

Healthy Housing Construction Priorities

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Why Do We Care About Healthy Homes?



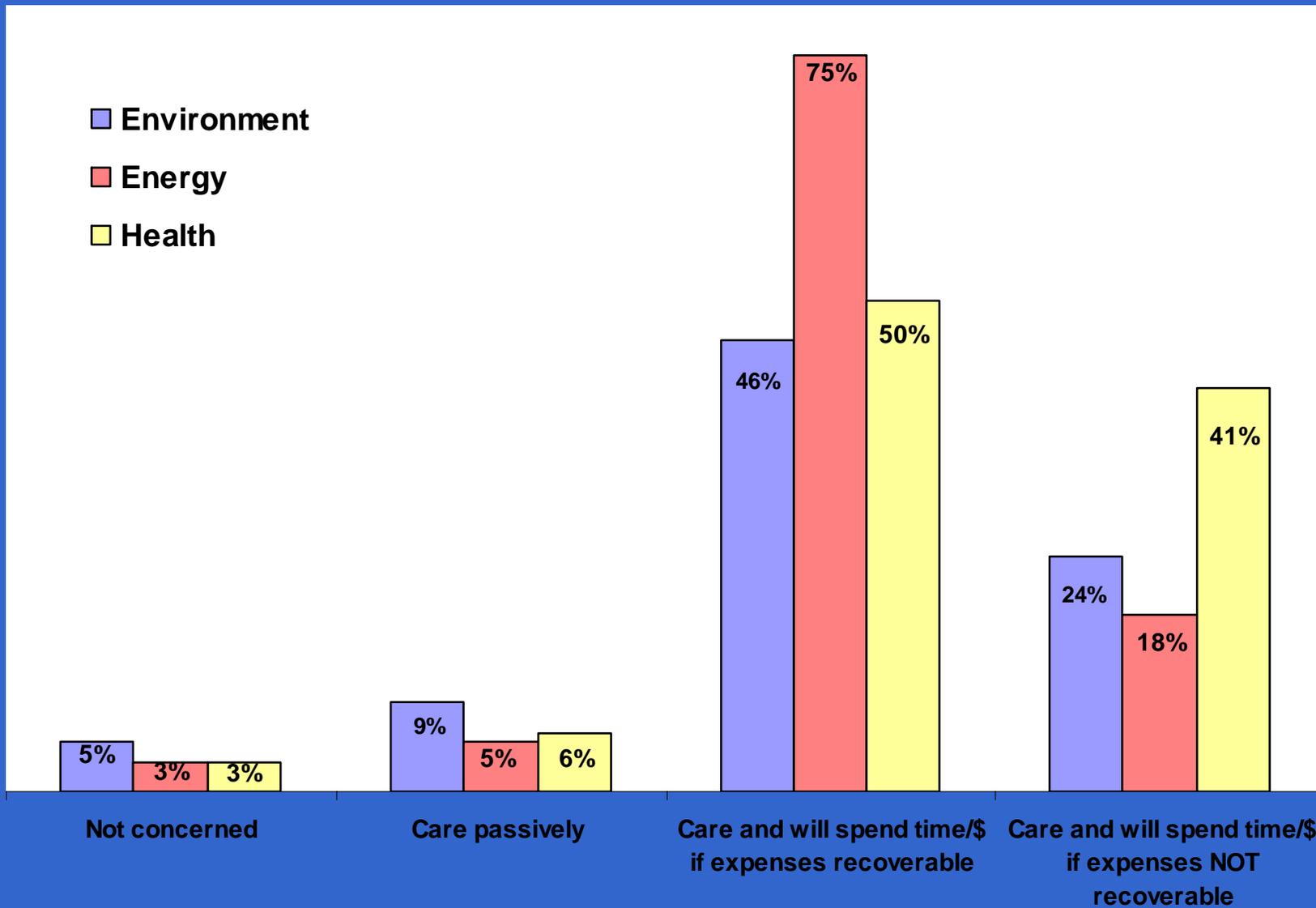
Young children spend **nearly 80%-90%** of their time inside

Housing affects health:

