University of Cincinnati Cancer Institute

COMPREHENSIVE LUNG CANCER CENTER

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

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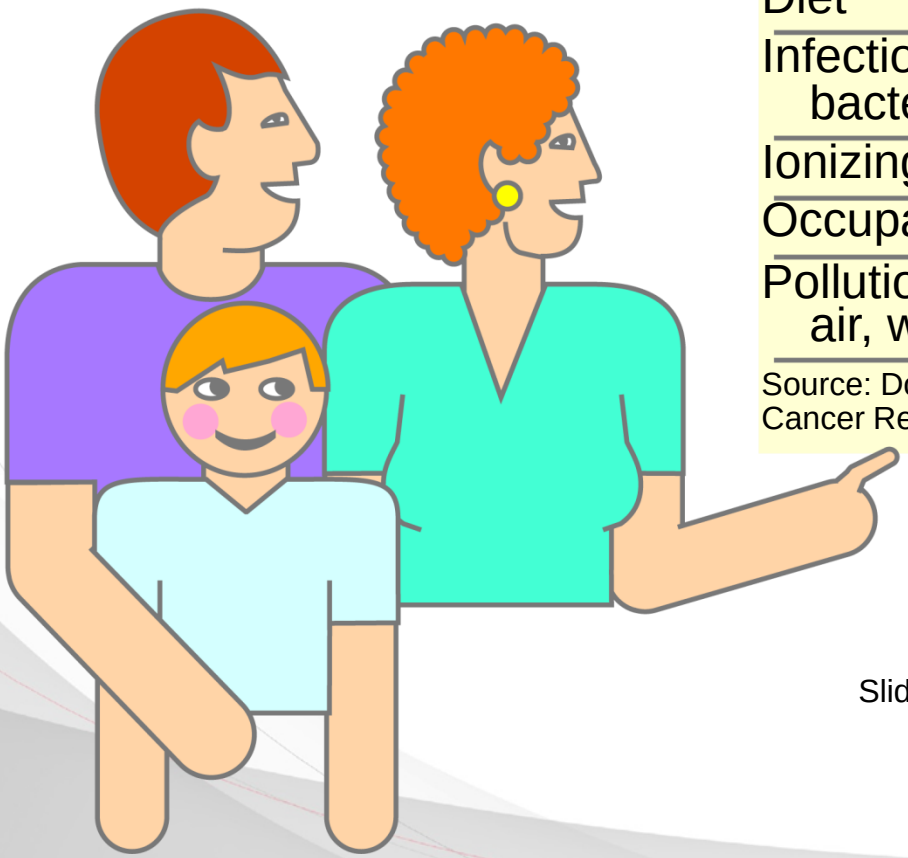
Environmental Factors Linked to Cancer (All Types)



Proportion of Cancer Deaths Linked to Avoidable Risk Factors	
Tobacco	29–31 percent
Diet	20–50 percent
Infections: bacteria, viruses	10–20 percent
Ionizing rad/ UV light	5–7 percent
Occupation	2–4 percent
Pollution: air, water, food	1–5 percent

Source: Doll R. (UK data) Recent Results in Cancer Research 1998; 154:3-21.

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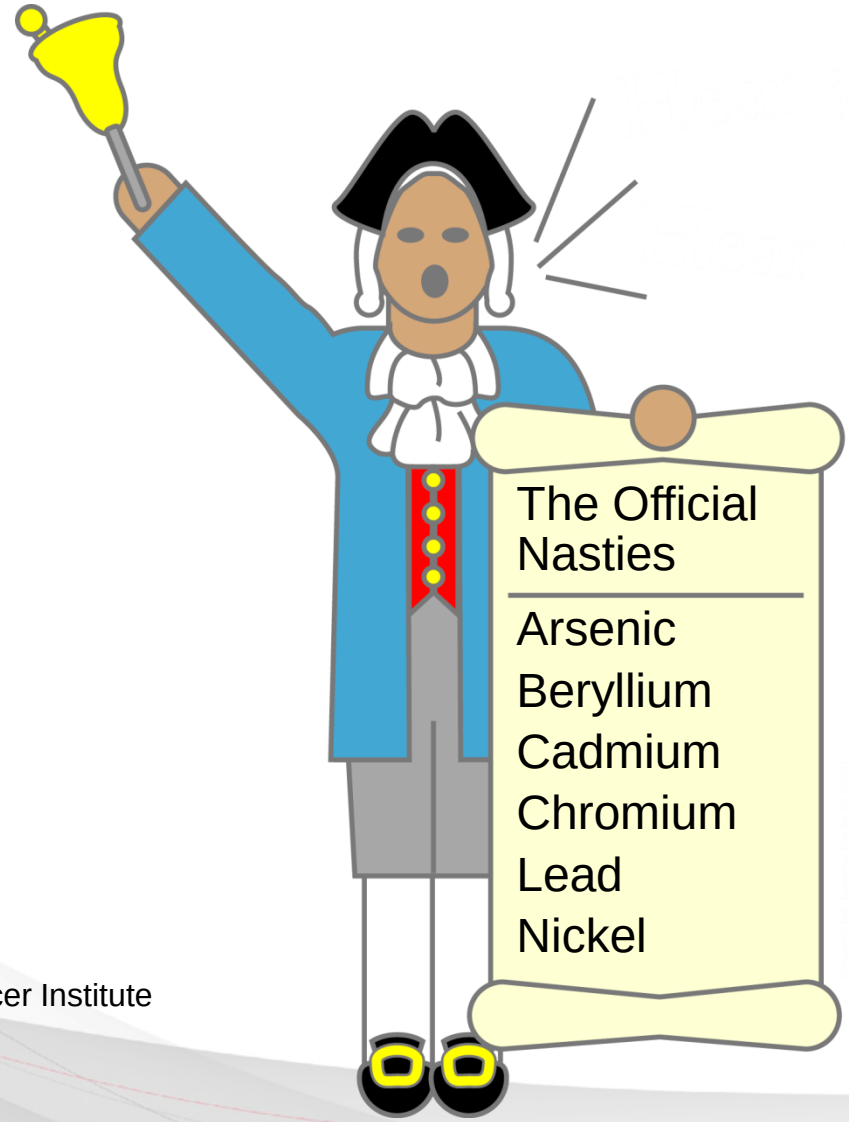
Environmental Carcinogens: The "Nasties" Lineup



