Radon: The Leading Environmental Cause of Cancer Mortality in the U.S

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College of Public Health
Department of Occupational and Environmental Health
Department of Epidemiology
University of Iowa
What Is Radon –222 (radon)?

- **Radon is a gas**

- **It is naturally occurring**

- **You can not see or smell it**

- **It enters buildings primarily from the soil**
U.S. Radon Potential

- Based on geology and surveys
- Expected closed building radon (pCi/L):
  - Zone 1: 4.0 and above
  - Zone 2: between 2.0 & 4.0
  - Zone 3: 2.0 and lower
Figure 4. Percent of homes tested with screening indoor radon levels exceeding 4 pCi/L for counties in the Upper Midwest. Data from the State/EPA Residential Radon Survey except for South Dakota (data from the Indian Health Service and The Radon Project).
RISK PERCEPTION: Why is the evidence often ignored or not accepted?

- Invisible, odorless, colorless
- Naturally occurring outdoors
- Can not link an individual death to radon exposure
- Long latency period
- Not a dread hazard
- Cancers occur one at a time
- Lung cancer does not occur in children
- Voluntary risk
- Lack of press – no sensational story
- No sensory reminders to repetitively stimulate us to think about it
Stanley Watras at the Limerick Nuclear Power Plant, Christmas 1984

"I just thank God that if it was going to be anybody living in that house, it would be me, somebody who could, through their work activities, discover the situation,"

Philadelphia Inquirer March 20, 1985
Radon Decay Products

Po-218 and Po-214 deliver the majority of radiation dose to the lung.
Why are radon decay products a health concern?

These particles are easily inhaled and deposited in the lungs where they can damage sensitive lung tissue.
Alpha Decay

$^4\text{He}$ nucleus ejected from $^{222}\text{Rn}$ nucleus

Radon - 222 $\rightarrow$ $^4\text{He} + ^{218}\text{Po}$
What Happens When Radon Decay Products Are Inhaled?

- Highly radioactive particles adhere to lung tissue, where they can irradiate sensitive cells.
- Radiation can alter the cells, increasing the potential for cancer.
Ionizing radiation can directly and indirectly damage DNA

**Alpha Particle**

Defects in tumor suppressor genes – p53

At risk individuals – GSTM₁ (glutathione S-transferase M1)
Annual Effective Dose Equivalent to Member of the U.S. Population
NCRP 93 (1987)

Natural (mrem)
- Radon 200
- Cosmic 27

Terrestrial:
- external 28
- internal 39

Artificial (mrem)
- Diag. X-rays 39
- Nuc. Med. 14
- Consumer Pro. 10
- Other ~1

TOTAL ~360
"Statistics are people with the tears wiped away."

Irving Selikoff
Studies of Underground Miners
National Academy of Sciences
BEIR VI (1999): Pooled Analysis of 11 Miner Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Lung ca</th>
<th>P-yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>China *</td>
<td>980</td>
<td>175,342</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>705</td>
<td>106,924</td>
</tr>
<tr>
<td>Colorado *</td>
<td>336</td>
<td>87,821</td>
</tr>
<tr>
<td>Ontario</td>
<td>291</td>
<td>380,719</td>
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<tr>
<td>Newfoundland *</td>
<td>118</td>
<td>48,742</td>
</tr>
<tr>
<td>Sweden *</td>
<td>79</td>
<td>33,293</td>
</tr>
<tr>
<td>New Mexico *</td>
<td>69</td>
<td>55,964</td>
</tr>
<tr>
<td>Beaverlodge</td>
<td>65</td>
<td>118,385</td>
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<tr>
<td>Port Radium</td>
<td>57</td>
<td>52,677</td>
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<tr>
<td>Radium Hill *</td>
<td>54</td>
<td>51,624</td>
</tr>
<tr>
<td>France</td>
<td>45</td>
<td>43,962</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,787</strong></td>
<td><strong>1,155,453</strong></td>
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Mean: WLM = 164, Duration=5.7 y