- Physical, chemical, biological exposures
- Psychological



Home Buyer Green Priorities



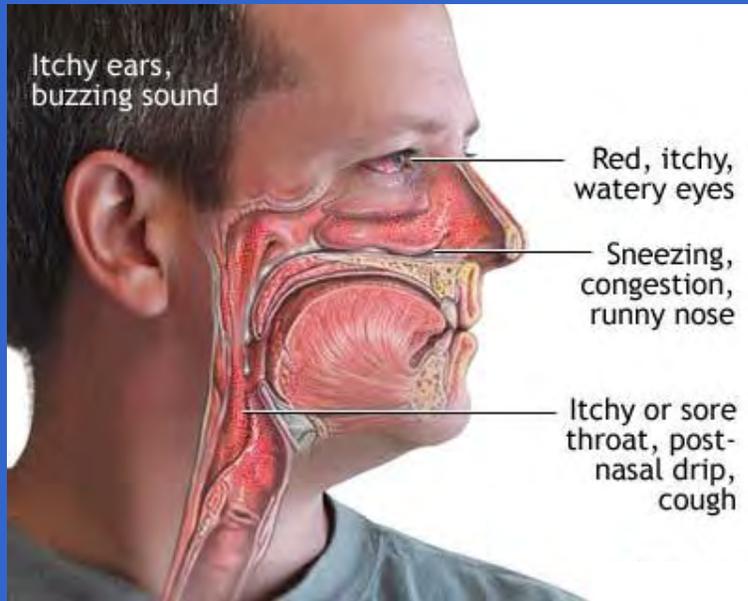
What will homebuyers pay for?

- Only 2.5% of potential homebuyers consider “the environment” a motivating factor in their next home purchase.
- 75% of homebuyers are willing to spend money on energy savings, if they can recoup their investment in cost savings; 18% if can't recoup investment.
- Almost 50% of homebuyers indicate a willingness to spend money for perceived health and wellness benefits, ***even if they never recoup this investment.***

Linking Health & Housing

- Breathing problems, including asthma
- Carbon monoxide poisoning
- Cancer – radon and ETS
- Allergic reactions
- Injuries: trips, falls, burns
- Other non cancer health problems
- Obesity
- Mental health
- Dampness and/or mold
- Radon gas
- Pests (mice, roaches) and pesticides used
- Poorly operating combustion appliances
- Volatile organic compounds: paints, adhesives, carpet, finishes
- Other chemicals & pollutants (NO_x; PM)
- Smoking
- Non walkable
- Unsafe or unstable housing

Are We Sick?



Dampness and Asthma

Health Outcome	Estimated % Increase in Damp Homes
Upper respiratory tract symptoms	52%
Cough	50%
Wheeze	44%
Current asthma	50%
Ever-diagnosed asthma	33%

What to Do?

- Keep it Energy Efficient
- Keep It Dry
- Keep It Ventilated
- Keep it Contaminant Free
- Keep It Pest Free
- Keep It Cleanable
- Keep it Safe

Energy Efficiency

- Helps to
 - Improve comfort, fewer space heaters or oven heating
 - Reduces unplanned air movement improving air quality
 - Reduce moisture and pests
 - Reduce utility bills – 50% of RI energy bills for home heating
- Key Actions
 - Air sealing – save \$250-\$500/yr
 - Attic and other insulation
 - Weather strip
 - Programmable thermostat – save \$120- @265/yr.

Insulation Helps Avoid Condensation & Mold



Keep it Dry: Manage Rainwater



Window Flashing



High Performing Toilets

- <math><1.3\text{ pgf}</math>
- EPA Water Sense
- Reliable and high performing
- Toilet study



Avoid Condensation



Keep it Ventilated

ASHRAE 62.2 Excerpts

	Continuous	Intermittent
Bath	20 cfm	50 cfm
Kitchen	5 air change/hour	100 cfm
House 2000 ft ³ /3 bdrm	60 cfm	

Bath Fan Working?