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Other Carcinogens: Metals

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

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Fibers and Dusts

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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

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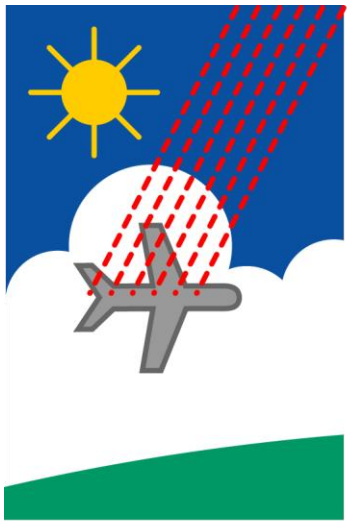
Polycyclic Aromatic Hydrocarbons (PAHs)

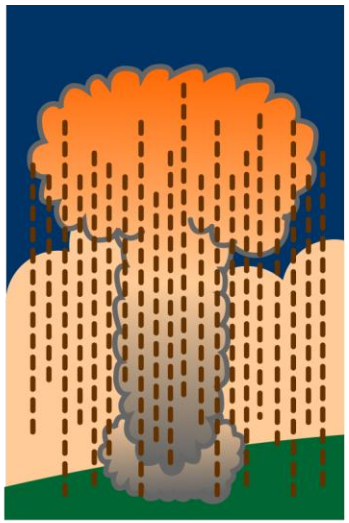
- Burning, carbon containing compounds
- Burning wood and fuel for homes
- Soot, coke oven emissions, cigar and cigarette smoke, smoke from charcoal broiled foods