Lubin et al. 1995

* With smoking info
Radon Exposure of Lung Cancer Cases in Miners

Number of lung cancer cases

- Reside 25Y @
  - <20 pCi/L
  - <10 pCi/L
  - <5 pCi/L

Working Level Months

- 0
- 25
- 25-49
- 50-99
- 100-199
- 200-399
- 400-799
- 800+

- 110
- 226
- 129
- 222
- 438
- 567
- 602
- 493
Dose-Response in Miner Studies (I)

Lubin et al. 1995
NRC BEIR VI, 1999
Dose-Response in Miner Studies (II)
Risk estimates based primarily on radon-exposed miners

Estimated 18,600 lung cancer deaths each year in the U.S. from residential radon exposure
In 2003, the EPA updated the BEIR VI risk estimates to 21,000 radon-related lung cancer deaths each year in the United States. 

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

Based on its analysis, EPA estimates that out of a total of 146,400 lung cancer deaths nationally in 1995, 21,100 (14.4%) were radon related. Although it is not feasible to totally eliminate radon from the air, it is estimated that about one-third of the radon-related lung cancers could be averted by reducing radon concentrations in homes that exceed EPA’s recommended 4 picocurie per liter (pCi/L) action level (NAS 1999).
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<td>10,540</td>
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Epidemiologic Residential Radon Studies
Dose Response Model
Linear Non-Threshold Theory

Adverse Health Effects

Dose

Observed Effects

Radon-Exposed Miners
Residential Radon Case-Control Around the World

European Studies

13 Studies from 9 Countries
- Austria
- Czech Republic
- Finland [nationwide]
- Finland [south]
- France
- Germany [eastern]
- Germany [western]
- Italy
- Spain
- Sweden [nationwide]
- Sweden [never smokers]
- Sweden [Stockholm]
- United Kingdom

North American Studies

- 7 Studies from 2 countries:
  - New Jersey
  - Winnipeg
  - Missouri I [non-smoking women]
  - Missouri II [women]
  - Iowa
  - Connecticut
  - Utah-South Idaho

- Total 3,622 cases and 4,966 controls

- Total 7,148 cases and 14,208 controls
Residential Radon Studies

Odds Ratios at 4.0 pCi/L
(150 Bq/m³)

China: Lubin 2004
Eur: Darby et al. 2004, 2006
NA: Krewski et al. 2005, 2006

Study Cases/Cntls
Utah/South Idaho 511/862
Connecticut 963/949
Iowa 413/614
Missouri-II 512/553
Missouri-I 538/1183
Winnipeg 738/738
New Jersey 480/442
Shenyang 285/338
Gansu 768/1659
United Kingdom 960/3126
Stockholm 196/375
Sweden (never-smkrs) 258/487
Sweden 960/3126
Spain 156/235
Italy 384/405
Germany (western) 1323/2146
Germany (eastern) 945/1516
France 571/1209
Finland (south) 160/328
Finland 881/1435
Czech Republic 171/173
Austria 183/188

OR at 4.0 pCi/L
Pooled Analyses Agreement at 3 pCi/L ??

New Jersey, Missouri I, Canada, Iowa, Missouri II, a combined study from Connecticut, Utah and S. Idaho

Shenyang, China, Stockholm, Sweden, Swedish nationwide, Winnipeg, Canada, S. Finland, Finnish nationwide, SW England, W. Germany, Sweden, Czech Republic, Italy-Trento, Spain, Austria, France, China - Gansu Province, E. Germany
Support for this research was provided by a grant from the National Institute of Environmental Health Sciences, National Institutes of Health.

Continuing support was provided by the National Cancer Institute and U.S. EPA.
Residential Radon Gas Exposure and Lung Cancer

The Iowa Radon Lung Cancer Study

R. William Field,1 Daniel J. Steck,2 Brian J. Smith,3 Christine P. Brus,1 Eileen L. Fisher,1 John S. Neuberger,4 Charles E. Platz,5 Robert A. Robinson,5 Robert F. Woolson,3 and Charles F. Lynch1

