COMMUNITY PLANNING & DEVELOPMENT

# Health@Home Rehabilitation Guidelines

Session 2 - Freedom from Contaminants and Pests

July 23, 2020

# Connection Issues and Chats

Should you have any **technical** issues or concerns:

1. Use the Chat Box on the bottom right (or) make sure the "Chat" icon is lit blue on the top
2. Submit your message to "Host and Presenters" so that all of us can see it.

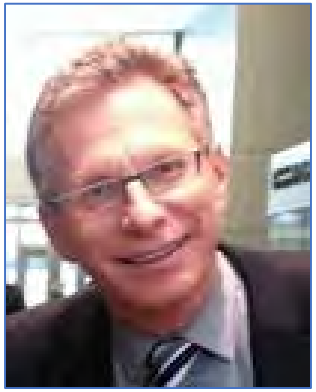
For **Questions** related to the content:

1. Use the Q&A Panel (same area as the chat box)
2. Submit to all as panel members and the host.

# Agenda

1. Welcome and Logistics
   - Lael Holton, AECOM
2. Health@Home Overview
   - Michael Freedberg, U.S. Dept of Housing and Urban Dev.
3. Keep it Contaminant Free
   - Ellen Tohn, Tohn Environmental Strategies
4. Radon - Case Study
   - Teri Provost, SEDA-COG
5. Pests - Pest Free Rehab Strategies
   - Susannah Reese, StopPests
6. Questions

# Presenters



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# Welcome

- Today is #2 in four-part series: we hope you will stick with all four sessions!
- Participants who attend all four sessions will receive a **Health@Home Certificate of Completion**
- Importance of healthy housing never been clearer:
  - Building more efficient homes, including passive house and zero ready homes
  - Spending more time in our homes than ever due to COVID-19.
  - Asthma and respiratory ailments identified as COVID-19 risk factor
- We need to be sure that when we rehab our homes, we maximize the indoor experience, minimize hazards.

# Health@Home – Training Series


| | |
|---|---|
| Overview and Keep it Well Ventilated and Clean | June 18 |
| **Keep it Contaminant and Pest Free** | **July 23** |
| Keep it Dry and Safe | Sept 10 |
| The Energy + Health Equation, Maintenance and Active Design | October 8 |

# Home Conditions Impact Health

Studies show home conditions contribute to health:

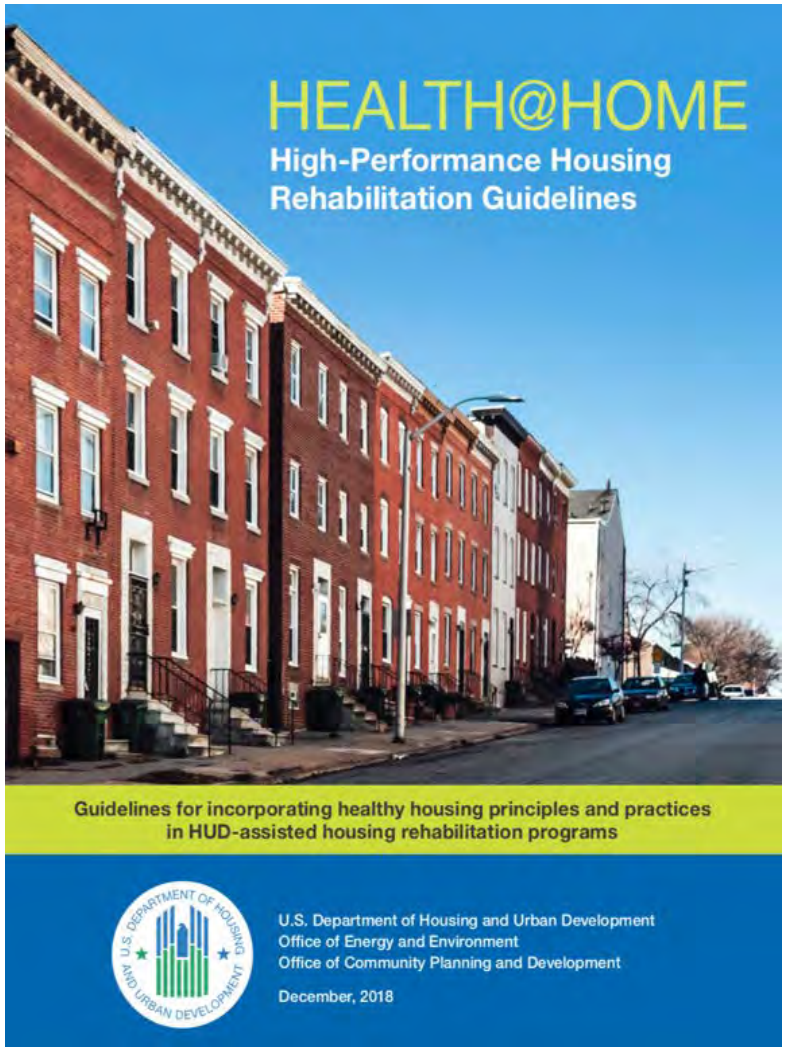
**A few examples**

- **Asthma**: 8% adults and children have asthma AND 20-40% of asthma attacks can be linked to home conditions

- **Radon**: 21,000 annual deaths estimated, over 7 million homes with suspected risks

- **Falls**: 1 in 4 older adults fall each year, over 50% of falls occur in the home.

# Health@Home Guidelines




- Google HUD Exchange - Health@Home https://www.hudexchange.info/resources/health-at-home/introduction/
- Rehab projects are an opportunity to address housing- based health issues
- Increased focus on indoor environment due to COVID-19

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# Guidelines Organized by Healthy Housing Principles



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# Crosswalk Between Principles and Building Components

Healthy Housing Principles Linked to Rehab Standards Organized by Building Component

- Site
- Roof/Exterior
- Foundation
- Insulation & Sealing
- Interior

- Electrical
- Plumbing
- Heating & Cooling
- Ventilation
- Appliances

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# Example: Keep It Well Ventilated

## 4 KEEP IT WELL VENTILATED

Pollutants can be found in concentrations 2 to 5 times higher indoors than outdoors. Increasing the supply of fresh air can help reduce exposure to indoor asthma triggers, allergens, and other contaminants. Ventilating local sources of moisture or contaminants from showers, combustion from fireplaces, or cooking appliances can also reduce indoor exposures that can increase respiratory and other health risks. Proper sealing of all exterior ventilation points is also essential to preventing the intrusion of exterior pollutants into the building environment.

### 4.1 BATHROOMS, KITCHENS, AND DRYERS

Ensure bathrooms, kitchens, and clothes dryers exhaust to the exterior and comply with ASHRAE 62.2 2016 requirements.

