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DEPARTMENT OF ENVIRONMENTAL PROTECTION



Bureau of Radiation Protection



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DEP at Home

Radon Action Month Webinar

January 16, 2013

Dial-in number for Audio: 1-877-668-4493

Event Number: 648 716 335

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Radon Division – What Does it Do?

- Radon Monitoring Section
- Radon Awareness and Outreach
 - Public service announcement, newspaper, radio, home shows, TV, website, phone calls, presentations
- Technical support
- Inspections
- Radon Certification Section
- Certify testers, mitigators and laboratories
- Reporting issues
- Enforcement

▶ Is Radon a Problem in Pennsylvania?

- Pennsylvania is unique!
- The geology and the soil contribute to Pennsylvania having some of the highest radon levels in the country
- Pennsylvania homes average about twice the EPA guideline of 4 pCi/L
- Approximately 40 percent of radon test results are greater than the EPA guideline

Radon Map

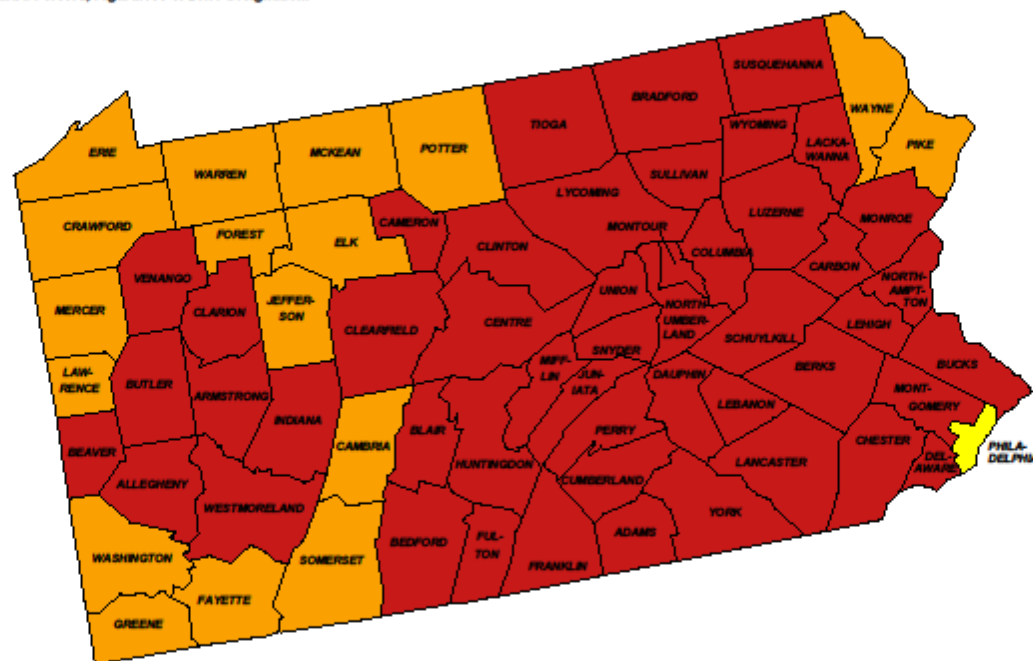
PENNSYLVANIA - EPA Map of Radon Zones

<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/gpinfo.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.



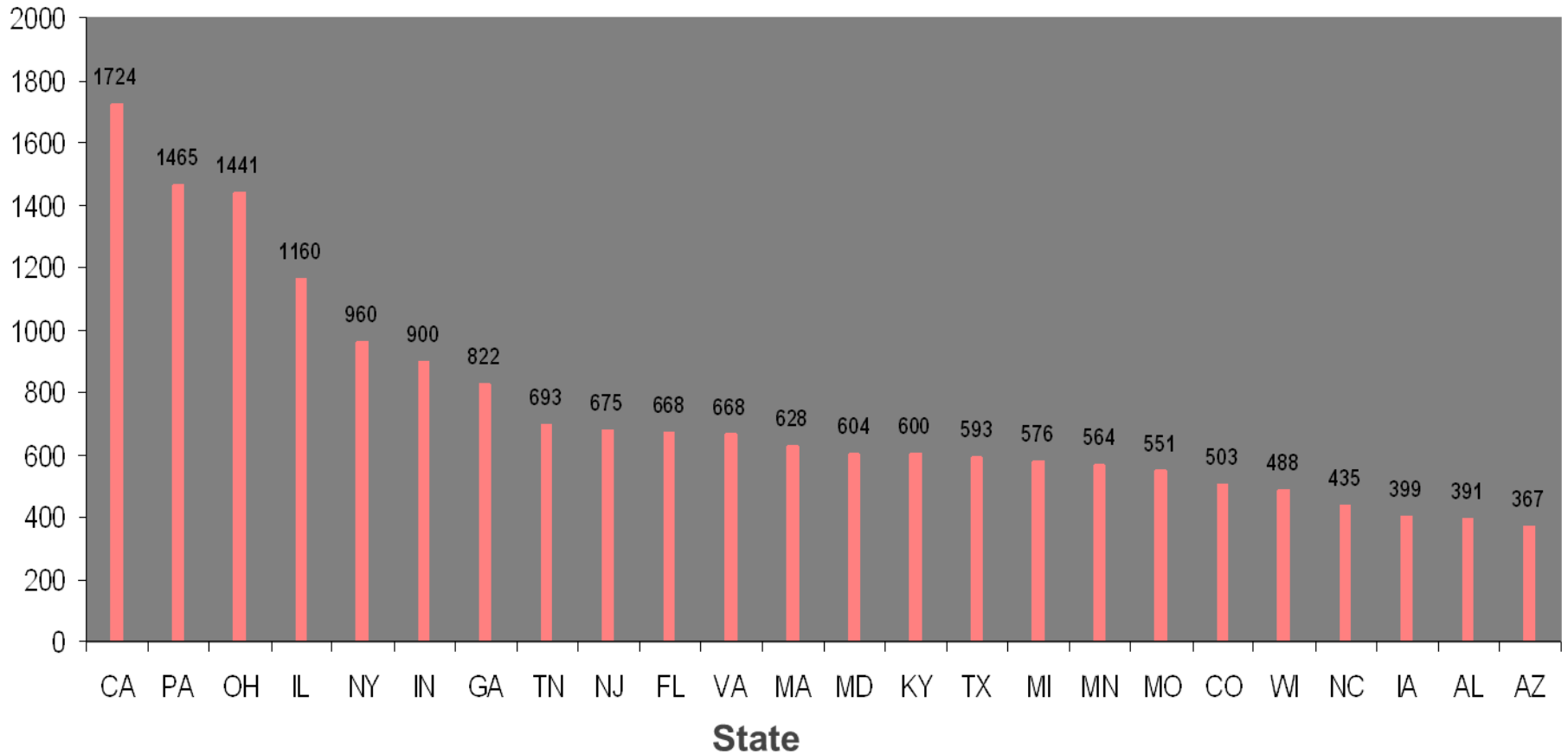
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Statewide Radon Levels

Radon Category (pCi/L)	Statewide Data
< 4 pCi/L	60.8%
4 to 10 pCi/L	22.7%
11 to 20 pCi/L	9.2%
21 to 50 pCi/L	5.3%
51 to 100 pCi/L	1.3%
> 100 pCi/L	0.44%
% > 4 pCi/L	39%
Sample Size	878,600