Exposure to high concentrations of radon progeny (radon) produces lung cancer in both underground miners and experimentally exposed laboratory animals. To determine the risk posed by residential radon exposure, the authors performed a population-based, case-control epidemiologic study in Iowa from 1993 to 1997. Subjects were female Iowa residents who had occupied their current home for at least 20 years. A total of 413 lung cancer cases and 614 age-frequency-matched controls were included in the final analysis. Excess odds were calculated per 11 working-level months for exposures that occurred 5–19 years (WLM5–19) prior to diagnosis for cases or prior to time of interview for controls. Eleven WLM5–19 is approximately equal to an average residential radon exposure of 4 pCi/liter (148 Bq/m³) during this period. After adjustment for age, smoking, and education, the authors found excess odds of 0.50 (95% confidence interval: 0.004, 1.81) and 0.83 (95% percent confidence interval: 0.11, 3.34) using categorical radon exposure estimates for all cases and for live cases, respectively. Slightly lower excess odds of 0.24 (95 percent confidence interval: −0.05, 0.92) and 0.49 (95 percent confidence interval: 0.03, 1.84) per 11 WLM5–19 were noted for continuous radon exposure estimates for all subjects and live subjects only. The observed risk estimates suggest that cumulative ambient radon exposure presents an important environmental health hazard. Am J Epidemiol 2000;151:1091–1102.
Results of All Radon Studies of Lung Cancer
Occupational Radon Exposure – also a health risk
Occupational Exposure to Radon – Very Common

- Mine workers, including uranium, hard rock, and vanadium
- School Employees
- Workers remediating radioactive contaminated sites, including uranium mill sites and mill tailings
- Workers at underground nuclear waste repositories
- Radon mitigation contractors and testers
- Phosphate fertilizer plant workers
- Oil refinery workers
- Utility tunnel workers
• Subway tunnel workers
• Construction excavators
• Power plant workers, including geothermal power and coal
• Employees of radon health mines
• Employees of radon balneotherapy spas (waterborne radon source)
• Water plant operators (waterborne radon source)
• Fish hatchery attendants (waterborne radon source)
• Employees who come in contact with technologically enhanced sources of naturally occurring radioactive materials
• Incidental exposure in almost any occupation from local geologic radon sources
• Farming related activities
Other types of cancer may be associated with protracted radon exposure.
Iowa radon leukaemia study: A hierarchical population risk model for spatially correlated exposure measured with error

Brian J. Smith\textsuperscript{1, *},†, Lixun Zhang\textsuperscript{2} and R. William Field\textsuperscript{3}

\textsuperscript{1}Department of Biostatistics, The University of Iowa, Iowa City, IA, U.S.A.
\textsuperscript{2}Departments of Biostatistics and Geography, The University of Iowa, Iowa City, IA, U.S.A.
\textsuperscript{3}Departments of Occupational and Environmental Health and Epidemiology, The University of Iowa, Iowa City, IA, U.S.A.

SUMMARY

This paper presents a Bayesian model that allows for the joint prediction of county-average radon levels and estimation of the associated leukaemia risk. The methods are motivated by radon data from an epidemiologic study of residential radon in Iowa that include 2726 outdoor and indoor measurements. Prediction of county-average radon is based on a geostatistical model for the radon data which assumes an underlying continuous spatial process. In the radon model, we account for uncertainties due to incomplete spatial coverage, spatial variability, characteristic differences between homes, and detector measurement error. The predicted radon averages are, in turn, included as a covariate in Poisson models for incident cases of acute lymphocytic (ALL), acute myelogenous (AML), chronic lymphocytic (CLL), and chronic myelogenous (CML) leukaemias reported to the Iowa cancer registry from 1973 to 2002. Since radon and leukaemia risk are modelled simultaneously in our approach, the resulting risk estimates accurately reflect uncertainties in the predicted radon exposure covariate. Posterior mean (95 per cent Bayesian credible interval) estimates of the relative risk associated with a 1 pCi/L increase in radon for ALL, AML, CLL, and CML are 0.91 (0.78–1.03), 1.01 (0.92–1.12), 1.06 (0.96–1.16), and 1.12 (0.98–1.27), respectively.

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Summary

- Radon is a global public health concern.
- The residential radon studies have provided direct evidence that prolonged residential radon is one of our leading public health risks and major cause of cancer mortality.
- Radon is our leading environmental cause of cancer mortality in the United States and seventh leading cause of cancer mortality overall.
Global Perspective on Radon


5.5 Evaluation

There is *sufficient evidence* for the carcinogenicity of radon and its decay products in experimental animals.