- Verify that all bathrooms and kitchens have point source exhaust ventilation ducted to the exterior (not to an attic or crawl space) with ductwork conforming to the manufacturer's requirements.
- Vent clothes dryers to the exterior with ductwork that conforms to the manufacturer's requirements and is free from obstructions and lint accumulation. Apply "Minimum Actions" in the "Source Ventilation" section of the EPA Healthy Indoor Environment Protocols for Home Energy Upgrades. See https://www.epa.gov/indoor-air-quality-iaq/healthy-indoor-environment-protocols-home-energy-upgrades.
- Consider installing exhaust fans in bathrooms with switching mechanisms that increase the likelihood of their use, such as switching the fan and light fixture with the same switch or using a humidistat to automate the operation of the fan relative to humidity level.

### 4.2 WHOLE HOUSE VENTILATION

To address significant reductions in air leakage (and subsequent reductions in ventilation) associated with substantial rehabilitation projects and projects with extensive air sealing and insulation work, install ventilation measures that meet ASHRAE Standard 62.2 2016 requirements for whole-building ventilation. Until recently, 62.2 applied only to single-family housing; however, 62.2 now covers all housing.

### 4.3 HVAC FILTRATION

Ensure that HVAC forced air systems have a leak-free filter housing on the return air ductwork, with a Minimum Efficiency Reporting Value (MERV) 8 filter, and that it is not clogged. Check that a MERV 8 filter is consistent with the manufacturer's instruction.

# Example: Appliances

## Appliances

| 11.3 CLOTHES DRYER EXHAUST | Key Principles: Ventilated; Dry |
|---|---|
| **Repair Standard** | **Minimum Life: 5 years** |

All clothes dryers must be vented to the exterior with smooth metal ductwork and an outlet that seals against air and pest infiltration when the dryer is not operating, without the use of screening (e.g., using a positively sealing flap on the exterior).

**Replacement Standard**

New dryer ductwork should be smooth metal, either galvanized steel or aluminum, with foil ductwork tape sealing the seams (not duct tape), and exhausted to the exterior with the shortest possible run. It should have an outlet that seals against air and pest infiltration when the dryer is not operating, without the use of screening (e.g., using a positively sealing flap on the exterior). Ductwork installation in unconditioned space should be insulated to a minimum R6.

# Context

- Focus is on moderate rehabilitation, home remodeling, or home repair programs
- Primarily single-family and low-rise multifamily housing
- For substantial or gut rehab consider a green building standard: Enterprise Green Communities, LEED, National Green Building Standard Earthcraft, Earth Advantage, Energy Star Indoor Airplus, WELL,  Fitwell.
- For in-depth discussion, see EPA IAQ Protocols for Existing Buildings

# ASHRAE Multifamily COVID-19 Guidance Overview

- **Immediate Actions - Examples**
  - Inform/encourage residents on social distancing/masks in common spaces
  - Assist residents with covering/sealing vents in rooms with infected or higher-risk patients
  - Portable air cleaners with HEPA filters or UV disinfection in common spaces
  - Install high efficiency MERV 13 filters in central systems and dwelling units.
  - Operate installed UVGI devices if present (only applies to systems installed in HVAC ducts)
- **Longer Term Upgrades - Examples**
  - Install or upgrade ventilation systems (bathrooms/toilets and public areas)
  - Consider permanent upgrade of filtration efficiency for systems serving public areas (MERV 13/ASHRAE 52.2)
  - Minimize transfer air between dwelling units, unit and corridors, units and common
- **Resident Education - Examples**
  - Provide instructions/demonstrations on correct use of building mechanical and passive ventilation systems
  - If building equipped with ventilation system, ask residents to open windows as little as possible
  - If residents maintain own systems, recommend upgrading filters to MERV 13 (ASHRAE 52.2)

ASHRAE Guidance provided for informational purposes only, not specifically recommended or endorsed by HUD.
See https://www.ashrae.org/technical-resources/multifamily-buildings

# ASHRAE Single Family COVID-19 Guidance Overview

- **General – All Homes**
  - Maintain normal temperatures (68-78oF/40-60% relative humidity)
  - Increase ventilation rate (if mechanical system not available, open windows)
  - Operate restroom exhaust fans – whenever in use, if possible continuously. Toilet lids closed when not in use.
  - Operate stand-alone air cleaners (purifiers) – MERV 14 or higher
  - Increase room air motion- ceiling fan
- **Additional Guidance – Forced Air Only**
  - Install high efficiency filters in air handlers (MERV 14 or higher)
  - Run as much as possible – use FAN ON setting (low speed)
  - Operate UltraViolet Germicidal Irradiation (UVGI) systems if present
  - Operate economizers, if present and weather permits

ASHRAE Guidance provided for informational purposes only, not specifically recommended or endorsed by HUD.
See https://www.ashrae.org/technical-resources/multifamily-buildings

# COVID-19 Multifamily Resources

- **ASHRAE**
  https://www.ashrae.org/technical-resources/multifamily-buildings

- **AIA**
  https://www.aia.org/resources/6307024-reopening-america-strategies-for-safer-sen

- **CDC**
  https://www.cdc.gov/coronavirus/2019-ncov/community/shared-congregate-house/index.html

- **HUD Exchange/Better Buildings Challenge**
  https://www.hudexchange.info/programs/better-buildings-challenge/covid-19/#covid-19-resources

# COVID-19 Single Family Resources

- **ASHRAE**

  https://www.ashrae.org/technical-resources/residential

  See link to Residential Air Quality Guide (available free on line during Covid-19)


- **CDC**

  Household Checklist

  Households Living in Close Quarters

- **EPA – Frequently asked questions about Indoor Air and Covid-19**

  https://www.epa.gov/coronavirus/frequent-questions-about-indoor-air-and-coronavirus-covid-19

  https://www.epa.gov/coronavirus/how-can-i-increase-ventilation-home-help-protect-my-family-covid-19

# Today's Session

# Healthy Housing Principle #2
# Keep it Contaminant Free

**RADON**

**LEAD**

**ASBESTOS**

**VOCS BUILDING MATERIALS**

**TOBACCO SMOKE**

**SEWER LINES**

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# Lead: Reduce exposures from paint, dust and water

**24 million homes with significant lead hazards**
**40,000 children have blood lead levels requiring follow up**

**Lead paint:**

- Pre-1978 properties receiving HUD assistance follow Lead Safe Housing rule (e.g., CDBG, HOME) if disturb > 2ft$^2$ of lead-based paint.
- Excludes properties designated for elderly, persons with disabilities unless children under age 6 reside.

Approaches vary by amount of rehab: $5-25K, > $25K

- Risk assessment (or standard treatments for rehab $5-$25K)
- Control lead hazards
  - Abatement (>25K rehab), Stabilize paint ($5-25K rehab)
  - Lead safe work practices & clearance testing.