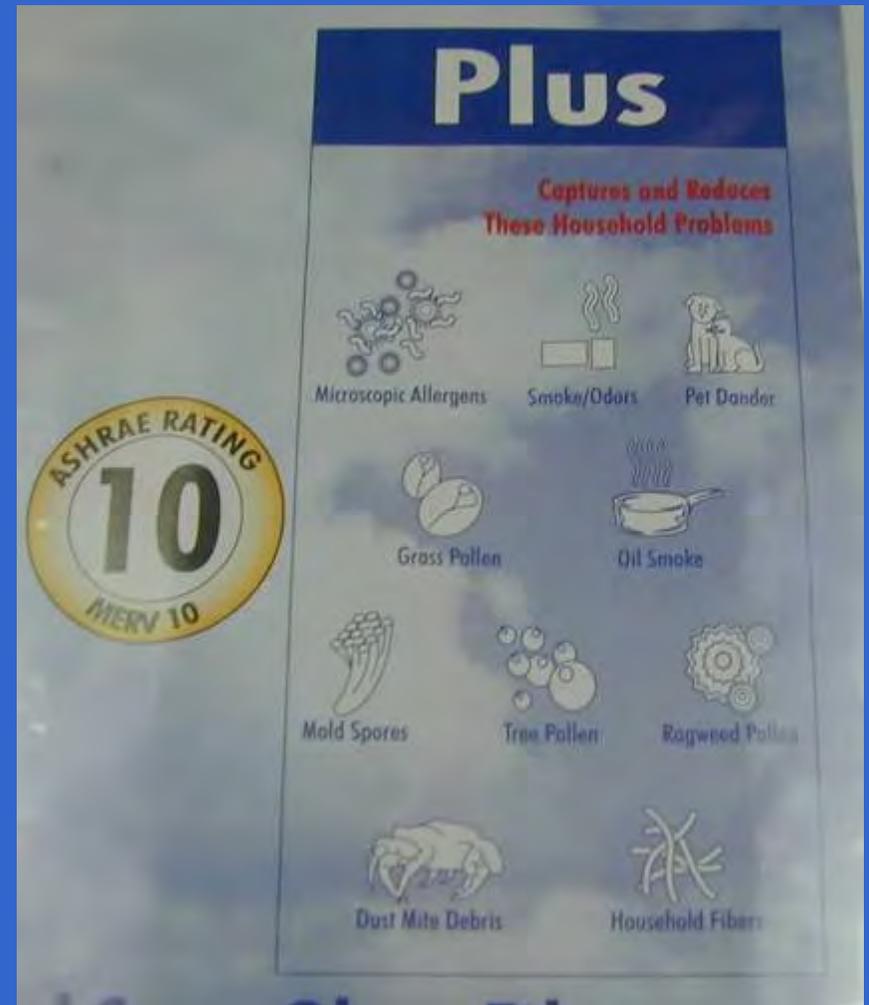
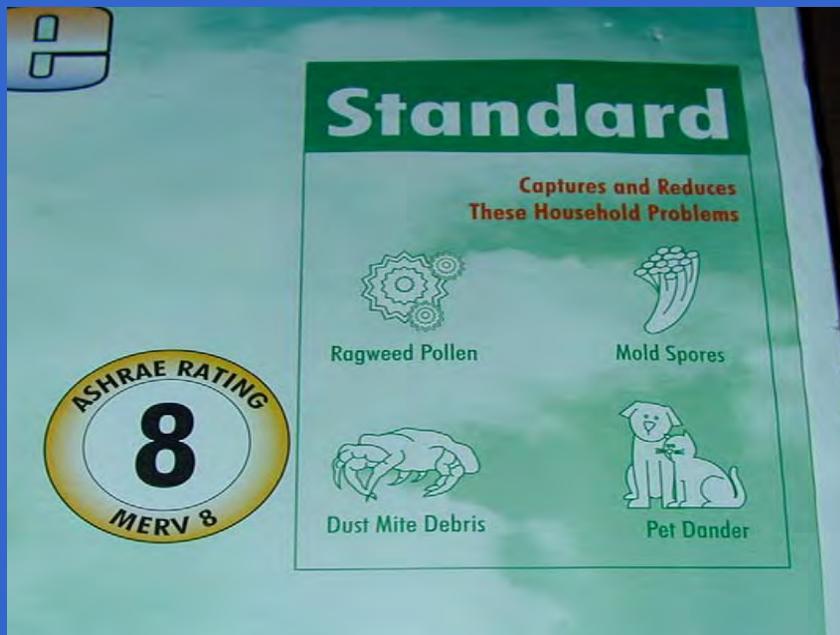
Energy Star Fans





Forced Hot Air Systems

- Size correctly – ACCA Manual J
- MERV 8 or better filter



MERV Ratings

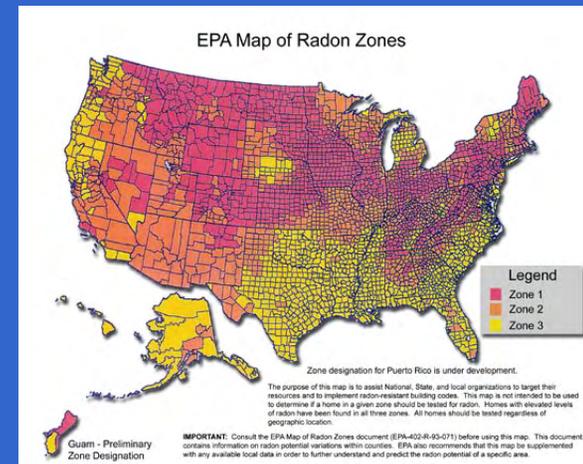
MERV	PARTICLE SIZE (μm)	TYPICAL CONTROLLED CONTAMINANT
1 – 4	>10.0	Pollen, sanding dust, textile and carpet fibers
5 – 8	3.0 – 10.0	Mold, spores, hair spray, cement dust
9 – 12	1.0 – 3.0	Legionella, lead dust, welding fumes
13 – 16	0.3 – 1.0	Bacteria, most tobacco smoke, insecticide dust, copier toner
17 - 20	≤ 0.3	Virus, combustion particles, radon progeny