Ionizing Radiation

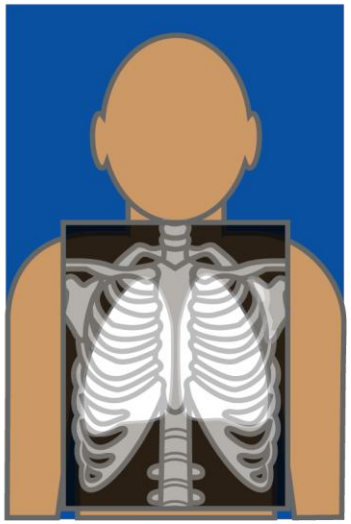
Cosmic rays



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

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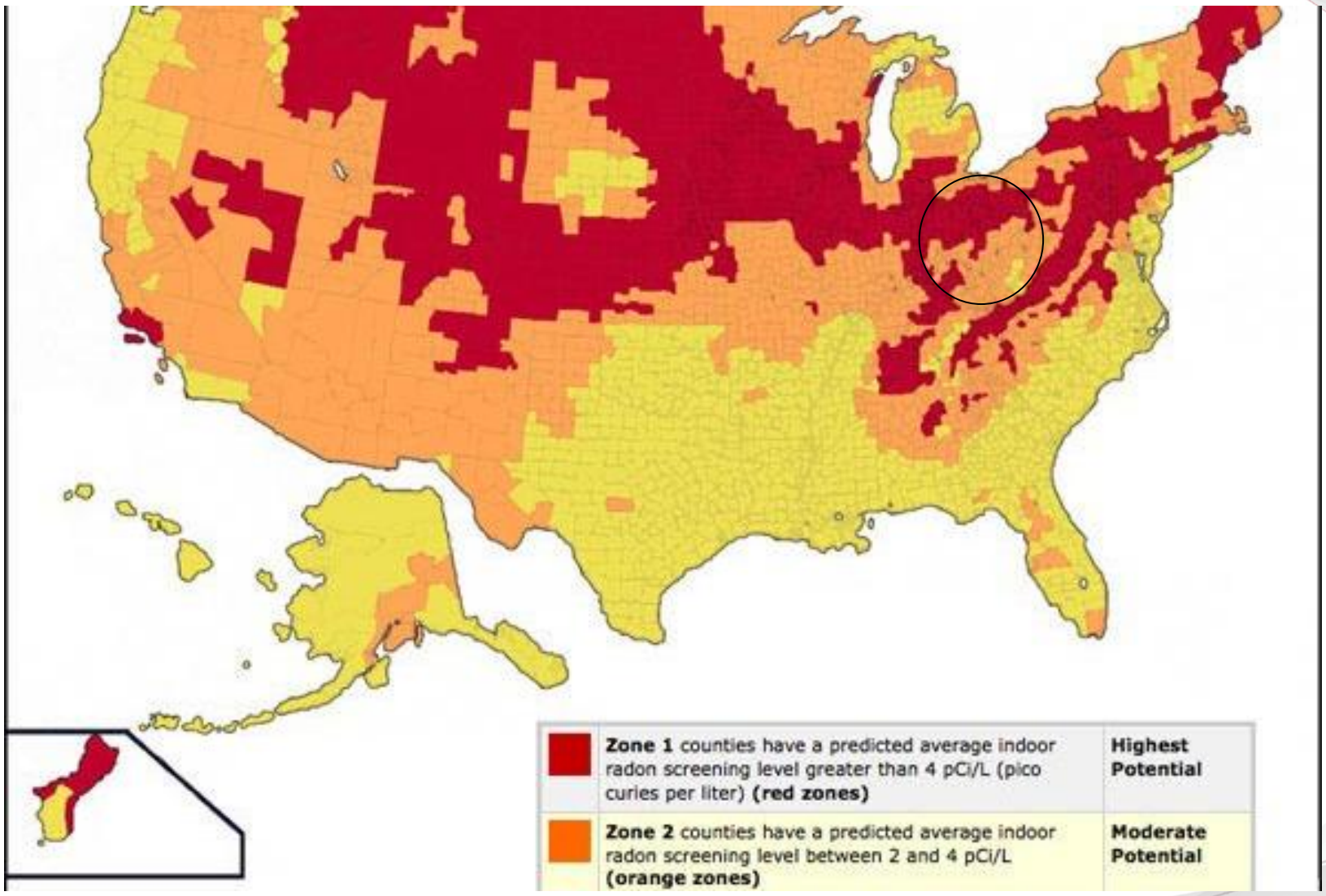

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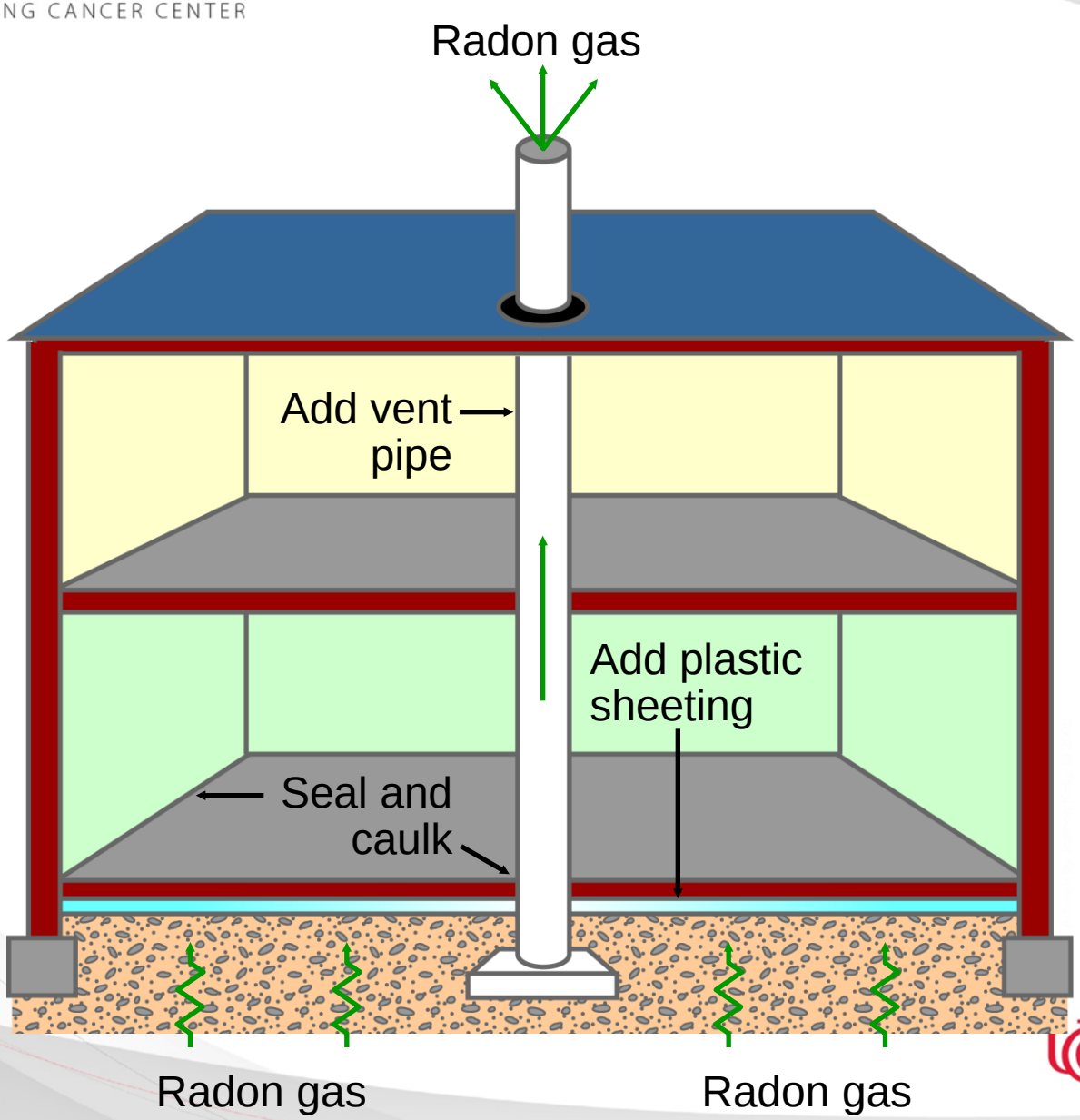
Radon