**For relevant Health@Home guidelines, see Rehab Standards:**

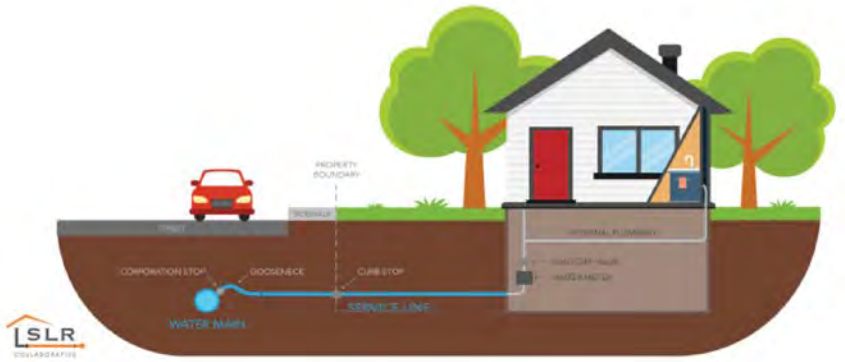
Contaminants 1.1; Interiors 7.3, 7.7; Exteriors 4.2

# Lead Service Lines

**Lead in water can result in substantial exposures, e.g., Flint Michigan and other cities. Lead in plumbing materials was banned in 1986.** Corrosive water water can spur leaching of lead from service lines and plumbing materials into drinking water.

**Lead service lines:** If water heater is replaced, determine if lead service line exists and consider replacement. Some states and localities offer funding for replacements. For more info - https://www.lslr-collaborative.org/ and the local public water supplier.

**For relevant Health@Home guidelines, see Rehab Standards:**
Site 2.4 – Lawn;
Building Exteriors - 4.2.7;
Plumbing – 9.1.4

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# Formaldehyde and Volatile Organic Compounds (VOCs)

**Avoid materials with harmful chemicals including VOCs can result in headaches, nausea, eye/nose/throat irritation.**

**Composite wood**: Avoid formaldehyde. Federal rules require labels showing compliance with TSCA Title VI. Applies to hardwood plywood, medium-density fiberboard, and particle board, finished goods.

**Paints and adhesives**: Minimize VOCs. Meet California South Coast Air Quality Management District Rule 1168 thresholds.

**For relevant Health@Home guidelines, see Rehab Standards:**
Contaminants 1.7 - VOCs; Foundations 5.2 - Basement Floors, 5.3 - Crawl Spaces; Interiors 7.6 - Cabinets/Countertops, 7.7 - Flooring, 7.7.2 - Finishes

# VOCs - Flooring

**Carpets**: Minimize VOCs. Meet Carpet and Rug Institute Green Label or Green Label Plus. [Don't install in wet areas to avoid creating allergens and asthma risks]

**Hard flooring**: Minimize VOCs. Use FloorScore® compliant products. Select durable products that are easily cleaned to minimize contaminants.

**For relevant Health@Home guidelines, see Rehab Standards:**
Interiors 7.7 - Flooring

# Resources

The Health@Home guidelines provide resources to find healthier products

## APPENDIX A
### GREEN AND HEALTHY BUILDING PRODUCTS –

Every home requires maintenance and periodic home repairs. The resources listed below provide information to help you use products and supplies that are both green and help to create a healthier home environment.

#### PAINT

Use low VOC interior paints and primers compliant with South Coast Air Quality Management District (SCAQMD) Rule 1113 thresholds (e.g., Master Painters Institute (MPI) GS-2, Extreme Green; Greenwise Gold; and GreenSeal (GS) 11 v 3.2 meet some of the SCAQMD thresholds).

#### CARPET

Avoid installing carpets in wet areas where moisture and mold problems can be created: building entryways, laundry rooms, bathrooms, kitchens, utility rooms, or rooms built on foundation slabs. Limit use of carpet in other areas to minimize collection of allergens and contaminants. If carpet is installed, use products that meet the Carpet and Rug Institute's Green Label or Green Label Plus certification for carpet, pad, and carpet adhesives. See https://carpet-rug.org.

#### HARD FLOORS

Use flooring that meets the Scientific Certification System's FloorScore program criteria. See www.rfci.com.


# Asbestos

**Exposure to asbestos increases the risk of developing lung disease. That risk is made worse by smoking.**

Asbestos containing materials (ACM) in:

- Steam or water pipe wrappings
- Acoustic ceiling tiles
- Roof shingles
- Floor tiles

**Do not disturb possible ACM**. If damaged (e.g., unraveling, frayed), isolate the area(s). If it will be disturbed contact a professional.

**Possible vermiculite in attics:** Do not disturb.

**For relevant Health@Home guidelines, see Rehab Standards:**
Contaminants 1.2;
Roofing 3.2;
Interiors 3.7 - Flooring;
Space Conditioning 10.1 -Heating Equipment

# Radon: Testing and Mitigation if Needed

**Radon is linked to 21,000 deaths year each.**

**Pre-work testing is recommended if:**

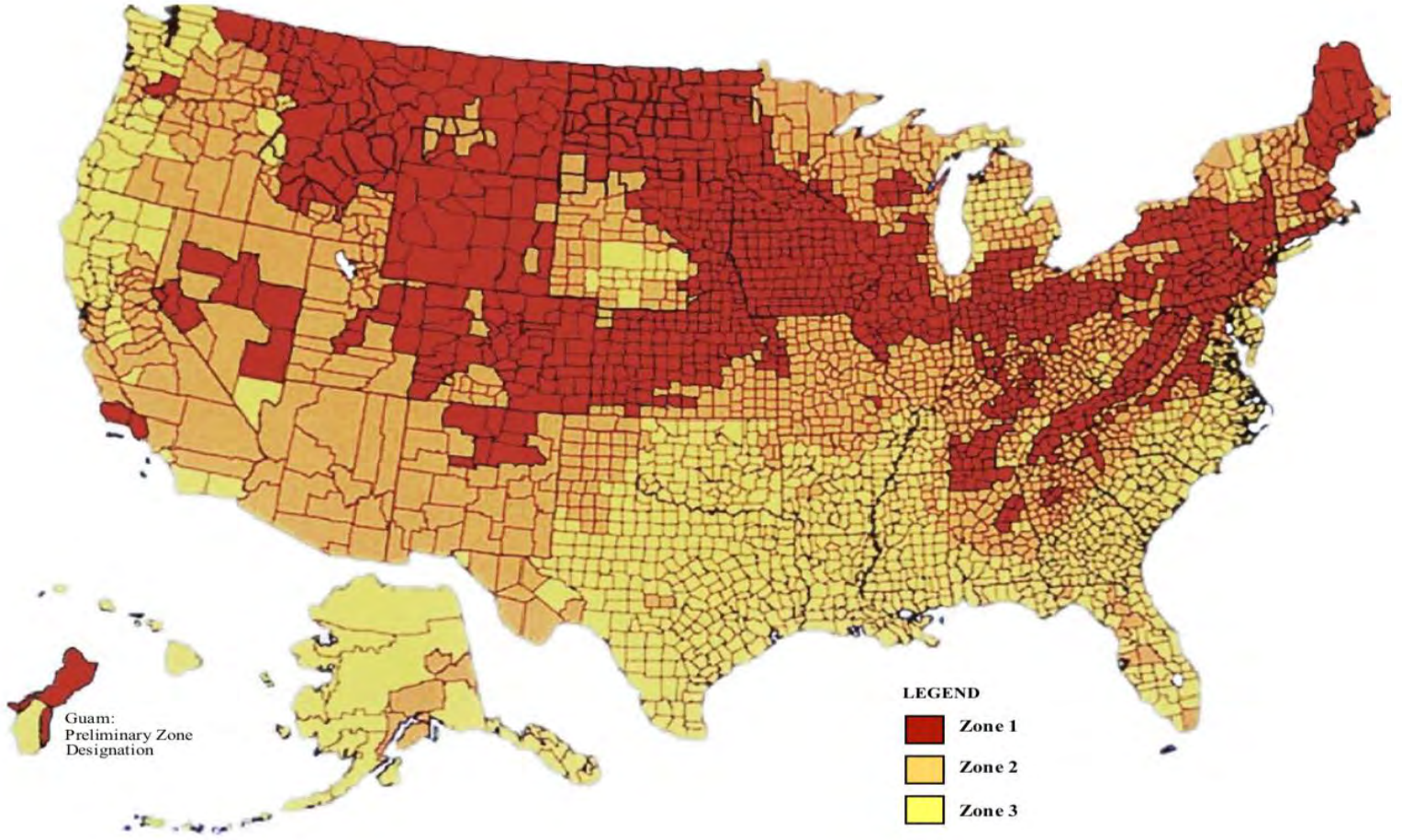
- Homes in EPA Zones 1 & 2 have greater risks
- Rehab could change air pressure (e.g., added insulation, HVAC)