Keep it Ventilated Combustion Sealed Equipment



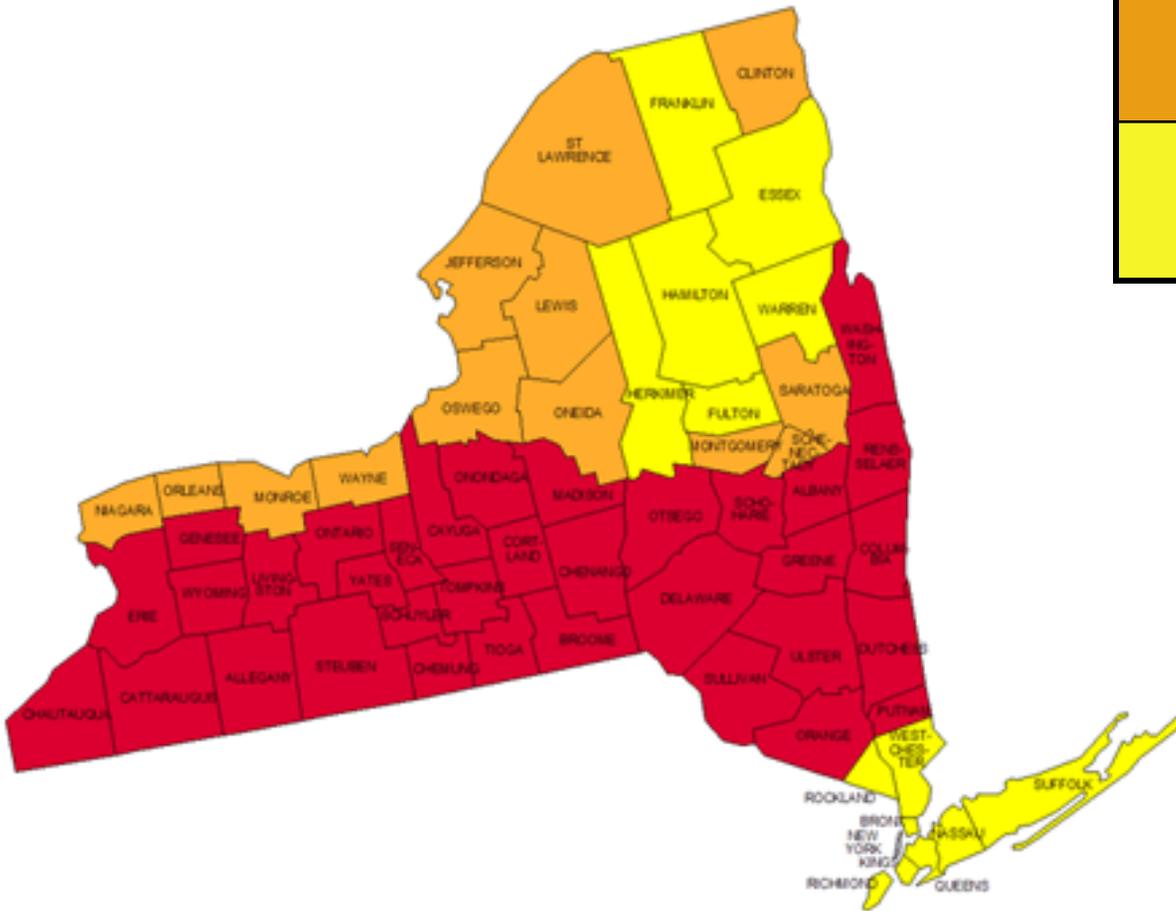
EPA Recommendations for New Construction & Large Rehabs

- In Zone 1
 - Build in passive system
 - Test post construction after occupancy
 - Convert to active system if levels are over 4 pCi/L
- Zones 2 and 3
 - Test post construction after occupancy
 - If levels are over 4 pCi/L, install passive or active system