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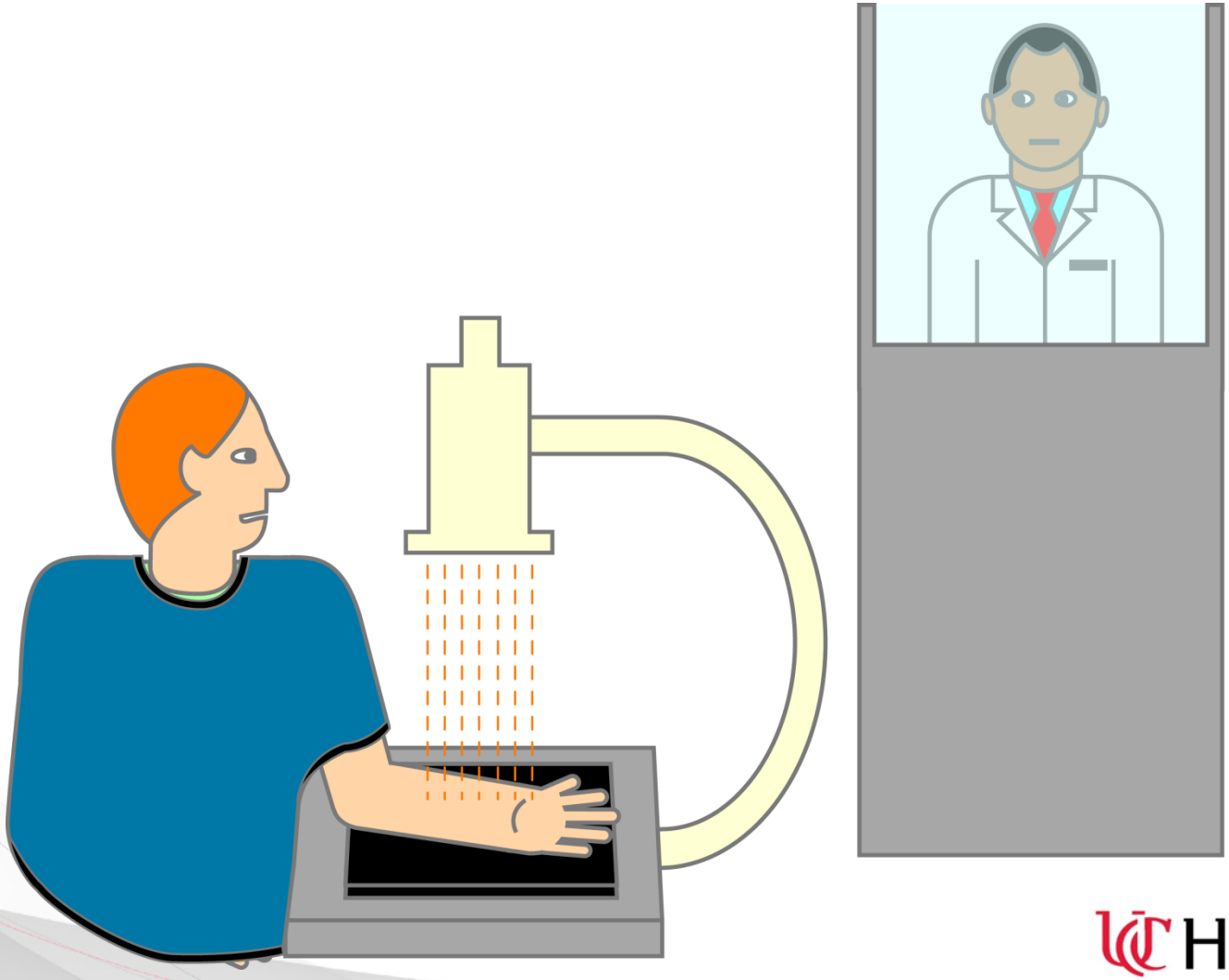
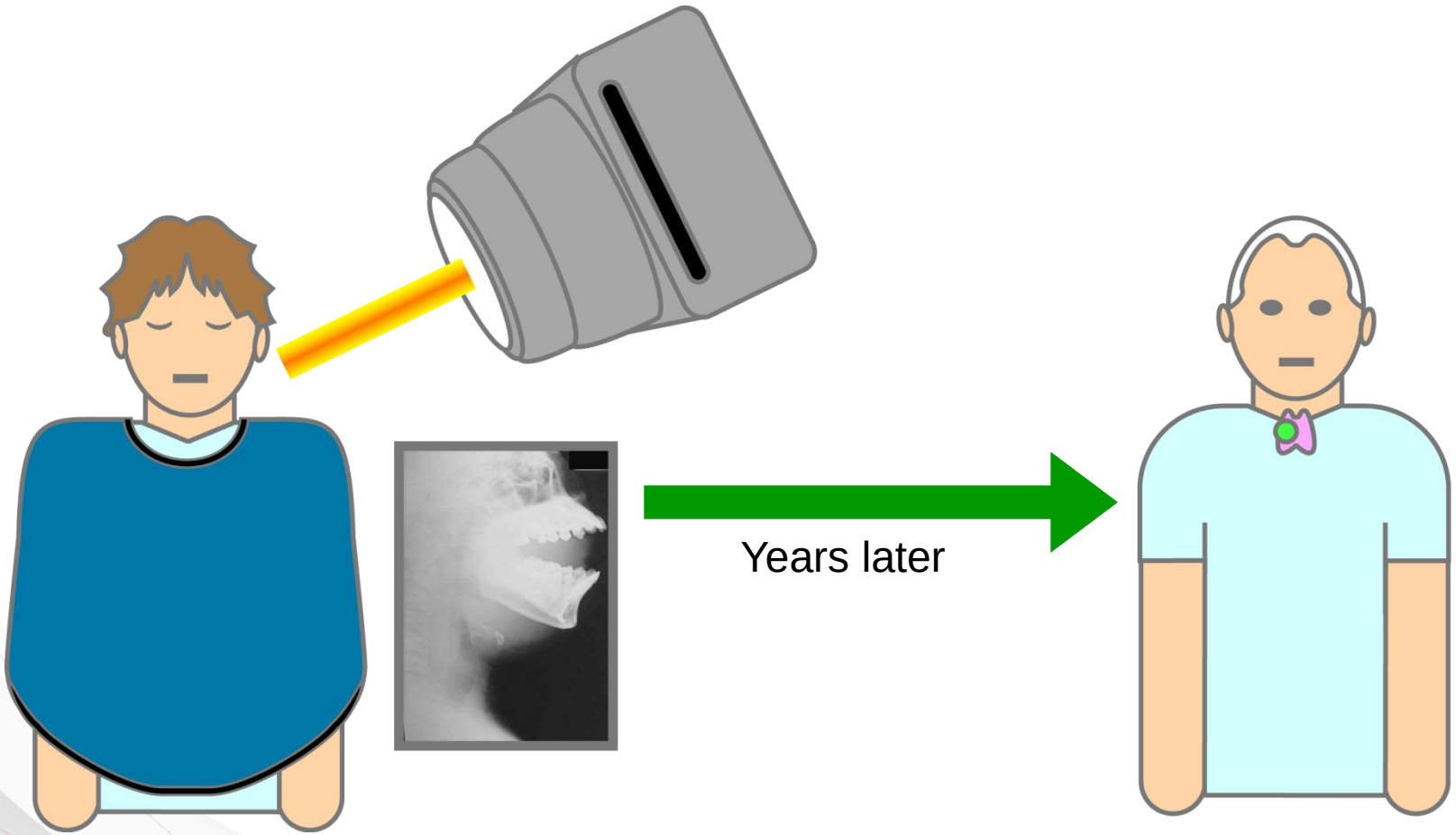
Diagnostic and Screening X-rays

