

Mary Kay Rayens, PhD

**(with N. Conley, W.C.
Haneberg, S. Stanifer, A.T.
Wiggins, and E.J. Hahn)**

**Using geologically-based
radon potential maps to
convey lung cancer risk**

BACKGROUND

- Lung cancer is almost completely preventable by eliminating smoking and exposure to secondhand smoke and radon.
- The risk factors of tobacco smoke and radon are related: more radon-related lung cancers occur in individuals with a history of exposure to tobacco smoke.
- Lung cancer death rates per 100,000 population higher in Kentucky (68.8) compared with the US (45.0); Eastern Kentucky at particular risk (120.0).
- Smoking rates also higher in Kentucky (24.6%) compared with the US (17.1%).

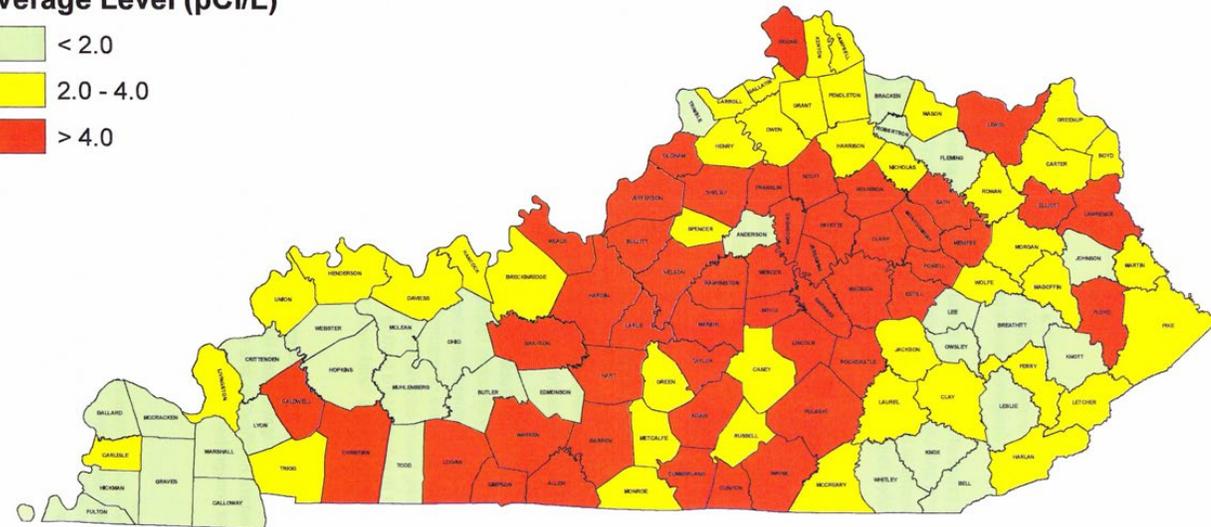
COUNTY-BASED MAPPING TO CONVEY RISK (EPA MAPS)

Kentucky Radon Map

Average Radon Levels by County

Legend

Average Level (pCi/L)



Notes:

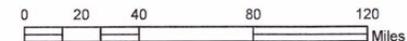
The amount of radon in the air is measured in "picocuries per liter of air" or "pCi/L". The risk of contracting lung cancer from radon depends on how much radon is in your home, the amount of time you spend in your home, and whether you are a smoker or have ever smoked. The EPA recommends to take action to reduce radon in your home if the level is 4 pCi/L or higher. Even radon levels below 4 pCi/L pose some risk because there is no safe level of radon.