**Mitigation is recommended if:**

- Pre-work levels > 4 pCi/L, may confirm results with 90-day test
- Post-work levels >4 pCi/L and higher than pre-work levels, may confirm with 90-day test


**For relevant Health@Home guidelines, see Rehab Standards:**
Contaminants 1.6; Site 2.1;
Foundations 5.1

# Radon: EPA Zones 1 & 2 Have Greater Risks

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# Radon: Precautionary Measures

**If testing is not feasible or pre-work levels are < 2 pCi/L take precautionary measures.**

- Ventilation meeting ASHRAE 62.2
- Cover exposed dirt in basements and crawlspaces
- Air seal sump pumps

Studies show that such measures can avoid increases in radon on first floors.



**For relevant Health@Home guidelines, see Rehab Standards:**
Contaminants 1.6;
Site 2.1;
Foundations 5.1

# Health@Home:

## *High-Performance Housing Rehabilitation Guidelines*

Radon Services – Housing Program

July 23, 2020

# Radon Testing
# Housing Existing Owner Occupied Housing Rehabilitation

Teri Provost, Director
Housing Rehabilitation

SEDA COG

EQUAL HOUSING OPPORTUNITY

# Facts about Radon

- Radon can be found in any type of home, whether your house is new, old, well insulated or drafty, you still have the potential of having radon in your home.
- Radon levels are the usually higher in the basement, so placing your test there is a good idea.
- Radon is the second leading cause of lung cancer. It is strongly urged that further action is taken when a home's radon test results are great then 4.0 piCi/L.

# Pennsylvania Radon Testing and Mitigation Standards

- **Testing:** For buildings in EPA Radon Zone 1 or 2, test for radon follow American Association of Radon Scientists and Technologists (AARST)'s Protocols
- **Mitigation:** Mitigate for radon level of 4 pCi/L or more, use ASTM and AARST standards

** These are DCED minimum standards and Commonwealth programs must comply to these regulations**

# EPA Map of Radon Zones

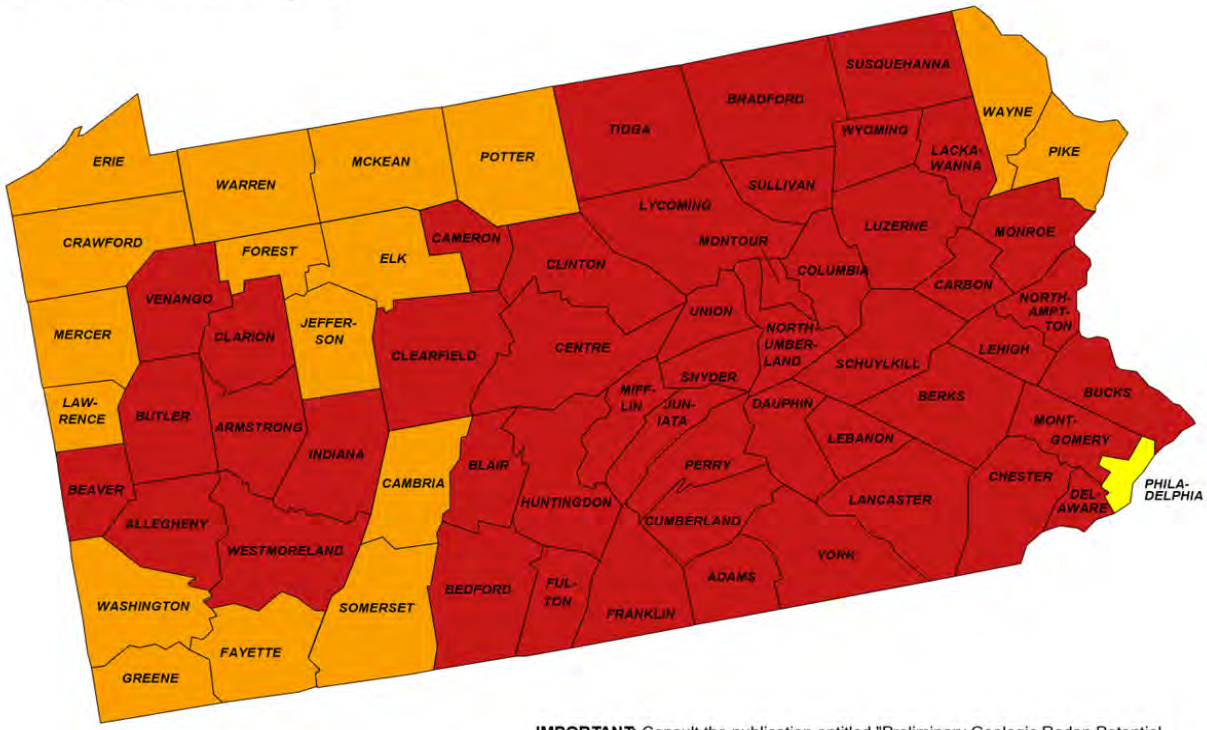
## PENNSYLVANIA - EPA Map of Radon Zones

http://www.epa.gov/radon/zonemap.html

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 determine if a home in a given zone should be tested for radon.