Annual Radon-Related Deaths



4-5 Draft Sep-07



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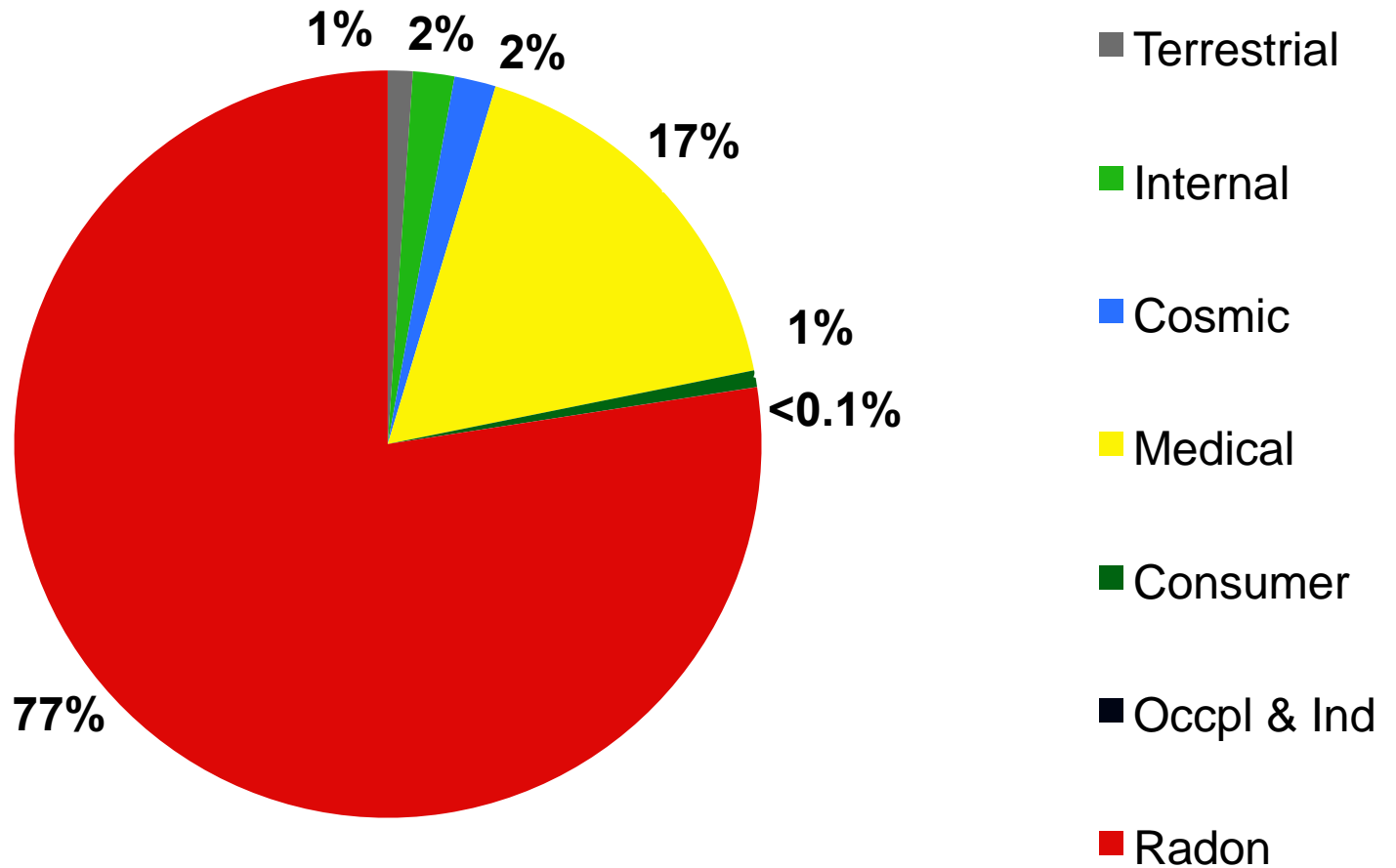
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Discussion

- Radon risk in perspective?
- Actions if high radon levels found?
- What is radon mitigation?
- Access to radon mitigators
- Radon in water

