Physician & Healthcare Provider's Introduction to Radon in Wyoming

OBJECTIVES

1. Update Healthcare Providers on Radon.
2. Persuade Healthcare Providers to Promote Radon Testing to Patients.
3. Persuade Healthcare Providers to Test Their Own Home for Radon.

What is Radon?

- Inert, Radioactive Gas.
- Naturally Occurring.
- Can’t be Seen or Smelled.
- Enters Buildings From Soil.

Where is Radon?

Many parts of the country have elevated radon concentrations.

How Much Radiation Are We Exposed To?

Three Types of Radiation
Alpha - Beta - Gamma

Why Do We Care About Radon?

1. Lung Cancer!
2. We Use Other Ways to Help Us Stay Alive, Why Not Test for Radon?
   1. Seat Belts
   2. Infant Car Seats
   3. Smoke Alarms
   4. CO2 Detectors
   5. GFCIs
   6. Exercise
   7. Proper Dating
   8. Building / Electrical / Plumbing / Fire Codes
   9. Safety Training
   10. First Aid / CPR
   11. Etc.

Lung cancer is not suspected until it causes a chronic cough or wheezing.
**Radon & Tobacco Smoke**

Group “A” Carcinogens

Highest ranking potential known to cause cancer in humans

4.0 pCi/L equivalent to smoking 1 pack of cigarettes / day @ 18 hours/day

**Lung Cancer**

Two Main Types Of Lung Cancer.

Not suspected until chronic cough or wheezing symptoms appear. Your doctor may order a chest X-ray, MRI, sputum test via coughing up phlegm, etc.

* Four Types of Smokers *

1. Current Smokers 18,000 / year die
2. Former Smokers 21,000 total
3. Non-Smokers
4. Never Smokers 3,000 / year die

Two Main Types Of Lung Cancer.

- Small-cell
- Non-small cell

Small-cell:
- More aggressive
- Longer survival
- More likely to metastasize

Non-small cell:
- Less aggressive
- Shorter survival
- Less likely to metastasize

Liz Hoffman
Never-Smoker
Died From Lung Cancer
November 2013

1 Reason out of 3,000 Why We Care About Radon

Just an “Ordinary House”
Radon was 8.8 pCi/L.
RNC???

Radon

www.wyomingradon.org

Are You Talking With Your Patients About Testing Their Homes for Radon?

What is the Ionizing Radiation That Damages Our DNA? (Alpha Particles)

Breathing Radon

Alpha Particles

Constant Bombardment

Radioactive particles increase potential for lung cancer.
What is the Penetration Power of Radiation?

Alpha – Beta – Gamma

Radiation Explained

How Does Radon Get From The Earth, Into Our Homes & into Our Lungs?

Vacuums, exhaust systems, thermal stack effects, every crack, opening & penetration.

Is Radon in Water a Problem in Wyoming?

Modified from Clark and Bahr, 1995
Uranium decays into radioactive particles which are inhaled, deposited in the lungs and damage sensitive lung tissue. Polonium 218, 214 & 210 deliver the radiologically significant dose to the respiratory epithelium.

Radon Decay Products
- Uranium
- Radon
- Radon-222
- Polonium-218
- Polonium-214
- Polonium-210
- Lead-206

**RDPs**
- **Radon Decay Products**
- **Radium**
- **Polonium**
- **Radon Decay Chain**
- **α**: Alpha Particle
- **γ**: Gamma Ray

**How is Radon Measured?**
- **P**: Pico = Trillionth
- **Ci**: Curie = A Measurement of Energy
- **L**: Per Liter of Air in Any Given Room

**Why 4.0 pCi/L?**
- **Ontario Miner Study**
  1. Prolonged Exposure >70 Years
  2. Inhaled Levels of Radon (4.0)
  3. Increased Risk of Lung Cancer

- **4.0 pCi/L Based on:**
  1. Miner Study: 70 Years
  2. 80's Technology (4.0 Achievable)
  3. Reasonable Amount of Money ($1,500)

**Percentage of Homes Tested Registering > 4.0 pCi/L By County**

**Percentage of Homes Tested Registering > 2.0 pCi/L By County**

**# of Homes Tested in Natrona County / By City**
Natrona County Radon Levels by pCi/L

2011 Wyoming Cancer

Lung Cancer Mortality = 225
Next Three Cancers Combined = 203

2007 – 2011
5 Year Survival Percentage per Cancer Type
(In 12 month-increments at time of diagnosis)

Lung Cancer Incidence 2006-2010 Rate per 100,000

What Health Authorities Say that Radon is a National Health Problem?

