FRESH: Dual Home Screening for Lung Cancer Prevention
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Disclosure

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In Memoriam…"I just did not know"
Lois, a never smoker, died from radon-induced lung cancer, September 2013
Age-adjusted Lung Cancer Incidence Rates 2006-2010
U.S. versus Kentucky

<table>
<thead>
<tr>
<th>Race</th>
<th>US Male</th>
<th>KY Male</th>
<th>KY Appalachia Male</th>
<th>US Female</th>
<th>KY Female</th>
<th>KY Appalachia Female</th>
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</thead>
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<tr>
<td>All Races</td>
<td>74.3</td>
<td>125.9</td>
<td>143.9</td>
<td>51.9</td>
<td>80.3</td>
<td>84.9</td>
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<tr>
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<td>125.6</td>
<td>144.4</td>
<td>54.6</td>
<td>80.7</td>
<td>85.4</td>
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<tr>
<td>Black</td>
<td>95.8</td>
<td>144.2</td>
<td>135.5</td>
<td>52.2</td>
<td>82.9</td>
<td>71.8</td>
</tr>
</tbody>
</table>

*Rates per 100,000 population

2Data Source: Kentucky Cancer Registry [http://www.cancer-rates.info/ky]

Lung Cancer Incidence by Area Development District

Data Source: Kentucky Cancer Registry [http://www.cancer-rates.info/ky]
Our Vision: Clean Air Free of Secondhand Smoke and Radon

FRESH

- Freedom from
- Radon Exposure and
- Smoking in the
- Home

Can Dual Home Screening Reduce Exposure?

Tobacco Smoke and Radon Cause Lung Cancer

- Smoking and secondhand smoke combined are the #1 cause of lung cancer.
- Radon is the 2nd leading cause of lung cancer.
**Tobacco, Radon, & Lung Cancer**

- **Tobacco Smoke**
  - 85% lung cancer cases caused by tobacco smoke.
  - 3,000 lung cancer deaths per year among nonsmokers from secondhand smoke

- **Radon**
  - 20,000 lung cancer deaths per year from radon exposure (only 2,100-2,900 among never smokers)
  - Of those exposed to at least 4 pCi/L of radon, the risk of developing lung cancer is estimated at 6/100 for smokers and 7/1,000 for nonsmokers.
  - Most never smokers with lung cancer are women.

**Radon and Lung Cancer**

- Soil gas infiltration primary source of indoor radon exposure.
- Most radon-induced lung cancers are associated with low to moderate radon concentrations.
- When radon gas is inhaled, alpha particles are emitted by the radon decay products (Po and Pb), leading to significant DNA damage.
- Radon decay products create Pb-210, a semi-stable isotope of lead (half-life 22 yrs)

**Synergistic Effects of Secondhand Smoke and Radon**

- Secondhand smoke particles linger in the air and are small enough to be inhaled directly into the lungs.
- Radon byproducts have a static charge and are attracted to secondhand smoke particles in the air.
- The combination of radon attached to secondhand smoke particles greatly increases the likelihood of lung cancer.
Purposes of the Study

- Test the effects of FRESH on:
  - (a) home exposure to SHS and radon and the likelihood of taking action among homeowners.
  - (b) Teachable Moment psychosocial factors
- Examine the differential effects of home smoking on taking action.
- Explore impact of FRESH on renters
- Identify factors associated with use of monetary incentive for radon mitigation (simulated tax credit)

Create a Teachable Moment!

Adapted from the Teachable Moment model (McBride et al., 2003)

FRESH: Dual Home Screening for Lung Cancer Prevention

- Pilot Funding from Markey Cancer Center, UK College of Nursing, UK Got Grants Program
- Brief, home screening and environmental feedback intervention (FRESH)
- 50 parents recruited in pediatrician’s office and received free home radon and air nicotine kits.
- 2-month follow up survey
- National Institute of Environmental Health Sciences (NIEHS)
- National Institute of General Medical Sciences (NIGMS)
- R01ES021502-02 (9/1/12-5/31/17)

Primary Pilot Findings

- Of the returned kits, 26% were > 4.0 pCi/L and 38% had nicotine > .1 μg/m³.
- Of those with high radon, more than half had contacted a mitigation specialist or planned contact.
- Of those with positive air nicotine, 75% had adopted smoke-free homes.
- Significant increase in perceived risk for lung cancer and synergistic risk perception after FRESH (regardless of home smoking).