Pennsylvania Annual Radiation Dose

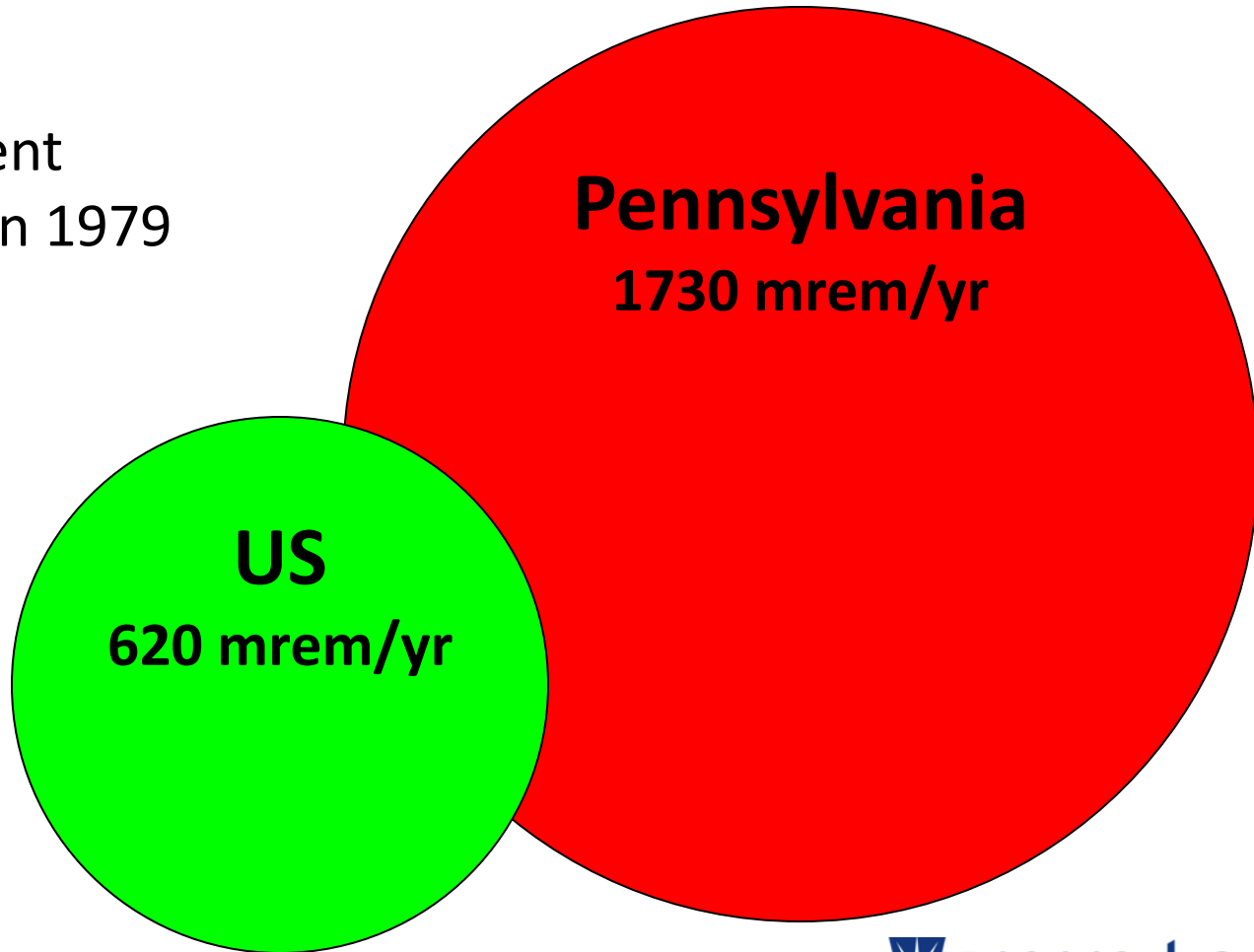


Annual Doses

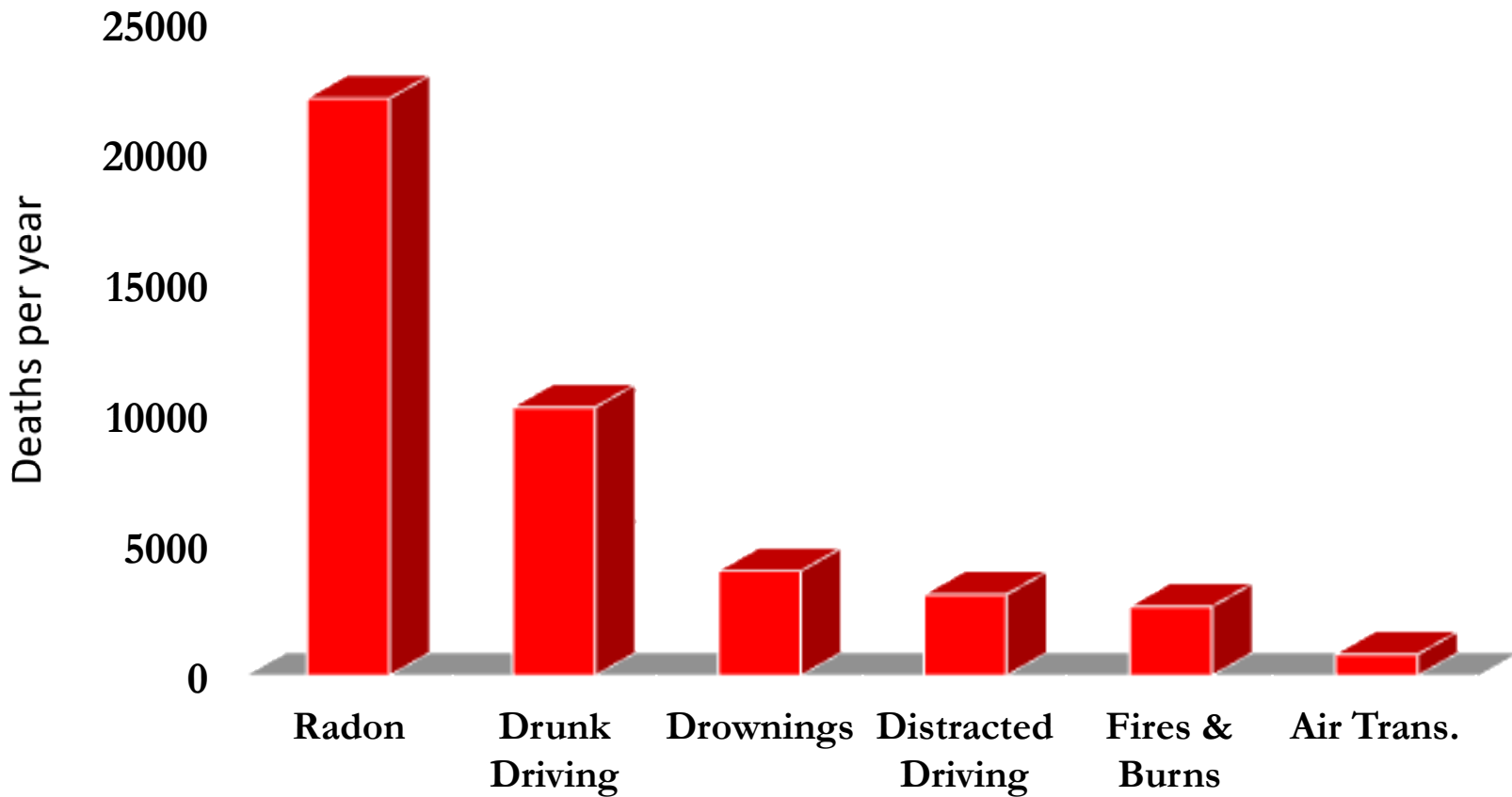


TMI Accident

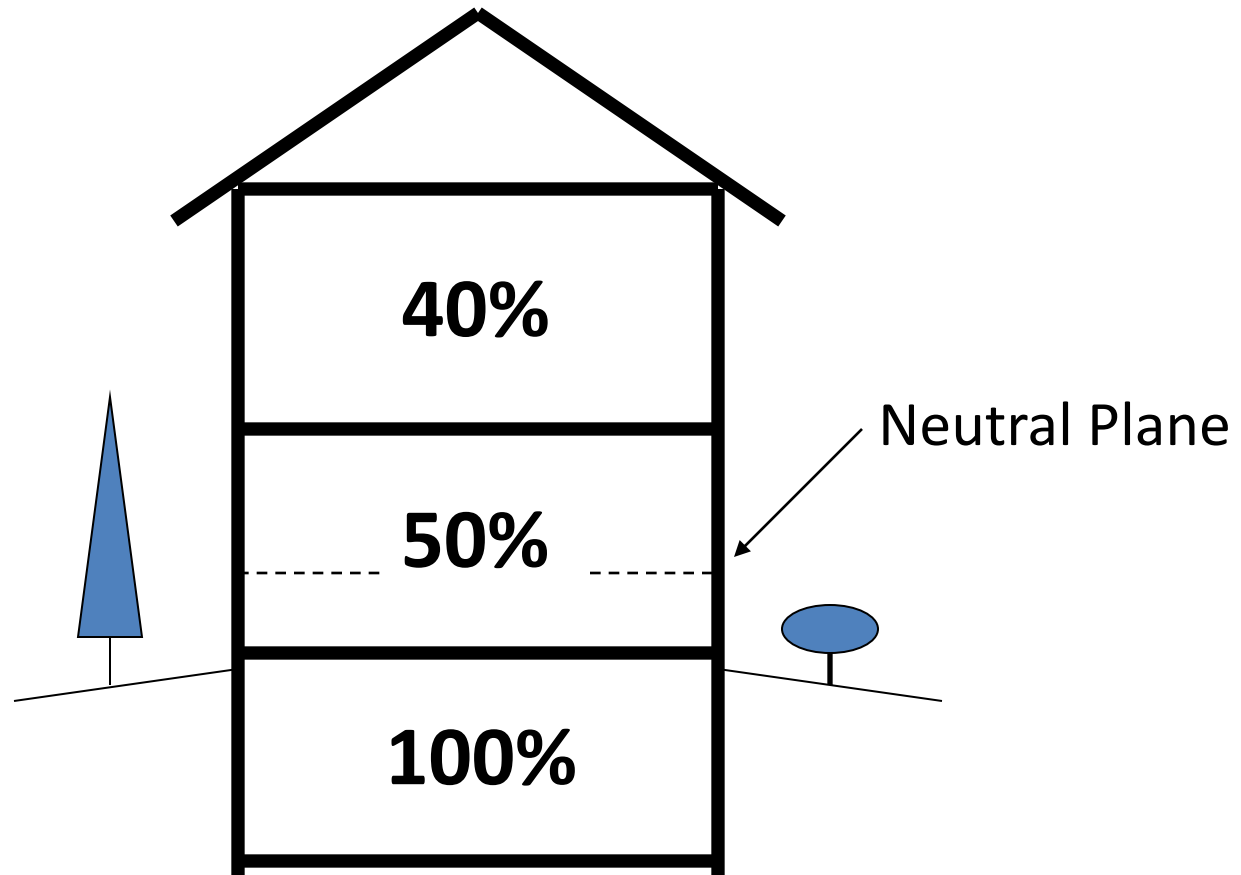
8 mrem once in 1979



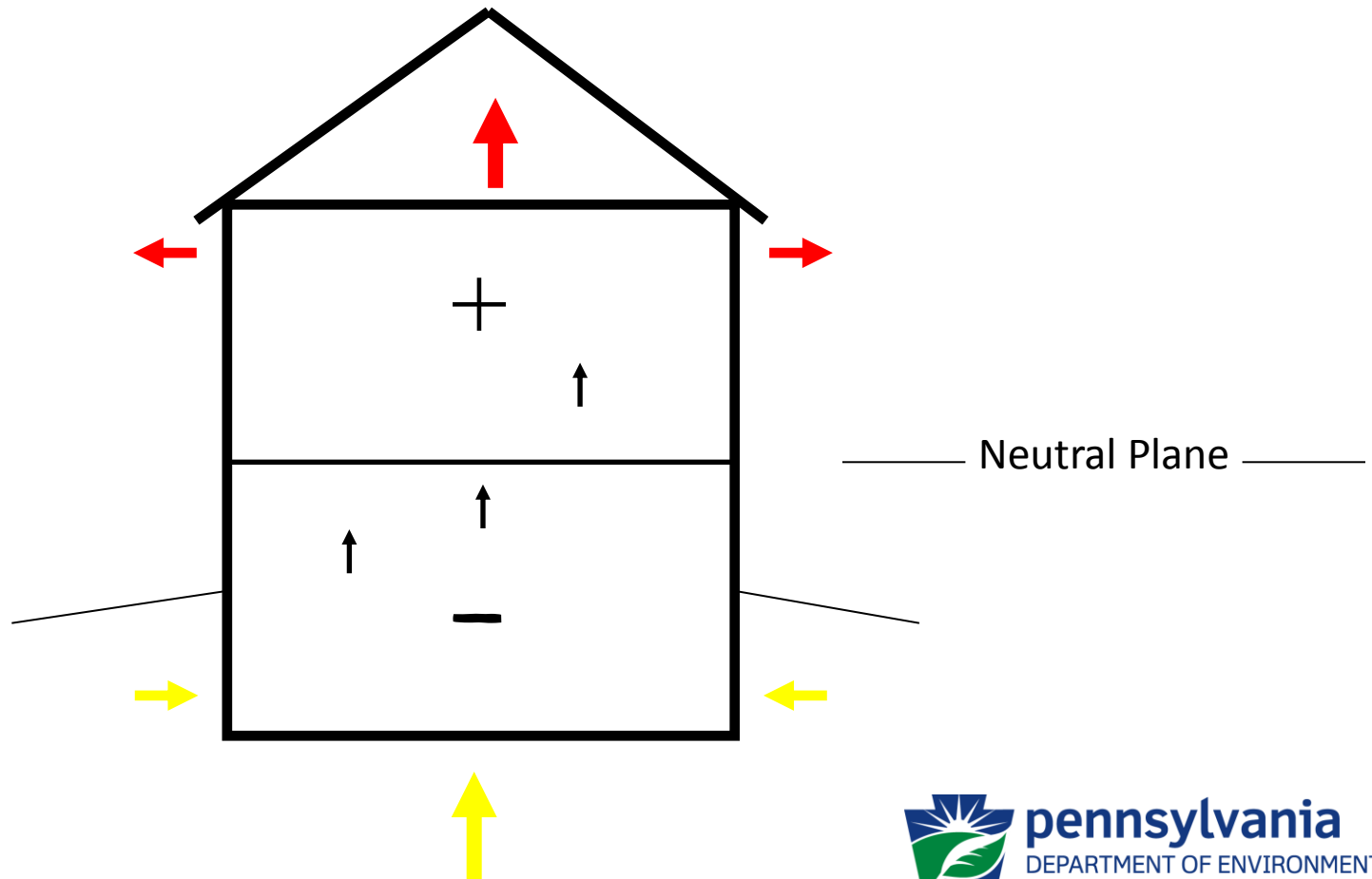
Radon Risks



Typical Radon Distribution

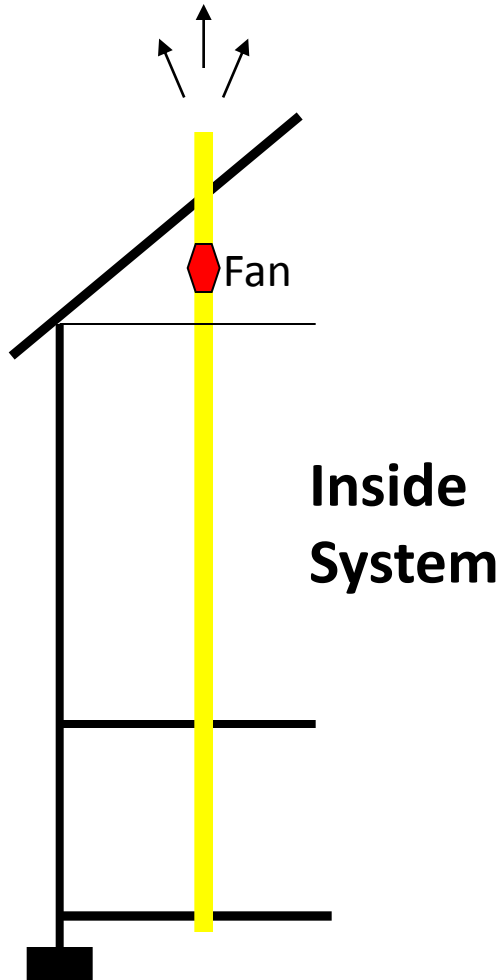


Pressure Differences

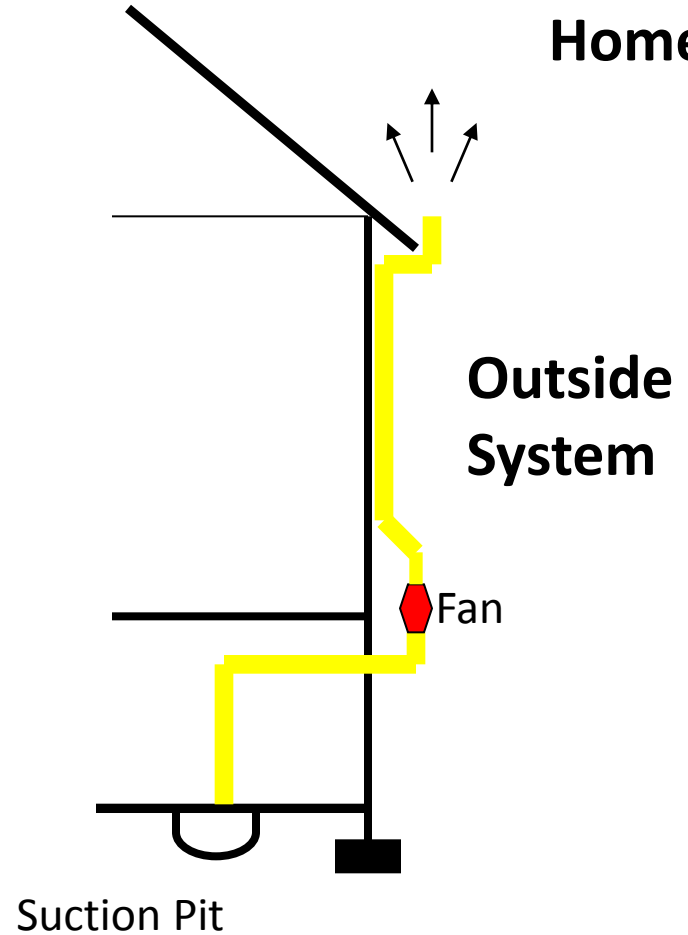


Radon Mitigation Systems

New



Existing Home



Additional Radon Information

Certified Radon Mitigators