- U.S. Surgeon General
- World Health Organization
- American Lung Association
- American Medical Association
- National Academy of Sciences
- Environmental Protection Agency
- Centers for Disease Control & Prevention
Have There Been Any Inter/National Radon Studies?

- New Jersey, Iowa, Missouri I, Missouri II, Combined study - Connecticut, Utah, S. Idaho
- China - Gansu Province
- South Finland
- Stockholm, Sweden
- East Germany
- West Germany
- Winnipeg, Canada
- Czech Republic
- Austria, Spain
- France

National Research Council BEIR VI

Radon is one of the most extensively investigated human carcinogens.

...indoor radon is the second leading cause of lung cancer after cigarette smoking.

Determining the Radon Level in Your Home

- Exposure POTENTIAL
- Short-Term Testing
- Exposure ACTUALITY
- Long-Term Testing

Exposure

U.S. Lung Cancer Deaths/yr

Never Smokers
Smokers

POTENTIAL
ACTUALITY

Short-Term Testing
Long-Term Testing

Active Soil Depressurization

Breathe Easier Test For Radon

Charles Lynch, MD, PhD. Discusses Radon

Dr. Williams Contracts Lung Cancer
For More Information Contact:
Wyoming Department Of Health
(307) 777-6015
steve.melia@wyo.gov
www.wyomingradon.org

Keep Families Safe
Test – Fix – Save a Life

Alzheimer Disease & Associated Disorders
Vol 15, No 2, pp106-115

Environmental LEAD-210 and Bismuth-210 Accrue Selectively in the Brain Proteins in Alzheimer Disease and Brain Lipids in Parkinson Disease

Questions
Is there a correlation / connection between Radon and AD or PD?

Radon
Smoking
Lungs
Cancer
P 53 Gene
Statistics
Screening Tests
Survivability
Rates/100K
Studies

How Does Radon Compare To Other Causes Of Death?

Radon: National Academy of Sciences 1998 data
Other: National Safety Council 1999 reports

Are There Any Medical Studies of Radon and Lung Cancer?

- Environmental and Occupational Causes of Cancer (50 pages, Aug 2005; Univ of Massachusetts)
- Residential Radon Gas Exposure and Lung Cancer: (12 page, Radon Lung Cancer Study)
- Radon in homes and risk of lung cancer: Collaborative analysis of individual data from 15 European case-control studies
- Environmental and Occupational Causes of Cancer (50 pages, Aug 2005; Univ of Massachusetts)
- A combined analysis of North American Case-Control Studies of Residential Radon and Lung Cancer
- Study of Lung Cancer and Residential Radon in the Czech Republic
- Residential Radon Exposure and Lung Cancer: Variations in Risk Estimates Using All Exposure Scenarios
- Localization of Tumor Suppressor Gene Candidates by Cytophysiology and Short Tandem Repeat Analysis to Supernumerary Human Burst Cell (12 pages, 1998; NIH)
- Environmental LEAD-210 and Bismuth-210 Accrue Selectively in the Brain Proteins in Alzheimer Disease and Brain Lipids in Parkinson Disease

Are Radon Levels Higher the Level Higher the Risk?

Risk increased equally by both duration and concentration of exposure
One dart at a time
Risk of Lung Cancer

Talk to Your Patients About Testing Their Homes For Radon

Radon Induced Lung Cancer

Radiation Damage to DNA / P53 Gene
Lung Cancer

Smoking
Lungs
Cancer

How Does Radon Compare To Other Causes Of Death?

Deaths per year (U.S.)

Radon
Drunk Driving
Drowning
Fires
Airline Crashes

Lower estimate
Upper estimate