. **Fundamentals of IPM.** IPM efforts must involve PHA staff, contractors, residents, and include:
 - a. Communicating the PHA’s IPM policies and procedures to be provided in the appropriate format to meet the needs of all residents including persons with limited English proficiency and in formats that may be needed for persons who are visually or hearing impaired. This applies to administrative staff, maintenance personnel, and contractors as well.
 - b. Identifying the environmental conditions that lead to pests and educating residents.
 - c. Identifying pests and immediately reporting the presence of pests.
 - d. Establishing an ongoing monitoring and record keeping system for regular sampling and assessment of pests, surveillance techniques, and remedial actions taken, include establishing the assessment criteria for program effectiveness. This is a highly effective preventative measure that can help reduce the possibility of a pest infestation outbreak.
 - e. Determining, with the involvement of residents, the pest population levels – by species – that will be tolerated, and setting thresholds at which pest populations warrant action.
 - f. Improving waste management and pest management methods.
 - g. Selecting the appropriate pesticides and insecticides to use. Some residents may suffer from Multiple Chemical Sensitivity or other Environmental Illnesses.
 - h. Ongoing efforts to monitor and maintain structures and grounds (e.g., sealing cracks, eliminating moisture intrusion/accumulation) and adding physical barriers to pest entry and movement.
 - i. Developing an outreach/educational program to ensure that leases reflect residents’ responsibilities for: (1) proper housekeeping, which includes sanitation upkeep and the reduction of clutter, trash removal and storage, (2) immediately reporting the presence of pests, leaks, and mold, (3) cooperating with PHA specific IPM requirements such as obtaining permission of PHA management before purchasing or applying any pesticides, and (4) avoiding introduction of bed bugs and other pests into buildings on used mattresses and other recycled furniture. See “Preventing and Getting Rid of Bed Bugs Safely,” New York City Department of Health and Mental Hygiene <https://www1.nyc.gov/assets/doh/downloads/pdf/vector/bed-bug-guide.pdf>
 - j. Check with local health department to determine if your state has laws for re-used furnishings.
 - k. The judicious use of pesticides when necessary, with preference for products that, while producing the desired level of effectiveness, pose the least harm to human health and the environment. Residents should notify PHA management before pesticides are applied.
 - l. Providing and posting “Pesticide Use Notification” signs or other warnings.
5. **Health Concerns.** Pests may adversely impact the health of residents and contribute to worsening some diseases, such as allergies and asthma. Cockroaches can cause asthma in children and can transfer disease-causing organisms to food and surfaces they contaminate. Rodents, such as mice and rats, carry disease, can trigger asthma attacks and even cause fires by gnawing through electrical wires. Although bed bugs are not known to transmit infectious diseases, their bites can lead to secondary infections. Bed bugs can cause

emotional distress and sleep deprivation for residents as well. Bed bug infestations can spread quickly and must be treated aggressively. All pest control methods are targeted to protecting the health of residents and staff. Although applying pesticides may be effective in eliminating pest populations, many of these chemicals are associated with health and/or environmental risks, and their use should be minimized if alternative methods exist. This is especially important in buildings housing vulnerable age groups such as children or the elderly and in buildings housing residents with compromised immune systems or who may suffer from Multiple Chemical Sensitivity and other environmental illnesses. Therefore, IPM offers the potential to ensure efficacy of pest elimination while protecting the health of residents, staff and the environment.

6. **Building.** Most of the effective methods of pest elimination, including ongoing repairs, erection of barriers, and monitoring, will extend the useful life of a building and as a result generate significant savings that could offset the costs of the pest control. Many of these non-application methods, including structural maintenance, and inspecting for and repairing leaking pipes and cracks in roofs, walls, and windows are effective in preventing moisture intrusion and accumulation. Additionally, IPM-conscious PHAs assess the need to install physical barriers to both pest entry and pest movement within every structure thereby reducing the spread of pest infestations.
7. **Implementation.** HUD promotes IPM as a pest control method. IPM effectively eliminates pests in safer and long term cost-effective ways than traditional pesticide treatments. IPM frequently has proven to be more effective in reducing pest populations than relying solely on broadcast pesticides. The Boston Housing Authority (BHA) experienced approximately one-third reduction in pest related work orders over multiple years in multiple sites. BHA has maintained this reduction and now uses IPM in all its BHA maintained properties. Continuation of the IPM program after initial development cost is considered preventative maintenance expense and is an eligible program activity under the Public Housing Operating Subsidy as codified at 24 CFR 990.165. Successful IPM requires resident participation through proper housekeeping, reporting of pest infestations, and trash removal. Residents can monitor pest populations and assist in identifying how to eliminate access to food and water for pests. Resident organizations must be prepared to assist residents who need help to follow the IPM policy. HUD encourages PHAs to partner with local pest management organizations.
8. **Procurement of IPM Services.** If a PHA uses an outside contractor for pest control, the PHA's pest control/IPM policies and procedures should be incorporated into the specifications or statement of work for the pest management contract. PHAs using an outside contractor are encouraged to use companies that are trained and certified to provide IPM services either through Green Shield certified (<http://www.greenshieldcertified.org/>) or Green Pro (<http://www.whatisgreenpro.org/>). The PHA should also consider training for maintenance staff, residents, Resident Councils as well as PHA administrative staff who oversee housing developments or administer occupancy and rental duties such as unit housekeeping inspections.
9. **PHA Maintenance Staff.** If a PHA uses its own maintenance staff for pest management, proper training in the PHA's IPM procedures is essential. It is especially critical to be trained in the proper treatments methods PHAs can use when treating for bed bugs. The contract administrator for any pest management contract should be trained as well. Successful results rely upon proper implementation; training is therefore of critical

importance. IPM training is available at: <http://www.stoppests.org/> and <http://healthyhousingsolutions.com/training-course/ipm>.

10. **Area of High Concern, Bed bugs.** As the number of bed bug infestations rise throughout the country, HUD is in the process of developing protocols to address this growing problem. HUD is addressing the unit inspection process as well as developing the tools necessary for PHAs to identify, treat and monitor the effectiveness of bed bug treatments in its portfolio. Identifying, reporting, treating and monitoring pest infestations are all critical components of IPM and are effective in addressing the bed bug problem.
11. **Reference Materials for Implementing IPM.** The below list of IPM practices does not constitute a HUD endorsement of any specific practice, but provides IPM ideas and practices that have been used to improve pest management while reducing unnecessary dependence on pesticides. HUD encourages PHAs, Indian tribes/TDHEs to share their policies, procedures, resident leases, and written case studies so that these may be published on the HUD website for others to read.
 - a. Healthy Housing Solutions, Inc.: <http://www.healthyhomestraining.org/ipm>
 - b. Bed Bugs: “What’s Working for Bed Bug Control in Multifamily Housing”
http://healthyhousingsolutions.com/wp-content/uploads/2014/12/NCHH_2010-Bed_Bug_Control.pdf
<http://pestworld.org/pest-world-blog/the-bed-bug-hub-one-stop-shop-for-bed-bug-information>
 - c. National Pesticide Information Center: <http://www.npic.orst.edu/>
 - d. Integrated Pest Management (IPM), A Guide for Managers and Owners of Affordable Housing, Boston Public Health Commission:
http://asthmaregionalcouncil.org/uploads/IPM/asthma_ipm_guide.pdf.
 - e. U.S. Environmental Protection Agency:
 - i. General IPM information <http://www.epa.gov/opp00001/contolling/index.htm> housing): <http://www.epa.gov/pesticides/ipm>
 - ii. EPA staff contacts: <http://www.epa.gov/pesticides/about/contacts.htm#ipm>
 - iii. List of EPA IPM publications and instructions for ordering documents:
<http://www.epa.gov/oppfead1/Publications/catalog/subpage3.htm>
 - f. Massachusetts Department Agriculture Resources – Building Managers and Landlords:
http://www.mass.gov/agr/pesticides/docs/CIB_Building_Managers.pdf
 - g. HUD funded “Healthy Public Housing Project” conducted by the Harvard School of Public Health In Boston Public Housing, <https://www.hsph.harvard.edu/hphi/>
 - h. Bed Bug Fact Sheets in English and Spanish produced by Dr. Dini Miller,
<http://www.vdacs.virginia.gov/pdf/bb-millerbasics.pdf>
12. **PHA Case Studies On IPM Application.**
 - i. Cuyahoga Housing Authority:
http://www.nchh.org/Portals/0/Contents/Case_Study_Cuyahoga_10-20-07.pdf
 - ii. Boston Housing Authority:
http://www.nchh.org/Portals/0/Contents/Case_Study_Boston_HA_11-13-07.pdf
 - iii. New York City Department of Health, Columbia University and the New York City Housing Authority: <http://www.beyondpesticides.org/dailynewsblog/?p=1604>
13. For further information contact Leroy Ferguson at (202) 402-2411 or email at Leroy.Ferguson@hud.gov or you can contact the nearest HUD Field Office of Public Housing

within your state. Indian tribes and TDHEs should contact the nearest HUD Office of Native American Programs. Locations of these offices are available on HUD's website at <http://www.hud.gov>.

/s/

Sandra B. Henriquez, Assistant Secretary for
Public and Indian Housing



**U.S. Department of Housing and Urban Development
Office of Public and Indian Housing**

SPECIAL ATTENTION OF:

NOTICE: PIH-2012-17

Regional Directors; State and Area Coordinators; Public Housing Hub Directors; Program Center Coordinators; Troubled Agency Recovery Center Directors; Special Applications Center Director; Administrators; Offices of Native American Programs; Public Housing Agencies;

Issued: February 28, 2012

Expired: This Notice remains in effect until amended, superseded, or rescinded

Housing; Housing Choice Voucher/Section 8; Tribally Designated Housing Entities; Indian Tribes; Resident Management Corporations

Cross References:

SUBJECT: Guidelines on Bedbug Control and Prevention in Public Housing

I. Purpose

Bedbug infestations have become a serious problem in housing throughout the country. Public Housing properties are not immune to infestations. This Notice provides information and references to best practices regarding the prevention and control of bedbug infestations. It also provides guidance on the rights and responsibilities of HUD, Public Housing Agencies (PHAs) and tenants with regard to bedbug infestations.

II. Background

After a long absence, bedbug infestations are a growing problem in the United States today. According to the United States Environmental Protection Agency (EPA), bedbug populations have increased dramatically. Bedbugs are considered a pest of significant public health importance by the EPA and the Centers for Disease Control and Prevention (CDC). Although the insects are not known to transmit disease, bites may itch and cause an allergic reaction in some people, which may lead to secondary infections. The presence of bedbugs may also contribute to stress or anxiety.

Experts suspect the resurgence is associated with greater international and domestic travel, lack of knowledge regarding the complex measures needed to prevent and control bedbugs, changes in pesticide availability and technology, and increased resistance of bedbugs to available pesticides. Bedbugs are not an indicator of poor sanitation, but excess clutter can provide them more places to hide, making early detection and targeted control

difficult.

HUD has received numerous reports of bedbug infestations in Public Housing properties in various regions. HUD is working closely with other federal agencies to develop and share best practices for preventing and controlling bedbugs.

III. Applicability

This notice applies to PHAs administering the public housing and project based Section 8 program. It may also be of interest to Indian tribes/TDHEs as well as owners/agents providing assisted housing through the Housing Choice Voucher (HCV) Program.

IV. Prevention of Bedbug Infestations

The best approach to bedbug management is to prevent an infestation from occurring in the first place. Federal agencies, such as EPA and HUD, are working in tandem to develop and share recommendations to prevent bedbug infestations.

PHAs are strongly encouraged to develop an Integrated Pest Management (IPM) Plan. Such plans describe the ongoing efforts the property management will take to prevent and respond to pests. For more details on IPM, please see the online guide at <http://www.stoppests.org>. According to the EPA, principles of IPM for bedbugs include:

- Raising awareness through education on prevention of bedbugs;
- Inspecting infested areas, plus surrounding living spaces;
- Checking for bedbugs in luggage and clothes when returning home from a trip;
- Looking for bedbugs or signs of infestation on secondhand items before bringing the items home;
- Correctly identifying the pest;
- Keeping records – including dates and locations where pests are found;
- Cleaning all items within a bedbug infested living area;
- Reducing clutter where bedbugs can hide;
- Eliminating bedbug habitats;
- Physically removing bedbugs through cleaning;
- Using pesticides carefully according to the label directions; and,
- Following up on inspections and possible treatments.

In addition or as part of an IPM plan, PHAs are strongly encouraged to take the following preventive steps:

- Provide training for staff to identify bedbugs, and to perform ongoing prevention actions as outlined in the IPM. When a community is at high risk for bedbugs (for example, if the community has experienced prior infestations), periodic building inspections are recommended.

- Actively engage residents in efforts to prevent bedbugs. Education and involvement of tenants is a critical component of IPM for bedbugs. Bedbugs may often go undetected and unreported and because they are active at night tenants may not be aware of their presence. PHAs may wish to hold workshops for tenants to learn to identify bedbugs, to create unfriendly environments for pests, and to report suspicions of bedbugs as soon as possible.
- Provide orientation for new tenants and staff, and post signs and handouts regarding bedbug prevention.

More information on bedbug prevention may be found by accessing the following websites:¹

- Healthy Homes Training:** *What's Working for Bedbug Control in Multifamily Housing?: Reconciling best practices with research and the realities of implementation.*
http://healthyhousingsolutions.com/wp-content/uploads/2014/12/NCHH_2010-Bed_Bug_Control.pdf
- National Pest Management Association Bedbug Hub:**
<http://pestworld.org/pest-world-blog/the-bed-bug-hub-one-stop-shop-for-bed-bug-information>
- National Pest Management Association Best Practices Website:**
<http://www.bedbugbmps.org>
- Environmental Protection Agency:**
<http://www.epa.gov/pesticides/bedbugs/>
- Public Housing Environmental Conservation Clearinghouse (PHECC)**
<http://www.hud.gov/offices/pih/programs/ph/phecc/pestmang.cfm>

V. **Addressing Infestations**

The PHA should respond with urgency to any tenant report of bedbugs. Within 24 hours of the tenant report, the PHA should make contact with the tenant, provide the tenant with information about control and prevention of bedbugs and discuss measures the tenant may be able to take in the unit before the inspection is performed. However, a bedbug inspection and, if necessary, treatment, may take time to schedule. The PHA should endeavor to take appropriate action within a reasonable time period using the guidelines provided below.

¹ An additional resource for interested parties is the *Bedbug Handbook*. L.J. Pinto, R. Cooper, and S.K. Kraft, *Bedbug Handbook: The Complete Guide to Bedbugs and Their Control* (Mechanicsville, MD: S.K. Pinto & Associates, 2007).

Following a report of bedbugs, the PHA or a qualified third party trained in bedbug detection should inspect the dwelling unit to determine if bedbugs are present. It is critical that inspections be conducted by trained staff or third party professionals. Low level inspections may escape visual detection. For this reason, multiple detection tools are recommended. Recent research indicates that “active” bedbug monitors containing attractants can be effective tools for detecting early infestations. Some licensed pest control applicators use canine detection to verify the presence of bedbugs. The inspection should cover the unit reporting the infestation and no less than surrounding apartments consisting of the units above, below, left and right, and should be completed within three business days of a tenant complaint if possible. If reputable, licensed pest control companies are unattainable within three calendar days, the PHA is required to retain documentation of the efforts to obtain qualified services. If an infestation is suspected but cannot be verified using the methods described above, the PHA should re-inspect the unit(s) periodically over the next several months.

When an infestation is identified, the unit and surrounding units should be treated for bedbugs according to the IPM Plan. Chemical treatments are necessary, but not reliable. Therefore, encasement, interception devices, vacuuming, steaming, freezing and commodity or building heat treatments may be utilized as part of the bedbug control effort. Infestations are rarely controlled in one visit. Effective treatment may require two to three visits, and possibly more. The length, method and extent of the treatment will depend on the severity and complexity of the infestation, and the level of cooperation of the residents.

VI. Additional Considerations

PHAs may offer protective tools to residents to help safeguard properties from infestation and recurrences. For example, the PHA may offer residents bed covers, climb-up interceptors, or other detection or protection devices that may become available. PHAs may voluntarily offer to inspect tenants’ furniture before move-in. PHAs may also offer tenants a service of non-chemical treatment of household items upon tenant move-in, non-chemical treatment or inspection of used furniture and/or non-chemical treatment of luggage before it is unpacked when a tenant returns from a trip. Tenants may voluntarily use such services, but PHAs may not require tenants to do so. These services or products are to be offered at the PHAs expense.

A PHA may not deny tenancy to a potential resident on the basis of the tenant having experienced a prior bedbug infestation, nor may give residential preference to any tenant based on a response to a question regarding prior exposure to bedbugs. A PHA may not charge a tenant to cover the cost of bedbug treatment; such costs should be covered by the PHA. HUD reserves the right to approve Lease Addenda. Lease Addenda may not conflict with this Notice.

VII. Tenant Rights and Responsibilities

Tenants are strongly encouraged to immediately report the suspicion of possible bedbugs in a housing unit or other areas of the property. Early reporting allows the pests to be identified and treated before the infestation spreads. Tenants are the first line of defense against bedbug infestations and should be encouraged to create living environments that deter bedbugs. This includes reducing unreasonable amounts of clutter that create hiding places for bedbugs, and regular checking of beds and laundering of linens.

Bedbug infestations can cause health concerns, including physical discomfort and may contribute to stress and anxiety on the part of the residents. Tenants should be advised of the following:

- A PHA may not deny tenancy to a potential resident on the basis of the tenant having experienced a prior bedbug infestation, nor may an owner give residential preference to any tenant based on a response to a question regarding prior exposure to bedbugs.
- A tenant reporting bedbugs may expect expeditious response and attention by the PHA, but should be advised that inspection and, if necessary, treatment of bedbugs may take time to schedule. The inspections should occur within three calendar days of the tenant report when possible.
- Following a report of bedbugs, the PHA or a qualified third party trained in bedbug detection should inspect the dwelling unit to determine if bedbugs are present. It is critical that inspections be conducted by trained staff or third party professionals. The PHA may enter the unit to perform these activities, in accordance with the lease.
- If bedbug infestation is found in the unit, the tenant may expect treatment to begin within five days of the inspection, though depending on the form of treatment, this may not be possible. Tenants should be advised that treatment may take several weeks.
- Tenants are expected to cooperate with the treatment efforts by allowing for heat treatment of clothing and furniture and refraining from placement of infested furniture or other items in common areas such as hallways. Tenant cooperation is shown to expedite the control of bedbugs and to prevent spreading of infestations.
- Management may make staff available to help with moving and cleaning of furniture to accomplish the treatment effort.
- The tenant will not be expected to contribute to the cost of the treatment effort.

- The tenant will not be reimbursed the cost of any additional expense to the household, such as purchase of new furniture, clothing or cleaning services.