***All homes should be tested, regardless of zone designation.***




Zone 1 Zone 2 Zone 3

**IMPORTANT:** Consult the publication entitled "Preliminary Geologic Radon Potential Assessment of Pennsylvania" (USGS Open-file Report 93-292-C) before using this map. http://energy.cr.usgs.gov/radon/grpinfo.html 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.

# DCED Minimum Standards

| Radon | |
|---|---|
| **Repair Standard** | Minimum Life: 5 years |
| All housing in this program will be subject to radon testing, laboratory certification and, if required, mitigation requirements as regulated by the PA Department of Environmental Protection (DEP). All testing services, laboratory certification and mitigation activities performed under this program must be conducted by individuals or entities having the appropriate certification(s) as administered by DEP. | |
| **Replacement Standard** | Minimum Life: 20 Years |
| If, as a result of the testing above, there is a presence of Radon at or above the 4 pCi/L level, remediation and mitigation will be performed by an individual or entity with the appropriate certification and constructed in compliance with the PA Department of Environmental Protection regulations. | |

# We Meet NEPA Review Requirements

- Federal agencies must meet NEPA, and HUD's regulations for implementing NEPA says -- **property proposed for HUD programs be free of "radioactive substances" where it could affect "the health and safety of occupants."**

- EPA guidelines recommend mitigation for residences with radon concentrations at or above 4 picocuries per liter of air (pCi/L).

# Radon testing in Housing Rehabilitation

- Radon testing is done by our Housing Rehabilitation Specialists.
- We use a Short-Term Electrets to complete the testing for 48-96 hours and follow all DEP requirements pertaining to our certifications. The Short-Term Electrets can be set in the field for up to 3 months.
- Test results > 4piC/L, we prioritize having mitigation installed immediately upon signing their contract with the homeowner.
- After mitigation, we retest the property to ensure the levels become lower than the 4 piC/L mark.

# Radon testing in Housing Rehabilitation

- When mitigation is required, we install the continuously running bathroom vent fan and when necessary, the 160 cfm range hood.
- We also use the (ASHRAE) 62.2 DCED speed.
- Our Department currently charges $250 per unit for radon testing services to our Communities.
- In the Housing Department we use the S-Chamber testing device, which can be used for both short- and long-term radon testing.

# Radon Mitigation in Housing Rehabilitation

- The average cost for a mitigation system is $1,500 to $2,500.
- A second fan (on the opposite side) can help reduce levels if needed.

# Examples of Radon Testing

Contractor is responsible to bid on performing the following work to meet or exceed the minimum standards set below. All installations are to be complete and must conform to manufacturer's specifications as well as all applicable codes pertaining to same.

- Elevated radon levels that need to be reduced to a lower concentration level less than 4.0 pCi/L guaranteed.
- Have a PA DEP licensed, and certified contractor install a sub slab depressurization type system that will be vented above the roof line of the dwelling.
- The system we will be installing will have the vent pipe installed on the exterior of the home.
- A copy of the radon installer's license will be required before payment is made.
- Manufacturing warranty information must be given to the homeowner prior to final payment.

# Snyder County

Radon level before:
41.5

Radon level after:
3.0

Installed 2 fans to improve radon levels

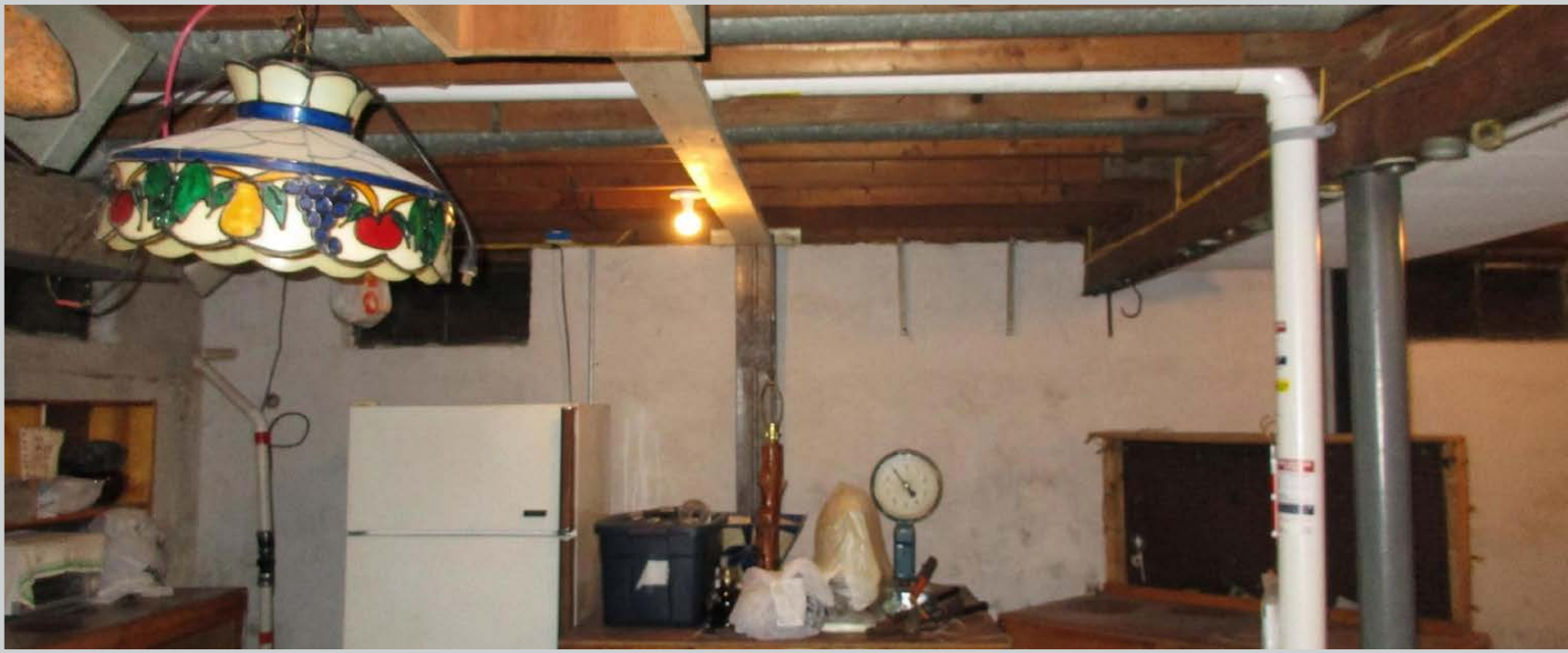


# Snyder County (Continued)



# Snyder County (Continued)


# Lock Haven, Clinton County



# Lock Haven, Clinton County

# Healthy Housing Principle #3
# Keep it Pest Free

**Exposure to mice and cockroaches can increase asthma symptoms.**

**8%**
**adults & children have asthma**

## During Rehab

- **Identify and address pests with Integrated Pest Management (IPM).**
- **Prevent pest entry.** Block, seal and eliminate pest entry around building envelope.