There is *sufficient evidence* for the carcinogenicity of radon and its decay products in humans.

Overall evaluation

Radon and its decay products are *carcinogenic to humans (Group 1).*
WHO-IRP National Partners

- Albania
- Argentina
- Austria
- Belgium
- Brasil
- Bulgaria
- Canada
- China
- Czech Republic
- Finland
- France
- Georgia
- Germany
- Greece
- Hungary
- India
- Ireland
- Italy
- Japan
- Lithuania
- Luxembourg
- Norway
- Poland
- Romania
- Russian Federation
- Serbia
- Slovenia
- South Korea
- Spain
- Sweden
- Switzerland
- Turkey
- USA
- Ukraine
- United Kingdom
http://www.who.int/ionizing_radiation/env/radon
WHO Handbook on Indoor Radon

THE WHO INITIATIVE TO REDUCE LUNG CANCER RISK AROUND THE WORLD
6. National radon programmes

**Key Messages**

- National radon programmes should aim to reduce the overall population risk and the individual risk for people living with high radon concentrations.

- To limit the risk to individuals, a national reference level of 100 Bq/m³ is recommended. Wherever this is not possible, the chosen level should not exceed 300 Bq/m³.

- To reduce the risk to the overall population, building codes should be implemented that require radon prevention measures in homes under construction. Radon measurements are needed because building codes alone cannot guarantee that radon concentrations will be below the reference level.

- Detailed national guidance on radon measurement protocols is essential to ensure quality and consistency in radon testing. A national radon database that monitors the measurement results over time can be used to evaluate the effectiveness of a national radon programme.

- An effective national radon programme requires input from several agencies within a country. One agency should lead the implementation and coordination and ensure linkage with tobacco control and other health promotion programmes.
Availability of WHO Handbook

• **WHO Handbook on Indoor Radon: A Public Health Perspective:**
  

• **WHO Radon Webpage:**
  
REducing Environmental Cancer Risk

What We Can Do Now
The President's Cancer Panel

LaSalle D. Leffall, Jr., M.D., F.A.C.S., Chair
Charles R. Drew Professor of Surgery
Howard University College of Medicine
Washington, DC 20059

Margaret L. Kripke, Ph.D.
Vivian L. Smith Chair and Professor Emerita
The University of Texas
M.D. Anderson Cancer Center
Houston, TX 77030

This report is submitted to the President of the United States in fulfillment of the obligations of the President's Cancer Panel to appraise the National Cancer Program as established in accordance with the National Cancer Act of 1971 (P.L. 92-218), the Health Research Extension Act of 1987 (P.L. 99-158), the National Institutes of Health Revitalization Act of 1993 (P.L. 103-43), and Title V, Part A, Public Health Service Act (42 U.S.C. 281 et seq.).
Comparative risk assessments by EPA [Environmental Protection Agency] and its Science Advisory Board... have consistently ranked radon among the top four environmental risks to the public.

SUSAN CONRATH
U.S. ENVIRONMENTAL PROTECTION AGENCY

We have to go beyond a voluntary program [for radon mitigation] at this point. You can see all these homes in the future will need retrofitting and it’s going to be three times, four times more expensive than doing it when we first build the homes.

WILLIAM FIELD
UNIVERSITY OF IOWA
From 2008 Office of Inspector General Report – total of number of homes built in high radon areas compared to number of homes constructed with radon resistant features.

- Total New Homes in Zone 1
  - Thousands

- Total New Homes Built in Zone 1
- Total New Homes Built in Zone 1 with RRNC

*a New homes built with RRNC in Zone 1 is based on EPA’s estimate that 60 percent of all homes built with RRNC are in Zone 1.*
Number of single family homes and number with radon reduction features

Source: OIG analysis of U.S. Census Bureau data on homes and gross annual radon fan sales data supplied by fan manufacturers to EPA’s Indoor Radon Team.
Radon in Schools