VIII. REAC Inspections

Bedbugs should be addressed when reported by staff, tenants or the Real Estate Assessment Center (REAC), regardless of the score of the REAC physical inspection. Inspectors ask the PHA to identify any units and/or buildings that are infested before the inspection begins. When bedbugs are reported or observed, the inspector will record the units and/or buildings affected in the comment section of the Physical Inspection report, noting that bedbugs were reported. The inspector will then select an alternate unit to inspect to replace any unit with observed or reported bedbugs.

REAC sends a “Bedbugs Reported” email to the local PIH field office with a copy to the PIH Regional director when bedbugs are noted in the comments section of a Physical Inspection Report. The PHA will see the information about bedbugs in the comment section of the Physical Inspection Report which provides PHAs with the necessary information to address the situation.

/s/

Sandra B. Henriquez, Assistant Secretary for
Public and Indian Housing

Attachment

Prevention and Safe Removal of Bedbugs

Bedbug infestations have become a serious problem in housing throughout the country. Public Housing properties are not immune to infestations, anyone or any home can get bedbugs. Bedbugs live on human and animal blood and typically hide and live in cracks and crevices in dark and undisturbed locations close to their hosts. They can live for long periods of time and although visible to the naked eye, they may be difficult to detect.

Bedbug Prevention Action Plan

- Inspect in and around sleeping and resting areas at home once a month.
- Look for signs of bedbug activity, active infestations will have fecal spotting, live or dead bedbugs, shed skins and bedbug eggs.
- Avoid used furniture and mattresses, especially discarded furniture and mattresses. Used furniture and refurbished mattresses may have bedbugs and bedbug eggs that are difficult to see.
- Inspect for the signs of bedbugs when traveling away from home. Look for live or dead bedbugs, shed bedbug skins or bedbug eggs and fecal spots on mattresses, clothing or dark cracks and crevices. Wood, metal or plastic furniture, sofas, chairs, tables and many other items may be infested with bedbugs.
- If contact with an active bedbug infestation is suspected away from home, segregate and isolate in sealed plastic bags any exposed luggage, clothing and personal effects until inspection and decontamination can be completed.
- Bedbugs prefer to live in cracks and crevices in areas like baseboards, moldings, window/door frames, and cracks/seams in walls and furniture, especially headboards and bed frames and screw holes.
- Seal baseboards, cracks, crevices, heat, plumbing and electrical services shared between apartments with pest-proofing sealants.
- Encase mattresses and box springs. Seal box springs in an appropriate zippered encasement to prevent bedbugs hiding inside from escaping; this location is commonly affected in bedbug infestations and yet difficult to inspect.
- Thoroughly vacuum apartment, furniture and all belongings and use crevice tools and other attachments where feasible. Place the contents of the vacuum in a tightly sealed disposable bag and remove.

EARLY DETECTION IS CRITICAL Early identification and reporting of infestations by residents to building management and neighbors limits the spread of bedbugs. As soon as possible contact Property Manager and/or pest management company. Report the suspected activity as soon as possible. The longer you wait the more likely the problem is to spread and the more difficult and costly it will be to control.

Bedbug Removal Action Plan

The following sequence of steps has been outlined by the Armed Forces Pest Management Board in order to facilitate control of bedbugs in housing.

- Using a vacuum cleaner (preferably HEPA-filtered), remove the bugs and their cast skins from all observed and suspected harborage sites during the initial inspection, and periodically afterward (once weekly is a suggested self-help action). The vacuum bag should

Prevention and Safe Removal of Bedbugs

be removed immediately afterward, sealed tightly inside a larger plastic bag, and that bag incinerated or placed in the next normal trash collection.

- Launder all infested cloth items in hot water, 120 degrees Fahrenheit or hotter for at least 10 minutes, with soap or detergent, then dry in a warm or hot dryer of at least 140 degrees for at least 20 minutes, or dry clean to kill all bedbug life stages present.
- Enclose each mattress and box spring in a sealed plastic cover, like those sold commercially. These types of encasements should be of high quality and bedbug puncture proof to limit exposure to house dust mites or bedbugs.
- Place and seal all recently laundered cloth items (*e.g.*, bed linens, clothing) inside new large plastic bags or tightly closed bins to prevent any bedbugs from re-infesting them.
- Seal shut all cracks, crevices, and entry points to wall voids, using a high-quality silicone-based sealant, especially within a 20 foot radius of any spot where bedbug bites have been reported, or where the bugs have actually been collected.
- Additional or alternative physical control measures against bedbugs may include: heat, cold, steam, physical mashing and sticky insect monitors.
- A residual insecticide should be applied, according to label directions, to each infested site and preferably to a small area around each site. Such applications often involve treating cracks and crevices. When planning and conducting any such treatments, consider examining, if not treating, the opposite side of any involved wall, floor or ceiling.
- Electrical outlet boxes, and similar voids that cannot be readily sealed, should be treated with an appropriately labeled insecticidal dust.
- Consider including some type of insect growth regulator (IGR) as a concurrent or adjunctive treatment (*e.g.*, as a tank mix).
- Limited use of an aerosol or ULV pyrethroid may facilitate the detection of hidden bedbugs by causing them to move around more, and may also potentially increase their exposure to any previously applied residual insecticide. DO NOT use any over-the-counter “foggers.” They are not very effective and may cause bedbugs to scatter.
- Fumigation or heat (or cold) treatment of batches of furniture, clothing or other items within chambers may be warranted and affordable in specific cases, but whole-structure fumigation to control bedbugs is seldom practical or economically feasible. And such treatments provide no residual effects at all.
- Re-inspection of infested structures and sites should be done about 10-21 days after any initial treatment, and (if needed) again about 10-21 days later, to detect, and to precisely target the treatment (if needed) of any continued infestation.¹

Carefully reintroduce cleaned items. Isolate and contain items that have been properly cleaned, laundered or heat treated. Heavy duty plastic bags or air tight containers may be used for this purpose. Clear bags and containers are preferable.

NEVER USE THE FOLLOWING PRODUCTS FOR BEDBUG TREATMENT:

- Insecticide “bombs”, total release foggers, camphor, kerosene, diesel, gasoline, alcohol or other similar products. These products can cause serious health problems. They are dangerous if misused and can cause fires and explosions. These products are not appropriate for bedbug management.**

Prevention and Safe Removal of Bedbugs

Additional information about bedbug prevention and treatment may be found by accessing the following resources:

- Armed Forces Pest Management Board:** *Bedbugs - Importance, Biology and Control Strategies*
<http://www.afpmb.org/sites/default/files/pubs/techguides/tg44.pdf>
- Environmental Protection Agency:**
<http://www.epa.gov/pesticides/bedbugs/>
- Healthy Homes Training:** *What's Working for Bedbug Control in Multifamily Housing?: Reconciling best practices with research and the realities of implementation.*
http://healthyhousingsolutions.com/wp-content/uploads/2014/12/NCHH_2010-Bed_Bug_Control.pdf
- National Pest Management Association Bedbug Hub:**
<http://pestworld.org/pest-world-blog/the-bed-bug-hub-one-stop-shop-for-bed-bug-information>
- National Pest Management Association Best Practices Website:**
<http://www.bedbugbmps.org>
- New York City Health Department:**
<http://www1.nyc.gov/assets/doh/downloads/pdf/vector/bed-bug-guide.pdf>
- Public Housing Environmental Conservation Clearinghouse (PHECC)**
<http://www.hud.gov/offices/pih/programs/ph/phecc/pestmang.cfm>
- <http://www.stoppests.org>
- The Bug Man's Bug Book:**
http://healthyhousingsolutions.com/wp-content/uploads/2014/12/The_Bugmans_Bug_Book.pdf
- Bedbug Handbook*. L.J. Pinto, R. Cooper, and S.K. Kraft
- Bedbug Handbook: The Complete Guide to Bedbugs and Their Control* (Mechanicsville, MD: S.K. Pinto & Associates, 2007).



ASSISTANT SECRETARY FOR HOUSING-
FEDERAL HOUSING COMMISSIONER

As Special Attention of

All Multifamily Hub Directors
All Multifamily Program Center Directors
All Multifamily Operations Officers
All Directors of Project Management
All Field Counsel

Notice H 2012-5

Issued: April 23, 2012

Expires: This notice remains in effect until
amended, revoked, or superseded

Cross References: Housing Notice 2011-20

SUBJECT: Guidelines on Addressing Infestations in HUD-insured and Assisted Multifamily Housing

I. Purpose

This Notice supersedes Housing Notice 2011-20, –Guidelines on Bed Bug Control and Prevention in HUD Insured and Assisted Multifamily Housing. Readers seeking guidance on the subject of bed bug infestations should instead refer to this Notice, which provides updated information to prevent and address infestations, including but not limited to bed bugs, insects, and all manner of vermin. HUD is providing guidance to Owners, Management Agents (O/As) and residents of HUD Multifamily insured and assisted properties to remind all parties of the importance of prevention, identification, and treatment of infestations in HUD-assisted and HUD-insured rental housing. The Department has received numerous inquiries and comments from the industry and HUD residents seeking clarification and information on appropriate steps to address infestations in Multifamily properties. This Notice provides information and references to best practices regarding the prevention and control of infestations. It also reaffirms existing program requirements with regard to infestations.

II. Background

Pursuant to 24 CFR Part 5, Subpart G, HUD housing must be decent, safe, sanitary and in good repair. Owners of HUD-insured or assisted housing must maintain such housing in a manner that meets physical condition standards. In accordance with project Regulatory Agreements and Section 8 HAP Contracts, the housing must have no evidence of infestation. HUD monitors Owners and Agents (O/As) to ensure that housing meets physical condition standards enumerated in 24 CFR 5.703. This includes providing guidance aimed at preventing and addressing infestations.

Many residents and O/As have contacted HUD to seek guidance on infestations. Of particular concern is the growing problem of bed bugs. According to the United States Environmental Protection Agency (EPA), bed bug populations have recently increased dramatically. HUD is working closely with other federal agencies to develop and share best practices for preventing, identifying and controlling bed bugs.

III. Applicability

This Notice provides guidance to the following types of projects:

- A. Properties assisted with Section 8 Project Based Rental Assistance, Rent Supplement or Rental Assistance Payment (RAP) contracts.
- B. Properties with active Section 202 Direct Loans, Section 202/162, Section 202 and 811 Capital Advances, and Section 202 Senior Preservation Rental Assistance Contracts or Section 811 Project Rental Assistance demonstration funding.
- C. Properties with active FHA insured first mortgages under Sections 207 pursuant to 223(f), 221(d)(3), 221(d)(4), 221(d)(5), 231, 213 or 236.

Certain provisions of this Notice are applicable only to assisted properties, as specified in various sections of the Notice below. The Notice does not supersede existing lease provisions that comply with state and/or local landlord/tenant laws and that have been approved by HUD (where such approval is required).¹ All parties should refer to the property lease executed between the tenant and the O/A, and the property House Rules, for details on Owner and resident rights and responsibilities related to infestations and housing physical condition standards. Certain assisted properties² are also subject to provisions of the HUD Model Lease for Subsidized Programs (Family Model Lease) (Form HUD-90105-A, HUD-90105-B, HUD 90105-C and HUD-90105-D) in HUD Handbook 4350.3, *Occupancy Requirements of Subsidized Multifamily Housing Programs*.

IV. Prevention of Bed Bug Infestations

Of particular concern for Multifamily O/As, as well as project residents, is the resurgence of bed bugs, which can cause discomfort and anxiety for residents and which can spread quickly. The ideal approach to bed bug infestations is to prevent them from occurring in the first place. Federal agencies, such as EPA and HUD, are working in tandem to develop and share recommendations to prevent infestations.

¹ For unassisted O/As, this Notice does not supersede state and local landlord/tenant law related to lease enforcement, housing habitability, and cure rights or damages.

² Section 221(d)(3) BMIR, Section 236, Section 8 New Construction, Section 8 Substantial Rehabilitation, Section 8 State Agency, RHS 515 with Section 8, Section 8 Loan Management Set-Aside (LMSA), Section 8 Property Disposition Set-Aside (PDSA), Rental Assistant Payment (RAP), and Rent Supplement projects are subject to the provisions of the Family Model Lease.

HUD encourages Multifamily O/As to develop an Integrated Pest Management Plan (IPM) to focus on preventing infestations. Such plans describe the ongoing efforts the property management will take to prevent and respond to pests. For more detail on IPMs generally, please see the online guide at <http://www.stoppests.org>. The information below pertains specifically to bed bug infestations.

According to the EPA, principles of IPM for bed bugs include:

- Raising awareness through education on prevention of bed bugs;
- Inspecting infested areas, plus surrounding living spaces;
- Checking for infestations on luggage and clothes when returning home from a trip;
- Reducing the number of secondhand items brought into units and looking for bed bugs or signs of infestation on secondhand items before bringing the items home;
- Correctly identifying the pest;
- Keeping records – including dates when and locations where pests are found;
- Cleaning all items within a bed bug infested living area;
- Reducing clutter where bed bugs can hide;
- Eliminating bed bug habitats;
- Physically removing bed bugs through cleaning;
- Using pesticides carefully according to the label directions; and,
- Following up on inspections and possible treatments.

In addition to or as part of an IPM program, Multifamily O/As are strongly encouraged to take the following steps to prevent bed bugs:

Provide training for staff to identify bed bugs, and to perform ongoing prevention actions as outlined in the IPM. When a community is at high risk for bed bugs (for example, if the community has experienced prior infestations), periodic building inspections are recommended.

Actively engage residents in efforts to prevent bed bugs. Education and involvement of project residents is a critical component of IPM for bed bugs. Bed bugs may often go undetected and unreported, because they are active at night, and tenants may not be aware of their presence. O/As may wish to hold workshops for tenants to teach them to identify bed bugs, to create unfriendly environments for pests, and to report suspicions of bed bugs as soon as possible.

Provide orientation for new tenants and staff, and post signs and handouts.

In addition, tenants should immediately report the suspicion of infestations in housing units or other areas of the property. Early reporting allows the pests to be identified and treated before the infestation spreads. Tenants are the first line of defense against infestations and should cooperate to create living environments that deter pests. This includes reducing unreasonable amounts of clutter that create hiding places for pests and deter treatment.

More information on bed bug prevention may be found by accessing the following websites:³

Healthy Homes Training: *What's Working for Bed Bug Control in Multifamily Housing?: Reconciling best practices with research and the realities of implementation.*
http://healthyhousingsolutions.com/wp-content/uploads/2014/12/NCHH_2010-Bed_Bug_Control.pdf

National Pest Management Association Bed Bug Hub:
<http://pestworld.org/pest-world-blog/the-bed-bug-hub-one-stop-shop-for-bed-bug-information>

National Pest Management Association Best Practices Website:
<http://www.bedbugbmps.org>

IPM Curriculum and Blog: <http://www.stoppests.org>

Environmental Protection Agency:
<http://www.epa.gov/pesticides/bedbugs/>

V. **Addressing Infestations**

The O/A should respond with urgency to tenant reports of infestations. The O/A should endeavor to take appropriate action within a reasonable time period. However, tenants are advised that pest inspections and, if necessary, treatment, may take time to schedule, particularly for recently resurgent pests such as bed bugs, for which it may be difficult to find trained specialists to perform inspections and conduct treatments.

Residents should fully cooperate with the O/A's efforts to identify and address infestations. This tenant cooperation is shown to expedite the control of infestations. Cooperation includes allowing the O/A to enter the unit to perform inspections and treatments, allowing pest treatments to occur, following the pest treatment protocol, and removing infested furniture or other items from common areas such as hallways or community rooms.

Residents are advised that some infestations, including bed bugs, require multiple treatments over the course of several weeks. Generally, relocation from units is not necessary for effective pest treatment. However, if reasonable temporary relocation is necessary, the O/A may request withdrawals from available project funds (which may include Reserve for Replacement, project income, or Residual Receipts, if authorized by HUD), as described below in Section VI, for those days when treatment is actively occurring that may render the unit uninhabitable. All withdrawals of this type must be approved by the Hub/PC Director or designee. Any temporary relocation must be carried out in accordance with applicable civil rights laws, including, but not limited to, Title VI

³ An additional resource for interested parties is the *Bed Bug Handbook*. L.J. Pinto, R. Cooper, and S.K. Kraft, *Bed Bug Handbook: The Complete Guide to Bed Bugs and Their Control* (Mechanicsville, MD: S.K. Pinto & Associates, 2007).

of the Civil Right Act of 1964 and Section 504 of the Rehabilitation Act of 1973. For example, when persons with disabilities are temporarily relocated, they must be placed in housing that provides, at a minimum, the same accessibility features as the housing in which they currently reside. Additionally, the O/A must ensure the right of return for tenants who have had to be temporarily relocated while the treatment is being performed.

VI. Project Resources

An O/A may contact HUD to request project resources for control of infestations. An O/A may use available operating funds to pay for activities to prevent and/or treat infestations. When other sources of funds are not available or sufficient, the Hub/PC Director may honor requests to reimburse Owners for infestation treatment from the Reserve for Replacement account, or, if authorized, the Residual Receipts account. The releases should follow the processes outlined in HUD Handbook 4350.1, *Multifamily Project Servicing*, Chapters 4 and 25. Owners may make advances (loan without interest) when no reserves are available. With prior HUD approval, Owners may repay the advances from project resources as discussed in HUD Handbook 4350.1.

For assisted housing projects, HUD may consider use of rental assistance to pay reasonable and necessary project expenses, such as an increased pest control line item in the project's operating budget, if the Section 8 Housing Assistance Payments (HAP) contract allows for budget-based rent setting in accordance with the *Section 8 Renewal Policy Guide*.

Owners of assisted properties are advised that any rental assistance received under Section 8, Rent Supplement or RAP cannot be used to reimburse residents for the cost of any additional expense to the household, such as purchase of new furniture, clothing or cleaning services. Assisted project Owners' requests for tenants to pay the costs of infestation treatment must be in accordance with the provision for tenant payment of damages or noncompliance as required in the Family Model Lease.

VII. Recurring Infestations

Many properties face recurring infestations. O/As may take initiative to offer protective tools to residents to help safeguard properties from recurrences. To prevent pests from entering a Multifamily property, O/As may voluntarily offer to inspect tenants' furniture before move-in. Where there is an approved (for Assisted Owners) lease provision that complies with state and/or local landlord/tenant law, O/As may require appropriate treatment of furniture upon tenant move-in, or when a tenant moves furniture into the apartment. These services or products are to be offered at the Owner's expense, or may be paid from project operating funds if available.