- Search “PA radon mitigator”
- 800-23RADON

Radon in Water

- Not regulated
- Risks mainly from off-gassing into air
- Removal by using:
 - Charcoal filters
 - Aeration systems



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Kevin M. Stewart
Director of Environmental Health

Why should you be
concerned about radon?

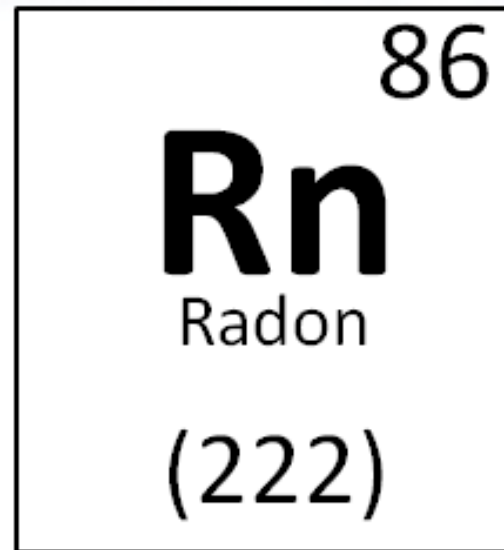
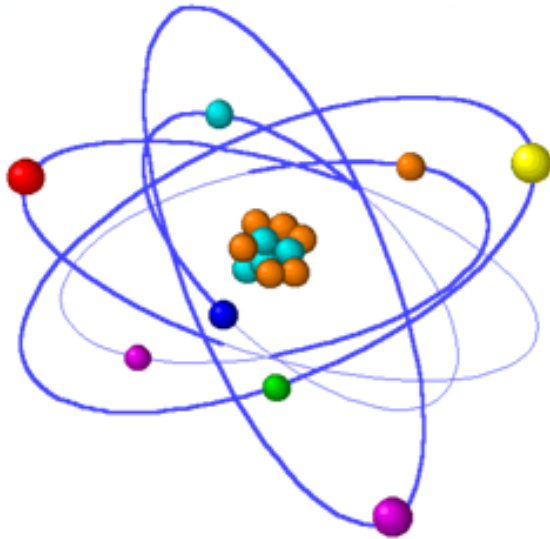
American Lung Association

Most People Know That:



Smoking is the **#1** Cause of Lung Cancer

Most People DON'T Know That:



Radon is the **#2** Leading Cause of Lung Cancer

National Radon Health Advisory

Indoor Radon gas is a national health problem. Radon causes thousands of deaths each year. Millions of homes have elevated Radon levels. Most homes should be tested for Radon. When elevated levels are confirmed, the problem should be corrected.

-- U. S. Public Health Service



 **AMERICAN LUNG ASSOCIATION.**
IN PENNSYLVANIA

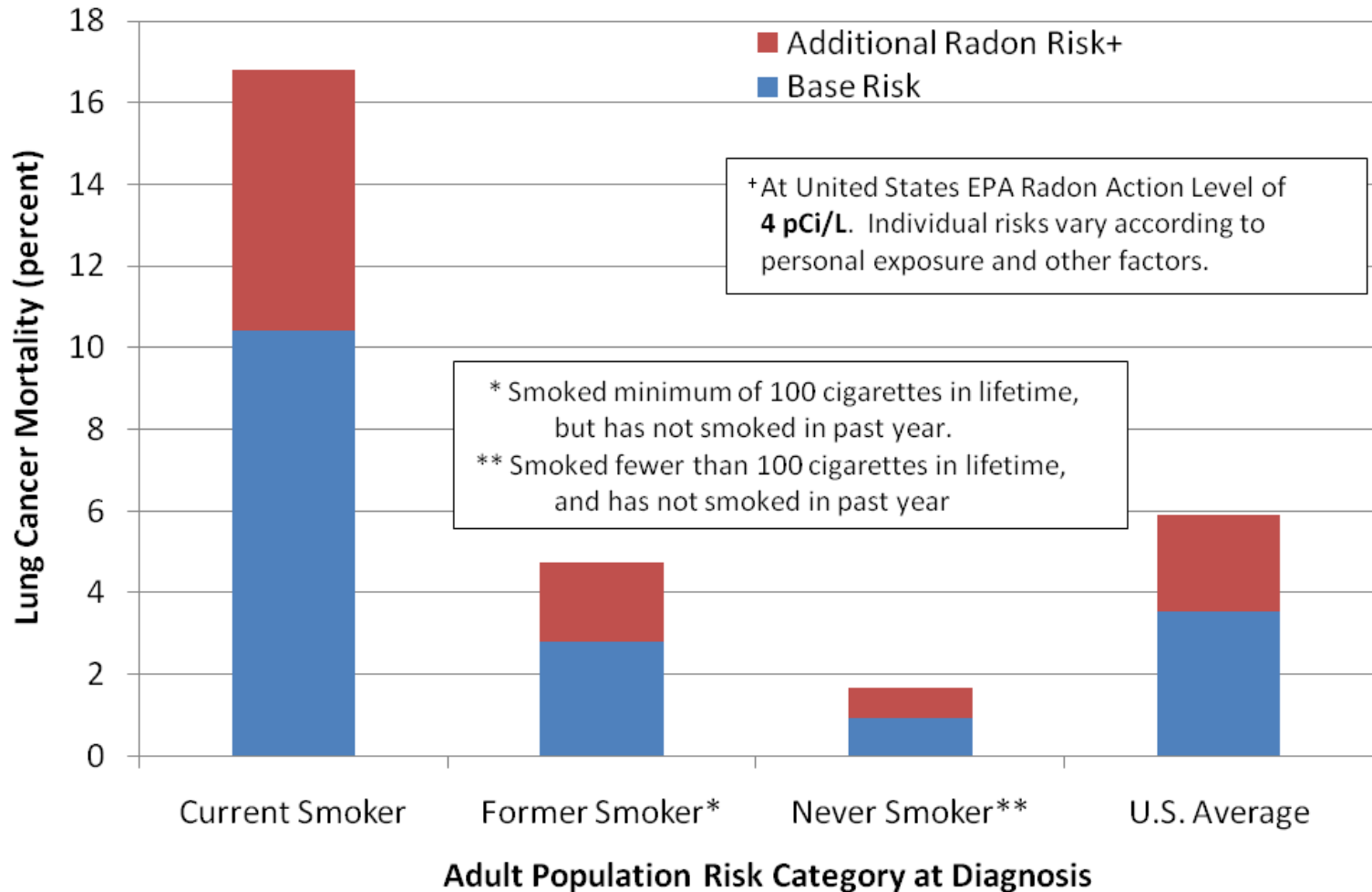
American Lung Association

Radon is Recognized as a National Health Problem!