Shield



Radiation Therapy



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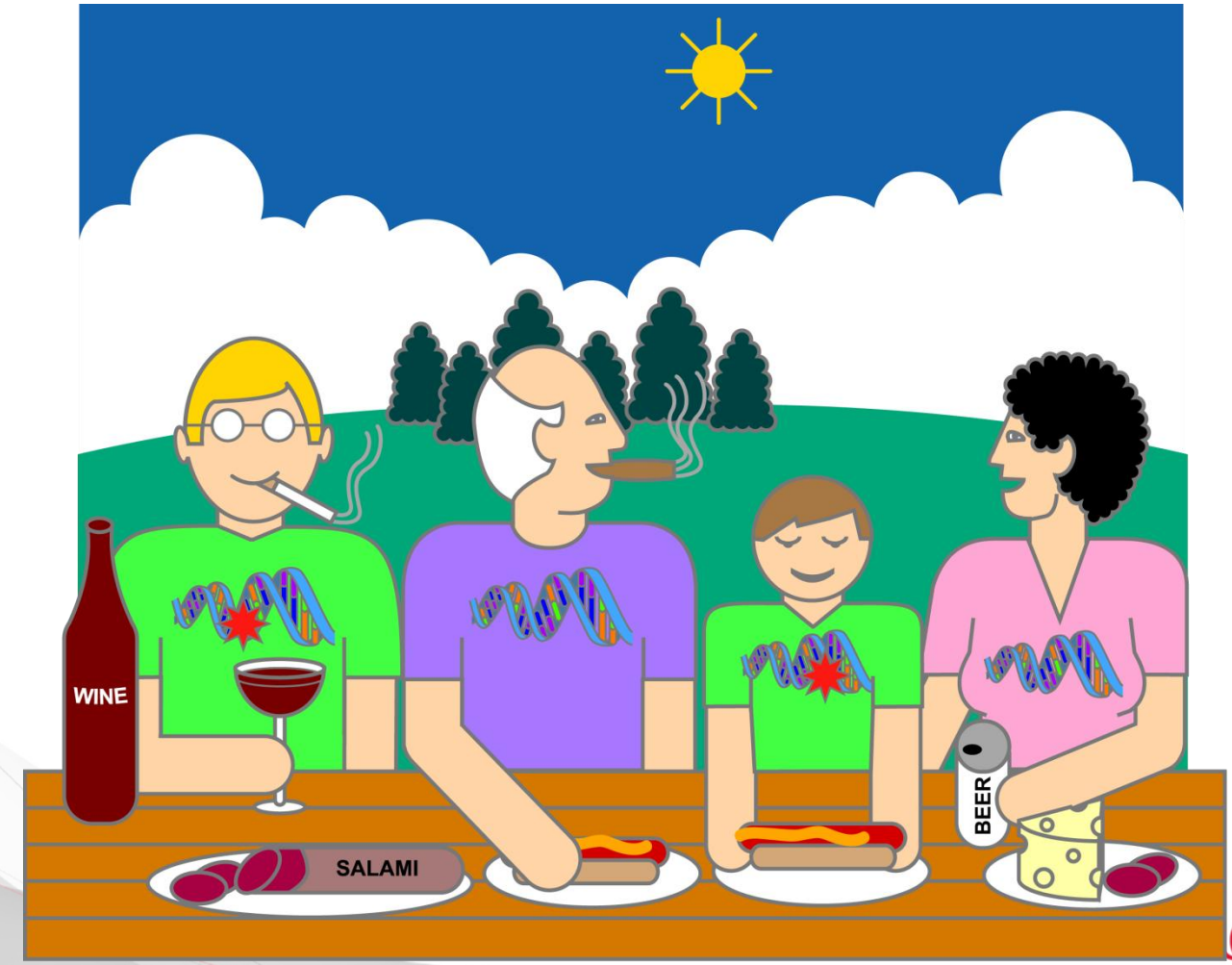
The Inside Matters: Random Gene Changes



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= cancer = random gene changes

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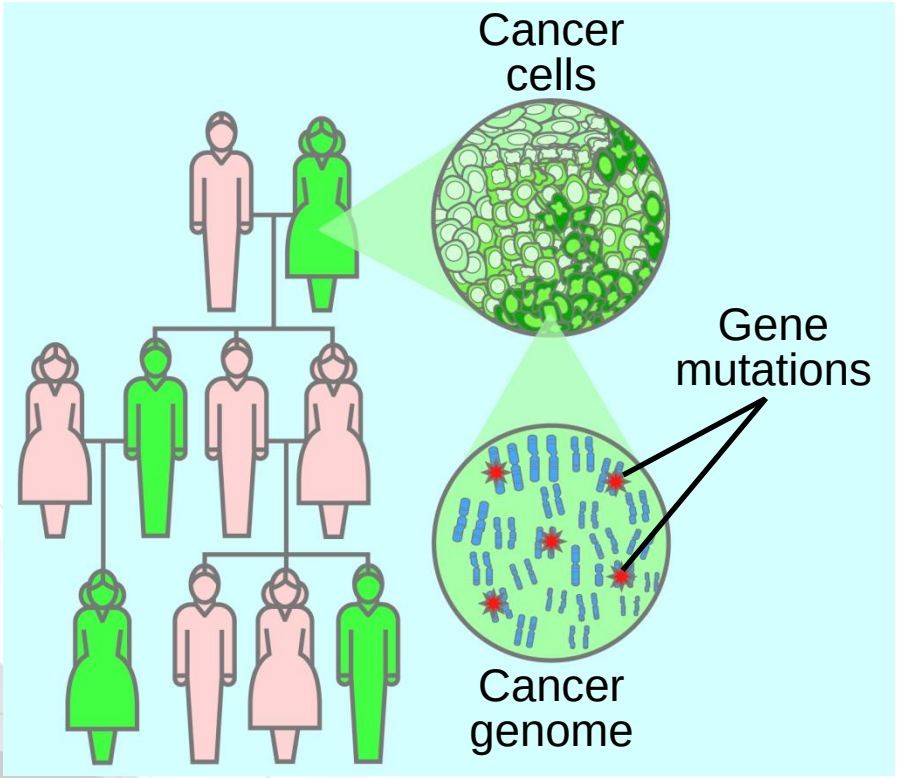
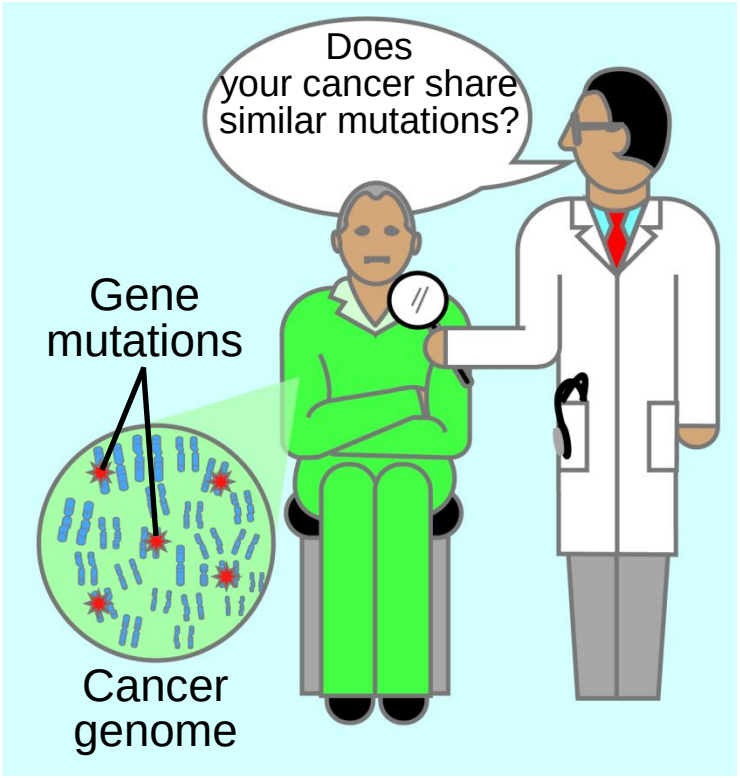
Familial Rates and Risk: Those We Understand