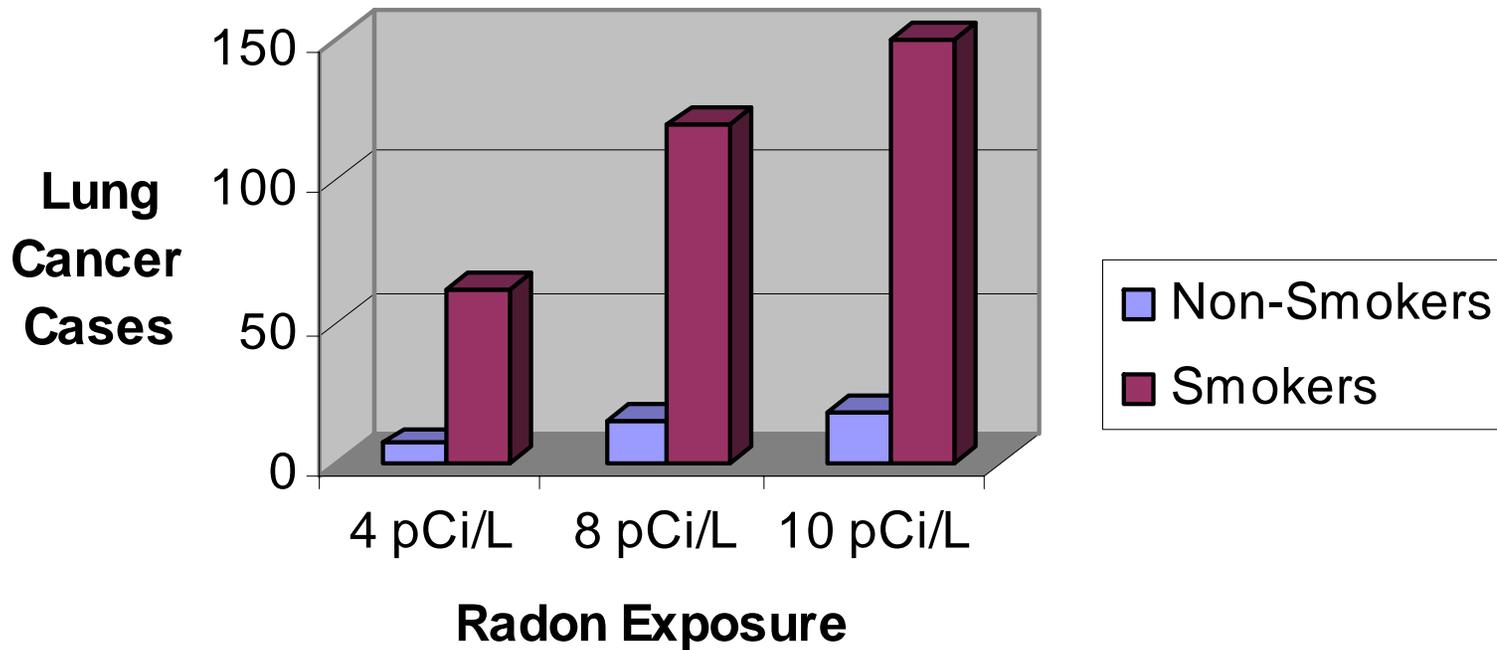


NY Radon – EPA Map

	Zone 1: High Risk Likely > 4 pCi/L
	Zone 2: Moderate Risk Likely 2-4 pCi/L
	Zone 3: Lowest Risk Likely <2 pCi/L



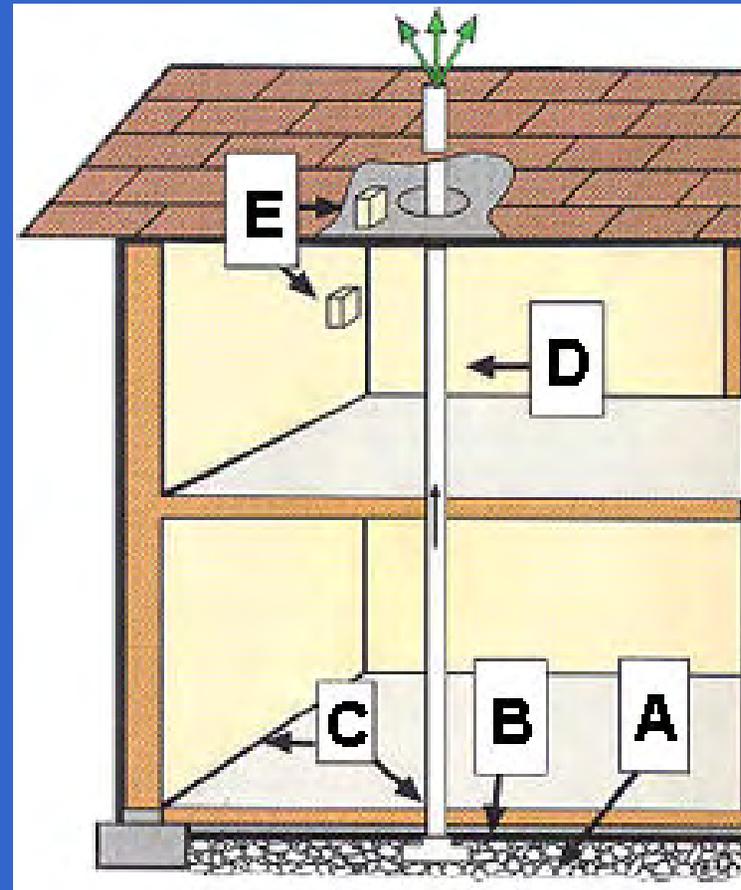
Estimated Lung Cancer Cases In a Population of 1,000 (US EPA, 2005)