Source: EPA, "A Citizen's Guide to Radon", January 2009

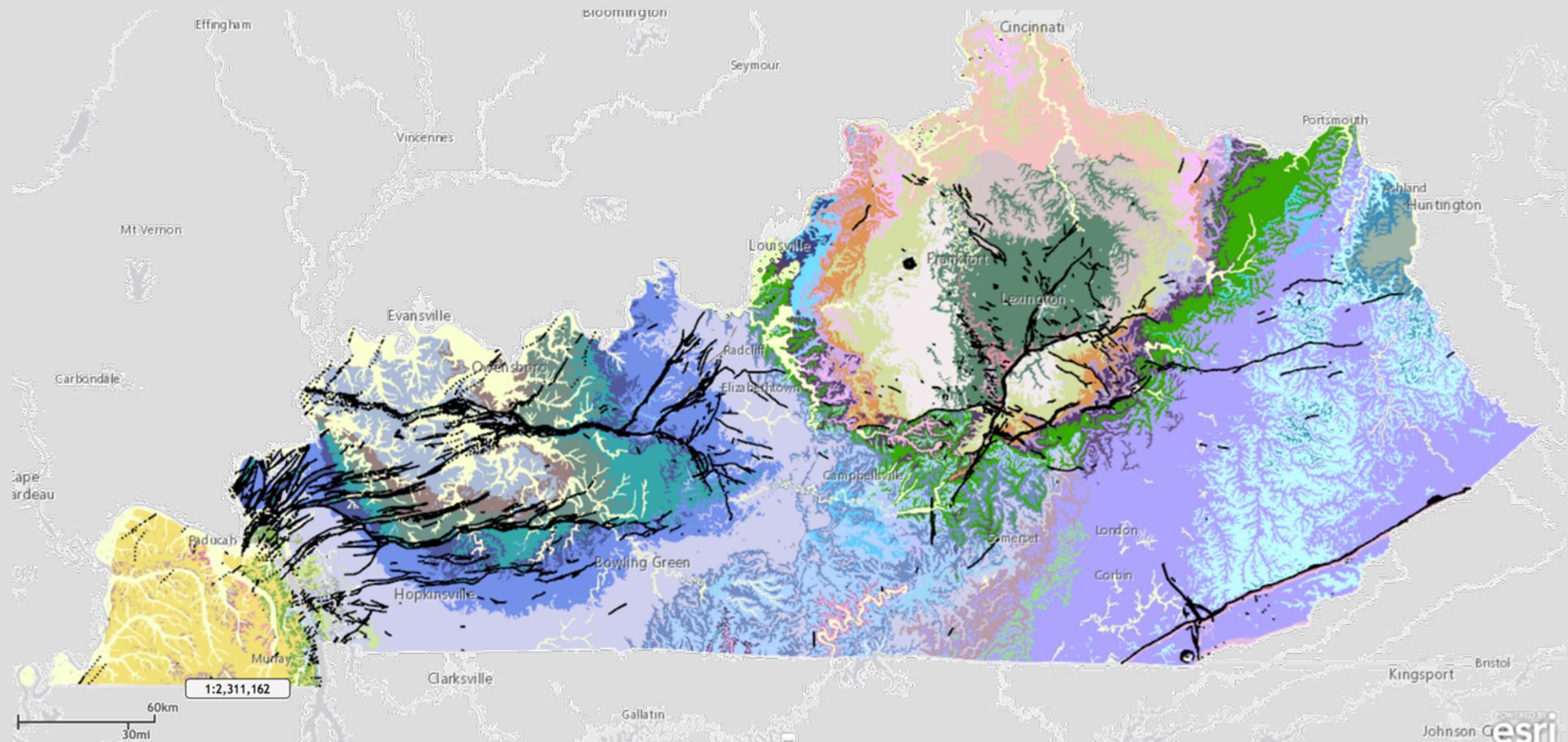
Source of Radon Data: Kentucky Radon Program, 1998-2008