All Owners (of assisted and unassisted properties) may pursue remedies provided in the lease agreement and in accordance with state and local rental law. Assisted Owners must follow additional guidelines including occupancy requirements for assisted housing, and must adhere to all HUD and state and local landlord/tenant laws before taking action to deny tenancy or remove residents for causes related to infestations. For O/As of assisted properties, the Family Model Lease provides remedies related to damages or noncompliance. Many O/As have proposed lease addenda

related to infestations. As detailed in HUD Handbook 4350.3, Section 6-9, Lease Addenda in assisted properties may not conflict with the Family Model Lease. HUD reserves the right to review and approve Lease Addenda for assisted properties, for example to ensure that tenant payment provisions in proposed Addenda do not exceed the remedies for damages or noncompliance provided in the Family Model Lease.

VIII. Responding to Inspection Findings

Infestations should be addressed when reported by staff, tenants or the Real Estate Assessment Center (REAC), or if an audit by the HUD Office of the Inspector General identifies possible infestation.

Presently, REAC inspectors will only deduct points if there is the –presence of rats, or severe infestation by mice or insects such as roaches or termites. The following deficiencies can be noted: 1) Insects and 2) Rats/Mice/Vermin.⁴ If there is no evidence of infestation (i.e. there are baits, traps, and sticky boards with no presence of insects or vermin) inspectors are instructed not to record this as a deficiency. If evidence is identified, the infestation may be cited as a deficiency.

As per Inspector Notice No. 2010-01, –the presence and/or treatment of bed bugs will not be scored in the UPCS inspection. However, inspectors now ask the O/A to identify any units and/or buildings that are infested before the inspection begins. If bed bugs are reported, the inspector will record the units and/or buildings affected in the comment section of the Physical Inspection report.

Because bed bug infestations are on the rise, HUD staff will take additional steps to monitor and track reports of bed bug infestation and treatments of such infestations. When bed bugs are reported by the Owner/Agent at the time of inspection or if the Inspector notes the presence of bed bugs, REAC sends a –Bed Bugs Reported email to the Hub/Program Center Director. HUD staff must take the following steps upon receipt of the –Bed Bugs Reported email from REAC (regardless of the PASS score the property receives) or if bed bugs are cited as a deficiency within the REAC report, or if bed bugs are reported by the O/A, project residents, the Performance Based Contract Administrator, or an OIG audit:

Enter the bed bug information on the Problem Statement screen in the Integrated Real Estate Management System (iREMS).

If bed bugs were identified by REAC, send the attached letter (Attachment 1) to the Owner regardless of the score of the REAC Physical Inspection.

Advise the Owner to describe what actions were taken or will be taken to eradicate the infestation.

Advise the Owner to inform HUD of the response to the infestation, and to inform HUD if and when the problem has been completely eradicated.

⁴ HUD Physical Inspection Program—Chapter 3: UPCS Definitions Training—Health & Safety

Release funds from Reserve for Replacement or Residual Receipts accounts if requested and if such funds are available and authorized.

Continue to enter all related information into the Problem Statement screen in iREMS; and,

Report any significant developments or problems regarding a bed bug infestation to Headquarters, Office of Asset Management.

If you have questions, please contact your Desk Officer in the Office of Asset Management.

Carol J. Galante
Acting Assistant Secretary for Housing –
Federal Housing Commissioner

Enclosures

ATTACHMENT

Property Owner
Address

SUBJECT: Bed Bugs
Property Name: _____

Dear Owner:

The [Hub Name] Multifamily Hub has received notification from the Real Estate Assessment Center (REAC) that during the physical inspection of your property performed on [Date], the inspector indicated that bed bugs were reported present at the property. The units/buildings below were identified as being infested with bed bugs:

Within 5 days of the date of this letter, please inform your Project Manager of the actions you are taking for bed bug control. This information should include the method of treatment used (or to be used), the timing for treatment(s), and your proposed plan for monitoring and preventing the possibility of future infestation.

If you have any questions, please contact your Project Manager, [Project Manager's Name], at [Project Manager's Telephone Number] ext. [Extension]

Sincerely,

Supervisory Project Manager
Project Management Division



Joint Statement on Bed Bug Control in the United States from the U.S. Centers for Disease Control and Prevention (CDC) and the U.S. Environmental Protection Agency (EPA)

Introduction and Purpose

The Centers for Disease Control and Prevention (CDC) and the U.S. Environmental Protection Agency (EPA) developed this document to highlight emerging public health issues associated with bed bugs (*Cimex lectularius*) in communities throughout the United States.

Bed bugs (**Photo 1**) have been common in U.S. history. Although bed bug populations dropped dramatically during the mid-20th century (1), the United States is one of many countries now experiencing an alarming resurgence in the population of bed bugs. Though the exact cause is not known, experts suspect the resurgence is associated with increased resistance of bed bugs to available pesticides, greater international and domestic travel, lack of knowledge regarding control of bed bugs due to their

prolonged absence, and the continuing decline or elimination of effective vector/pest control programs at state and local public health agencies.

In recent years, public health agencies across the country have been overwhelmed by complaints about bed bugs. An integrated

approach to bed bug control involving federal, state, tribal and local public health professionals, together with pest management professionals, housing authorities and private citizens, will promote development and understanding of the best methods for managing and controlling bed bugs and preventing future infestations. Research, training and public education are critical to an effective strategy for reducing public health issues associated with the resurgence of bed bug populations.

Impact of Bed Bugs on Public Health

Although bed bugs are not known to transmit disease, they are a pest of significant public health importance. Bed bugs fit into a category of blood-sucking ectoparasites (external parasites) similar to head lice (*Pediculus humanus capitis*). Bed bugs, like head lice, feed on the blood of humans but are not believed to transmit disease. Other ectoparasites, such as body lice (*Pediculus humanus corporis*), are known to transmit several serious diseases. Differences in the biology of similar species of pests, such as body lice and head lice (or bed bugs) can greatly impact the ability of pests to transmit disease.



Photo 1. Bed Bug. Photo courtesy of Dr. Harold Harlan, Armed Forces Pest Management Board Image Library

Bed bugs cause a variety of negative physical health, mental health and economic consequences. Many people have mild to severe allergic reaction to the bites with effects ranging from no reaction to a small bite mark to, in rare cases, anaphylaxis (severe, whole-body reaction) (2). These bites (**Photo 2**) can also lead to secondary infections of the skin such as impetigo, ecthyma, and lymphangitis (3,4). Bed bugs may also affect the mental health of people living in infested homes. Reported effects include anxiety, insomnia and systemic reactions (1).



Photo 2. Skin Reaction to Bed Bug bites. Photo courtesy of Dr. Harold Harlan

Research on the public health effects of bed bugs has been very limited over the past several decades, largely due to the

noted decline in bed bug populations in the latter half of the 20th century. Now that bed bug populations are rapidly increasing, additional research is needed to determine the reasons for the resurgence, the potential for bed bugs to transmit disease and their impact on public health.

Economically, bed bug infestations are also a burden on society. Although the exact dollar amount is not known, the economic losses from health care, lost wages, lost revenue and reduced productivity can be substantial. The cost of effectively eliminating bed bugs may be significantly more than the cost of eliminating other pests because bed bug control usually requires multiple visits by a licensed pest control operator and diligence on the part of those who are experiencing the infestation. Control in multi-family homes is much more difficult than in single family homes because bed bugs frequently travel between units, either by direct transport by humans or through voids in the walls. There are additional costs and complexities associated with coordinating and encouraging participation from multiple residents.

When a community starts to experience bed bug infestations, control is often more challenging because:

- Local public health departments have very limited resources to combat this problem and bed bugs frequently are not seen as a priority.
- Municipal codes struggle to identify those responsible for control of bed bug infestations. Tenants and landlords often dispute who is ultimately responsible for the cost of control and treatment. Treatment costs are high and transient populations make it difficult or impossible to assign responsibility.
- Pesticide resistance and limited control choices make treatment even more difficult. Some bed bug populations are resistant to almost all pesticides registered to treat them. Residents may use over-the-counter or homemade preparations that are ineffective (or even dangerous) and may promote further resistance.
- Pesticide misuse is also a potential public health concern. Because bed bug infestations are so difficult to control and are such a challenge to mental and economic health, residents may resort to using pesticides that are not intended for indoor residential use and may face serious health risks as a result. Additionally, residents may be tempted to apply pesticides registered for indoor use, but at greater application rates than the label allows. This results in a much greater risk of pesticide exposure for those living in the home. Pesticides must

always be used in strict accordance with their labeling to ensure that the residents and applicators are not exposed to unsafe levels of pesticide residues.

Bed Bug Biology

Bed bugs are small, flat insects that feed on the blood of sleeping people and animals. They are reddish-brown in color, wingless, and range from 1 to 7 millimeters in length. They can live several months without a blood meal.

Infestations of these insects usually occur around or near the areas where people sleep or spend a significant period of time. These areas include apartments, shelters, rooming houses, hotels, nursing homes, hospitals, cruise ships, buses, trains, and dorm rooms.

Bed bugs are experts at hiding. They hide during the day in places such as seams of mattresses, box springs, bed frames, headboards, dresser tables, cracks or crevices, behind wallpaper, and under any clutter or objects around a bed. Their small flat bodies allow them to fit into the smallest of spaces and they can remain in place for long periods of time, even without a blood meal. Bed bugs can travel over 100 feet in one night, but they tend to live within 8 feet of where people sleep.

Bed bugs are usually transported from place to place as people travel. Bed bugs travel in the seams and folds of luggage, overnight bags, folded clothes, bedding, furniture, and anywhere else where they can hide. Most people do not realize they can transport stow-away bed bugs as they travel potentially infesting new areas, including their homes, as they relocate.

One of the easiest ways to identify a bed bug infestation is by bite marks that appear on the face, neck, arms, hands, and any other body parts. However, these bite marks may take as long as 14 days to develop in some people so it is important to look for other clues when determining if bed bugs have infested an area. These signs may include the exoskeletons (**Photo 3**) of bed bugs after molting, bed bugs in the fold of mattresses and sheets, a sweet musty odor, and rusty-colored blood spots from their blood-filled fecal material that is often excreted on the mattress or nearby furniture.



Photo 3. Bed Bug Exoskeletons. Photo courtesy of Dr. Harold Harlan, Armed Forces Pest Management

Board Image Library

When bed bugs bite, they inject an anesthetic and an anticoagulant that prevents a person from feeling the bite. Because bites usually occur while people are sleeping, most

people do not realize they have been bitten until marks appear. The bite marks are similar to that of a mosquito or a flea - a slightly swollen and red area that may itch and be irritating. The bite marks may be random or appear in a straight line. Other symptoms of bed bug bites include insomnia, anxiety, and skin problems that arise from profuse scratching of the bites.

Everyone is at risk for bed bugs bites when visiting an infested area. However, anyone who travels frequently and shares living and sleeping quarters where other people have previously slept has an increased risk for being bitten and for spreading a bed bug infestation.

Integrated Pest Management for Bed Bugs

The current national problem with bed bugs is likely due to the convergence of three human behaviors: lack of awareness of the historical and biological link humans have with bed bugs, increased international travel, and past over-reliance on pesticides. Bed bugs are a “nest parasite” that resides in the human nest – the bedroom. Over time, bed bugs have evolved to develop resistance to many of the chemical pesticides currently used. In fact, bed bugs were widely resistant to DDT by the mid-1950s (5).

Integrated pest management (IPM) is an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices. IPM programs use current, comprehensive information on the life cycles of pests and their interaction with people and the environment. This information, in combination with available pest control methods, is used to manage pest damage by the most economical means, and with the least possible hazard to people, property, and the environment.

Bed bug control is most effective when an IPM approach is implemented with diligent participation by the residents. In multi-family housing, diligent participation is also required of the building management. IPM takes advantage of all appropriate pest management options, including the judicious use of pesticides. Although bed bugs may sometimes be controlled by non-chemical means alone, this approach is often very difficult, potentially less effective, and usually more resource intensive. A comprehensive IPM program to control bed bugs may include a number of methods such as:

- using monitoring devices,
- removing clutter where bed bugs can hide,
- applying heat treatment,
- vacuuming,
- sealing cracks and crevices to remove hiding places,
- using non-chemical pesticides (such as diatomaceous earth) and
- judicious use of effective chemical pesticides

A coordinated community IPM program can alleviate both the discomfort and cost of managing bed bugs. The underlying philosophy of bed bug IPM is based on the fact that bed bug infestations will not go away without intervention. Intervention is most effective when populations are low. Such a coordinated effort could create a partnership among government, property managers, citizens, and pest management professionals to ensure an effective intervention facilitated by environmental health professionals. EPA and CDC recommend that pest management and environmental health professionals throughout the U.S. continue to use IPM strategies as they address the bed bug issue.

The Role of Government Agencies and the Public in Bed Bug Control

CDC, EPA, and other federal agencies are working closely with state, tribal and local health departments, academia and private industries to monitor and better understand the recent resurgence of bed bugs in communities throughout the United States. CDC and EPA are facilitating communications and working to expand the knowledge base among agencies and programs that may have a role in reducing bed bug populations. The two agencies are also fostering cooperation with the private sector and the public to encourage their help with this endeavor.

CDC is partnering with experts in the areas of medicine, entomology, epidemiology and environmental toxicology to better understand the resurgence of bed bugs and the methods and tools that are needed for effective bed bug control. CDC will provide timely information on emerging trends in bed bug control with the goal of developing national strategies to reduce bed bug populations. CDC recognizes that very limited research has been conducted on bed bugs during the past several decades and encourages increased bed bug research to determine the causes of the resurgence, the most effective methods of control and the potential for bed bugs to transmit disease.

EPA's primary responsibility is the dual statutory charges to ensure that the pesticides with public health uses are (1) safe and (2) effective against the pests on their labels. EPA carries out this responsibility by conducting rigorous scientific screening of pesticides and imposing limits through registration of pesticides to ensure that when used to control pests, they do not harm people or the environment.

EPA is working to ensure that pest management professionals and the public have access to the latest information on effective bed bug control tools. EPA realizes that certain bed bug populations in communities across the nation are becoming increasingly resistant to many of the existing pesticides. EPA is actively working with industry and researchers to identify new compounds (or new uses of existing compounds) to control bed bugs. In addition, EPA is working to educate the general public, pest professionals, and public health officials about bed bug biology and IPM, which is critical to long-term bed bug control.

Other federal agencies are also involved in research and education about bed bugs. For example, the U.S. Department of Housing and Urban Development (HUD) is funding research on bed bug monitoring and control in low-income, multi-family housing, along with educating public housing authorities and other housing industry groups about bed bug identification and control. Health departments can use local HUD field office personnel or local housing officials as resources when addressing bed bug issues in multi-family housing.

State, tribal, and local government agencies and health departments play a critical role in protecting the public from bed bugs. Public health departments serve on the front lines, providing information on prevention and control of bed bugs through various programs to the public and private sector.

The public, together with their local health agencies, must be involved in the control and management of bed bug populations and must be provided with the knowledge of best practices to prevent and control bed bug infestations. In some cases, a coordinated community control program may be necessary to reduce or eliminate bed bug populations.

Additional Information

For additional information about bed bugs and their control, please see the following print references:

- Cooper RA, Harlan HJ. Ectoparasites, part three: bed bugs and kissing bugs. In: Mallis A, Hedges SA, Moreland D, editors. Handbook of pest control, ninth edition. Richfield, OH: GIE Media, Inc.; 2004. p. 495-529.
- Harlan HJ, Faulde MK, Bauman GJ. Bedbugs. In: Bonnefoy X, Kampen H, Sweeney K, editors. Public health significance of urban pests. Copenhagen: World Health Organization; 2008. p. 131-53.
- Miller DM. Bed bugs (Insecta: Hemiptera: Cimicidae: Cimex spp.). In: Capinera J, editor. Encyclopedia of entomology. Dordrecht, Netherlands: Kluwer Academic Press Springer; 2008. p. 405-17.
- Usinger RL. Monograph of Cimicidae. Lanham, MD: The Entomological Society of America; 1966.

For additional information about bed bugs and their control, please see the following Web sites:

- U.S. Environmental Protection Agency:
<http://epa.gov/pesticides/controlling/bedbugs.html>
- Centers for Disease Control and Prevention:
<http://www.cdc.gov/nceh/ehs/Topics/bedbugs.htm>
- Bed Bug Hotel Safety:
<http://www.oregon.gov/DHS/ph/pl/docs/bedbughotel.pdf>
- Central Ohio Bed Bug Task Force Information: <http://centralohiobedbugs.org/>
- Cornell Bed Bug Guide:
http://www.nysipm.cornell.edu/publications/bb_guidelines/
- Harvard School Public Health Bed Bug Management:
<http://www.hsph.harvard.edu/bedbugs/>
- National Pest Management Association: <http://www.pestworld.org/for-consumers/pest-frequently-asked-questions/bedbug-faq>
- National Pesticides Information Center: <http://npic.orst.edu/pest/bedbug.html>
- New Jersey Bed Bug Fact Sheet:
<http://www.nj.gov/health/eoh/phss/documents/bedbugfactsheet.pdf>
- University of Kentucky Bed Bug Fact Sheet:
<http://www.ca.uky.edu/entomology/entfacts/entfactpdf/ef636.pdf>
- University of Minnesota Bed Bug Information for Travelers:
<http://www.extension.umn.edu/distribution/housingandclothing/M1196.html>

References

1. Anderson A, Leffler K. Bed bug infestation in the news: a picture of an emerging public health problem in the United States. *Journal of Environmental Health*. 2008;70(9):24-7, 52-3.
2. Thomas I, Kihiczak GC, Schwartz RA. Bed bug bites: a review. *International Journal of Dermatology*, 2004;43:430-3.
3. MedlinePlus [Internet]. Bethesda (MD): National Library of Medicine (US); [updated 2010 Feb 17]. Impetigo; [updated 2010 Jan 12; cited 2010 Feb 17]. Available from <http://www.nlm.nih.gov/medlineplus/impetigo.html>.
4. Burnett JW, Calton GJ, Morgan RJ. Bed bugs. *Cutis* 1986;38(1):20.
5. Pinto LJ, Cooper RA, Kraft SK. *Bed bug handbook: the complete guide to bed bugs and their control*. Mechanicsville, MD: Pinto and Associates, Inc.; 2007.

Suggested citation: Centers for Disease Control and Prevention and U.S. Environmental Protection Agency. Joint statement on bed bug control in the United States from the U.S. Centers for Disease Control and Prevention (CDC) and the U.S. Environmental Protection Agency (EPA). Atlanta: U.S. Department of Health and Human Services; 2

Summary of National Green Building Programs

Enterprise Community Partners Green Communities Criteria

Green Communities is a major initiative led by Enterprise Community Partners (Enterprise). Established in September 2004, it is a five-year, \$555 million commitment to create more than 8,500 homes that deliver significant health, economic, and environmental benefits for low-income families and communities. The program establishes green building criteria and provides funding to assist developers in planning and construction. As of January 2008, Enterprise has invested over \$570 million in over 250 developments that will result in more than 11,000 homes that meet the Green Communities Criteria.