✓ 1/15 homes may have an elevated radon level (above EPA action level of 4 pCi/L).

Keep it Contaminant Free: Radon Resistant Construction

- A. Gas-Permeable Layer
- B. Plastic Sheeting
- C. Seal and Caulk
- D. Vent Pipe
- E. Junction Boxes



Gas Permeable Layer



Sealing and Caulking



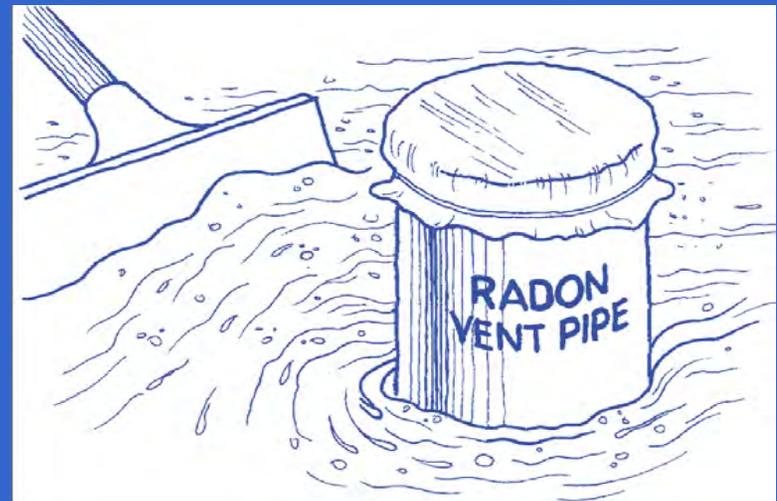
Active System Allows for Elbows



Venting the Pipe



Label Radon Systems



Radon Mitigation Costs

	Likely Costs
New Construction <ul style="list-style-type: none">- Passive system only- Active system	\$350 - \$500 \$650 - \$800
Existing Homes	\$800 - \$2,500

Keep It Contaminant Free

- Low VOC paints/primers
- Low VOC sealants/adhesives
- Smooth & Cleanable Flooring
- Wire Shelves



Carbon Monoxide Alarms

- Not required in NY
- Place outside sleeping areas – we are most vulnerable
- One on each floor of house





The Financial Burden

NON Smoking Room

Labor ~ 12hrs*35/hr = \$420
Paint ~ 3 Gallons = \$60
Ceiling Paint~2 Gln = \$40
Carpet Shampoo = \$50

Smoking Room

Labor ~ 24hrs*35/hr = \$840
Paint ~ 3 Gallons = \$60
Ceiling Paint ~2 Gln = \$40
Carpet Shampoo = \$50
Primer = \$100
Replace Rug Burns = \$600

Total = \$570 VS. = *\$1,070 – **\$1,690

*Depending on Carpet Condition.