“A nationwide survey of radon levels in schools estimates that nearly one in five has at least one schoolroom with a short-term radon level above the action level of 4 pCi/L (picoCuries per liter) - the level at which EPA recommends that schools take action to reduce the level. EPA estimates that more than seventy thousand (70,000) schoolrooms in use today have high short-term radon levels.”
“EPA's national survey of schools produced some alarming results about concentrations in our children's classrooms. Public awareness must be raised about the hazards of radon to hasten efforts to reduce the danger. **All schools must be tested to determine if there is a problem, and schools must inform parents of the results. We cannot ignore this problem.**"

**Kathryn Whitfill, National PTA President.**
Rossen Reports: Is your child breathing radon gas at school?

Officials say it's in thousands of classrooms, but many districts are doing nothing

By Jeff Rossen
TODAY
updated 2/29/2012 7:38:45 AM ET

What experts call a serious threat in our nation's schools is invisible to the naked eye. TODAY National Investigative Correspondent Jeff Rossen reports.
The Radon Threat Is Still With Us

By BILL FIELD
Published: March 28, 2012

Iowa City

“I AM really sorry to tell you this, but you have less than a 50 percent chance of living for one year and about a 15 percent chance of living for five years.”

This gloomy prognosis is delivered each year to thousands of Americans who have been given a diagnosis of lung cancer caused by exposure to the radioactive gas radon. Since the late 1980s, a half million Americans have died from radon-induced lung cancer, including a significant number who never smoked a day in their lives. You may have heard of radon more than 20 years ago when dangerous levels were first found in homes across the country. But the risks posed by this gas still have not been addressed in much of the nation.

Outside air contains very low levels of radon, but it becomes a problem when it accumulates in homes by seeping through cracks, sump-pump pits and other openings. The gas produces radioactive decay particles that can damage the cells that line the lung and lead to lung cancer. Scientifically rigorous epidemiology studies in North America and Europe have clearly established the link between radon exposure in the home and lung cancer. It is the leading environmental cause of cancer mortality in the United States and is expected to be the seventh leading cause of cancer death overall this year.
The cancer risk attributable to residential radon exposure has been clearly demonstrated and must be better addressed. The following are needed:

- The Environmental Protection Agency (EPA) should consider lowering its current action level (4 pCi/L) for radon exposure, taking into account data on radon-related cancer risk developed since the existing action level was established.

- Public and health care provider education should be developed and broadly disseminated to raise awareness of radon-related cancer risk.

EPA

HHS
Health care provider professional organizations
Media
• Improved testing methods for residential radon exposure and better methods for assessing cumulative exposure should be developed. Tax deductions or other incentives should be implemented to encourage radon mitigation retrofitting of existing housing. Building code changes should be made to require radon reduction venting in new construction.

• All schools, day care centers, and workplaces should be tested at regular intervals for radon. Radon level data must be made available to the public. Buildings found to have levels in excess of the EPA action level should be mitigated.

Industry
Congress
Internal Revenue Service
State and local governments

State and local governments
Radon Testing and Mitigation
“Closed House” Conditions
For All Short-Term Tests

- All exterior doors and windows closed, except for normal entry and exit
- Internal-external air exchange systems off
  - Total internal recycle is allowed
  - Combustion or make-up air must not be closed
- Permanent radon mitigation systems remain on
Test Location Depends on Purpose

- Choose occupied room
- Keep away from drafts and moisture
Test Placement Within A Room

- 3 feet from windows or exterior doors
- At least 20 inches above floor
- 4 inches from other objects
- Where it won’t be disturbed

12 inches min.

3 feet min.

20 inches min.
A Common Real Estate Testing Method
2 Simultaneous Tests

Two Simultaneous tests

Mitigation Recommended

YES

Average of Both Tests > 4.0 pCi/L

NO

No Mitigation Recommended
Homes With High Radon Concentrations Can Be Remediated

Active soil depressurization is a means of creating a vacuum beneath a slab or plastic sheet and collecting the radon before it enters a building.
Can’t We Just Seal The Cracks?