- American Lung Association
- American Medical Association
- American Cancer Society
- American Public Health Association
- U. S. Environmental Protection Agency
- U. S. Surgeon General

Mortality Risk

Approximate United States Lung Cancer Mortality Risk at 4 pCi/L



Annual U. S. Lung Cancer Deaths

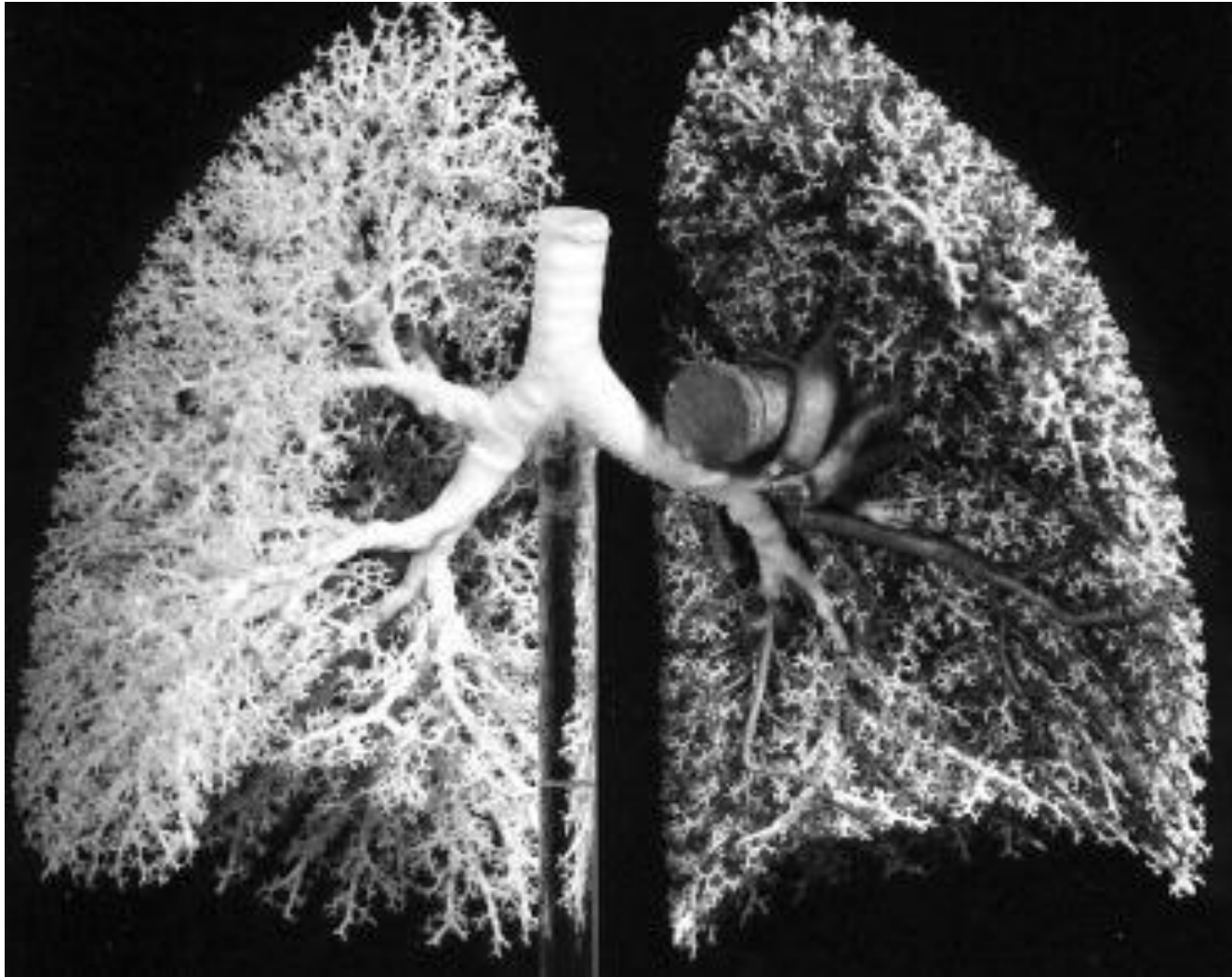
- Smoking Alone 116,000
- Smoking and Radon 18,000
- Radon Alone 3,000
- Other 21,000
- **Total 158,000**
- The rate of lung cancer deaths due to radon depends on smoking rates.

How does radon
cause lung cancer?

American Lung Association

- Answer lies in
 - How the lungs work, and
 - The nature of radon decay products

Human Lungs



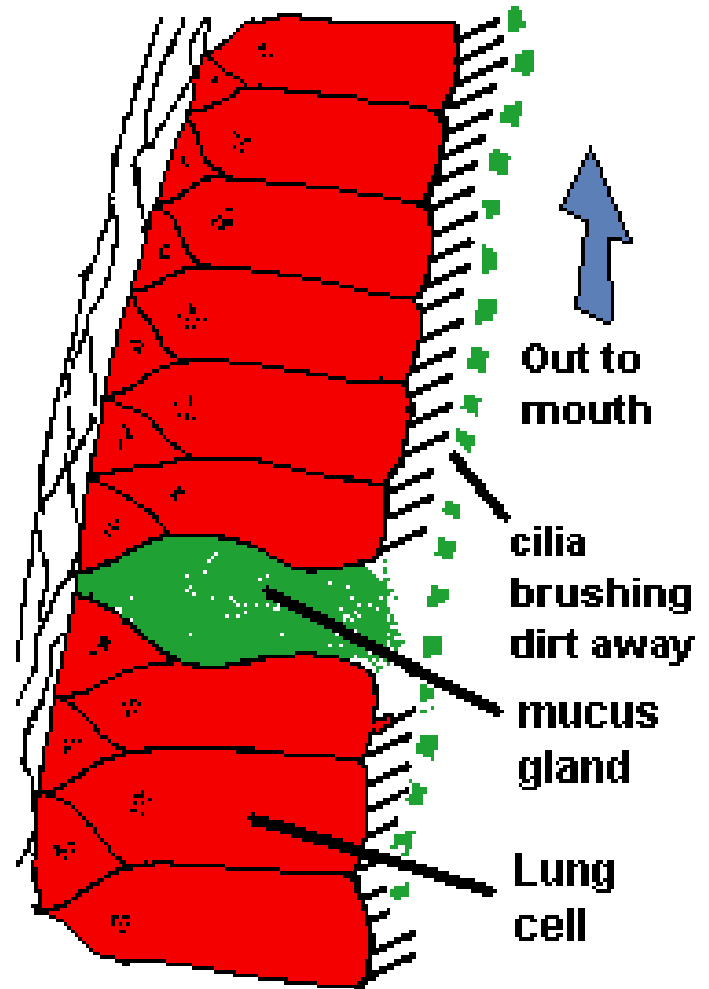
Cast of human lungs—Anatomical Institute, Bern, Switzerland