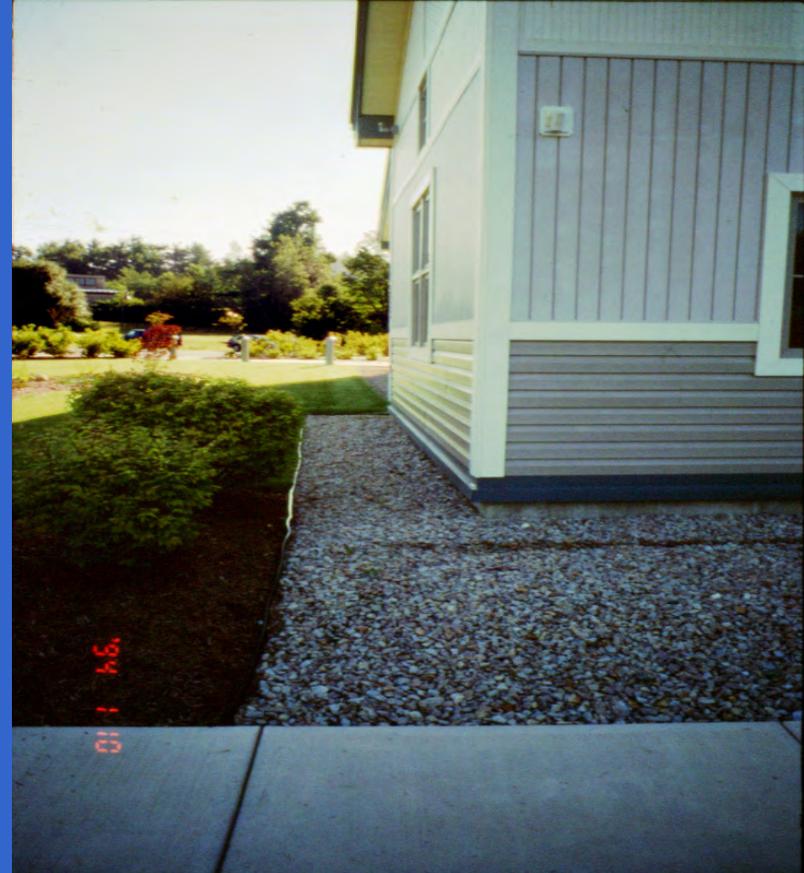
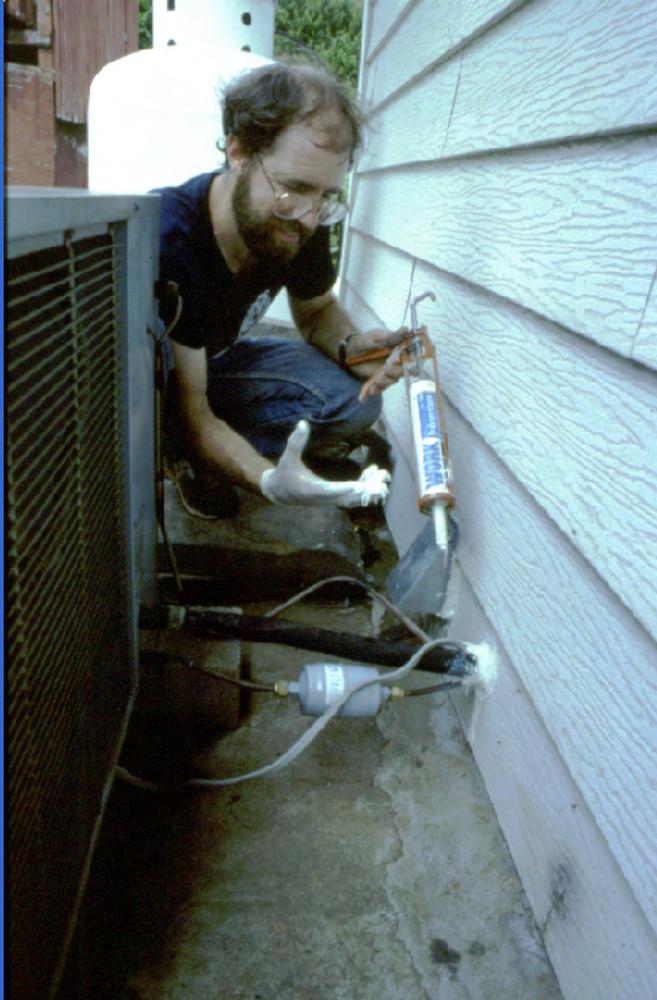
**Additional costs could be added for cabinets/countertops.

Keep It Pest Free

- Integrated Pest Management vs. traditional
- Monitor pest – where are they?
- Seal holes and cracks – stops pest & air
- Selected use of pesticides: roaches gels & baits – no spraying
- Seal up food and garbage

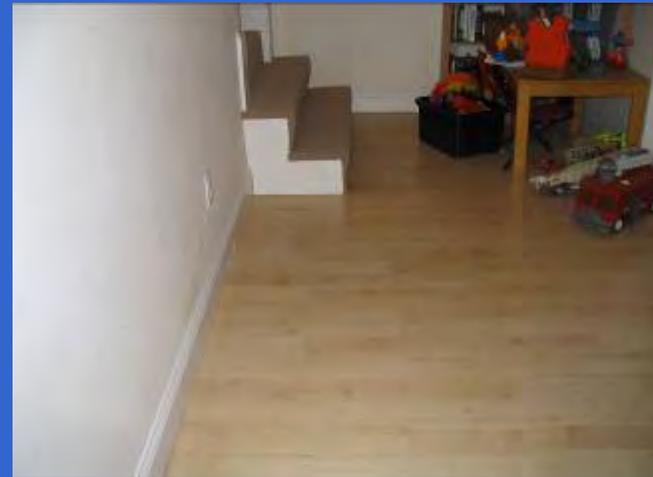


Block Pest Entry



Landscaping >24" from home

Keep it Cleanable - Flooring



Track in Contaminants

- Four Steps
 - Hard Surface Walkways
 - Outside Grate-Like Mat
 - Inside Carpet Pad
 - Hard Surface Floor