- Radon can enter through very small openings.
- Without affecting house pressures, sealing is not a stand-alone technique.
Suction Point For Slabs And Basements

- Hole cut through slab
- Pit dug out
- PVC pipe connected to hole
- Pipe routed to fan
- May require more than one suction point
System Depressurization Fan

- Installed in attic, garage, or outside
- Quiet
- 40 - 90 watt fan runs continuously
- 11 year expected life
System Discharges Away From Building Openings

- Discharge should be high to avoid radon entering building
  - Minimum of 10 feet above grade
  - 10 feet from openings, 2 feet below discharge
  - Above eave

- Rain cap not recommended

- 1/4 inch bird screen

US EPA Mitigation Standards
http://www.epa.gov/iaq/radon/pubs/
New Homes Can Be Built With Radon Control Systems
Radon: The Leading Environmental Cause of Cancer Mortality in Iowa and the Midwest

R. William Field, PhD, MS
College of Public Health
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Outreach activities related to Radon
Iowa Cancer Consortium (ICC)

What is the ICC?

In 2001, the Iowa Legislature commissioned a detailed study of the impact of cancer on the state. Their report, *The Face of Cancer in Iowa*, led to the formation of the Iowa Consortium for Comprehensive Cancer Control.

Now referred to as the Iowa Cancer Consortium (ICC), the organization is a partnership of researchers, legislators, health care providers, faith-based organizations, public health agencies, family caregivers, cancer survivors, volunteers and many other Iowans who work together to conquer cancer.

Our Mission...

...is to reduce cancer incidence and mortality in Iowa through collaborative efforts that provide services and programs directed towards comprehensive cancer prevention and control.
Has radon made itself at home?

Don't let your home and your health be exposed to this dangerous visitor.

Radon is a radioactive gas that usually exists outdoors. Released from the normal decay of uranium found in the rocks and soil surrounding a home, radon can build up within homes to concentrations that significantly increase the risk of lung cancer.

Radon can get into any type of building — homes, offices, and schools — and result in high indoor radon concentrations. But you and your family are most likely to get your greatest exposure at home, where you spend most of your time.

YOU CAN'T SEE, SMELL, OR TASTE IT. RADON IS THE SECOND LEADING CAUSE OF LUNG CANCER AND IT MIGHT BE AN UNWELCOME VISITOR IN YOUR HOME.

The EPA Recommends

- Test your home for radon — it's easy and inexpensive.
- Fix your home if your radon level is 4 pCi/L or higher.
- Radon levels less than 4 pCi/L still pose a risk, and in many cases may be reduced.
“Any home can have a radon problem,” says Dr. Bill Field, a professor in the Department of Occupational and Environmental Health as well as the Department of Epidemiology in the College of Public Health at the University of Iowa. “This means new and old homes, well-sealed and drafty homes, and homes with or without basements.”

According to Field, radon typically moves up through the ground and into the air in a home through cracks and other openings in the foundation. Your home traps radon inside, where it can build up.

Radon is a problem all over the U.S., but Midwesterners should be especially aware of its risks. Iowa has the highest percentage of homes in the country that exceed the Environmental Protection Agency’s (EPA) radon action level of 4 pCi/L (picocuries per liter).

Dr. Bill Field is working to bring awareness to the dangers of radon. He served on the World Health Organization’s International Radon Project and provided testimony on the issue to the President’s Cancer Panel. He also served as the lead author on a large-scale NIH-funded radon study performed in Iowa that found a 50 percent increased risk of lung cancer from prolonged radon exposures.

“RADON IS THE LEADING ENVIRONMENTAL CAUSE OF CANCER MORTALITY IN THE MIDWEST.”
– Dr. Bill Field in his 2008 testimony to the President’s Cancer Panel.

HOW TO TEST YOUR HOME

The only way to find out if your home has an elevated radon concentration is to test for it. There are many kinds of low-cost “do-it-yourself” radon test kits you can get through the mail and in hardware stores and other retail outlets. “At $10-$20, these tests are affordable and reliable,” says Field, who recommends doing a preliminary at-home test and confirming results with another.

“If you praise, you can hire a qualified tester to do the testing for you,” says Field. “This will cost $75 - $125, and you’ll get a more detailed finding.”

“Many people falsely believe their homes have already been tested for radon, for example, when they purchased the home, or by previous owners,” says Field. “It’s likely you received information about radon before you moved in, but it’s not a requirement to perform radon testing before you move into a home, or for homes to be built radon resistant.”