American Lung Association

- The lungs are the most external organs of the body
 - Living cells are in contact with the outside world
 - Most of the body's airways have a thin mucus layer 5-7 μm (microns) thick; the lungs produce about a quart a day
 - The mucus traps air pollution and particles
 - If the lungs didn't produce this mucus, you would die

Lung Clean-up

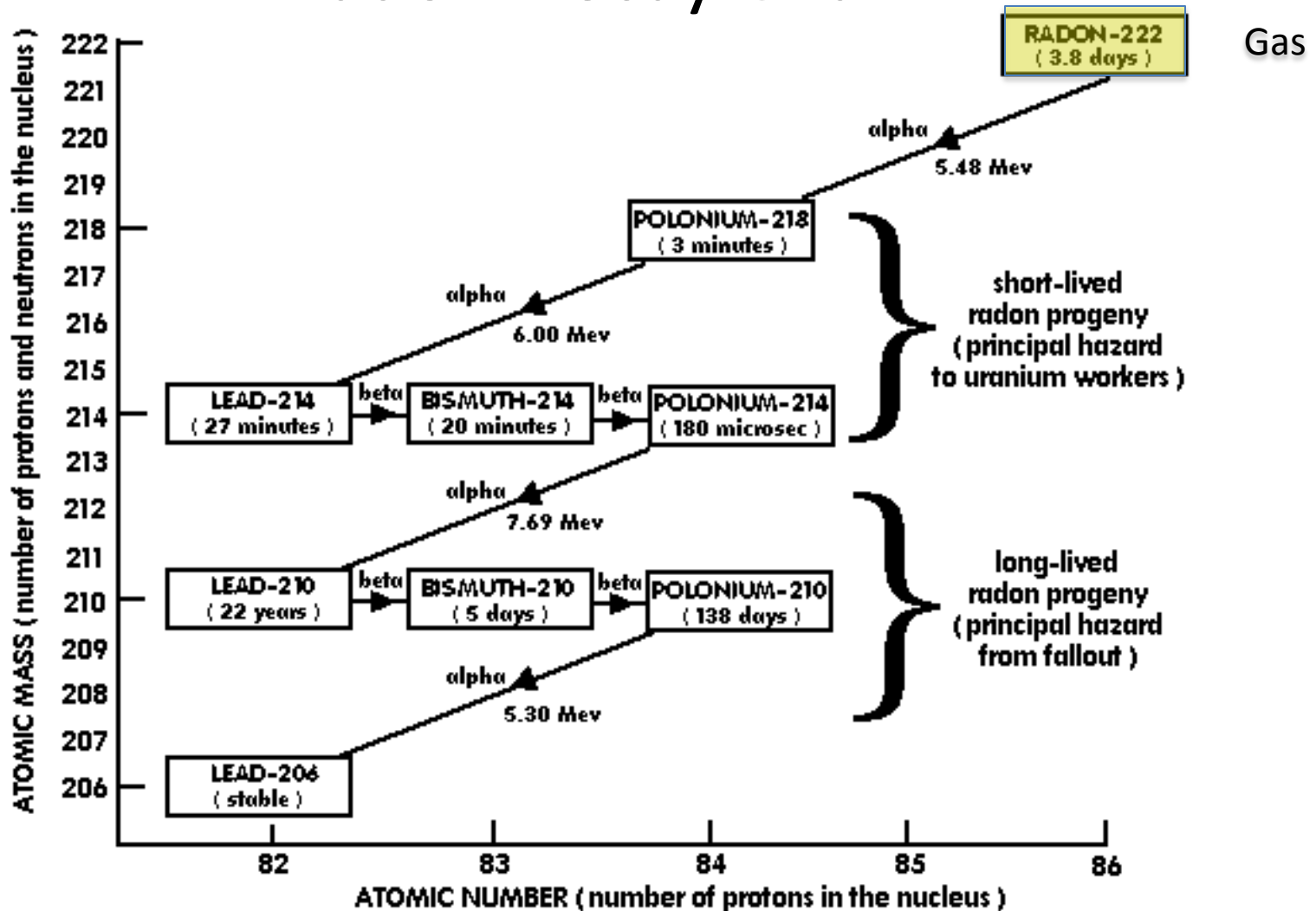
- The cells lining the lungs have hair-like structures called cilia
- Cilia beat 25 strokes per second – moving mucus and trapped particles out
- It takes up to 36 hours for the mucus from the deepest parts of the lungs to reach the top of the trachea (windpipe)



Schematic of Lung Epithelium –
Lung Association of Saskatchewan

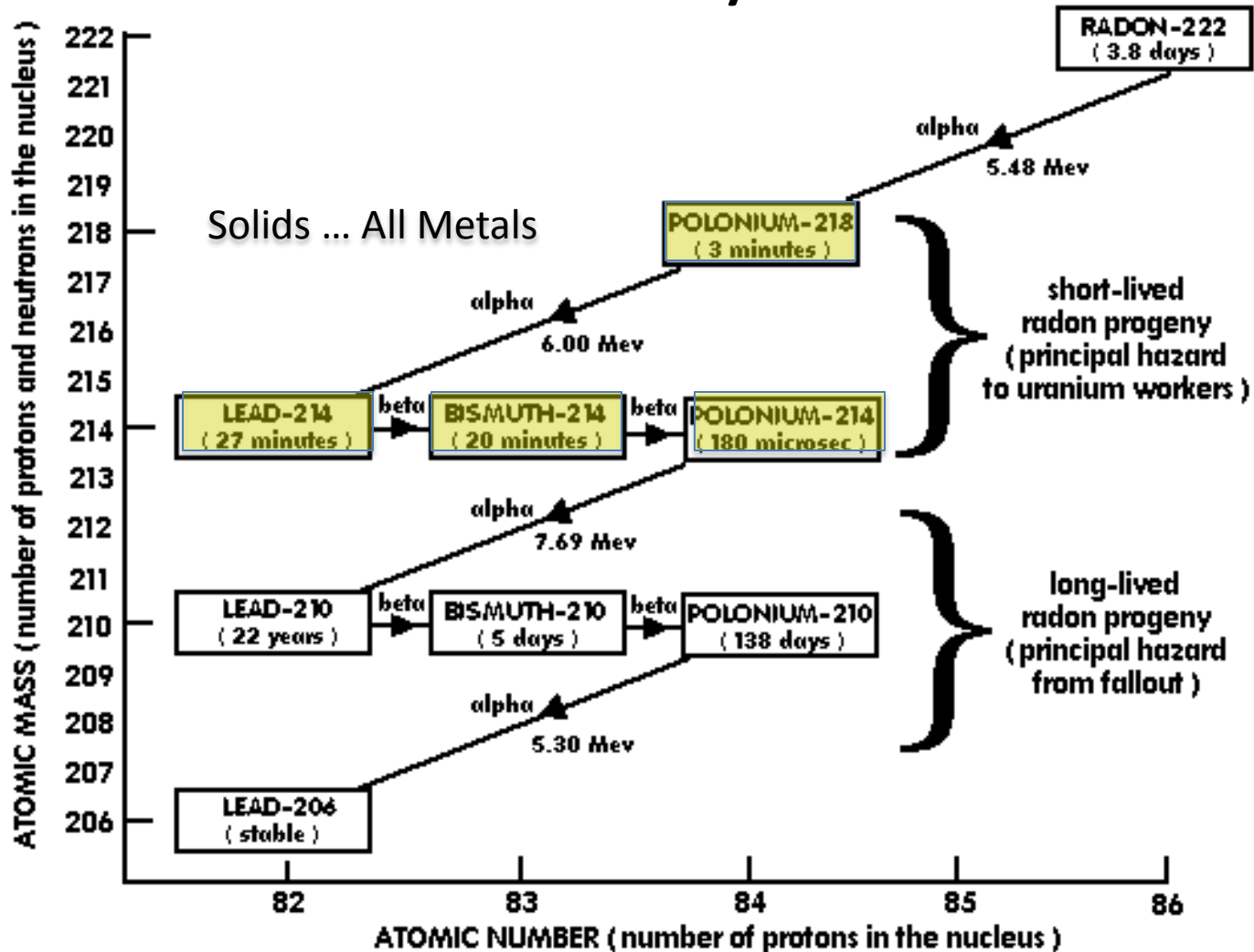
Where Does Radon Come From?