Projects developed under the criteria must satisfy all 40 mandatory elements and gain additional points (35 points for new construction or 30 for rehabilitation projects) from optional criteria. The criteria allow flexibility if a particular hardship is demonstrated and an alternative is proposed that meets the intent and accomplishes the same outcome as the criteria. Building projects that

conform to the criteria are eligible for grants, loans, and tax credit equity as incentives. This is currently the only national green building program that requires a minimum number of new homes or apartments to be dedicated to lower-income residents.

The criteria are divided into the following categories:

- Integrated Design Process
- Site, Location, and Neighborhood Fabric
- Site Improvements
- Water Conservation
- Energy Efficiency
- Materials Beneficial to the Environment
- Healthy Living Environment
- Operations and Maintenance

Optional criteria are available in Location and Neighborhood Fabric, Site Improvements, Energy Efficiency, Materials Beneficial to the Environment, and Healthy Living Environment. A review panel evaluates each project for grant approval. As part of the grant requirement, the grantee's architect and construction manager must self-certify compliance with the program criteria.

Mandatory Criteria: Yes, comprehensive

Third Party Certification: No

Building Performance Testing: Optional

Units Certified/Completed as of June 30, 2008: 11,970

www.greencommunitiesonline.org

US Green Building Council's Leadership in Energy and Environmental Design for Homes (LEED for Homes)

The U.S. Green Building Council (USGBC) administers the Leadership in Energy and Environmental Design (LEED) program. LEED for Homes is a voluntary initiative designed to actively promote the transformation of the mainstream home building industry toward more sustainable practices. The long-term goal is to recognize and reward the top 25% of new homes, in terms of environmental stewardship. LEED for Homes applies to market rate and affordable homes, as well single family and multifamily homes.

The program has completed its pilot phase and began its full program in 2008. The program includes mandatory and optional green construction practices in the following categories, for a total of 136 available points:

- Awareness and Education
- Location and Linkages
- Energy and Atmosphere
- Sustainable Sites
- Water Efficiency
- Indoor Environmental Quality
- Materials and Resources
- Innovation and Design Processes



Builders receive credits for achieving criterion in each of the eight criteria categories. LEED for Homes has several performance tiers termed Certified (45-59 points), Silver (60-74 points), Gold (75-89 points), and Platinum (90-136 points). The award level point thresholds are adjusted based on home size. A third-party Provider is responsible for determining the LEED for Homes score and the rating.

The costs of participation in the LEED for Homes Program are established by local or regional Providers plus a registration and certification fee to USGBC based on the number of homes or square footage of multifamily buildings (www.usgbc.org/DisplayPage.aspx?CMSPageID=147). The Provider is responsible for the third-party inspection and performance testing services. These verification and rating services generally require approximately 2 to 3 days per home. The costs vary depending on the size and location of the homes, and the number of green measures to be inspected and tested.

Mandatory Criteria: Yes, moderate

Third-Party Certification: Yes

Building Performance Testing: Yes

ICC-700-2008 National Green Building Standard

The National Association of Home Builders (NAHB), the International Code Council (ICC) and the NAHB Research Center initiated a process in 2007 for the development of a national standard for green home building construction practices beyond current rating systems, following the consensus process of the American National Standards Institute (ANSI). The standard, entitled the “ICC-700 National Green Building Standard (NGBS)” is a voluntary green home building standard that can be adopted by local green home building programs as a conformance guide for single-family, multi-family, remodeling, and site development projects.



The NGBS builds upon the NAHB Model Green Home Building Guidelines developed by the NAHB Research Center in 2004 (see NCHH’s 2006 Comparison of Green Building Guidelines for an analysis of the NAHB Model Green Home Building Guidelines). ANSI approved NGBS in January 2009.

The NGBS includes a minimum number of mandatory construction practices and a mandatory minimum point score based on construction practice options under each principle. There are no maximum limits. For single-family homes, for example, projects reach a threshold by reaching specific point scores: 222 points for Bronze, 406 for Silver, 558 for Gold, and 697 for Emerald. In the indoor environmental quality category, the minimum score is 36 for Bronze, 65 for Silver, 100 for Gold, and 140 for Emerald.

Mandatory Criteria: Yes, limited (mandatory minimum points)

Third-Party Certification: Yes

Units Certified: NA

U.S. Environmental Protection Agency Energy Star with Indoor Air Package Pilot Specifications

The U.S. Environmental Protection Agency (EPA) developed the ENERGY STAR with Indoor Air Package (IAP) Pilot Specifications to recognize homes equipped with a comprehensive set of indoor air quality measures. IAP is targeted to production builders, which according to EPA are the most rapidly growing sector of the home building industry and are highly influential in home building trends. Homes that comply with these specifications can use “Indoor Air Package” as a complementary label to ENERGY STAR for homes. As a prerequisite for this label, a home must first be ENERGY STAR qualified. ENERGY STAR is a performance-based program, which requires qualified homes to be at least 15 % more energy efficient than homes built to the 2004 International Residential Code (IRC), and include additional energy-saving features that typically make them 20–30% more efficient than standard homes. IAP requires a suite of additional prescriptive measures, including:



- Moisture Control
- Radon Control
- Pest Control
- HVAC Systems
- Combustion Safety
- Building Materials
- Home Commissioning

Like Energy Star, IAP requires third-party verification through the Home Energy Rating System (HERS).

Mandatory Criteria: Yes, comprehensive

Third-Party Certification: Yes

Building Performance Testing: Yes

Units Certified: Not Applicable (Pilot Program)

www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_iap

Method of Analysis

We compared the criteria of the four national programs to a detailed list of healthy homes measures that are aligned with NCHH’s seven healthy homes principles. Those principles involve keeping homes:

- Dry
- Clean
- Ventilated
- Safe
- Contaminant-Free
- Pest-Free
- Maintained

These principles were developed by a broad-based expert workgroup of housing and health professionals as part of the federally funded National Healthy Homes Training Center and Network. The principles reflect the latest in scientific research and best practices related to reducing housing-related health hazards. For more information see www.healthyhousing.org/training.

Table 1 presents a detailed analysis comparing each program to the NCHH criteria. The left column presents NCHH’s recommended criteria for achieving the aforementioned principles. We compared each program to these criteria and assigned a score based on the following scoring system:

Score	Green Program Description
3	Includes mandatory criterion equivalent to NCHH criterion
2	Includes mandatory criterion similar to NCHH criterion
1	Includes optional criterion that is similar to NCHH criterion
0	Does not include similar criterion

Table 2 provides summary grades for each program, both by each healthy homes principle and overall. We established a target score for each category by multiplying the number of criteria under each healthy homes principle by 2.5 (average 2 and 3 of the scores listed above). For example, if half of the criteria in a category scored a 3 (i.e., half criterion were mandatory and equivalent to the NCHH standard) and half scored a 2 (i.e., were mandatory and similar but not equivalent to the NCHH standard), then the program would achieve 100% of the target score. The score of 2.5 acknowledges that some differences in the language for a specific criterion are likely and acceptable.

The overall grade (A, B, C, D) for the program was calculated by totaling the scores for all the criteria across categories. This provides all criterion equal weight in arriving at a total grade.

Grading Key

A+	>100% of target score, <i>all</i> NCHH criteria included
A	90-100% of target score.

B	80-89% of target score.
C	70-79% of target score.
D	<69% of target score.

This analysis did not assign a weighting factor to each individual criterion because there are generally insufficient scientific data to support such a judgment. The concept of healthy homes involves taking a holistic approach to the home environment by implementing packages of upgrades, which together can ensure the health, safety, and durability of a home. For this reason, the analysis does not credit programs for establishing a threshold number of points for optional items. By definition, this inclusion of optional items (even to achieve an overall point value) will entail trading off some indoor environmental quality item for another.

Results

Tables 1 and 2 show the results of the analysis.

The Enterprise Community Partners Green Communities Program and the EPA Indoor Air Package Programs ranked the highest among the programs included in the analysis. This is largely due to the fact that they include many mandatory criteria for the indoor environment.

The LEED-H and ICC -700-2008 rating systems include a mixture of mandatory and optional criteria to achieve even the lowest LEED rating of “certifiable”. It is not possible to assess the mix of criteria that a builder will select to comply with the standard. NCHH conservatively rated optional criteria as a 1, thereby reducing the LEED-H score for all such criteria. The NGBS relies substantially on optional criteria with a minimal set of mandatory standards. As such the program received the lowest rating.



The LEED-H and ICC -700-2008 rating systems include a mixture of mandatory and optional criteria to achieve even the lowest LEED rating of “certifiable”. It is not possible to assess the mix of criteria that a builder will select to comply with the standard. NCHH conservatively rated optional criteria as a 1, thereby reducing the LEED-H score for all such criteria. The NGBS relies substantially on optional criteria with a minimal set of mandatory standards. As such the program received the lowest rating.

One reviewer suggested that optional criteria receive greater credit because the flexibility in scoring enables greater program participation. The reviewer also noted that several of the optional healthy homes criteria are pursued by the majority of program participants. The reviewer suggested multiplying the percentage of projects that incorporate the optional measure by the score a measure would have received if it were mandatory as an alternative scoring system. For example, if “landscaping away from a building” would receive a score of 3 as a mandatory element, it would receive a 2.7 if 90% of the program participants selected it as an optional criterion. Although such a nuanced system may reflect a more precise view of the actual compliance with a program’s criteria in a prior year, because programs cannot predict the optional criteria that future projects will select, NCHH felt that these programs could not be scored as highly as those based on mandatory criteria. In addition, NCHH believes that the healthy homes criteria are practical and cost-effective (e.g. avoiding installing carpets in wet areas) and so it is sensible to include them as prerequisites.

Across all the green programs, there is substantial variation in their performance under the *Dry* and *Contaminant-Free* categories with scores ranging from A to D. Energy Star IAP and Green Communities received an A under the Dry category (ENERGY STAR IAP, Green Communities, and LEED-H) because they require extensive moisture control practices. The LEED-H program addresses several aspects of moisture control through its Durability Plan requirement. One concern is that it is not possible to assess whether the plan will always include the most important moisture control elements. Nonetheless, because the durability plans are mandatory and will be evaluated as part of program participation, NCHH rated LEED-H’s Dry criteria as similar to the NCHH specific requirements.

Ensuring structures are properly ventilated is particularly important because of the green building mandate to improve energy efficiency by tightening the building envelope. Energy upgrades can benefit occupant health by increasing comfort and reducing unplanned airflows which can result in moisture problems. Mechanical ventilation helps ensure contaminants and humidity are exhausted to the outside and that the home receives clean, fresh air. NCHH has identified the American Society of Heating, Refrigerating, and Air-Conditioning

Engineers standard 62.2 (ASHRAE 62.2, 2007) as the industry standard for ventilation for buildings of four stories or less, which should be included in all green and healthy programs. All the programs, except NGBS specifically reference ASHRAE 62.2 as the ventilation performance standard.

The evaluation indicates greater consistency across green programs for the *Pest-Free* and *Maintained* categories. All of the programs included criteria to minimize pest infestations following the least toxic methods and to educate homeowners about proper maintenance of their green homes. In contrast, all of the programs included in the analysis overlooked safety (e.g., preventing trips/falls and poisonings), even though the home is the predominant source of unintentional injuries for children in the United States. In addition, the programs missed opportunities to incorporate building finishes that are easy to keep clean (e.g. smooth, cleanable flooring), which help owners reduce allergens and contaminants that may accumulate in a home.

Finally, in this analysis we examined the extent to which the programs incorporate third-party verification. All of the programs, except Enterprise Green Communities, require third-party verification. However, Green Communities does require its participants to certify compliance with the program criteria. It also conducts inspections and performance testing of a sampling of units.

	Enterprise Community Partners Green Communities	ENERGY STAR Indoor Air Package	USGBC LEED Homes	ICC-700 National Green Building Standard
SAFE (5 Criteria – 12.5 points)				
Hot Water Temperature <120 F	0	0	0	0
Locked Medicine Storage Cabinets	0	0	0	0
Shower Grab Bars	0	0	0	0
Smoke Detectors	2	2	2	2
Carbon Monoxide Alarms	3	3	3	1
TOTAL	5 (40%)	5 (40%)	5 (40%)	3 (24%)
CONTAMINANT-FREE (7 Criteria – 17.5 points)				
Low VOC Products	3	0	1	1
Urea Formaldehyde Free Composite Wood Products or Sealed	3	3	1	1
Low VOC Carpet	3	3	1	1
Garage Isolation	3	3	1	2
Smooth Cleanable Low VOC Floors	1	1	1	1
Combustion Venting	2	3	3	1
Radon Test and Mitigation System	3	2	2	2
Smoke-free Policy – optional	0	3	0	1
Use Lead Safe Work Practices - optional applicable only to rehabilitation	3	na	na	3
TOTAL *does not include optional scores	18 (103%)	17 (97%)	10 (57%)	9 (51%)
PEST-FREE (1 Criterion – 2.5 points)				
Rodent Proof Materials	3	3	2	1
TOTAL	3 (120%)	3 (120%)	2 (80%)	1 (40%)
MAINTAINED (2 Criteria – 5 points)				
User's Manual for Health Features	3	3	3	3
Homeowner's Manual for Equipment and Certification	3	2	3	2
TOTAL	6 (120%)	5 (100%)	6 (120%)	5 (100%)
THIRD-PARTY VERIFICATION (1 Criterion - 2.5 points)				
On-Site Inspection	2	3	3	3
TOTAL	2 (80%)	3 (120%)	3 (120%)	2 (120%)

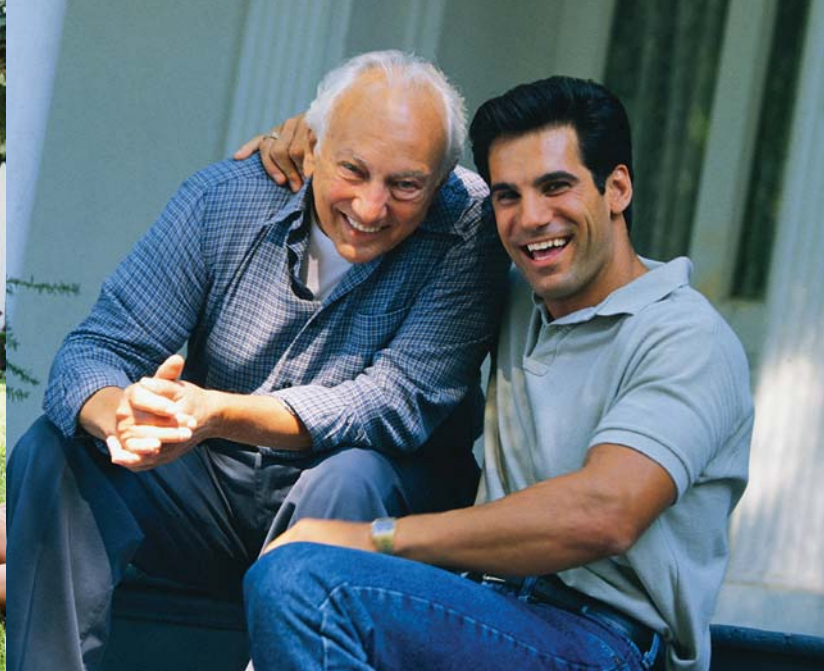
Table 2: National Green Program Health Grades

Health Principles	Enterprise Community Partners Green Communities	EPA Indoor Air Package	USGBC LEED For Homes	ICC-700 National Green Building Standard
DRY	A	A	B	C
CLEAN	D	D	D	D
VENTILATED	A	A+	A	C
SAFE	D	D	D	D
CONTAMINANT-FREE	A	A	D	D
PEST-FREE	A+	A+	B	D
MAINTAINED	A+	A	A+	A
VERIFIED/CERTIFIED	B	A+	A+	A+
OVERALL GRADE *	B	B	C	D

* Based on total score across all criteria in comparison to 85 target score

Grading Key

A+	>100%, <i>all</i> NCHH criteria included
A	90-100% of target score.
B	80-89% of target score.
C	70-79% of target score.
D	<70% of target score.



U.S. Department of Health and Human Services
U.S. Department of Housing and Urban Development

Healthy Housing Inspection Manual



Contents

PREFACE	1
Format of This Manual.....	3
SECTION 1. Healthy Homes Model Resident Questionnaire	4
General Housing Characteristics	5
Indoor Pollutants.....	6
Home Safety	7
Voluntary Health Assessment Data.....	8
SECTION 2. Healthy Homes Visual Assessment Data Collection Form	10
Instructions for Visual Assessment Observations	11
Site (Items 1–29).....	12
Fencing and Gates	12
Grounds or Pavement	12
Children’s Play Areas	14
Other.....	15
<i>Comments, Site Section</i>	17
Building Exterior (Items 30–62).....	18
Doors.....	18
Fire Escapes.....	19
Foundations.....	20
Lighting.....	20
Roofs	21
Walls.....	22
Windows.....	24
<i>Comments, Exterior Section</i>	25
Building Systems (Items 63–81)	26
Electrical Systems	26
Fire Protection	27
HVAC.....	28
<i>Comments, Building Systems Section</i>	30

Common Areas (Items 82–102)	31
Elevators.....	31
Signage	31
Smoking Area	31
Interior Trash	31
Outlets, Switches, Cover Plates	31
Smoke and Carbon Monoxide Detectors.....	32
Walkways/Steps	32
Ceiling.....	32
Floors.....	33
<i>Comments, Common Areas Section</i>	35
Housing Unit (Items 103–196)	36
Bathroom	36
Ceiling, Floors, and Walls.....	38
Doors	40
Electrical	41
Water Heater	42
HVAC System.....	43
Kitchen.....	45
Laundry Area	47
Lighting.....	48
Patio/Porch/Deck/Balcony	48
Smoke and Carbon Monoxide Detectors.....	49
Stairs	50
Windows	50
<i>Comments, Housing Unit Section</i>	51
Other Items (Items 197–229)	52
Garbage and Debris	52
Injury Hazards	52
Childproofing Measures.....	53
Poisoning Hazards	53
Pest Hazards.....	54
Moisture Hazards	55
Swimming Pool, Spa, or Whirlpool	55
Other Hazards	56
<i>Comments, Other Items Section</i>	57
Overall Comments on This Inspection	58

APPENDIX 1: Description of Health and Safety Conditions Identified on the Visual Assessment Form... 59

Site (Items 1–29).....	59
Fencing and Gates	59
Grounds or Pavement	59
Children’s Play Areas	60
Other.....	61
Building Exterior (Items 30–62).....	62
Doors	62
Fire Escapes.....	63
Foundations.....	64
Lighting	64
Roofs	64
Walls	65
Windows	66
Building Systems (Items 63–81)	67
Electrical Systems (Building)	67
Fire Protection (Building).....	68
HVAC (Building).....	69
Common Areas (Items 82–102)	70
Elevators.....	70
Signage	70
Smoking Areas	70
Interior Trash	70
Outlets, Switches, Cover Plates	70
Smoke and Carbon Monoxide Detectors.....	70
Walkways/Steps	70
Ceiling.....	71
Floors.....	71

Housing Unit (Items 103–196)	72
Bathroom	72
Ceiling, Floors, and Walls	74
Doors	74
Electrical	75
Water Heater	76
HVAC	76
Kitchen	77
Laundry Area	79
Lighting	79
Patio/Porch/Balcony	79
Smoke and Carbon Monoxide Detectors	80
Stairs	80
Windows	81
Other Items (Items 197–229)	81
Garbage and Debris	81
Injury Hazards	82
Childproofing Measures	82
Poisoning Hazards	82
Pest Hazards	82
Moisture Hazards	83
Swimming Pool, Spa, or Whirlpool	83
Other Hazards	84
Comments and Notes	84
APPENDIX 2: 2003 International Property Maintenance Code (2003 IPMC) Cross-References.....	85
APPENDIX 3: Additional Resources.....	87
Optional Environmental Sampling Methods: Links to Information on the Internet	87
Selected Web References for Healthy Homes Issues	88

Preface

THE **HEALTHY HOUSING INSPECTION MANUAL** completes the foundation of the Centers for Disease Control and Prevention’s (CDC’s) Healthy Homes Initiative. The manual reflects the ongoing commitment of both CDC and the U.S. Department of Housing and Urban Development (HUD) to work together to provide local jurisdictions with tools to address housing-related health hazards. Development of this manual was supported by the HUD and CDC Healthy Homes Initiatives.