## Post Rehab

- **Keep relative humidity below 50%** to minimize dust mites and pests; both are asthma triggers.
- **Adopt IPM practices.**

**For relevant Health@Home guidelines, see Rehab Standards:**
Contaminants 1.5; Site 2.4;
Exterior 4.2;
Foundations 5.1, 5.2, 5.3;
Insulation 6.1;
Interiors 7.6;
Space Conditioning 10;
Ventilation 11

# Keep Rehab Projects Pest-Free with IPM



## Health@Home

Susannah Reese, StopPests in Housing

Northeastern IPM Center

Cornell University

July 23, 2020

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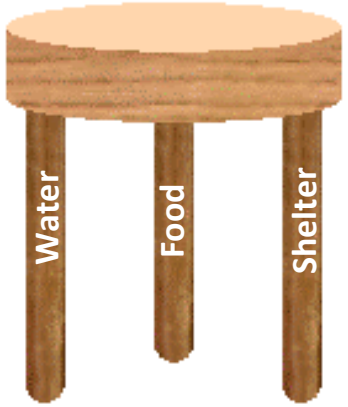
# What is IPM?

- **Integrated:** Uses multiple approaches that work together
- **Pest:** What the multiple approaches work to fight
- **Management:** Use of the most economical means with the least possible risk to people, property, and the environment



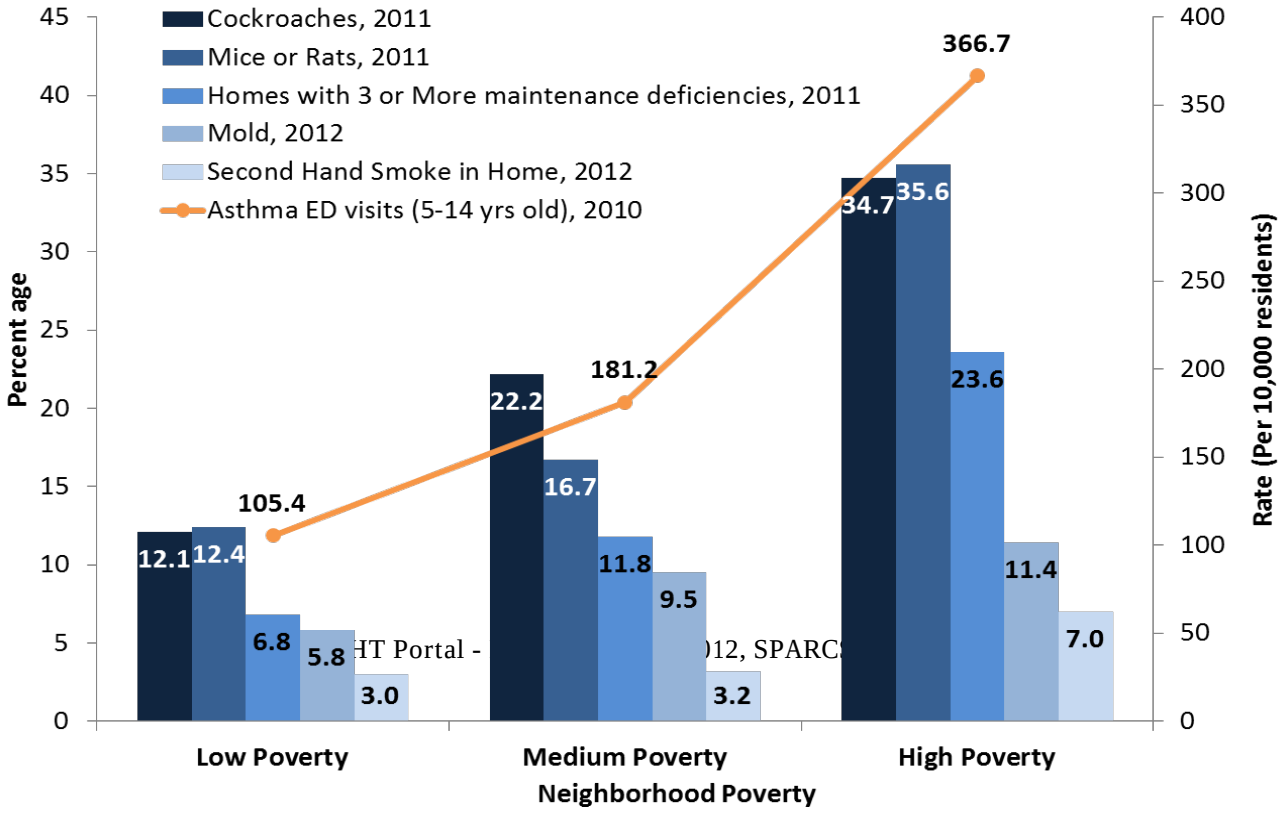

**When rehabbing a property emphasis should be on prevention of pests by eliminating food, water, and access to shelter**

# Priority Pests

Most common (and concerning) pests of housing

- **Rodents**
- **Cockroaches**

# Housing Disrepair, Allergens, and Poor Health Outcomes Increase with Neighborhood Poverty

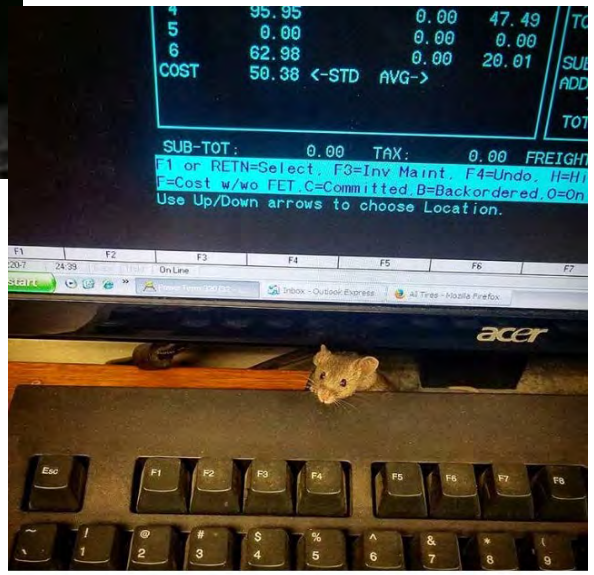



Source: NYC EPHT Portal - HVS 2011; CHS 2012, SPARCS 2010.

# Mice

Drip urine and feces everywhere they go potentially spreading disease – Hantavirus, leptospirosis, Rat bite fever, Salmonella, Murine typhus

And they chew wires!



