Risk Factors for Lung Cancer: It’s Not All Smoke

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Environmental Factors Linked to Cancer (All Types)

Proportion of Cancer Deaths Linked to Avoidable Risk Factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco</td>
<td>29–31 percent</td>
</tr>
<tr>
<td>Diet</td>
<td>20–50 percent</td>
</tr>
<tr>
<td>Infections:</td>
<td>10–20 percent</td>
</tr>
<tr>
<td>bacteria, viruses</td>
<td></td>
</tr>
<tr>
<td>Ionizing rad/ UV light</td>
<td>5–7 percent</td>
</tr>
<tr>
<td>Occupation</td>
<td>2–4 percent</td>
</tr>
<tr>
<td>Pollution:</td>
<td>1–5 percent</td>
</tr>
<tr>
<td>air, water, food</td>
<td></td>
</tr>
</tbody>
</table>

Environmental Carcinogens: The “Nasties” Lineup

The Official Nasties
Arsenic
Beryllium
Cadmium
Chromium
Lead
Nickel
# Other Carcinogens: Metals

<table>
<thead>
<tr>
<th>Metal</th>
<th>Cancers</th>
<th>Present in</th>
<th>Human Carcinogen?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic</td>
<td>Skin, lung, bladder,</td>
<td>Wood preservatives, glass, pesticides</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>kidney, liver</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beryllium</td>
<td><strong>Lung</strong></td>
<td>Nuclear weapons, rocket fuel, ceramics, glass, plastic, fiberoptic products</td>
<td>Yes</td>
</tr>
<tr>
<td>Cadmium</td>
<td><strong>Lung</strong></td>
<td>Metal coatings, plastic products, batteries, fungicides</td>
<td>Yes</td>
</tr>
<tr>
<td>Chromium</td>
<td><strong>Lung</strong></td>
<td>Automotive parts, floor covering, paper, cement, asphalt roofing; anti-corrosive metal plating</td>
<td>Yes</td>
</tr>
<tr>
<td>Lead</td>
<td>Kidney, brain</td>
<td>Cotton dyes, metal coating, drier in paints, varnishes and pigment inks, certain plastics, specialty glass</td>
<td>Probable carcinogen</td>
</tr>
<tr>
<td>Nickel</td>
<td>Nasal cavity, <strong>lung</strong></td>
<td>Steel, dental fillings, copper and brass, permanent magnets, storage batteries, glazes</td>
<td>Nickel metal: Probable carcinogen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nickel compounds:</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Slide from the National Cancer Institute
Fibers and Dusts

• Asbestos
  • Workplace exposure (places where installation is used, shipyards, textile mills, etc.)
  • Smoking + asbestos: high risk of lung cancer
  • Also mesothelioma

• Air pollution: especially in cities
  • Worldwide, about 5% of all lung cancer deaths caused by air pollution

• Ceramic fibers, silica dust, wood dust
Polycyclic Aromatic Hydrocarbons (PAHs)

- Burning, carbon containing compounds
- Burning wood and fuel for homes
- Soot, coke oven emissions, cigar and cigarette smoke, smoke from charcoal broiled foods
Ionizing Radiation

- Cosmic rays
- Fallout
- Radon gas
- X-ray
Radon

- Naturally occurring gas that results from breakdown of uranium in soil and rocks
- Invisible, no smell, no taste

- Indoors, radon can become concentrated
- Homes built on soil with natural uranium deposits can have high indoor radon levels (especially in basements)
- Occupational exposure at Fernald and elsewhere; Fernald community residents

- When enters lungs, exposes lungs to small amount of radiation
- Add plastic sheeting
- Seal and caulk
- Add vent pipe
- Slide from the National Cancer Institute
Diagnostic and Screening X-rays

Shield
Years later
The Inside Matters: Random Gene Changes
Familial Rates and Risk: Those We Understand

Kidney Cancer in Family

Kidney Cancer: A Sporadic Case

Does your cancer share similar mutations?

Gene mutations

Cancer genome

Cancer cells

Gene mutations

Cancer genome
Familial Rates and Risk: Those We Don’t Understand As Well (Lung Cancer)

Cancer cells

Gene mutations

Cancer genome

Gene mutations

Cancer genome

Gene mutations

Cancer genome

Gene mutations

Cancer genome

Gene mutations

Cancer genome

Gene mutations
Tobacco Smoke

• Cigarette, cigar and pipe smoking increase the risk of lung cancer. (Second hand smoke, too)

• Tobacco smoke contains arsenic, benzene, beryllium, cadmium, chromium, nickel, polonium-210

*Smoked cigarettes on one or more of the 30 days preceding the survey. Whites and African Americans are non-Hispanic.
Source: Youth Risk Behavior Surveillance System, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2012.
Quitting Decreases Risk

- Lung cancer survivors
  - Quitting smoking helps improve the body’s ability to heal and respond to therapy (surgery, chemotherapy, and other treatments)
  - Lowers risk of pneumonia and respiratory failure
  - Quitting lowers risk of new cancers (lung and other)

- All
  - Quitting at age 30 reduces chance of dying prematurely from smoking related diseases by more than 90 percent.
  - Ten years after quitting, risk of lung cancer decreases about 50%.
  - **Tell your family and friends!**
Choose Better Health

- Not smoking/ quitting smoking
- Healthy diet
- Exercise
Protect Yourself

- Lower exposure to radon
- Lower medical radiation exposure when possible
- Lower personal exposures (solvents, combustion smoke)
- Lower workplace exposures