The agencies’ initiatives related to healthy homes were created to develop a holistic approach to healthy housing based on the following broad objectives:

- Broaden the scope of single-issue public health and safety programs—such as childhood lead poisoning prevention, residential asthma intervention, injury prevention—to adopt a holistic approach addressing multiple housing deficiencies that affect health and safety.
- Build competency among environmental public health practitioners, public health nurses, housing specialists, housing owners, housing managers, and others who work in the community so they can incorporate healthy housing activities into their professional activities.
- Develop national healthy homes capacity through crossdisciplinary grants, contracts, and other activities at the federal, state, tribal, and community levels that research and demonstrate low-cost, effective home hazard assessment and intervention methods.
- Develop effective education and outreach materials, with a particular focus on high-risk populations, to increase public awareness of residential hazards and highlight effective actions households can take to reduce the risk for illness and injury.

The *Healthy Housing Inspection Manual* is a model reference tool that local jurisdictions or others may use as is or modify based on local needs. Use of the manual is expected to improve the effectiveness and efficiency of the public health, housing management, and workforces that identify, prevent, and control health problems associated with housing. The manual does not introduce any inspection requirements, nor does it modify any existing inspection requirements for housing agencies, residents, HUD, or CDC. The manual is not a substitute for the Federal Housing Administration (FHA) Minimum Property Standards. Finally, the manual does not propose to establish any regulatory authority for HUD or CDC with regard to residential inspection requirements.

The *Healthy Housing Inspection Manual* takes environmental health professionals and housing managers, specialists, and inspectors through the elements of a holistic home inspection. It is also a useful reference tool for nurses, outreach workers, and others who are interested in preventing illness and injury due to residential health and safety hazards.

The *Healthy Housing Inspection Manual* addresses the broad range of housing deficiencies and hazards that can affect residents' health and safety. The purpose of the manual is to

- improve communication and collaboration among public health professionals, housing professionals, property owners and property managers,
- increase the understanding of the relations among exposure to hazardous agents, conditions in the home, and adverse health outcomes, and
- improve the ability of programs to address an array of housing deficiencies in an efficient, effective, and timely manner.

HUD and CDC have also jointly developed and funded other important activities related to healthy homes, including

- a healthy housing curriculum that addresses the training needs of environmental public health practitioners, public health nurses, housing specialists, and others interested in building local capacity to address housing-related health hazards (Healthy Homes Training Center and Network, <http://www.healthyhomestraining.org>).

- the *Healthy Housing Reference Manual*, which gives public health and housing professionals the tools necessary to ensure that housing stock is safe, decent, and healthy for our citizens, particularly children and the elderly, who are often most vulnerable and spend more time in the home (<http://www.cdc.gov/nceh/publications/books/housing/housing.htm>).

FORMAT OF THIS MANUAL

HUD and CDC recommend that section 1, the Healthy Housing Model Resident Questionnaire (a voluntary health assessment), be completed first. The questionnaire should be used to collect information that cannot be determined visually. Information from the questionnaire can provide important clues that point to housing deficiencies.

SECTION 2, the Visual Assessment Data Collection Form, should be used to collect information that can be determined without asking questions of a resident. This form includes detailed assessment of exterior housing, kitchen, bathroom, and living area, as well as a general building information.

This manual also contains three supporting appendices:

- a data dictionary that defines housing deficiencies listed in the Visual Assessment Data Collection Form;
- a cross-reference to code provisions in the 2003 International Property Maintenance Code (2003 IPMC); and
- additional resources (links to environmental sampling methods and to more information about substances or issues related to healthy housing).

Visual Survey Report

Resident: _____

Alternate Contact: _____

Address: _____

Unit # _____ Unique ID _____

Resident Phone: _____

Visual Conducted by:

Date:

Make a checkmark (✓) if the problem appears in the room or area. For deteriorated paint and water damage, indicate the extent of the problem (see instructions) Use the extra rows to identify any other hazards you notice. Put an asterisk (*) above any room(s) where a child sleeps or plays. Circle (○) where you photograph a problem.

ROOM OR AREA

PROBLEM		Exterior	Porch	Entryway	Living Room	Dining Room	Kitchen	Bedroom 1	Bedroom 2	Bedroom 3	Bathroom 1	Bathroom 2	Basement		
Deteriorated paint	Walls														
	Windows, door, or trim														
	Paint chips on floor														
Soil with no grass or mulch															
Cockroaches															
Rodents															
Holes in wall															
Mold/ Mildew	Obvious source of moisture														
	No obvious source of moisture														
Water Damage: walls wet/newly stained															
Strong musty smell															
Natural gas/sewer gas smell															
Unvented gas oven/dryer/heater															
Worn-out carpeting															
Other:															
Other:															
Other:															
Other:															
Other:															

If renting, received lead hazard disclosure information from landlord? Yes No
Follow-up visit scheduled for: Date _____ Time: _____

Visual Survey Instructions

I. Talk with the resident before you begin:

- Explain that you will draw floor and site plans, take notes, take photographs, collect samples, and possibly leave roach traps, a carbon monoxide alarm, or radon detectors for more than one day.
- Explain what kinds of samples you plan to take after you finish the visual survey.
- If a tenant, ask whether the resident received lead hazard disclosure information from the landlord and note the response in the space provided at the bottom of the **Visual Survey Report**.

2. Survey the exterior and grounds and draw the Site Plan:

The Site Plan is a sketch of the area around the home where you will not any problems you identify and where you collect soil samples. See CEHRC's website for the Site Plan form and an example.

- Walk around outside the building to look at the overall layout of the property.
- On the **Site Plan**, draw the outline of the building and where it sits on the property.
- Label important features on the **Site Plan**:
 - The location of the street and other landmarks
 - Play areas
 - Trash areas (dumpster, trash collection area)
 - Outdoor parking areas
 - Garages or other buildings

3. Note hazards on Site Plan and Visual Survey Report:

- Note the following hazards, **(1)** on the Site Plan, AND **(2)** by making a check mark next to the name of the problem in the “exterior” column on the **Visual Survey Report**:

- **Bare soil (no grass, mulch, or wood shavings) in the yard around the home or in a common outdoor area:** in play areas (in sand boxes, under swing sets, in areas where kids play), along the “dripline” within three feet of the building, and in other areas of the yard.

- **Deteriorated Paint (peeling, flaking, chipping, cracking):**

- Deteriorated in any way
- Paint coming loose from the surface or substrate (wood, plaster, metal, drywall)
- On the home, fences, etc.

- **Holes in the walls of the building.** Look for openings around windows and doors.

- Indicate the extent of the problem for **deteriorated paint and water damage** by noting on the following on the Visual Survey Report:

- N = None

- L = Low (less than 2ft²)

- M = Moderate (2 - 10ft²)

- H = High (10ft² or more)

- E = Extreme (structural damage caused by this problem)

- Note the following hazards on the **Visual Survey Report** only:

- **Rodents or evidence:** Note if you see, or the resident reports seeing, rats or mice, or very small pellets that may be rodent droppings.



- **Other physical conditions that seem hazardous,** such as standing water, woodpiles near exterior walls, accumulated trash, obvious water damage or wood rot, and damaged gutters, downspouts and other

building components.

4. Draw one Floor Plan for each floor of the home:

The Floor Plan shows the layout of the rooms (as seen from above). The Floor Plan makes it easy for you to note where you identify problems. You will also use the Floor Plan to show where you collect samples, leave testing materials for collection, and take photographs.

The Floor Plan does not have to be drawn using exact measurements. It should show the general relationships between rooms in the home and exterior walls. See CEHRC's website for the Floor Plan for and an example.

- Walk through the home to get a good understanding of the overall layout of the rooms.
- Draw the overall outline of the entire home.
- If the home has more than one floor, note which floor each **Floor Plan** represents before you draw it. If the home has two floors, one copy of the floor plan will be marked "**1 of 2**" and the other will be "**2 of 2**". If you draw a plan for an unoccupied basement, mark it "**0**".
- Draw the walls between rooms, then the doors and windows:
 - a. Draw a rectangle for each door. 
 - b. Draw a circle through the line of the wall for each window. 
 - c. Mark the walls of closets to help you keep the walls in perspective and avoid confusion about the doors.
- Label each room using the same names and abbreviations as listed on the **Visual Survey Report**
- Draw an asterisk (*) in rooms where children sleep or play.
- Be sure to note entryway of the home.

5. Perform the Visual Survey: note hazards on both the Floor Plan and Visual Survey Report

- Fill in the top of the **Visual Survey Report** and cross out columns for rooms that are not present. Add names or areas if necessary. If you

do not have enough columns, use a second copy of the report and write “1 of 2” on the first sheet and “2 of 2” on the second.

- Draw a star/asterisk (*) next to the names of rooms where children sleep or play.
- In each room, look for the problems listed below. For each, (1) note the location of each problem on the floor plan using the abbreviation from the key below, AND (2) make a check mark (☑) next to the name of the problem in the column for that room on the **Visual Survey Report**.

a. Deteriorated paint (peeling, flaking, chipping, cracking paint):

- Deteriorated in any way
- Paint coming loose from the painted surface (wood, plaster, metal, drywall)
- Teeth marks on the painted surface.

b. Cockroaches or their remains: Note the location if you see any cockroaches, their shells or debris, or if the resident reports seeing them.

c. Holes in walls between the inside and outside of the building and between rooms. Look for openings around windows and exterior doors.

d. Unvented gas oven, clothes dryer, or heater: An appliance that burns natural gas, kerosene, wood, or other fuel is “unvented” if it does not have a pipe or ductwork that sends the exhaust outside.

e. Mold or fungus or similar stains on the wall, on the carpet, under sinks, outside of showers, or around windows. On the Visual Survey Report, check “obvious source of moisture” if the mold is near a source such as a dripping drain or moisture around a window. If there is no obvious moisture source for the mold, check the other box.

- Indicate the extent of the problem for **deteriorated paint and water damage** by noting on the following on the Visual Survey Report:

- N = None
- L = Low (less than 2ft²)
- M = Moderate (2 - 10ft²)
- H = High (10ft² or more)
- E = Extreme (structural damage caused by this problem)

- On the **Visual Survey Report** only, note the following potential problems:
 - a. Walls appear wet or newly stained, or the plaster or drywall is bulging.**
 - b. Rodents or evidence:** Note if you see, or the resident reports seeing, rats or mice, or very small pellets that may be rodent droppings.
 - c. Strong musty smell like mold or fungus.**
 - d. Natural gas or sewer gas smell.** If you think you smell natural gas, advise the resident to call the gas company immediately.
 - e. Old or worn-out carpeting if in poor condition or extremely dirty.**
 - f. Other:** write in additional physical conditions that seem problematic (such as other odors, water leaks, etc.)

6. Double-check the Visual Survey Report, Floor Plan, and Site Plan:

- The resident's name, address, and unit number, and your name should be filled in.
- Make sure the names of the rooms on the **Floor Plan(s)** match those on the **Visual Survey Report**.

7. Determine further testing needs and locations:

Plan to take samples if you have identified any of the following:

- Deteriorated paint (lead)
- Bare soil (lead)
- Water damage (lead, mold and moisture)
- Unvented appliances (carbon monoxide)
- Cockroaches or evidence

8. Provide follow-up instructions, schedule the next visit, and thank the resident:

- Explain approximately when and how the **Summary Results Report** will be presented.

Schedule a time when someone will be home if you need to return to collect tests for carbon monoxide, cockroaches or radon, and note this on the Visual Survey Report.

Pediatric Environmental Home Assessment

HOME VISIT EXERCISE ANSWER SHEET

RESIDENT REPORTED INFORMATION

Bolded responses indicate areas of greater concern.

General Housing Characteristics

Type of ownership	<input type="checkbox"/> Own house	<input type="checkbox"/> Market rate rental hsg.	<input type="checkbox"/> Subsidized rental hsg.	<input type="checkbox"/> Shelter	
Age of home	<input type="checkbox"/> Pre-1950	<input type="checkbox"/> 1950 -1978	<input type="checkbox"/> Post-1978	<input type="checkbox"/> Don't know	
Structural foundation	<input type="checkbox"/> Basement	<input type="checkbox"/> Slab on grade	<input type="checkbox"/> Crawlspace	<input type="checkbox"/> Don't know	
Floors lived in (check all that apply)	<input type="checkbox"/> Basement	<input type="checkbox"/> 1 st	<input type="checkbox"/> 2 nd	<input type="checkbox"/> 3 rd or higher	
Heating	Fuel used	<input type="checkbox"/> Natural gas / LPG	<input type="checkbox"/> Oil	<input type="checkbox"/> Electric	<input type="checkbox"/> Wood
	Sources in home	<input type="checkbox"/> Radiators	<input type="checkbox"/> Forced hot air vents	<input type="checkbox"/> Space heater or oven	<input type="checkbox"/> Other: _____
	Filters changed	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know	<input type="checkbox"/> No filter
	Control	<input type="checkbox"/> Easy to control heat	<input type="checkbox"/> Hard to control heat		
Cooling	<input type="checkbox"/> Windows	<input type="checkbox"/> Central/window AC	<input type="checkbox"/> Fans	<input type="checkbox"/> None	
Ventilation (check all that apply)	<input type="checkbox"/> Opens windows	<input type="checkbox"/> Kitchen & bathroom fans	<input type="checkbox"/> Central ventilation		

NOTES:

Indoor Pollutants

Mold and moisture	<input type="checkbox"/> Uses dehumidifier <input type="checkbox"/> No damage	<input type="checkbox"/> Uses vaporizer or humidifier	<input type="checkbox"/> Musty odor evident	<input type="checkbox"/> Visible water / mold damage	
Pet	Presence	<input type="checkbox"/> No pets	<input type="checkbox"/> Cat # _____	<input type="checkbox"/> Dog # _____	<input type="checkbox"/> Other: _____
	Management	<input type="checkbox"/> Kept strictly outdoors	<input type="checkbox"/> Not allowed in patient's bedroom	<input type="checkbox"/> Full access in home	<input type="checkbox"/> Sleeping location: _____
Pests	Cockroaches	<input type="checkbox"/> None	<input type="checkbox"/> Family reports	<input type="checkbox"/> Evidence seen	Present in <input type="checkbox"/> kitchen <input type="checkbox"/> bedroom <input type="checkbox"/> other
	Mice	<input type="checkbox"/> None	<input type="checkbox"/> Family reports	<input type="checkbox"/> Evidence seen	Present in <input type="checkbox"/> kitchen <input type="checkbox"/> bedroom <input type="checkbox"/> other
	Rats	<input type="checkbox"/> None	<input type="checkbox"/> Family reports	<input type="checkbox"/> Evidence seen	Present in <input type="checkbox"/> kitchen <input type="checkbox"/> bedroom <input type="checkbox"/> other
	Bedbugs	<input type="checkbox"/> None	<input type="checkbox"/> Family reports	<input type="checkbox"/> Evidence seen	Present in <input type="checkbox"/> bedroom <input type="checkbox"/> other
Lead paint hazards	<input type="checkbox"/> Tested and passed	<input type="checkbox"/> Tested, failed, and mitigated	<input type="checkbox"/> Not tested/Don't know	<input type="checkbox"/> Loose, peeling, or chipping, paint	
Asbestos	<input type="checkbox"/> Tested – None present	<input type="checkbox"/> Tested, failed, and mitigated	<input type="checkbox"/> Not tested/Don't know	<input type="checkbox"/> Damaged material	
Radon	<input type="checkbox"/> Tested and passed	<input type="checkbox"/> Tested, failed, and mitigated	<input type="checkbox"/> Not tested/Don't know	<input type="checkbox"/> Failed test but not mitigated	
Health and Safety Alarms	<input type="checkbox"/> Smoke alarm working and well placed	<input type="checkbox"/> CO alarm working and one on each floor	<input type="checkbox"/> CO alarm does not log peak level	<input type="checkbox"/> No smoke alarm <input type="checkbox"/> No CO alarm	
Tobacco smoke exposure	<input type="checkbox"/> No smoking allowed	<input type="checkbox"/> Smoking only allowed outdoors	<input type="checkbox"/> Smoking allowed indoors <input type="checkbox"/> bedroom <input type="checkbox"/> playroom	<input type="checkbox"/> Total # smokers in household: _____ <input type="checkbox"/> Mother smokes	
Other irritants	<input type="checkbox"/> None	<input type="checkbox"/> Air fresheners	<input type="checkbox"/> Potpourri, incense, candles	<input type="checkbox"/> Other strong odors: _____	
Type of cleaning	<input type="checkbox"/> Standard Vacuum (non HEPA)	<input type="checkbox"/> HEPA vacuum	<input type="checkbox"/> Damp mop and damp dusting	<input type="checkbox"/> Sweep or dry mop	
Cleaning products used	<input type="checkbox"/> Labeled non-toxic	<input type="checkbox"/> Bleach	<input type="checkbox"/> Ammonia	<input type="checkbox"/> Other: _____	

NURSE OBSERVED INFORMATION

Bolded responses indicate areas of greater concern.

