

Radon 101

KY Radon Overview

Lung Cancer Prevention and Survivorship is Good Business: Unifying Communities and Industries for Better Health

January 25, 2017



Topics for Discussion

- Webinar Participant Letter
- Radon Overview
- Radon Health Effects
- Radon Entry Points and Sources
- Kentucky Radon Statistics and Maps
- Addressing Radon in Kentucky
- Education and Outreach Materials
- University of Kentucky College of Nursing, BREATHE - Research and Resources

Radon Overview

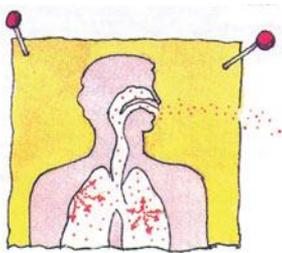


Radon is a cancer-causing natural radioactive gas that:

- you can't see, smell or taste.
- causes more than 25,000 deaths each year.
- is the leading cause of lung cancer among non-smokers, second only to smoking.
- is widely regarded as the leading environmental cause of cancer mortality.

The only way to know if a building has elevated radon levels is to have it tested.

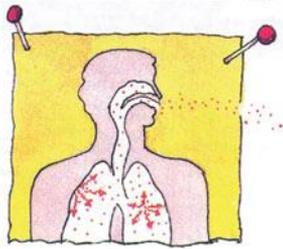
Key Characteristics of Radon



Key Characteristics:

- Naturally occurring radioactive gas
- Chemically inert
- Negative pressures pull radon indoors
- Radon is an unstable element that forms decay products
- Radon decay products have a short half-life of 3.8 days

Radon-Induced Lung Cancer



Radon-induced lung cancer:

- Caused when inhaled products decay and release alpha particles, causing lung cells to be killed or mutated
- Exposure factors:
 - Duration of exposure (time in building)
 - Concentration of exposure (radon level)
 - Smoking increases risk by a factor of 8 to 10
- No level of exposure is safe.

Radon Entry Points and Sources



Radon entry points:

- Floor cracks
- Construction joints
- Wall cracks
- Suspended floor gaps
- Service pipe gaps
- Wall cavities
- Water supply
- Sump crotch, plumbing penetrations

Indoor air contribution sources:

- Soil gas: 90%-95%
- Emanation: 3%-5%
- Water supply: 1%-2%

Know Your Number



EPA action level = 4.0 pCi/L

WHO action level = 2.7 pCi/L

Radon Level*:	Equates to ¹ :
2.0 pCi/L	100 chest x-rays / year 4 cigarettes / day
4.0 pCi/L	200 chest x-rays / year 8 cigarettes / day
8.0 pCi/L	400 chest x-rays / year 16 cigarettes / day
20.0 pCi/L	1,000 chest x-rays / year 40 cigarettes / day
40.0 pCi/L	2,000 chest x-rays / year 80 cigarettes / day

*Radon is measured in pico curies per liter of air (pCi/L)

¹US Department of Health and Family Services. Public Health Service. *Toxicological Profile for Radon*. (1990).

Kentucky Radon Statistics



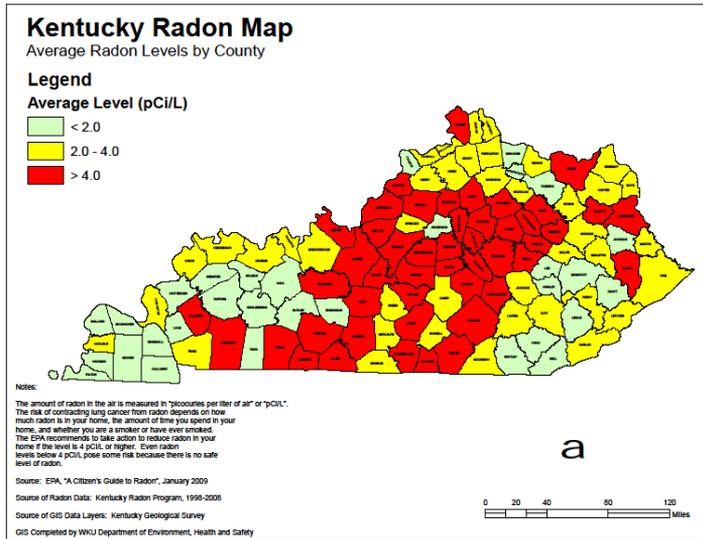
Kentucky radon statistics^{1,2}:

- Radon found in elevated levels in every county in state.
- Nationwide, 1 in 15 (7%) of homes contain elevated levels versus 47% of all Kentucky homes. (56% - Fayette County)
- Nationwide, average home tests at 1.3 pCi/L versus 6.7 pCi/L average for Kentucky homes. (8.6 avg - Fayette County)
- In some areas of Kentucky, more than 65% of all homes will test above 4.0 pCi/L
- Kentucky leads our nation in lung cancer death rates – this isn't all because of smoking

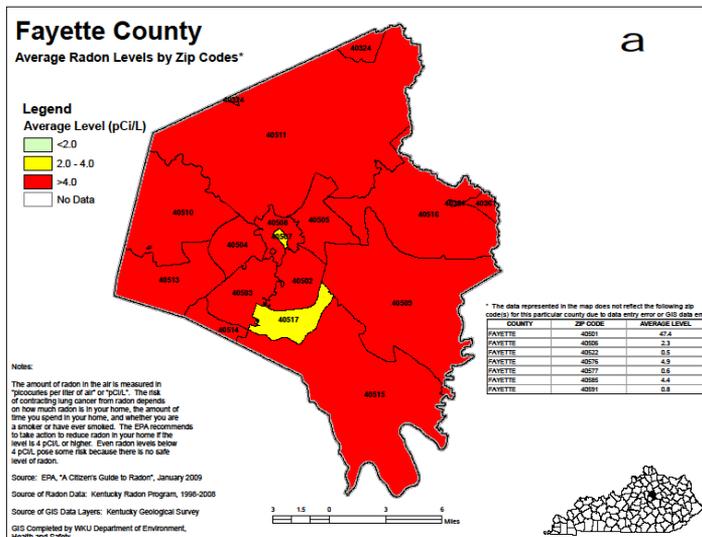
¹Kentucky Cabinet for Health and Family Services. Kentucky Radon Program. Kentucky Radon Test Results. (2009).

²US environmental Protection Agency. Indoor Air Division. *A Citizen's Guide to Radon*. EPA 402-K-09-001, January 2009.

Kentucky Radon Map



Fayette County Radon Map

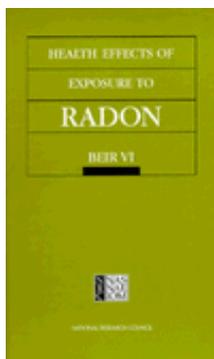


US Surgeon General



- US Surgeon General issued a National Health Advisory in 2005
- Advisory urged Americans to test their homes to find out their level of radon exposure
- Advisory stressed need to fix homes with a level ≥ 4.0 pCi/L
- Dr. Carmona also noted that more than 20,000 Americans die each year from radon-induced lung cancer

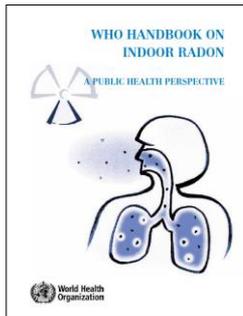
Radon Science



National Academy of Sciences (NAS), BEIR VI: *The Health Effects of Exposure to Indoor Radon (1998)*

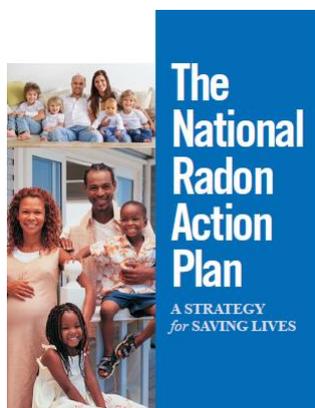
- Radon is a serious health problem, and the second leading cause of lung cancer
- No evidence of a threshold
- Effects of radon and smoking are synergistic
- Radon contributed to 15,000 to 22,000 US lung cancer deaths in 1995
- Reduction of radon levels to < 4.0 pCi/L could prevent approx 1/3 of deaths