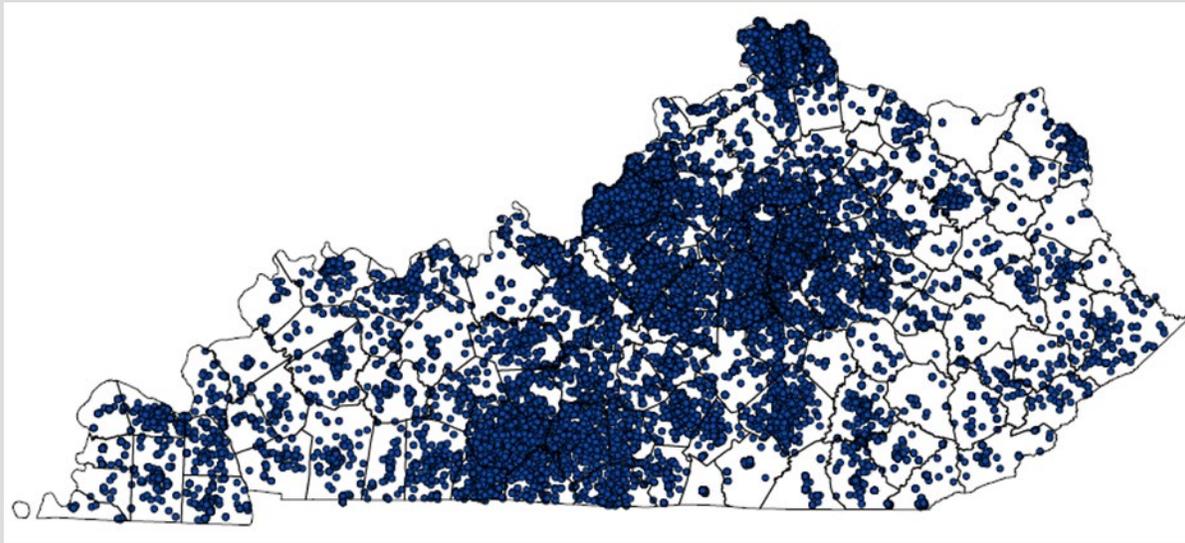
Source of GIS Data Layers: Kentucky Geological Survey