Shoes Off – Less Dust Enters

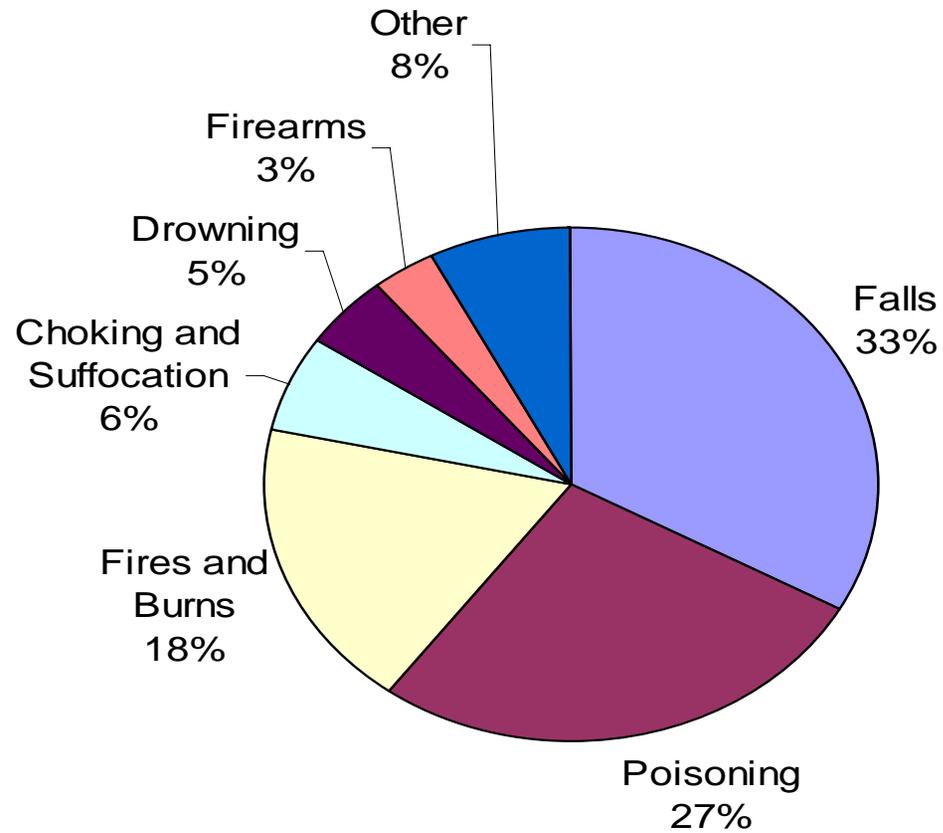


Control Dust When Cleaning



- Central vacuum ensures dust doesn't enter living space
- Needs good filtration
- Needs exterior exhaust

Keep it Safe



Remember

- Priorities
 - Energy efficiency
 - Test for CO, Radon, Lead
 - Control moisture & ventilate: bath, kitchen fans; control rainwater & dehumidify; HE toilets; filter air
 - Lead safe work practices
 - Track off systems
- Integrate into common choices
 - Pest exclusion not pesticides
 - Low VOC paints

Current Decisions Healthier Choices

- Painting – low VOC
- Vacuum – central vac with filtration
- Cabinets /Shelving – no urea formaldehyde; wire shelves
- Orientation – access views and nature
- Toilets – high performance
- Flooring – smooth cleanable flooring, green criteria
- Mudrooms – shoe storage, walk off mats

New Opportunities for Choices

- Ventilation – point source, whole house
- HVAC – sizing and filtration
- Radon – radon control systems
- Carbon monoxide – combustion sealed and direct vent equipment, sealed garage connection
- Energy conservation/envelope – meet Energy Star and avoid unplanned airflows
- Smoke Free in multi family buildings

Resources

- Greenseal.org
 - Paints, cleaners, etc
- Toolbase.org
 - Information on low VOC products
- Aqmd.gov
 - South Coast Air Quality Management District criteria on adhesives
- Centerforhealthyhousing.org (Thank you for use of slides)
- Carpet-rug.org – green carpet