Kidney Cancer in Family



Kidney Cancer: A Sporadic Case



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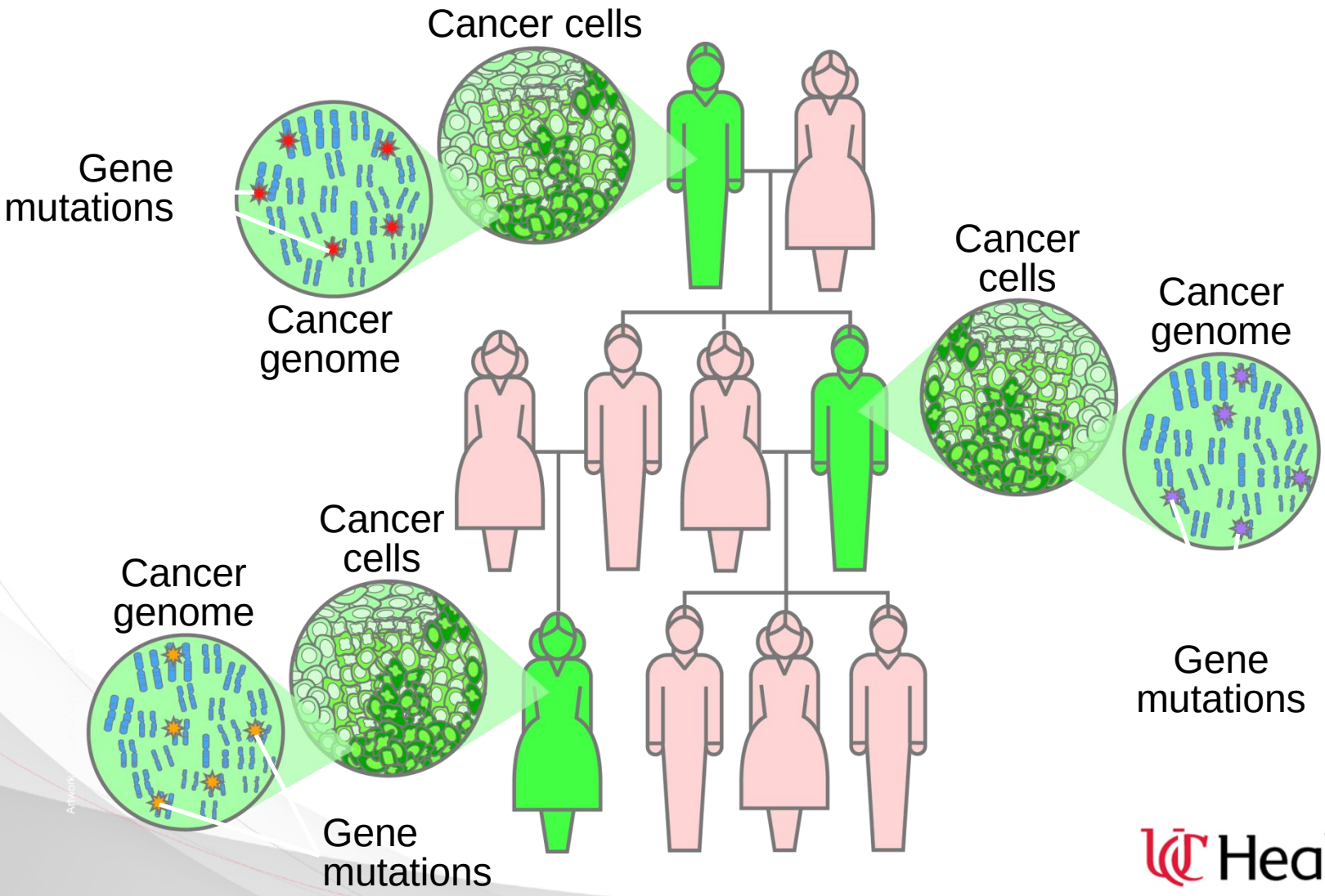
Familial Rates and Risk: Those We Don't Understand As Well (Lung Cancer)