Follow up Focus Group

- Reasons to test for radon and SHS:
  - Potential impact on their children
  - Wanted very little information when their levels were low
  - Thought telephonic intervention delivery not necessary
    - Use phone for reminders to complete testing and/or surveys.

Study Design

- RCT with stratified sampling to ensure equal proportion of those exposed to SHS in the home
- Recruit homeowners (n = 520) and renters (n = 46) at UK Family Medicine Clinic & Pharmacy
- Baseline electronic survey ($10)
- Intervention
  - Free home test kits for radon and SHS
  - Environmental feedback intervention post-results (8-10 weeks post-enrollment)
- Follow up online surveys to assess behavior change (3-9-15 mos; $20-$30-$40)
- 17-month home testing
Treatment Group (n = 260) | Control Group (n = 260)
---|---
- Free radon and SHS test kits and brochures at enrollment
- $20 if return both test kits.
- If results high, brief problem solving via telephone.
- Tailored environmental feedback intervention via U.S. mail.
- Voucher to cover 30% of the radon mitigation cost up to $600 (simulated tax credit).
- Brochures and coupon for free test kits
- If they request a test kit, they will simply receive the results by mail
- Referred to the health department for information on radon, mitigation, quitting smoking, and reducing SHS exposure.

Renter Sub-study (n = 46)
- Expand intervention to query concerns about communicating with their landlord and persuading them to take action
  - Added information on smoke-free rental and public housing and radon mitigation in multi-unit housing to share with landlords
- Simulated tax credit voucher for radon mitigation to landlord.
- Post-study interview using qualitative methods to assess feasibility and acceptability, and to explore the impact and potential challenges of FRESH ($20)
Environmental Feedback Intervention

- Tailored based on one of four conditions
  - high radon/high SHS (radon ≥ 4 pCi/L; SHS ≥ 0.1 μg/m³)
  - high radon/low SHS
  - low radon/high SHS
  - low radon/low SHS

- Brief problem solving via phone
  - Readiness stage assessment, stage-tailored queries to enhance self-efficacy, motivation, & behavior change
  - Follow-up queries using 5Rs Relevance, Risks, Rewards, Roadblocks, Repetition
  - Stage-tailored goals and actions to reduce risk

- Mailed packet with results and educational materials

Sample Characteristics

- 66% Female
- 79% Caucasian; 12% African American; 4% Hispanic or Latino; 4% Asian
- Mean Age: 51 Years
What Can You Do?

- **Promote Tobacco Treatment**
  - 1-800-QUIT-NOW
- **Promote Smoke-free Homes & Public Housing**
  - At least 30 ft away from entryways, doors, windows.
- **Promote Tobacco-free Campuses**
  - All products, all the time, everywhere
- **Promote Lung Cancer Awareness Month**
- **Support Local and State Smoke-free Policies**
- **Promote Home Radon Testing**
- **Support Radon Policy Change**

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*As of October 1, 2013, 36% of Kentuckians are protected by comprehensive smoke-free workplace or home regulations.*

*Source: Percent of the Kentucky population covered by 100% smoke-free workplace laws: University of Kentucky College of Nursing, Lexington, KY. October 1, 2013.*

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*Legend*
- Red: Tobacco-free Colleges
- Yellow: Smoke-free Colleges
- Green: 8-12 School Campuses

Note: 8-12 School Campuses includes 208 School Districts from Central Kentucky College data provided by the American Lung Association Right to Breathe Initiative (http://www-stopsmoke.org/pdf/righttobreathe/kentucky.pdf) 8-12 School Districts provided by the Kentucky Department of Education (http://www.education.ky.gov/).
Exposure to Radon in Kentucky

Clean Indoor Air Partnership

- Our Mission
  To reduce tobacco use and exposure to secondhand smoke and radon through research, community engagement, and policy surveillance and development in treatment and prevention.
  - www.ciap.uky.edu
  - Find kysmokefree on twitter and facebook

Questions?

- For more information, contact us:
  - www.radon.uky.edu
  - www.kcsp.uky.edu
  - 859-257-2358