Home Environment					
Drinking Water Source		<input type="checkbox"/> Public water system	<input type="checkbox"/> Household Well		
Kitchen	Cleanliness	<input type="checkbox"/> No soiling	<input type="checkbox"/> Trash or garbage sealed	<input type="checkbox"/> Trash or garbage not sealed	<input type="checkbox"/> Wall/ceiling/floor damage
	Ventilation	<input type="checkbox"/> Functioning stove exhaust fan/vent	<input type="checkbox"/> Mold growth present	<input type="checkbox"/> Broken stove exhaust fan/vent	<input type="checkbox"/> No stove exhaust fan/vent
Bathroom		<input type="checkbox"/> Functioning exhaust fan/vent/window	<input type="checkbox"/> Mold growth present	<input type="checkbox"/> Needs cleaning and maintenance	<input type="checkbox"/> Wall/ceiling/floor damage
Basement		<input type="checkbox"/> None/No Access	<input type="checkbox"/> Mold growth present	<input type="checkbox"/> Needs cleaning and maintenance	<input type="checkbox"/> Wall/ceiling/floor damage
Living Room		<input type="checkbox"/> No soiling	<input type="checkbox"/> Mold growth present	<input type="checkbox"/> Needs cleaning and maintenance	<input type="checkbox"/> Wall/ceiling/floor damage
Laundry area		<input type="checkbox"/> None	<input type="checkbox"/> Well maintained	<input type="checkbox"/> Dryer not vented	<input type="checkbox"/> Hang clothes to dry
Sleep Environment					
Patient's sleep area	<input type="checkbox"/> Own room	<input type="checkbox"/> Shared # in room _____	<input type="checkbox"/> Other		
# Beds	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> More than 2	
Allergen impermeable encasings on beds	<input type="checkbox"/> On mattress and boxspring (zippered)	<input type="checkbox"/> On mattress only (zippered)	<input type="checkbox"/> On mattress (not zippered)	<input type="checkbox"/> No mattress covers	
Pillows	<input type="checkbox"/> Allergen-proof	<input type="checkbox"/> Washable	<input type="checkbox"/> Feather/ down		
Bedding	<input type="checkbox"/> Washable	<input type="checkbox"/> Wool/not washable	<input type="checkbox"/> Feather/ down		
Flooring	<input type="checkbox"/> Hardwood/Tile/Linoleum	<input type="checkbox"/> Small area rug	<input type="checkbox"/> Large area rug	<input type="checkbox"/> Wall-to-wall carpet	
Dust/mold catchers	<input type="checkbox"/> Stuffed animals/washable toys <input type="checkbox"/> No clutter	<input type="checkbox"/> Non-washable toys	<input type="checkbox"/> Plants	<input type="checkbox"/> Other _____	
Window	<input type="checkbox"/> Washable shades/curtains	<input type="checkbox"/> Washable blinds	<input type="checkbox"/> Curtains/ drapes	<input type="checkbox"/> No window/poor ventilation	
Other irritants	<input type="checkbox"/> Abundant cosmetics and fragrances				

Home Safety <i>* can indicate housing code violations</i>					
General					
Active renovation or remodeling	<input type="checkbox"/> Yes	<input type="checkbox"/> No			
*Stairs, protective walls, railings, porches	<input type="checkbox"/> Yes	<input type="checkbox"/> No			
*Hallway lighting	<input type="checkbox"/> Adequate	<input type="checkbox"/> Inadequate			
Poison control number	<input type="checkbox"/> Posted by phone	<input type="checkbox"/> Not posted by phone			
**Family fire escape plan	<input type="checkbox"/> Developed and have copy available	<input type="checkbox"/> None			


Electrical appliances (radio, hair dryer, space heater)	<input type="checkbox"/> Not used near water	<input type="checkbox"/> Used near water BATHROOM		
Matches and lighters stored	<input type="checkbox"/> Out of child's reach	<input type="checkbox"/> Within child's reach		
Exterior environment	<input type="checkbox"/> Well maintained	<input type="checkbox"/> Abundant trash and debris	<input type="checkbox"/> Chipping, peeling paint	<input type="checkbox"/> Broken window(s)


NURSE OBSERVED INFORMATION (continued)

Child Safety				
Young Children Present	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
Coffee, hot liquids, and foods	<input type="checkbox"/> Out of child's reach	<input type="checkbox"/> Within child's reach		
Cleaning supplies stored	<input type="checkbox"/> Out of child's reach	<input type="checkbox"/> Within child's reach		
Medicine and vitamins stored	<input type="checkbox"/> Out of child's reach	<input type="checkbox"/> Within child's reach		
Child (less than six years old) been tested for lead poisoning	<input type="checkbox"/> Within past 6 months Result: _____	<input type="checkbox"/> Within past year or more. When? <1 year Result: <10	<input type="checkbox"/> No	
Child watched by an adult while in the tub	<input type="checkbox"/> Always	<input type="checkbox"/> Most of the time	<input type="checkbox"/> No	
*Home's hot water temperature	<input type="checkbox"/> <120 F	<input type="checkbox"/> >120 F	<input type="checkbox"/> Don't know	
Non-accordion toddler gates used	<input type="checkbox"/> At top of stairs	<input type="checkbox"/> At bottom of stairs	<input type="checkbox"/> No	
Crib mattress	<input type="checkbox"/> Fits well	<input type="checkbox"/> Loose	<input type="checkbox"/> NA	
Window guards	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
Window blind cords	<input type="checkbox"/> Split cord	<input type="checkbox"/> Looped cord		

NOTES:

Funded by The U.S. Environmental Protection Agency


 and developed by


National Center for Healthy Housing

10227 Wincopin Circle, Suite 200 • Columbia, MD 21044 • Tel. (410) 992-0712
www.centerforhealthyhousing.org

With thanks to

N • E • E • T • F

The National Environmental Education & Training Foundation

We credit its *Environmental Management of Pediatric Asthma: Guidelines for Health Care Providers*
and model Pediatric Environmental History Form

and



The Center for Healthy Homes and Neighborhoods at Boston University

We credit its model Pediatric Asthma-Allergy Home Assessment form

Pediatric Environmental Home Assessment Form

NURSING PLAN OF ACTION

After completing the assessment, use this as a guide for patient education and recommending corrective action for potential residential hazards. This care plan does not address education related to medical management of asthma or other conditions.

General Housing Characteristics		
CONCERN	NURSE TO DO	FAMILY TO DO
Age of home	<ul style="list-style-type: none"> <input type="checkbox"/> If built before 1978, educate as follows: <ul style="list-style-type: none"> ○ Home is likely to have lead paint. ○ Lead hazards can be harmful to young children’s health and development. ○ If family has a child less than six years old then it is important to test for lead hazards. ○ If deteriorated paint is observed, encourage family to place temporary barriers to prevent children’s contact with the paint. <input type="checkbox"/> Get more information about lead testing at www.epa.gov/lead/ and provide to family. <input type="checkbox"/> Get more information on lead safe work practices from http://www.hud.gov/offices/lead/training/index.cfm and provide to family. <input type="checkbox"/> Have information on state and local CLPPP services and provide to family. <input type="checkbox"/> Be prepared to demonstrate lead-safe cleaning techniques <input type="checkbox"/> Review items in “Family To Do” column with family. 	<ul style="list-style-type: none"> <input type="checkbox"/> If your child is less than six years old, contact the childhood lead poisoning prevention program (CLPPP) at your state and local departments of health. <input type="checkbox"/> Consider getting a lead paint inspection or risk assessment to determine whether there are lead hazards in your home. <input type="checkbox"/> If there are hazards, repair them based on state and local regulations and requirements. Consult with state CLPPP or Dept. of Environment for lists of trained contractors. <input type="checkbox"/> If planning “do-it-yourself” repairs, take a Lead Safe Work practices course and follow the instructions in “Lead Paint Safety: A Field Guide for Painting, Home Maintenance, and Renovation Work”, or other state and local guidance. <input type="checkbox"/> Until potential paint hazards can be addressed, place temporary barriers to children’s contact with deteriorated paint and begin damp mopping and dusting windows, doors, trim, and floors as demonstrated.
Heating source - Other: Kerosene heaters, space heaters, fireplaces, wood stoves	<ul style="list-style-type: none"> <input type="checkbox"/> Counsel family about the dangers of such heating sources in terms of fire safety and indoor air quality. <input type="checkbox"/> Get more information about indoor air quality and combustion sources in the home at http://www.epa.gov/iaq/combust.html and provide to family. <input type="checkbox"/> Review items in “Family To Do” column with family. 	<ul style="list-style-type: none"> <input type="checkbox"/> Make sure kerosene heaters are vented to the outdoors or not used. <input type="checkbox"/> Make sure space heaters are at least 3 feet from anything flammable. <input type="checkbox"/> When necessary, use only 12 or 14 gauge extension cords (the lower the better). <input type="checkbox"/> Ensure that there is a good seal on fireplace screen or woodstove doors. <input type="checkbox"/> Do not use charcoal grills to heat or cook inside the home. <input type="checkbox"/> Call utility company immediately if you smell natural gas. Open window and evacuate the home of people and pets.
Filters	<ul style="list-style-type: none"> <input type="checkbox"/> Counsel family to do proper filter maintenance. <input type="checkbox"/> Review items in “Family To Do” column with family. 	<ul style="list-style-type: none"> <input type="checkbox"/> Change filters quarterly. <input type="checkbox"/> Use filters which are rated MERV 10.

Indoor Pollutants		
CONCERN	NURSE TO DO	FAMILY TO DO
Vaporizers/Humidifiers	<ul style="list-style-type: none"> <input type="checkbox"/> Counsel the family about the importance of proper vaporizer/humidifier maintenance and impact of mold growth on patient health. <input type="checkbox"/> Get more information about humidifier maintenance at http://www.epa.gov/iaq/pubs/humidif.html and provide to family. <input type="checkbox"/> Review items in “Family To Do” column with family. 	<ul style="list-style-type: none"> <input type="checkbox"/> Change the water daily with clean cold water. <input type="checkbox"/> Use distilled or demineralized water. <input type="checkbox"/> Clean humidifier every 3 days. Follow manufacturer’s instructions. <input type="checkbox"/> Change filter regularly. Follow manufacturer’s instructions. Change more often if dirty. <input type="checkbox"/> Keep surrounding area dry. <input type="checkbox"/> Drain and clean humidifier before storing. <input type="checkbox"/> Only run humidifier a few hours a day to avoid mold growth.
Mold/Musty odor	<ul style="list-style-type: none"> <input type="checkbox"/> Educate family about the importance of keeping things dry and the impact of mold on family health. <input type="checkbox"/> Get more information at http://www.epa.gov/mold/moldguide.html and provide to family. <input type="checkbox"/> Review items in “Family To Do” column with family. 	<ul style="list-style-type: none"> <input type="checkbox"/> Any mold or musty odor must be investigated for a source of water. Examine plumbing, roofing, or other possible leaks. <input type="checkbox"/> If homeowner, make necessary repairs. <input type="checkbox"/> If renter, talk with your landlord about needed repairs. Consider calling the local board of health for possible code violations. <input type="checkbox"/> Run bathroom and kitchen fans for at least 30 minutes to remove moisture. Wipe shower walls after bathing. <input type="checkbox"/> Wipe condensation from windows regularly. <input type="checkbox"/> Do not hang clothes inside the house to dry. <input type="checkbox"/> Contact local health department if you smell “rotten eggs” or sewer-type gas in the home.

Indoor Pollutants (continued)		
CONCERN	NURSE TO DO	FAMILY TO DO
Pets	<ul style="list-style-type: none"> <input type="checkbox"/> If patient is allergic to pets, educate as follows: <ul style="list-style-type: none"> <input type="checkbox"/> Pets should not be allowed in bedrooms. <input type="checkbox"/> If possible, pets should be given away. <input type="checkbox"/> If pets cannot be given away, wash and groom pet to reduce allergens. <input type="checkbox"/> Identify low-cost sources/loaner programs for HEPA vacuums and provide information to family. <input type="checkbox"/> Review items in "Family To Do" column with family. 	<ul style="list-style-type: none"> <input type="checkbox"/> If symptomatic, get allergen testing to determine if you are allergic to pets. <input type="checkbox"/> Frequently vacuum areas where pets spend time. Use a HEPA- vacuum if possible. <input type="checkbox"/> Wash all bedding regularly in hot water. <input type="checkbox"/> Groom pets outside.
Infestations (mice, rats, cockroaches)	<ul style="list-style-type: none"> <input type="checkbox"/> Educate family about pest management and behavior change. <input type="checkbox"/> Identify resources in the local community for Integrated Pest Management services or equipment. <input type="checkbox"/> Identify local health department numbers for rodent control and inspection and provide to family. <input type="checkbox"/> Get more information and order print materials at www.epa.gov/pesticides/catalogue and provide to family. <input type="checkbox"/> Review items in "Family To Do" column with family. 	<ul style="list-style-type: none"> <input type="checkbox"/> Eliminate water and food sources. Seal garbage and all foodstuffs. Look for water leaks. <input type="checkbox"/> Call local board of health for inspection. <input type="checkbox"/> AVOID "bombs" of pesticides. Use baits, gels and traps. Place these out of child's reach/ <input type="checkbox"/> Hire, or talk to your landlord about hiring, an exterminator for "Integrated Pest Management" which does NOT include spraying pesticides.
Lead paint hazards	<ul style="list-style-type: none"> <input type="checkbox"/> See "Age of Home" above. <input type="checkbox"/> Have information on state and local CLPPP services and provide to family. <input type="checkbox"/> If family has a history with a history of elevated blood lead levels, verify that the family is receiving case management from the state or local CLPPP. Or make a referral to that program. Report observations and teaching provided at this visit to the CLPPP case manager <input type="checkbox"/> Review items in "Family To Do" column with family. 	<ul style="list-style-type: none"> <input type="checkbox"/> See "Age of Home" above. <input type="checkbox"/>
Radon	<ul style="list-style-type: none"> <input type="checkbox"/> Be familiar with the areas of high radon in your community. <input type="checkbox"/> Educate family about impact of radon on health. <input type="checkbox"/> Get more information about radon and radon testing at www.epa.gov/radon/ and provide to family. <input type="checkbox"/> Review items in "Family To Do" column with family. 	<ul style="list-style-type: none"> <input type="checkbox"/> Consider purchasing a radon home test kit. <input type="checkbox"/> Consult with your state and local departments of health about radon.
Asbestos	<ul style="list-style-type: none"> <input type="checkbox"/> Educate family about impact of asbestos on health. <input type="checkbox"/> Get more information about asbestos testing at www.epa.gov/asbestos/ and provide to family. <input type="checkbox"/> Review items in "Family To Do" column with family. 	<ul style="list-style-type: none"> <input type="checkbox"/> Do not disturb any surfaces which might contain asbestos. Do not attempt to remove asbestos on your own. <input type="checkbox"/> If cracked or crumbling asbestos insulation is visible, tack plastic to walls to encase the insulation until a trained contractor can address the problem. <input type="checkbox"/> Consult with your state and local departments of health about asbestos.

<p>Smoke alarm/CO alarm</p>	<ul style="list-style-type: none"> <input type="checkbox"/> If no smoke alarms, educate about risks and local laws regarding the presence of smoke alarms. <input type="checkbox"/> Counsel family to : <ul style="list-style-type: none"> <input type="checkbox"/> Install smoke alarms in home on every level and in every sleeping area. <input type="checkbox"/> Test them once a month. <input type="checkbox"/> Replace the batteries at least twice a year. <input type="checkbox"/> Replace alarms every 10 years. <input type="checkbox"/> If combustion appliances but no CO alarms, educate about risks and local laws regarding the presence of CO alarms. Change batteries twice a year. <input type="checkbox"/> Provide occupant with local CO alarm requirements. <input type="checkbox"/> Review items in "Family To Do" column with family. 	<ul style="list-style-type: none"> <input type="checkbox"/> If no smoke alarms, then: <ul style="list-style-type: none"> <input type="checkbox"/> Purchase smoke alarms. Ensure that there is an operational smoke alarm on every floor of the home and in every sleeping area. <input type="checkbox"/> Test alarms monthly and change batteries twice a year. <input type="checkbox"/> Call local board of health for local smoke alarm requirements. Some states have laws regarding presence of smoke alarms. <input type="checkbox"/> If combustion appliances but no CO alarms, then: <ul style="list-style-type: none"> <input type="checkbox"/> Make sure to purchase CO alarms which log peak levels. <input type="checkbox"/> Ensure that there is an operational CO alarm on every floor of the home and in every sleeping area. <input type="checkbox"/> Some states now have laws regarding presence of CO alarms. <p>If the power goes out, do not burn candles, use other heating sources unless there is a supply of fresh air in the room at all times.</p>
<p>Tobacco Smoke</p> <p>Exposure</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Educate about risks of environmental tobacco smoke (ETS) to children. <input type="checkbox"/> Identify local smoking cessation programs and provide to families. <input type="checkbox"/> Get more information about ETS at http://www.epa.gov/smokefree/index.html and provide to family. <input type="checkbox"/> Review items in "Family To Do" column with family. 	<ul style="list-style-type: none"> <input type="checkbox"/> Choose not to smoke in your home and car and do not allow family and visitors to do so. Infants and toddlers are especially vulnerable to the health risks from secondhand smoke. <input type="checkbox"/> Do not allow childcare providers or others who work in your home to smoke. <input type="checkbox"/> Until you can quit, choose to smoke outside. Moving to another room or opening a window is not enough to protect your children. <input type="checkbox"/> Get help to stop smoking. Refer to EPA Smokefree Home pledge website www.epa.gov/smokefree and contact local smoking cessation services. <input type="checkbox"/> Do not burn candles, incense, or other products in the home if children or adults with respiratory problems live there.

Home Environment		
CONCERN	NURSE TO DO	FAMILY TO DO
Other Irritants (scents, potpourri)	<ul style="list-style-type: none"> <input type="checkbox"/> If air fresheners present, educate as follows: <ul style="list-style-type: none"> o Many air fresheners have volatile organic compounds (VOC) which trigger asthma. Avoid these products whenever possible. <input type="checkbox"/> Get more information about VOCs at http://www.epa.gov/iaq/voc.html and provide to family. <input type="checkbox"/> Review items in “Family To Do” column with family. 	<ul style="list-style-type: none"> <input type="checkbox"/> Remove air fresheners from home. <input type="checkbox"/> Do not use products to “freshen” carpets. <input type="checkbox"/> Use cleaners/detergents labelled “fragrance-free”.
Cleaning	<ul style="list-style-type: none"> <input type="checkbox"/> Educate about benefits of wet mopping. <input type="checkbox"/> Identify low-cost sources/loaner programs for HEPA vacuums and provide information to family. <input type="checkbox"/> Demonstrate the 3-bucket lead safe cleaning practices if deteriorated paint is observed. <input type="checkbox"/> Review items in “Family To Do” column with family. 	<ul style="list-style-type: none"> <input type="checkbox"/> Avoid dry mopping or sweeping which makes dust airborne and may trigger an asthma exacerbation. Use wet mopping instead. <input type="checkbox"/> Use a HEPA-vacuum when possible.
Drinking Water Source – Public water supply	<ul style="list-style-type: none"> <input type="checkbox"/> Know local resources for water testing and provide to family. <input type="checkbox"/> Get more information about water testing at www.epa.gov/safewater/labs <input type="checkbox"/> Find out if the public water supplier has notified consumers of any violations of health-based standards in the last year. Provide this to family. <p>Review items in “Family To Do” column with family</p> <ul style="list-style-type: none"> <input type="checkbox"/> 	<ul style="list-style-type: none"> <input type="checkbox"/> Test water for lead. Contact local or state department of health for water testing information. <input type="checkbox"/> Run water each morning for at least 3 minutes to clear pipes. <input type="checkbox"/> Use cold water to make formula.