WHO and Other Organizations



- World Health Organization (WHO) recommends action level of 2.7 pCi/L
- Other organizations involved with radon risk reduction:
 - American Lung Association (ALA)
 - American Cancer Society (ACS)
 - American Medical Association (AMA)
 - National Cancer Institute
 - Kentucky Cancer Consortium
 - HUD, CDC, EPA, DOE, DOD, et al

American Lung Association (in collaboration)



- The National Radon Action Plan presents a long-range strategy for eliminating avoidable radon-induced lung cancer in the United States.
- The ultimate goal is to eliminate avoidable radon-induced lung cancer in the United States by incorporating radon testing, radon mitigation and radon-resistant construction.
- <https://www.epa.gov/radon/national-radon-action-plan-strategy-saving-lives>

The Kentucky Cancer Consortium

- The Kentucky Cancer Consortium (KCC) is Kentucky’s comprehensive cancer control coalition funded by the Centers for Disease Control and Prevention.
 - Maintain and update the Kentucky Cancer Action Plan priority goals, objectives and strategies to address cancer prevention and control gaps.
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The Kentucky Cancer Consortium

- KCC focuses on issues related to cancer that are shared by multiple regions and/or the entire state.
 - Utilize cancer control data and KCC “best process” to:
 - Identify and prioritize statewide needs for cancer prevention and control.
 - Identify evidence-based interventions and resources to meet those needs.
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The Kentucky Cancer Consortium – Cancer Action Plan

Goal 3: Reduce incidence and mortality of cancers related to environmental carcinogens.

OBJECTIVE 3.1: By 2018, develop a baseline measure of the percentage of buildings and homes that are tested for radon in Kentucky (Developmental baseline: Kentucky Radon Program)

OBJECTIVE 3.2: By 2018, develop a baseline measure of the percentage of buildings and homes with radon levels exceeding the U.S. EPA action guideline of 4 pCi/L. radon levels exceeding the U.S. EPA action guideline of 4 pCi/L. (Developmental baseline: Kentucky Radon Program)

OBJECTIVE 3.3: By 2018, develop a baseline measure of newly built buildings and homes with radon-resistant new construction (RRNC) features. (Developmental baseline: Kentucky Radon Program)

<http://www.kycancerc.org/canceractionplan/canceractionplan.pdf>

The Kentucky Radon Coalition

- **The Kentucky Radon Coalition**
 - Housed under the umbrella of KCC
 - Other groups include the Radon Leadership Team and Radon Stakeholder groups
 - **Overall Purpose:**
 - To work collaboratively to address radon induced lung cancer in Kentucky
 - Align the stakeholders, centrally located within KCC, behind the goals of the Kentucky Cancer Action Plan
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The Kentucky Radon Coalition

Education

- Training on new radon regulations to larger coalition
- Training for health professionals
- Future trainings for realtors, home inspectors and other industry professionals

Outreach

- Engage and update KCC member organizations
- Promotion of radon initiatives within the Lung Cancer Prevention and Early Detection Network
- Promote the goals of findings from research projects (i.e.. BREATHE)

Policy

- Educate about radon policies to increase radon testing and awareness
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The Kentucky Radon Coalition

- National Radon Action Month, January, 2017
 - PSA's in 3 large media markets in KY
 - Website for radon kit orders
 - KCC's Lung Cancer Network
 - Coalition meetings and trainings
 - Northeast KY Area Health Education Center Lung Cancer and Radon
 - University of Kentucky, College of Nursing – BREATHE
<http://www.uky.edu/breathe/>
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Radon Resources

- **The Kentucky Radon Program:**
 - <http://chfs.ky.gov/dph/info/phps/radongas.htm>
- **Kentucky Association of Radon Professions:**
 - <http://www.kentuckyradon.org/>
- **Centers for Disease Control and Prevention**
 - <https://www.cdc.gov/features/protect-home-radon/>
- **National Radon Action Plan:**
 - <https://www.epa.gov/radon/national-radon-action-plan-strategy-saving-lives>
- **University of Kentucky, College of Nursing, BREATHE:**
 - www.breathe.uky.edu

Questions?

Thank You!

Clay Hardwick, R.S.
Kentucky Radon Program
(502) 564-4856
clay.hardwick@ky.gov

Kristian Wagner, MS, RD, LD
Health Policy Director
kristian@kycancerc.org
(859) 327-1611