GIS Completed by WKU Department of Environment, Health and Safety



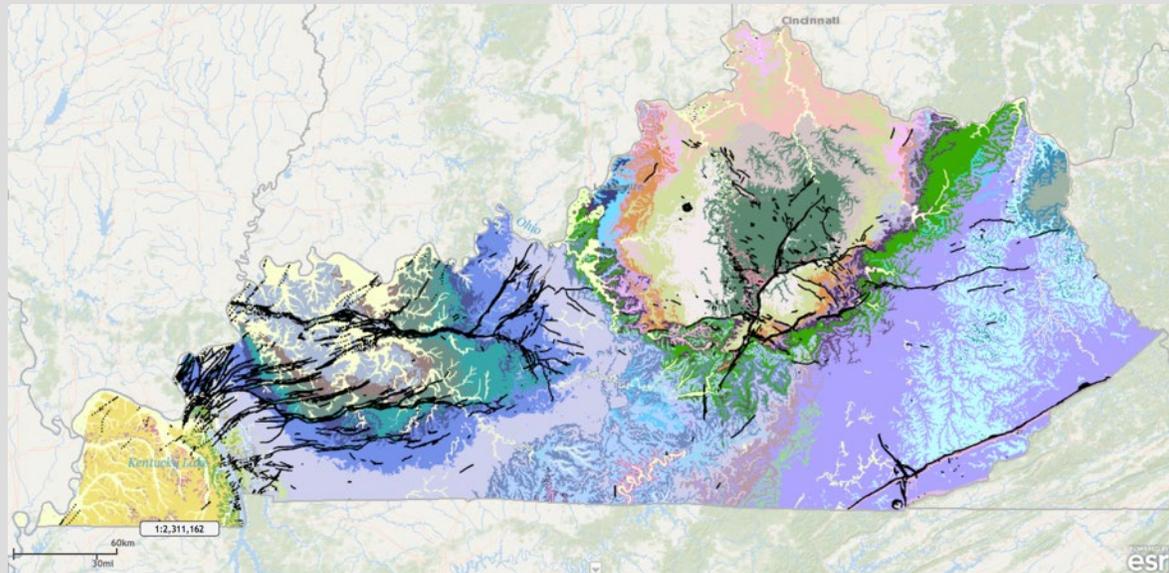
BEDROCK GEOLOGIC MAP





60,000+
radon home
test kit
results

+



Statewide
bedrock geologic
map

METHODS

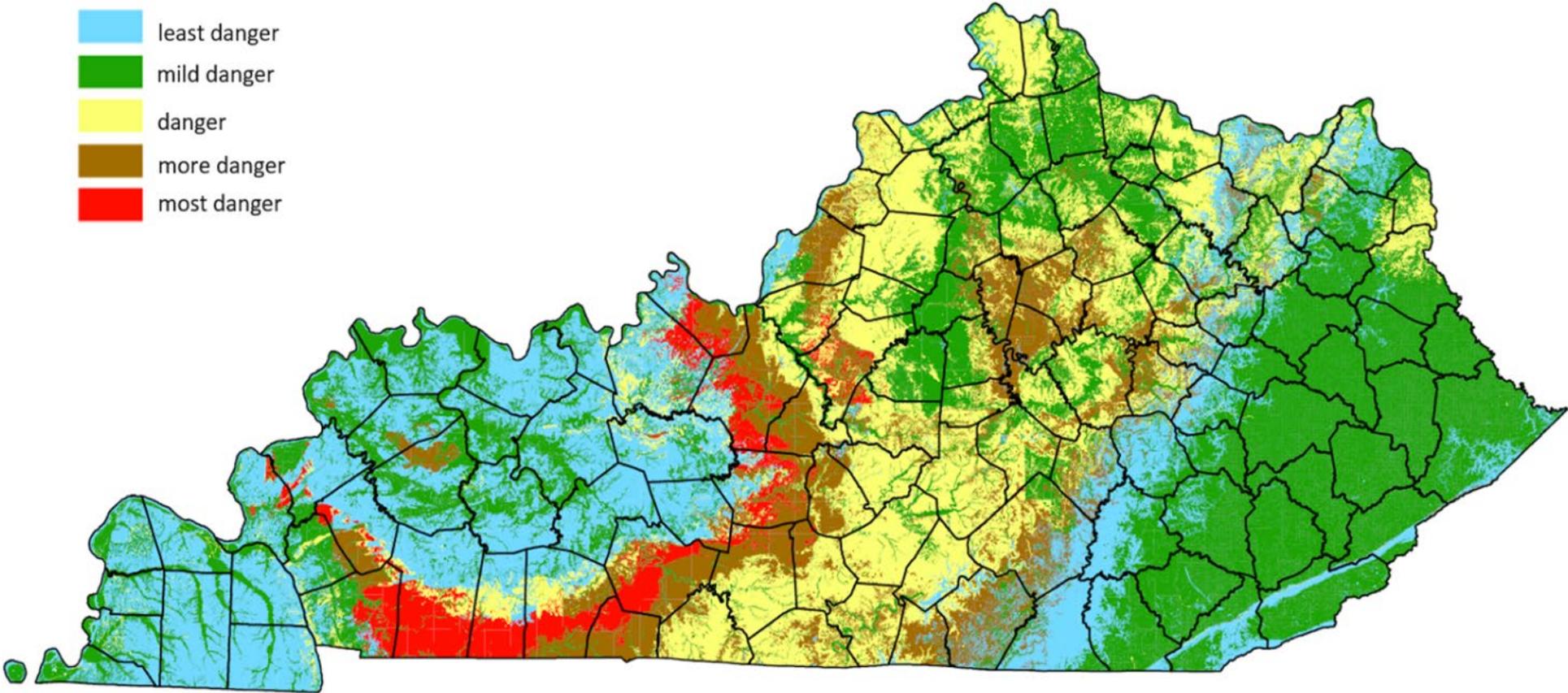
BREATHE & KGS created maps using de-identified observed radon values from the two major radon testing companies serving Kentucky (1985-2016).

>60,000 observed home radon values, along with latitude, longitude, and geologic data compiled to create each county-level radon potential map.