Home Environment (continued)

CONCERN	NURSE TO DO	FAMILY TO DO
<p>Drinking Water Source – Household well water</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Ask these additional questions: <ul style="list-style-type: none"> <input type="checkbox"/> Has the water been tested within the last year? <input type="checkbox"/> If water has been identified as contaminated, does family use bottled water? <input type="checkbox"/> Are infants, pregnant women in the household? If so, encourage testing for nitrates. <input type="checkbox"/> Are there noticeable changes in water taste, odor, color or clarity? (In this case, especially if pregnant woman or infant is in the household, recommend testing more than once a year). <input type="checkbox"/> Has there been a chemical or fuel spill leak near water supply? (If yes, recommend testing for chemical contaminants, such as volatile organic compounds). <input type="checkbox"/> Provide local health department contact information for water testing. <input type="checkbox"/> Get more information about water testing at www.epa.gov/safewater/labs <input type="checkbox"/> Review items in “Family To Do” column with family. 	<ul style="list-style-type: none"> <input type="checkbox"/> Test well water for lead, nitrates, and bacteria annually. Contact local or state department of health for water testing information. <input type="checkbox"/> Family should never dump chemicals into the yard or septic system. This prevents well drinking water contamination. <input type="checkbox"/> Avoid use of pesticides and fertilizers in the yard whenever possible. These can filter into water supplies. <input type="checkbox"/> Run water each morning for at least 3 minutes to clear pipes. <input type="checkbox"/> Use cold water to make formula.
<p>Mold</p>	<ul style="list-style-type: none"> <input type="checkbox"/> See “Mold and Musty Odor” recommendations above. Review items in “Family To Do” column with family. 	<ul style="list-style-type: none"> <input type="checkbox"/> See “Mold and Musty Odor” recommendations above. <input type="checkbox"/> Make sure fans in bathroom and kitchen vent to the outside, not just in to walls. The goal is to take moisture out of home.
<p>Damage</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Educate about mold risks as they relate to damage. <input type="checkbox"/> If family owns home, then counsel to change behaviors. <input type="checkbox"/> If family rents home, then counsel them to talk with their landlord. <input type="checkbox"/> Review items in “Family To Do” column with family. 	<ul style="list-style-type: none"> <input type="checkbox"/> If homeowner, then make necessary repairs. <input type="checkbox"/> If renter, then talk with your landlord about needed repairs. Consider calling the local board of health for possible code violations.

Sleeping Area		
CONCERN	NURSE TO DO	FAMILY TO DO
Mattress covers	<input type="checkbox"/> If patient is allergic to dust mites, educate as follows: <ul style="list-style-type: none"> ○ Use allergen impermeable mattress covers with zippers on beds and pillows. <input type="checkbox"/> Review items in “Family To Do” column with family.	<input type="checkbox"/> If symptomatic, get allergen testing to determine if you are allergic to dust mites. <input type="checkbox"/> Wash all bedding weekly in hot water. Including blankets, bed covers. <input type="checkbox"/> Wet wipe or vacuum impermeable mattress covers weekly.
Carpet	<input type="checkbox"/> Review items in “Family To Do” column with family.	<input type="checkbox"/> Clean wall to wall carpet with vacuum weekly. <input type="checkbox"/> Shake area rugs outside weekly. <input type="checkbox"/> If carpet is more than 8 years old, consider replacing it with smooth wipeable flooring to reduce dust exposure.
Dust catchers	<input type="checkbox"/> Review items in “Family To Do” column with family.	<input type="checkbox"/> Reduce dust with less clutter. <input type="checkbox"/> Seal clutter in bags or boxes. <input type="checkbox"/> Use wire shelving so dust can settle to closet floors and be vacuumed up.
Windows	<input type="checkbox"/> If patient is allergic to dust mites, review items in “Family To Do” column with family.	<input type="checkbox"/> If symptomatic, get allergen testing to determine if you are allergic to dust. <input type="checkbox"/> Use window treatments that are wipeable. <input type="checkbox"/> Avoid curtains and drapes to reduce excessive dust exposure. <input type="checkbox"/> Use window guards or prevent windows from opening more than 4” if young children are in the room.

Home Safety		
General Safety		
CONCERN	NURSE TO DO	FAMILY TO DO
Renovation/remodeling	<input type="checkbox"/> See "Age of Home" above. <input type="checkbox"/> Review items in "Family To Do" column with family.	<input type="checkbox"/> See "Age of Home" above. <input type="checkbox"/> If the home was built pre-1978 and there is a child less than six years old: <ul style="list-style-type: none"> ○ Get a lead paint inspection or risk assessment. ○ Repair any lead hazards based on state and local regulations and requirements. Consult with state CLPPP. <input type="checkbox"/> If the home was built pre-1978 and there is no child less than six years old: <ul style="list-style-type: none"> ○ Consult with the CLPPP at your state and local departments of health about lead-safe renovation. ○ Change behaviors, such as modifying dust generating techniques and containing the work area. ○ Hire contractors trained in Lead Safe Work Practice or get this training if you are doing the work yourself. ○
Stairs, walls, railings, porches, lighting	<input type="checkbox"/> If family owns home, then counsel to change behaviors, such as making minor repairs to fix loose railings. <input type="checkbox"/> If family rents home, then counsel them to talk with their landlord. <input type="checkbox"/> Review items in "Family To Do" column with family.	<input type="checkbox"/> If homeowner, make necessary repairs consistent with local building codes.. <input type="checkbox"/> If renter, talk with your landlord about needed repairs. Consider calling the local board of health for possible code violations. <input type="checkbox"/> Spaces between railings should be no more than 4" to prevent accidental injury. <input type="checkbox"/> Compact fluorescent light bulbs can reduce energy costs. <input type="checkbox"/> Do not use throw rugs near stairs or in bathrooms. These can be trip and fall hazards.
Poison control	<input type="checkbox"/> Provide national poison control number 1-800-222-1222 to family. <input type="checkbox"/> Review items in "Family To Do" column with family.	<input type="checkbox"/> Post the national poison control number 1-800-222-1222 near telephone. <input type="checkbox"/> Keep all medicines, vitamins, cleaners, pesticides, paints, solvents, and other chemicals out of sight and out of reach of children, in locked cabinets wherever possible.

General Safety (continued)		
CONCERN	NURSE TO DO	FAMILY TO DO
Family fire escape plan	<input type="checkbox"/> Counsel to change behaviors, such as develop a family safety plan. <input type="checkbox"/> Get more fire safety information at http://www.usa.safekids.org/sites/default/files/documents/fpw_checklist.pdf <input type="checkbox"/> Review items in “Family To Do” column with family.	<input type="checkbox"/> Develop a family safety plan. <input type="checkbox"/> Know two ways out of the house. <input type="checkbox"/> Have a place to meet after you are outside the house. <input type="checkbox"/> Teach children the family safety plan for escaping your home in a fire. <input type="checkbox"/> Practice plan at least twice a year.
Electrical appliance	<input type="checkbox"/> Counsel to change behavior. <input type="checkbox"/> Review items in “Family To Do” column with family.	<input type="checkbox"/> Do not use electrical appliances near water. <input type="checkbox"/> Have Ground Fault Circuit Interrupters installed on electrical outlets near water. <input type="checkbox"/> Use outlet covers. <input type="checkbox"/> Repair or throw away any appliance with frayed wiring.
Matches and lighters	<input type="checkbox"/> Counsel to change behavior. <input type="checkbox"/> Review items in “Family To Do” column with family.	<input type="checkbox"/> Do not store matches and lighters where children can reach them.
Exterior environment	<input type="checkbox"/> If abundant trash and debris, counsel family about waste management. <input type="checkbox"/> If waste containment is the problem, counsel family to talk with landlord. <input type="checkbox"/> See “Infestations” above. <input type="checkbox"/> If the home was built pre-1978, contact the childhood lead poisoning prevention program (CLPPP) at your state and local departments of health for information about chipping, peeling paint. See “Age of Home” above. <input type="checkbox"/> Review items in “Family To Do” column with family.	<input type="checkbox"/> See “Infestations” above. <input type="checkbox"/> See “Age of Home” above. <input type="checkbox"/> Inspect children’s outdoor play equipment annually and repair as needed. <input type="checkbox"/> Make sure that there is no bare soil, peeling paint, animal feces in play areas. <input type="checkbox"/> Water sources (pools, ponds) should be fenced. Children should be supervised around water at all times.
Young Children		
CONCERN	NURSE TO DO	FAMILY TO DO

Hot liquids/cleaning supplies/medicines	<input type="checkbox"/> Counsel to change behaviors. <input type="checkbox"/> Review items in "Family To Do" column with family.	<input type="checkbox"/> Do not have hot liquids, cleaning supplies, or medicines within a child's reach. <input type="checkbox"/> Keep pot handles and stove knobs out of children's reach.
Lead testing for children less than 6 years old	<input type="checkbox"/> If the home was built pre-1978, counsel the family to have the child's blood tested for lead. <input type="checkbox"/> See "Age of Home" above. <input type="checkbox"/> Review items in "Family To Do" column with family.	<input type="checkbox"/> Contact the childhood lead poisoning prevention program (CLPPP) at your state and local departments of health about lead testing resources. <input type="checkbox"/> See "Age of Home" above.
Child watched by an adult while in tub	<input type="checkbox"/> Counsel to change behavior. <input type="checkbox"/> Educate family about importance of not leaving children unattended in the tub. <input type="checkbox"/> Review items in "Family To Do" column with family.	<input type="checkbox"/> Do not leave children unattended in the tub. <input type="checkbox"/> Test water temperature with forearm before placing child in tub.
Hot water temperature	<input type="checkbox"/> Educate family about dangers of scalding. <input type="checkbox"/> Review items in "Family To Do" column with family.	<input type="checkbox"/> Set hot water temperature to <120 F

Toddler gates	<input type="checkbox"/> Counsel family to install non-accordion toddler gates at the top and bottom of stairways. <input type="checkbox"/> Review items in “Family To Do” column with family.	<input type="checkbox"/> Contact local injury prevention program to determine whether there are toddler gate resources available. <input type="checkbox"/> Install non-accordion toddler gates at the top and bottom of stairways.
----------------------	---	---

Young Children		
CONCERN	NURSE TO DO	FAMILY TO DO
Crib mattress	<input type="checkbox"/> Counsel family that crib mattress should fit snugly next to the crib so that there is no gap. <input type="checkbox"/> If two adult fingers can be placed between the mattress and the crib, then counsel the family to immediately replace the mattress. <input type="checkbox"/> Review items in “Family To Do” column with family.	<input type="checkbox"/> Put your baby to sleep in a crib with a firm, flat mattress and no soft bedding underneath. <input type="checkbox"/> Ensure that your crib mattress fits snugly next to the crib so that there is no gap. <input type="checkbox"/> Infants should always be put to bed on their backs, not face-down. <input type="checkbox"/> Do not hang toys across crib. <input type="checkbox"/> Bars on crib should be no more than 4” apart.
Window guards	<input type="checkbox"/> Counsel family about window safety. <input type="checkbox"/> Contact local injury prevention program to determine whether there are window guard resources available. <input type="checkbox"/> Review items in “Family To Do” column with family.	<input type="checkbox"/> Contact local injury prevention program to determine whether there are window guard resources available. <input type="checkbox"/> Install window guards.
Window blind cords	<input type="checkbox"/> Counsel family to keep window blind cords out of children’s reach and to purchase childproofing items for cord safety. <input type="checkbox"/> Review items in “Family To Do” column with family.	<input type="checkbox"/> Keep window blind cords out of children’s reach <input type="checkbox"/> Purchase childproofing items for cord safety.



Pediatric Environmental Home Assessment Scenario

The scenario is fictional. The photos are taken from a variety of homes to highlight key issues.

For the sake of the exercise, take on the role of a public health nurse conducting a pediatric environmental home visit.

It is a warm summer day and you are going out on a home visit to see a family. The family has a six-year old child who has, and is being treated for, asthma. The mom has concerns about recent exacerbations in her child's asthma and the need for more frequent use of “rescue” inhalers.

You note that the family lives in a multi-family building in an urban neighborhood. The building appears to have been built in the late 1950s. That is consistent with other buildings in the neighborhood. Given its urban location, you know that the home is connected to a public water system.

As you go along, you make notes and check off any relevant information on the [PEHA Survey form](#). Let's get started!

Welcome and Introductions

- [View “Welcome and Introductions” video clip \(7.5 MB\).](#)
- [View photos of basement conditions.](#)
- [View photos of outside conditions.](#)

As you talk further, the mom reports that she is a Section 8 tenant. When she moved in, she says the landlord told her that the house was built in 1958 and that lead hazard control work was completed before she moved in 18 months ago. She could not remember getting any booklet or warnings about lead when she signed her lease.

You ask the mom about other general housing characteristics. She knows there is a basement but has not been in there. She says she has seen the oil truck connect up to the fittings on the side of the house. She shows you the unlocked door to the basement in the common area. You check out the basement.

The mom says that the oil heat can be hard to control in the winter. Some rooms are too hot and others are too cold. She sometimes has to open windows to make the rooms comfortable.

You observe, and the mom reports, that there are no pets in the home.

The mom is focused on the construction dust and mice. She says she has not seen any mold. You follow along on the [PEHA Survey Form](#) and ask about other pests. The mom reports no trouble with cockroaches, rats, or bedbugs.

You ask about asbestos and radon. The mom reports that she has no knowledge about whether the building has been tested or treated.

You do not observe any air fresheners or scented candles present, but you ask about their use. The mom confirms that she does not use those items because they aggravate her child's asthma.

Next you do a kitchen walkthrough with the mom.

Kitchen

- [View “Kitchen Walkthrough” video clip \(5.8 MB\).](#)
- [View photos of other kitchen conditions.](#)

You review the [PEHA Survey Form](#) and ask to move on to the bedroom and bathroom.

Living Room Walkthrough and Neighborhood Review

- [View “Living Room Walkthrough and Neighborhood Review” video clip \(3.2 MB\).](#)
- [View photos of living room conditions.](#)

You note the active construction outside and the dust that is accumulating in the window sill even though the window is closed. You also note that there are no window guards on the windows and that the blinds have looped cords.

You ask the mom when was the last time the young children were tested for lead. Mom notes that it was within the last year and the results were less than 10.

You sit down again with the mom to review home safety questions. You provide her with a poison control hotline sticker to place on the phone. You ask about fire safety issues. She notes that there is no smoking allowed in the house and matches are stored in a high, safety-locked cabinet. The family does not have a formal fire escape plan.

The mom reports that the hallway lighting is good. She has no safety concerns about lighting. In the kitchen you note the coffee maker and tea kettle. You ask about the child’s access to hot liquids. The mom notes that her son is older and is aware that he should not touch hot things. You ask the mom if she knows what the hot water temperature is set at. She does not know.

Bedroom and Bathroom

- [View “Bedroom and Bathroom Walkthrough” video clip \(6.6 MB\).](#)
- [View photos of bedroom conditions.](#)
- [View photos of bathroom conditions.](#)

You ask the mom about the use of humidifiers in the bedroom. She notes that she sometimes uses them in the winter because the air gets too dry from the hard to control heat.

As you talk further, the mom confirms that the bathroom fan does function although it is a bit noisy. You observe a hair dryer on the edge of the sink. You ask the mom about adult supervision when her child is bathing. She notes that she is right there most of the time but may sometimes leave the room to grab a towel or item of clothing for the child.

Medication Review and Wrap-up

- [View “Medication Review and Wrap-up” video clip \(7.0 MB\).](#)



Fact Sheet



Healthy Homes Maintenance Checklist

The following checklist was developed for the Healthy Homes Training Center and Network as a tool for healthy home maintenance. A healthy home is one that is constructed, maintained, and rehabilitated in a manner that is conducive to good occupant health.

To maintain a healthy home, occupants should keep it dry, clean, well-ventilated, free from contaminants, pest-free, safe and well-maintained. Good home maintenance can act to

reduce allergens, prevent illness, and reduce injury from accidents. This checklist provides basic guidelines; items may need to be checked more often depending on local conditions and manufacturer suggestions.

Developed for the National Healthy Homes Training Center by Terry Brennan and Ellen Tohn, technical advisors to the National Center for Healthy Housing.