# CDC Recommendations for Cleaning Mouse Urine and Droppings

- Wear an N-95 mask and latex gloves
- Spray the nest, urine, and droppings with disinfectant or a mixture of bleach and water
  - One part bleach to 10 parts water
  - Let soak 5 minutes
  - For commercial disinfectant, following the label for dilution and disinfection time
- Use a paper towel to pick up the urine and droppings
- Dispose of waste in sealed bag


# Identify pests and conditions

When beginning a rehab project start with inspection to find pests and conditions which encourage pests


~$30.00

# Not sure you have pests?

Monitoring tools can let you know where and what pests are present


~$0.15

# Inspect exterior for pest entry points

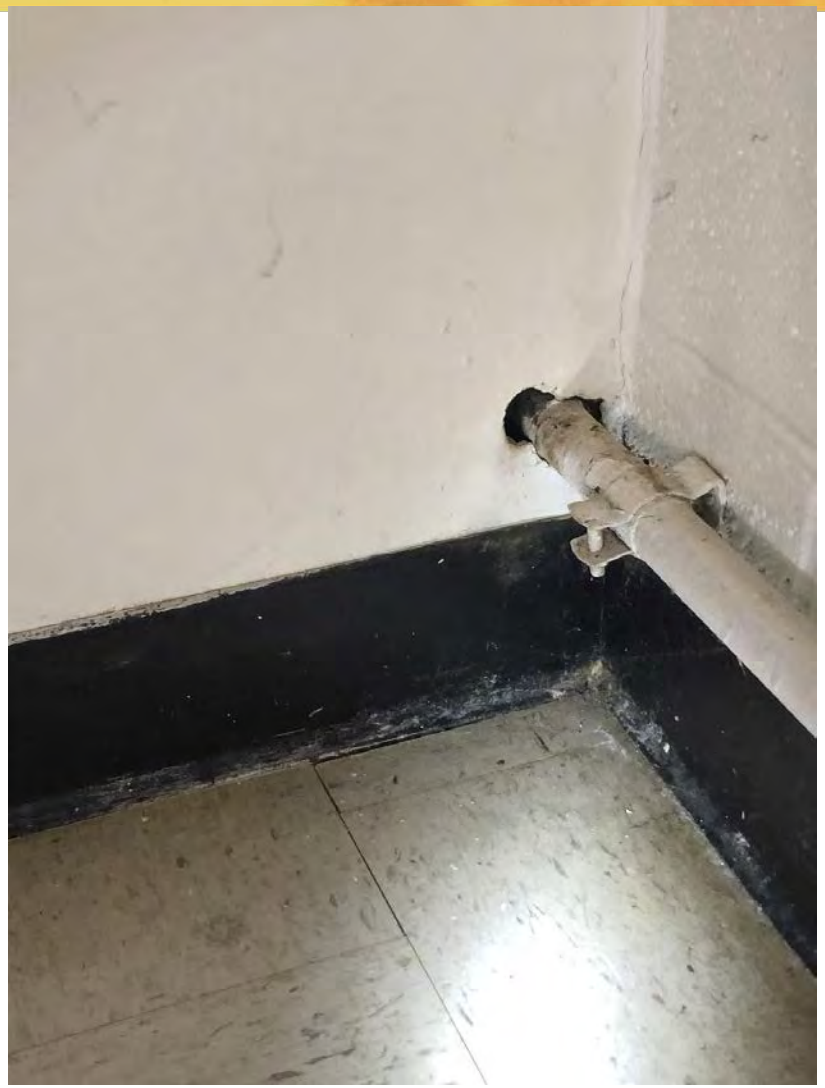
If you can fit a pencil in a hole, a mouse can start chewing and get inside!

Find the gaps

# Pay attention to doors!

# Inspect interior

# Inspect interior



# Address hidden issues

# Limit access to food


Clean and maintain garbage disposal system

# Evaluate trash receptacles

# Address moisture problems

Deny pests access to water. Fix leaks and moisture problems.

# Exclusion – keep the pests out

Improvements made during renovation prevent future problems

Caulk around cabinets and counters so cockroaches can't access voids

Caulk to keep pests outside

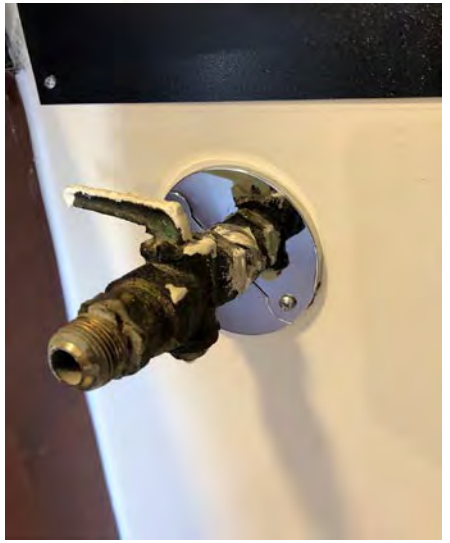
# Seal holes with durable and effective materials

Exclusion materials made with metal prevent rodents

~$28.00



~$60.00



$2.00

# Landscaping for pest prevention

Keep vegetation at least 1’ away from foundation

# Remove the pests

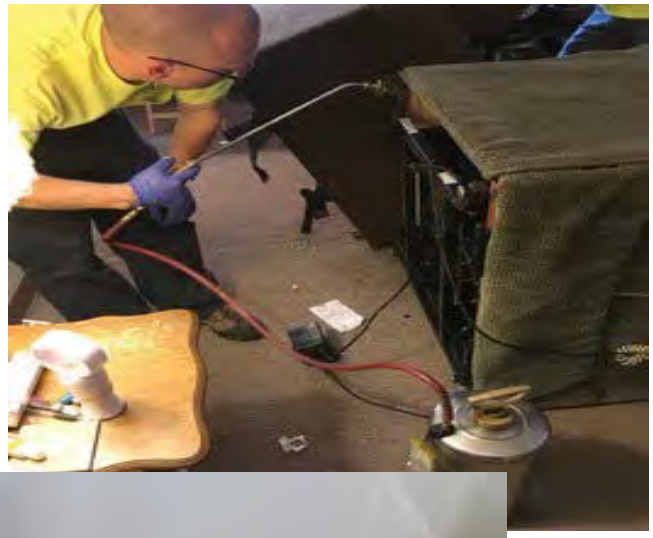
Mechanical tools eliminate and remove pests