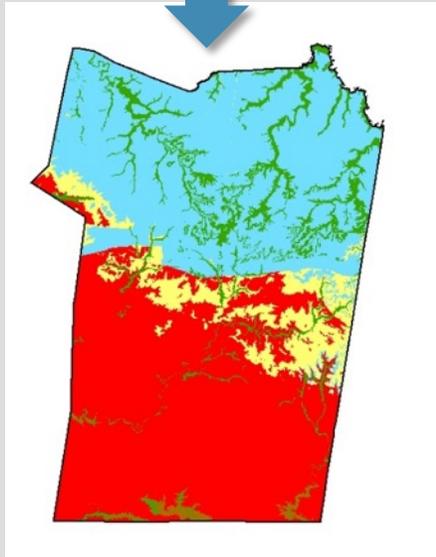
Infographics used to simplify the synergistic risk message of exposure to radon and secondhand smoke, encourage residents to take action to lower their risks, and posted to website for each of 120 counties

RADON POTENTIAL MAP

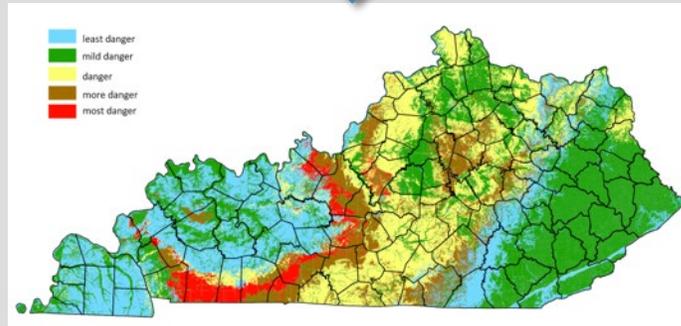
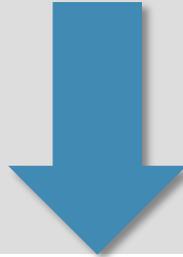
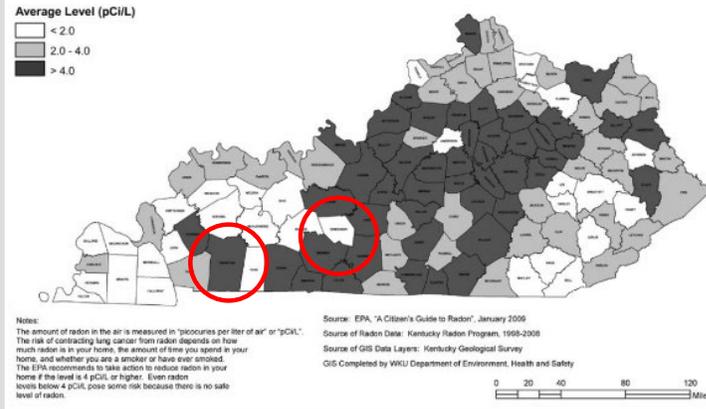
- least danger
- mild danger
- danger
- more danger
- most danger



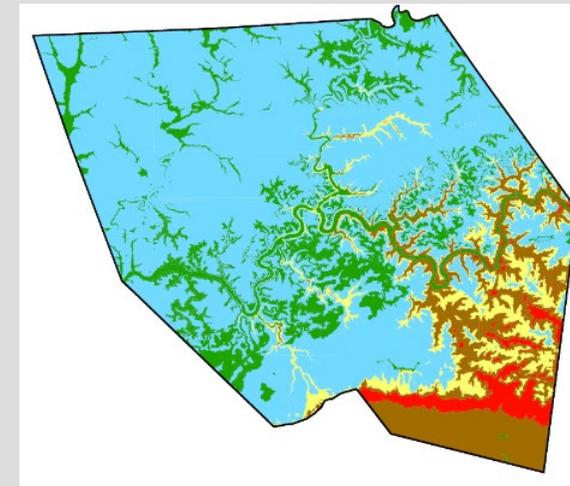
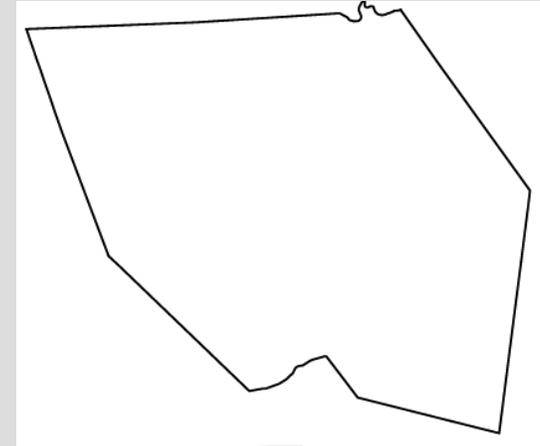
Christian County