“YOU CAN FIX A RADON PROBLEM

If radon is detected, the problem can be fixed. Radon reduction systems, also known as mitigation systems, can reduce radon levels in your home by up to 90 percent. Most systems cost between $1,200 and $1,800, depending on your home.

“RADON TESTING WILL LIKELY BE REQUIRED FOR ALL HOME SALES IN THE FUTURE,” SAYS FIELD, “SO IT MAKES SENSE TO FIX A RADON PROBLEM NOW, RATHER THAN WAITING UNTIL YOU SELL THE HOME.”

Installing a mitigation system at the time of construction is ideal and less costly. But the systems can be installed in any type of home, even after construction.


IN SOUTH DAKOTA, 48 OF THE 55 COUNTIES—PRIMARILY IN THE CENTRAL AND EASTERN PART OF THE STATE—are in the “Red Zone.”

ALL 99 COUNTIES IN IOWA ARE IN ZONE 1—ALSO KNOWN AS THE “RED ZONE”—FOR RADON LEVELS, MEANING PEOPLE IN THESE COUNTIES HAVE THE HIGHEST POTENTIAL FOR RADON IN THEIR HOMES.
Occupational and Environmental Causes of Lung Cancer

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KEYWORDS
- Lung • Cancer • Environmental • Occupational • Carcinogen • Epidemiology
- International Agency for Research on Cancer

KEY POINTS
- If considered independently from tobacco smoking, environmentally and occupationally related causes of lung cancer are among the top 10 causes of cancer mortality in the United States.
- The goal of this review was to describe the occurrence and recent findings of the 27 agents currently listed by the International Agency for Research on Cancer (IARC) as lung carcinogens, including the categories of ionizing radiation, chemicals and mixtures, occupational exposures, metals, dust and fibers, personal habits, and other exposures.
- Supplementary new information, with a focus on analytic epidemiologic studies that have become available since IARC’s most recent evaluation, is also discussed.
Video on radon geared to health care professionals

Please watch:
http://www.canceriowa.org/BreathingEasier.aspx
Richard D. Williams, M.D., Rubin H. Flocks Professor and former Head of the University of Iowa Department of Urology, died on May 28, 2010 at age 65 following a brave fight against cancer.

Dr. Williams was born on October 7, 1944 in Wichita, Kansas, where he met and married the love of his life, Beverly Ferguson. Dr. Williams received his B.S. degree from Abilene Christian University in 1966 and his M.D. from Kansas University School of Medicine in 1970. He completed his Urology Residency at the University of Minnesota in 1976, after which he received research training as a National Kidney Foundation/American Urological Association fellow. Dr. Williams was selected Chief of Urology at the San Francisco Veterans Affairs Medical Center in 1979, and became Assistant Professor and Chief of Urologic Oncology at University of California San Francisco in 1983. Subsequently he served as the Rubin H. Flocks Professor and head of the University of Iowa, Department of Urology from 1984 until he stepped down earlier this year due to his declining health. His commitment to research aimed at improving patient care was central to his long and distinguished career.
Charles F. Lynch, M.D., Ph.D.,
MEDICAL DIRECTOR OF THE IOWA CANCER REGISTRY
Your help is needed!

Breathing Easier

Do you ask your patients if they've tested their homes for radon?

“Educating patients about the risk, and promoting the use of radon test kits, is something everyone can do and should do.”
- Charles Lynch, M.D., Ph.D.

“I remember him putting his face in his hands. He was sitting next to me out in his waiting room, and he just said, ‘Why don’t physicians know about this?’”
- Gail Orcutt, Pleasant Hill

“I want physicians personally to test their homes. We can really have an influence if we can get people to test. As physicians, we can model the behavior that we’d like our patients to follow.”
- Timothy Vermillion, D.O.

Watch a video to learn how asking this important question could save lives:

Download educational fliers to hang in clinic or exam rooms:

Iowa-Specific Fliers (click images below to view and print)

National Fliers (click images below to view and print)

http://www.canceriowa.org/BreathingEasier.aspx
Radon: The Leading Environmental Cause of Cancer Mortality in Iowa and the Midwest

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