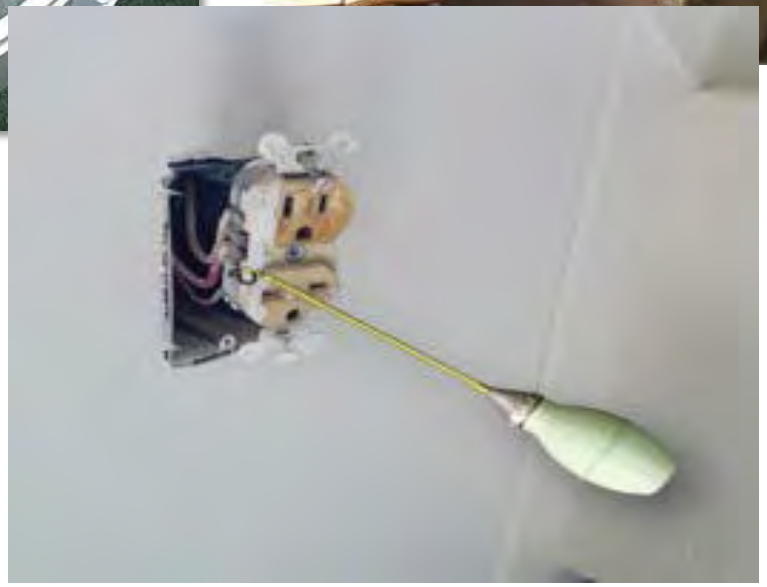


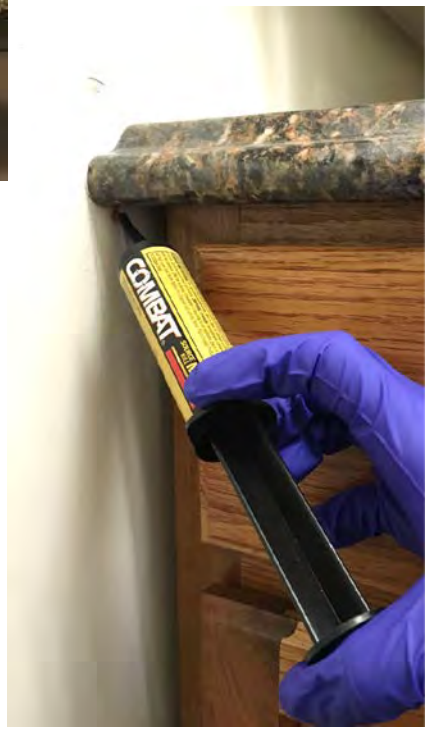
~$0.45

~$10.00

# Hire a professional if pesticides are needed







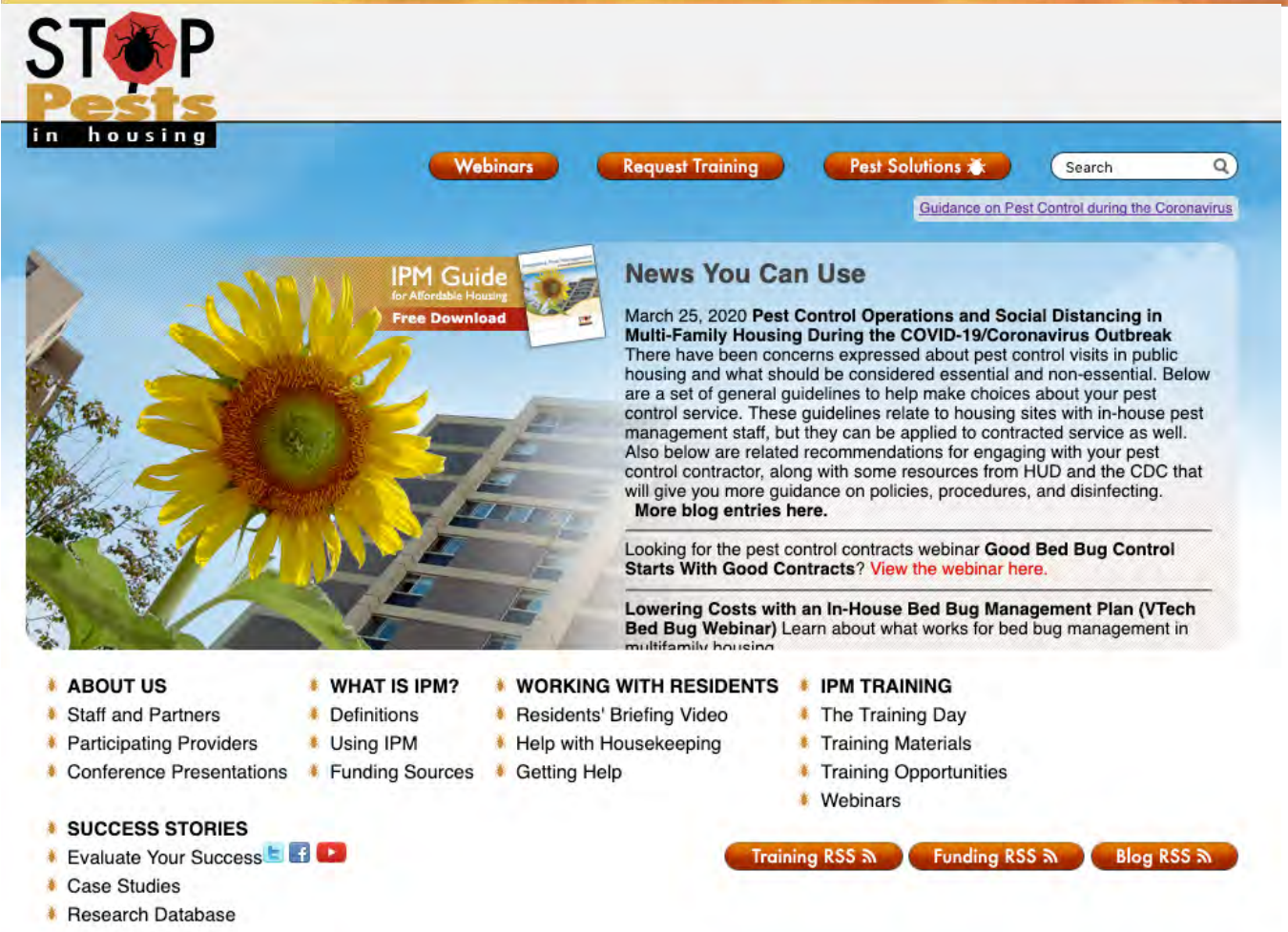

Chemical tools are best left to the professionals

# More information

Pest Prevention By Design
https://sfenvironment.org/sites/default/files/fliers/files/final_ppbd_guidelines_12-5-12.pdf

Or visit NYC DOH
https://www1.nyc.gov/site/doh/health/health-topics/pests-and-pesticides.page

# Make your own IPM plan




**Questions?**
**Susannah K. Reese**
sck27@cornell.edu
www.StopPests.org

**Use the Q&A feature!**
**Visit StopPests.org**

# Questions?

For any questions, please type them into the “Q&A” box in the lower right.

We will answer as many as we have time to answer.

# Technical Assistance Available

- On-call TA is available to incorporate Health@Home standards into current rehab standards.
- Limited to 3-5 HUD grant recipients/partners
- Please submit TA Request to energyaction@hud.gov by July 30.

# Health@Home Website and Resources

**A recording of this webinar (and all other presentations) will be available on the Health@Home series website:**
https://www.hudexchange.info/news/health-at-home-webinar-series/

**Certificates of Completion** available to those who attend all trainings, including archived trainings. In order to receive credit for off-line viewings, please email us at the address shown below, no later than November 15, 2020.

**Main Health@Home website on HUD Exchange:**
https://www.hudexchange.info/resources/health-at-home/introduction/

For questions or information contact:
Lael Holton at communitycompasstraining@aecom.com

# Next Session - Keep it Dry and Safe