AVERAGE RADON LEVELS BY COUNTY, KENTUCKY



Edmonson County



CONVEYING LOCATION- SPECIFIC RISK TO GENERAL POPULATION

Are you in danger from **RADON** in Warren County?

Radon is a naturally occurring, radioactive gas.

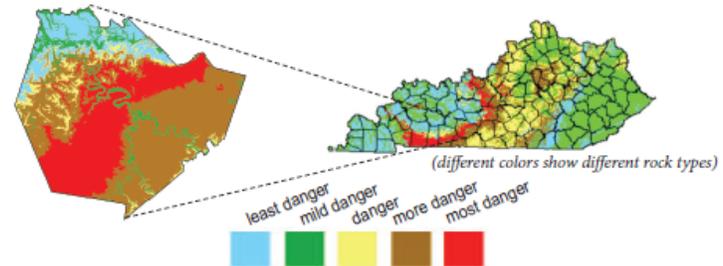
- It cannot be seen, smelled or tasted.
- It may seep into your home from the rocks below.
- It is the second leading cause of lung cancer.

TEST YOUR HOME • KNOW YOUR LEVEL

For a radon test kit, contact the Kentucky Radon Program at (502) 564-4856.

Certain types of rock have higher levels of radon:

Radon is a problem in many areas in Kentucky, including Warren county.

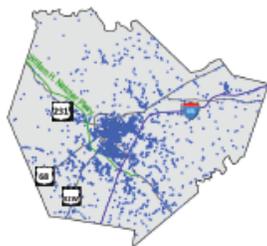


Smoking and radon:

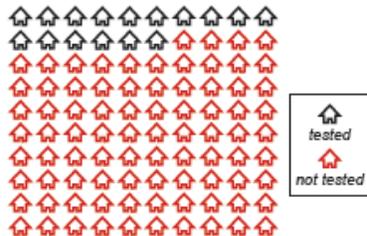
Breathing radon is dangerous,
but it is even *more* harmful when
you also breathe tobacco smoke.



In Warren County:



Blue dots show homes already tested for radon.



More homes in Warren County need to be tested.

To Do List:

- ✓ **TEST** your home for radon.
- ✓ **TALK** with a health care provider about your results.
- ✓ **FIX** your home if the level is high. Call a certified radon professional.
- ✓ **ASK** people to smoke outside.
- ✓ **TELL** your loved ones about the dangers of radon and tobacco smoke.

TEST YOUR HOME • KNOW YOUR LEVEL

For a radon test kit, contact the Kentucky Radon Program at (502) 564-4856.
For more information about the maps, contact BREATHE at (859) 257-7028.

BREATHE
Bridging Research Efforts and Advocacy
Toward Healthy Environments

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College of Nursing

RISK ASSESSMENT: WHAT TO DO NEXT



CONCLUSIONS AND CITATION

- Combining testing results with geologic formations provides a more precise evaluation of risk
- Infographic summaries are a straightforward low-literacy way of demonstrating risk potential, while highlighting the synergistic risk associated with radon and tobacco smoke exposure
- The ability to inform the general population not only about risk potential but also to provide doable action steps and who to contact make this format widely accessible

Haneberg, W.C., Wiggins, A., Curl, D.C., Greb, S.F., Andrews, W.M., Radmacher, K., Rayens, M.K., and Hahn, E.J. (2020). A geologically based indoor-radon potential map of Kentucky. *GeoHealth*.
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CONTACT INFORMATION

mkrayens@uky.edu

WWW.BREATHE.UKY.EDU