Radon Decay Chain



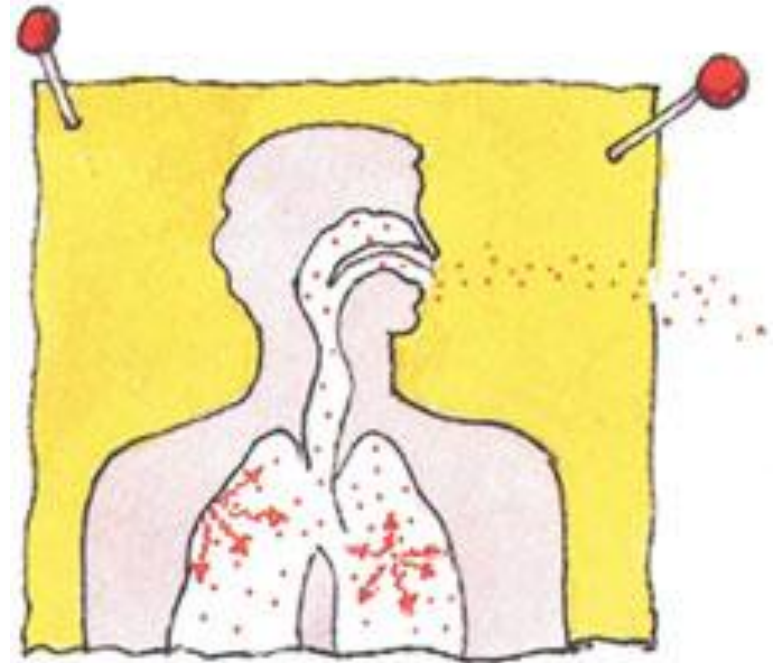
Where Does Radon Come From?

Radon Decay Chain



How Does Radon Cause Cancer?

- Radon decay products are short-lived isotopes that are suspended in the air, often attached to fine particles
- When inhaled deep into the lungs, they usually decay further before the lungs can sweep them out
- The alpha particles emitted can directly or indirectly damage DNA in the cells of lung tissue, thus increasing the risk of developing lung cancer



Main Understandings

- There is no confirmed “safe level” of radon exposure
- Demonstrated lung cancer risks to underground miners occur at radon levels that clearly overlap with exposures frequently experienced in Pennsylvania
- Pooled residential studies published in 2004 to 2006 confirm an increase in lung cancer risk on the order of 10 percent at the 4 pCi/L level – *not* a safety standard
- The EPA has estimated that **one in seven** lung cancer deaths (about 21,000) are radon-related

Radon Work in Pennsylvania

- Public health education via media
- Distribution of radon test kits and information through school-based programs around the state
- Distribution of radon test kits and information through our on-line request portal
- Collaboration with civic, business, health, education and local government entities to distribute radon test kits and information

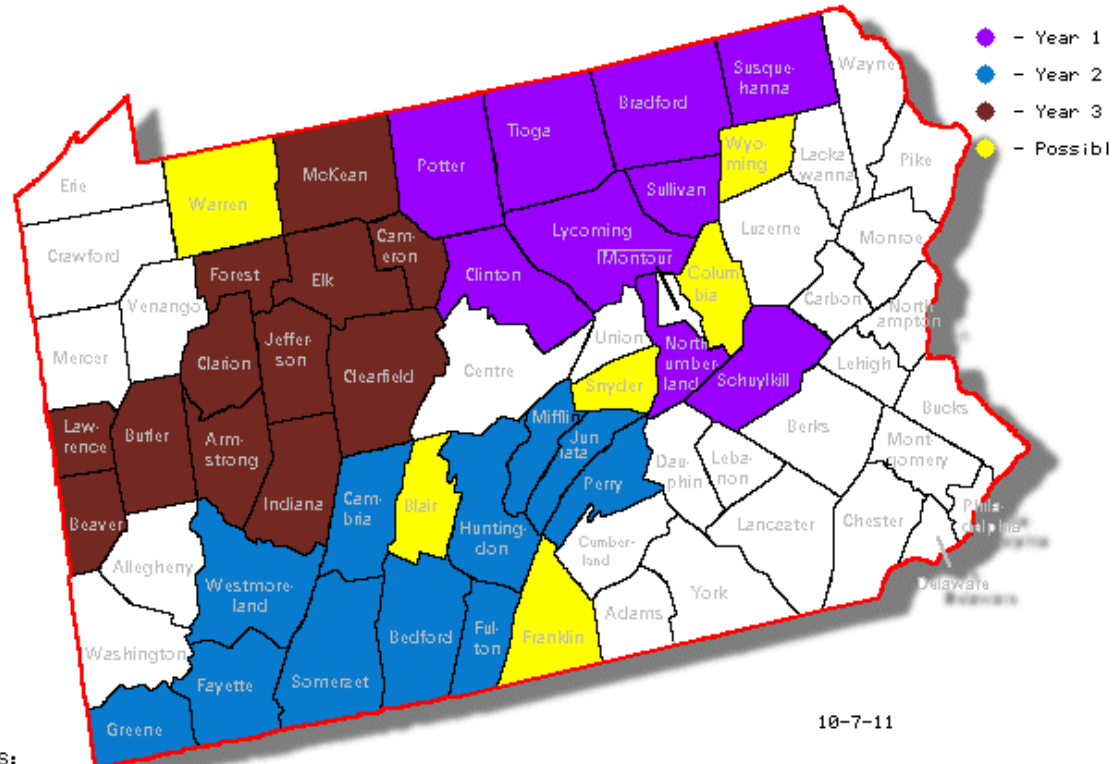
Three-Year Approach

- Two Principal Criteria for Identification of Candidate Counties
 - Counties with greater likelihood of homes with elevated radon
 - Counties with history of being under-tested in comparison with statewide testing rate

Three-Year Approach

- Year 1 - NE Quadrant (4500 test kits)
- Year 2 - SW Quadrant (6000 test kits)
- Year 3 - NW Quadrant (TBD)

Proposed County Groups for Radon Outreach Years 1, 2, and 3



10-7-11

NOTES:
Groups of counties are proposed as starting points for structuring future work, not necessarily as final sets.



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Office of External Affairs

QUESTIONS?

Please type questions into the chat window.



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