Yard and Exterior	Spring	Fall	Annual	As Needed	Pro Needed?
Water drains away from house	●				
No trip, fall, choking, sharp edge hazards	●	●			
Fence around pool intact	●	●			
Check for signs of rodents, bats, roaches, termites	●	●			
Drain outdoor faucets and hoses		●			
Clean window wells and check drainage	●	●			
Clean gutters and downspouts	●	●			

Exterior Roof, Walls, Windows	Spring	Fall	Annual	As Needed	Pro Needed?
Shingles in good condition	●				
Check chimney, valley, plumbing vent, skylight flashing	●				
Make sure gutters discharge water away from building	●				
Check attic vents		●			
Check attic for signs of roof leaks	●				
Check for icicles and ice dams					
Look for peeling paint	●				
Look for signs of leaks where deck attaches to house	●				
Check below window & door that flashing intact	●				
Repair broken, cracked glass		●			
Look for signs of leaks at window and door sills	●				
Clean dryer vent	●	●			
Check exhaust ducts are clear	●	●			

Basement and Crawlspace	Spring	Fall	Annual	As Needed	Pro Needed?
No wet surfaces, puddles	●	●			
Sump pump and check valve working	●	●			
Floor drain working	●				
Vacuum basement surfaces	●				
Check for signs of rodents, bats, roaches, termites		●			

	Spring	Fall	Annual	As Needed	Pro Needed?
HVAC Equipment - Replace Filters					
Warm air furnace (merv 8)		●			
Air conditioner (central air merv 8)	●				
Dehumidifier	●				
Outdoor air to return to heat recovery ventilation		●			

	Spring	Fall	Annual	As Needed	Pro Needed?
Attic					
Check for signs of rodents, bats, roaches, termites		●			
Check for water damage		●			
Ensure insulation in place		●			
Check that fans still exhaust to outdoors (check ductwork connections)			●		

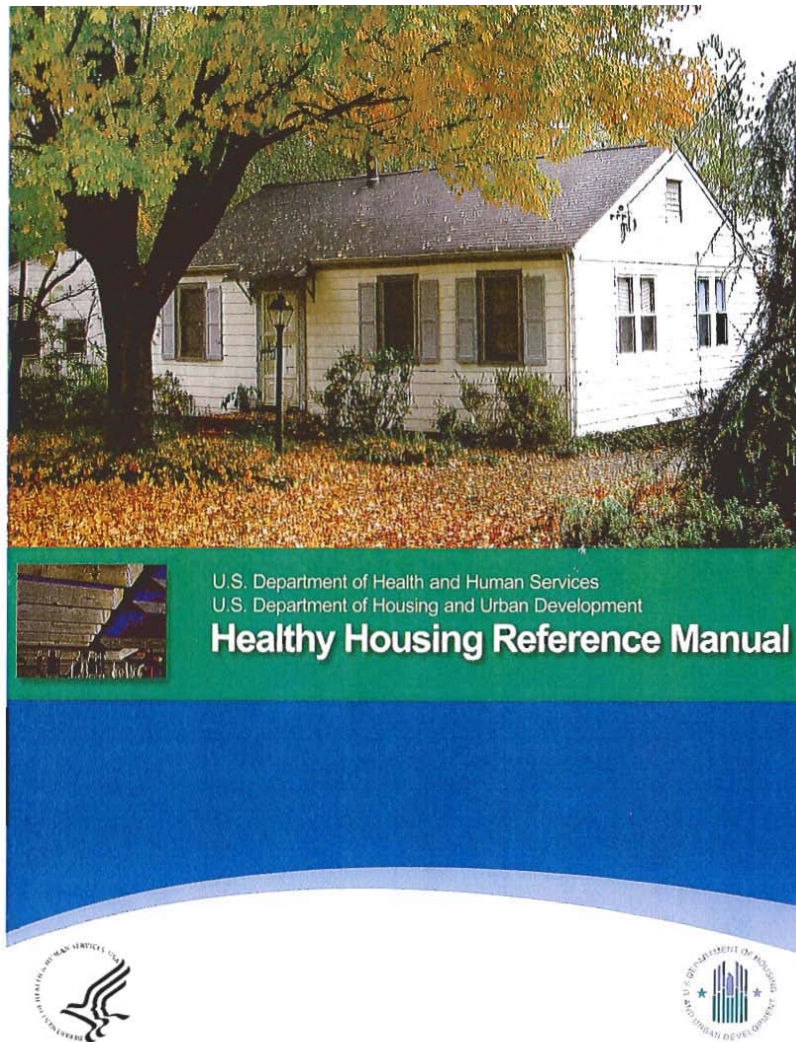
	Spring	Fall	Annual	As Needed	Pro Needed?
Plumbing, Fixtures, and Appliances					
Check washer hoses- connections			●		
Check dishwasher hoses for leaks			●		
Check toilet supply/shut-off valve			●		
Clean & check refrigerator drip pan-icemaker connections			●		
Check shower-tub surrounds for signs of damage			●		
Check traps and drains under sinks, tubs, showers for leaks			●		
Check hot water heater for leaks		●			
Check boiler for leaks		●			
Check water main/meter or well pump for leaks or sweating		●			
Clean septic tank					
Check drain and supply time for leaks	●	●			
Check bath and kitchen fans operation	●	●			

	Spring	Fall	Annual	As Needed	Pro Needed?
Interior Walls, Ceilings, Windows, Doors					
Check for signs of water damage			●		
Check operation of windows and doors	●				
Lubricate and repair windows and doors				●	

	Spring	Fall	Annual	As Needed	Pro Needed?
Appliances					
Clean kitchen range hood screens				●	
Clean dryer vents and screens	●				
Clean exhaust fan outlets and screens	●				
Clean outdoor air intakes and screens		●			
Clean air conditioning coils, drain pans	●				●
Clean dehumidifier coils, check operation	●				
Clean and tune furnaces, boilers, hot water heaters		●			●
Clean and tune ovens and ranges		●			●

	Spring	Fall	Annual	As Needed	Pro Needed?
Electrical Equipment					
Check for damaged cords	●	●			
Test ground fault interrupters	●				
Test outlets for proper hot, neutral, and ground					
Check smoke and CO alarms	●	●			

	Spring	Fall	Annual	As Needed	Pro Needed?
Garage					
Ensure storage of fuel cans	●	●			
Proper operation of garage door safety shut-off	●	●			
Check for signs of water damage	●				
Check for signs of rodents, bats, roaches, termites	●	●			



Chapter 1 —Housing History and Purpose

Introduction
 Preurban Housing
 Ephemeral Dwellings
 Episodic Dwellings
 Periodic Dwellings
 Seasonal Dwellings
 Semipermanent Dwellings
 Permanent Dwellings
 Urbanization
 Trends in Housing
 References
 Additional Sources of Information

Chapter 2 —Basic Principles of Healthy Housing

Introduction
 Fundamental Physiologic Needs
 Fundamental Psychologic Needs
 Protection Against Disease
 Protection Against Injury
 Protection Against Fire
 Fire Extinguishers
 Protection Against Toxic Gases
 References
 Additional Sources of Information

Chapter 3 —Housing Regulations

Introduction
 History
 Zoning, Housing Codes, and Building Codes

Zoning and Zoning Ordinances
 Exceptions to the Zoning Code
 Housing Codes
 Building Codes
 References
 Additional Sources of Information

Chapter 4 —Disease Vectors and Pests

Introduction
 Disease Vectors and Pests
 Rodents
 Cockroaches
 Fleas
 Flies
 Termites
 Fire Ants

Mosquitoes
References

Chapter 5 —Indoor Air Pollutants and Toxic Materials

Introduction
Indoor Air Pollution
Biologic Pollutants
Chemical Pollutants
Toxic Materials
Asbestos
Lead
Arsenic
References

Chapter 6 —Housing Structure

Introduction
New Housing Terminology
Old Housing Terminology
Foundation
Vapor Barriers
Crawl Space Barriers
Vapor Barriers for Concrete Slab
Homes
Wall and Ceiling Vapors
House Framing
Foundation Sills
Flooring Systems
Studs
Interior Walls
Stairways
Windows
Doors
Roof Framing
Rafters
Collar Beam
Purlin
Ridge Board
Hip
Roof Sheathing
Dormer
Roofs
Asphalt Shingle
EPDM
Asphalt Builtup Roofs
Coal Tar Pitch Builtup Roofs
Slate Roofs
Tile Roofs
Copper Roofs
Galvanized Iron Roofs
Wood Shingle Roofs
Roof Flashing
Gutters and Leaders
Exterior Walls and Trim
Putting It All Together
References

Additional Sources of Information

Chapter 7 —Environmental Barriers

Introduction
Roof
Insulation
Siding
Fiber Cement
Brick
Stucco
Vinyl
Asbestos
Metal
References

Chapter 8 —Rural Water Supplies and Waterquality Issues

Introduction
Water Sources
Source Location
Well Construction
Sanitary Design and Construction
Pump Selection
Dug and Drilled Wells
Springs
Cisterns
Disinfection of Water Supplies
Chlorine Carrier Solutions
Routine Water Chlorination
(Simple)
Well Water Shock Chlorination
Backflow, Backsiphonage, and
Other Water Quality Problems
Backflow
Backsiphonage
Other Water Quality Problems
Protecting the Groundwater
Supply
References
Additional Sources of Information

Chapter 9 —Plumbing

Introduction
Elements of a Plumbing System
Water Service
Hot and Cold Water Main Lines
Water Heaters
Drainage System
Corrosion Control
Water Conservation
Putting It All Together
References
Additional Sources of Information

Chapter 10 —Onsite Wastewater Treatment

Introduction
Treatment of Human Waste
Onsite Wastewater Treatment
Systems
Septic Tank Systems
Alternative Septic Tank Systems
Maintaining the Onsite
Wastewater Treatment Systems
Symptoms of Septic System
Problems
Septic Tank Inspection
References
Additional Sources of Information

Endnotes

Essentials for Healthy Homes Practitioners Course

OVERVIEW

1. Lowry, S. (1991, October). "Housing". *British Medical Journal*, 303(6806), 838-40 (1.1)
2. U.S. Environmental Protection Agency. *Child-Specific Exposure Factors Handbook*. (2008), <http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=199243>. (1.2)
3. Phipatanakul, Wanda, Peyton A. Eggleston, Elizabeth C. Wright, and Robert A. Wood. "Mouse Allergen II. The Relationship of Mouse Allergen Exposure to Mouse Sensitization and Asthma Morbidity in Inner-city Children with Asthma." *Journal of Allergy and Clinical Immunology* 106.6 (2000): 1075-080. (1.5)
4. Matsui, Elizabeth C., Peyton A. Eggleston, Timothy J. Buckley, Jerry A. Krishnan, Patrick N. Breyse, Cynthia S. Rand, and Gregory B. Diette. "Household Mouse Allergen Exposure and Asthma Morbidity in Inner-city Preschool Children." *Annals of Allergy, Asthma & Immunology* 97.4 (2006): 514-20. (1.5)
5. Perry, T "The Prevalence of Rat Allergen in Inner-city Homes and Its Relationship to Sensitization and Asthma Morbidity." *Journal of Allergy and Clinical Immunology* 112.2 (2003): 346-52. (1.6)
6. *Who Guidelines for Indoor Air Quality Dampness and Mould*. Copenhagen: WHO Regional Office for Europe, 2009. (1.6)
7. U.S. Centers for Disease Control and Prevention. National Environmental Health Tracking. <http://ephtracking.cdc.gov/showAsthma.action> (click on Search Asthma Data) (1.6)
8. "Vital Signs: Asthma Prevalence, Disease Characteristics, and Self-Management Education -- United States, 2001-2009." *Morbidity and Mortality Weekly Report*. May 6, 2011. www.cdc.gov/mmwr/preview/mmwrhtml/mm6017a4.htm (1.7)
9. U.S. Department of Commerce. American Housing Survey Data. www.census.gov/programs-surveys/ahs/ (1.11)
10. Centers for Disease Control and Prevention. Tobacco Control State Highlights 2012. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2013. (1.14)

11. International Code Council. www.iccsafe.org. (1.16)
12. HealthyPeople.gov. 2020 Topics and Objectives.
<http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=12> (1.17)
13. Rebecca L. Morley, Ellen Tohn. “How Healthy are National Green Building Programs?” (2008).
http://www.nchh.org/Portals/0/Contents/Green_Analysis_2-24-09.pdf. (1.18)

START WITH PEOPLE

1. Wallace, LA, Mitchell, H, O'Connor, GT, Neas, L, Lippmann, M, Kattan, M, Koenig, J, Stout, JW, Vaughn, BJ, Wallace, D, Walter, M, Adams, K, Liu, LJ (2003). “Particle Concentrations in Inner-City Homes of Children with Asthma: The Effect of Smoking, Cooking, and Outdoor Pollution.” *Environmental Health Perspectives*, 111(9), 1265-72. (2.3)
2. U.S. Department of Health and Human Services. “The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General—Executive Summary.” U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2006. (2.3)
3. Adgate, JL, Kukowski, A, Stroebel, C, Shubat, PJ, Morrell, S, Quackenboss, JJ, Whitmore, RW, Sexton, K (2000). “Pesticide Storage and Use Patterns in Minnesota Households with Children.” *J Expo Anal Environ Epidemiol*, 10(2):159-67. (2.3)
4. Dunn et al. 2004 (2.6)
5. Evans et al. 1996 (2.6)
6. Lepore et al. 1992 (2.6)
7. Regeoczi 2003 (2.6)
8. Evans et al. 2001 (2.6)
9. Golden et al. 2005(2.6)
10. Kripke 1998(2.6)
11. Shenassa et al. 2007(2.6)
12. Institute of Medicine 2004(2.6)

HOUSE AS A SYSTEM

1. Photo courtesy of Rick Eades, TAGMA of Jackson Mississippi, Inc. Real Estate Inspections (3.5)
2. Department of Energy - <https://ees.lbl.gov/search/node/heating%20products> (3.5)

KEEP IT DRY

1. U.S. Environmental Protection Agency. Pesticides: Compliance and Enforcement. www.epa.gov/pesticides/enforcement/index.htm. (4.20)

KEEP IT CLEAN

2. Arlian LG, Vyszynski-Moher D, Morgan M. "Mite and Mite Allergen Removal During Machine Washing of Laundry." *J Allergy Clin Immunol* 2003; 111: 1269-73. (5.2)
3. U.S. Environmental Protection Agency. "Should You Have the Air Ducts in Your Home Cleaned?" Indoor Environments Division, Office of Air and Radiation. EPA 402-K-97-002, October 1997. (5.6)

KEEP IT PEST-FREE

1. Gern, JE, and WW Busse, "Contemporary Diagnosis and Management of Allergic Diseases and Asthma," 5e. 2008:Newtown PA, Handbooks in Healthcare Co. p.5ff. (6.3)
2. Cohn, RD, Arbes, SJ, Jr., Jaramillo, R, Reid, LH, & Zeldin, DC (2006). "National Prevalence and Exposure Risk for Cockroach Allergen in U.S. Households." *Environ Health Perspect*, 114(4), 522-526. <https://www.ncbi.nlm.nih.gov/pubmed/16581539> (6.4)
3. Cohn, R D, Arbes, SJ, Yin, M, Jaramillo, R, & Zeldin, DC (2004). "National Prevalence and Exposure Risk for Mouse Allergen in US Households." *Journal of Allergy and Clinical Immunology*, 113(6), 5. (6.4)
4. 2014 Annual Report of the American Association of Poison Control Center's National Poison Data System: 25th Annual Report (17301). https://aapcc.s3.amazonaws.com/pdfs/annual_reports/2014_AAPCC_NPDS_Annual_Report.pdf. (6.7)
5. HUD Notice PIH-2011-11, April 26, 2011, Promotion of Integrated Pest Management (IPM). (6.9)

KEEP IT VENTILATED

1. United States Consumer Product Safety Commission. Carbon Monoxide Questions and Answers. <https://www.cpsc.gov/safety-education/safety-education-centers/carbon-monoxide-information-center/carbon-monoxide-questions-and-answers>. (7.4)
2. Carbon Monoxide Detector Placement. <http://www.homesafe.com/coalert/> (7.4)

KEEP IT SAFE

1. Karin A. Mack, PhD, et al. (2013) “Fatal Unintentional Injuries in the Home in the US, 2000–2008.” *American Journal of Preventive Medicine*. Volume 44, Issue 3, Pages 239–246. (8.2)
2. Carol W. Runyan PhD, et al. (January 2005) “Unintentional Injuries in the Home in the United States Part I: Mortality.” *American Journal of Preventive Medicine*. Volume 28, Issue 1, Pages 73-79. (8.3)
3. Safe Kids USA: Preventing Injuries at Home, at Play, and on the Way. http://www.safekids.org/sites/default/files/documents/skw_home_fact_sheet_feb_2015.pdf (8.5)
4. Federal Hazard Substance Act. Public Law 86-613; 74 Stat. 372, July 12, 1960, as amended. (8.8)
5. U.S. Product Safety Commission, Office of Compliance, Requirements under the Federal Hazardous Substances Act: Labeling and Banning Requirements for Chemicals and Other Hazardous Substances. <https://www.cpsc.gov/Business--Manufacturing/Business-Education/Business-Guidance/FHSA-Requirements/>. (8.8)
6. U.S. Department of Homeland Security, U.S. Fire Administration National Fire Data Center. (2012). Residential Building Fires (2008–2010). Topical Fire Report Series, Volume 13, Issue 2, April 2012. (8.8)
7. Adapted from recommendations of the U.S. Consumer Product Safety Commission, the U.S. Fire Administration, the National Fire Protection Agency, and Centers for Disease Control and Prevention. <http://www.cdc.gov/HomeandRecreationalSafety/Fire-Prevention/index.html>. (8.12)
8. Topical Fire Report Series. “Smoking-Related Fires in Residential Buildings.” (2008-2010). Volume 13, Issue 6, June 2012. (8.12)

KEEP IT CONTAMINANT-FREE

1. U.S. Department of Health and Human Services. “The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General—Executive Summary.” U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2006 (9.2)
2. Ahrens M. Home structure fires. Quincy (MA): National Fire Protection Association; 2011 (9.2)
3. Behm I, Kabir Z, Connolly GN, et al. 2012. “Increasing Prevalence of Smoke-Free Homes and Decreasing Rates of Sudden Infant Death Syndrome in the United States: An Ecological Association Study.” *Tobacco Control* 21(1):6-11. (9.2)
4. Market Demand for Smoke-Free Rules in Multi-Unit Residential Properties, April 2009, Massachusetts Smoke-Free Housing Project, Public Health Advocacy Institute, Northeastern University School of Law (9.4)

KEEP IT MAINTAINED

1. Jacobs, DE, Clickner, RP Zhou, JY, Viet, SM, Marker, DA, Rogers, JW, Zeldin, DC, Broene, P, Friedman, W 2002. “The Prevalence of Lead-Based Paint Hazards in U.S. Housing.” *Env. Health Perspectives*, 110(10): A599-606. (10.4)
2. U.S. Environmental Protection Agency. Protect Your Family from Asbestos-Contaminated Vermiculite Insulation. <https://www.epa.gov/asbestos/protect-your-family-asbestos-contaminated-vermiculite-insulation>. (10.10)
3. National Admission Standard for Asbestos. 40 CFR § 61.146, Subpart M; 40 CFR § 61.149(b), Subpart M. http://www.swcleanair.org/docs/misc/NES_Asbestos.pdf. (10.11)
4. Environmental Protection Agency. EPA Asbestos Materials Bans: Clarification (May 18, 1999). (10.11)
5. See 40 CFR § 61.141, Subpart M; 40 CFR § 61.145, Subpart M. See also id. (10.11)
6. ¹See EPA, supra note 18. (10.11)
7. See 15 U.S.C. § 2601-2692 (1976). (10.11)
8. See 54 FR 29460 (July 12, 1989), available at <https://www.epa.gov/asbestos/asbestos-manufacture-importation-processing-and-distribution-commerce-prohibitions-final>. (10.11)

9. See *Corrosion Proof Fittings v. EPA*, 947 F.2d 1201 (5th Cir.1991). (10.11)
10. (EPA 402-R-03-003, June 2003, pg 1), (10.12)
11. See *Respiratory Health Effects of Passive Smoking: Lung Cancer and Other Disorders*, December 1992, Document # EPA/600/6-90/006F.14 (10.13)
12. (EPA 402-K-05-005, May 2005, pg 18) (10.13)

MAKING IT WORK

No references