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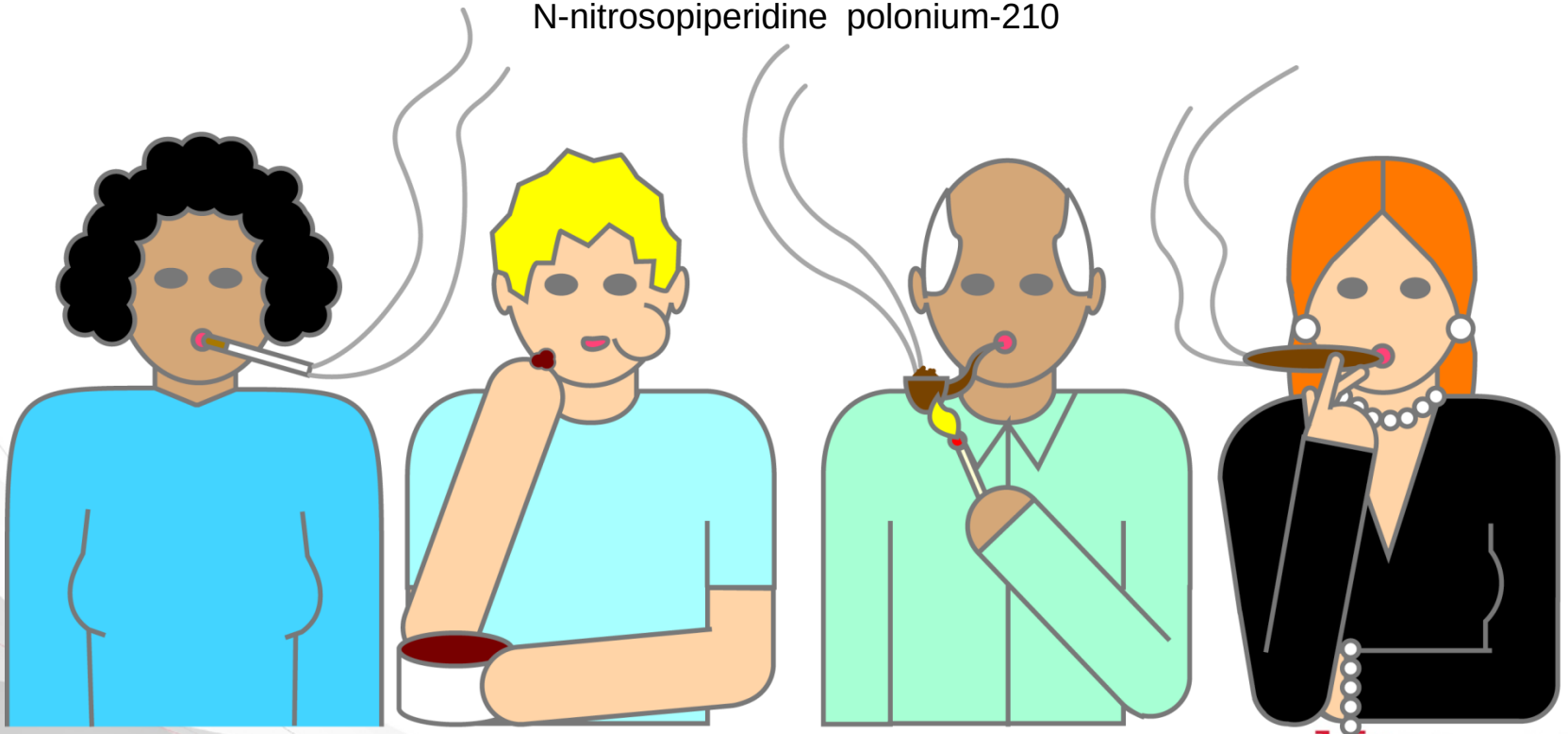
Tobacco

aminostilbene arsenic benz[a]anthracene benz[a]pyrene benzene benzo[b]fluoranthene benzo[c]phenanthrene benzo[f]fluoranthene cadmium chrysene dibenz[a c]anthracene dibenzo[a e]fluoranthene dibenz[a h]acridine dibenz[a j]acridine dibenzo[c g]carbazone N-dibutylnitrosamine 2,3-dimethylchrysene indeno[1,2,3-c d]pyrene S-methylchrysene S-methylfluoranthene alpha-naphthylamine nickel compounds N-nitrosodimethylamine N-nitrosomethylethylamine N-nitrosodiethylamine N-nitrosonornicotine N-nitrosoanabasine N-nitrosopiperidine polonium-210



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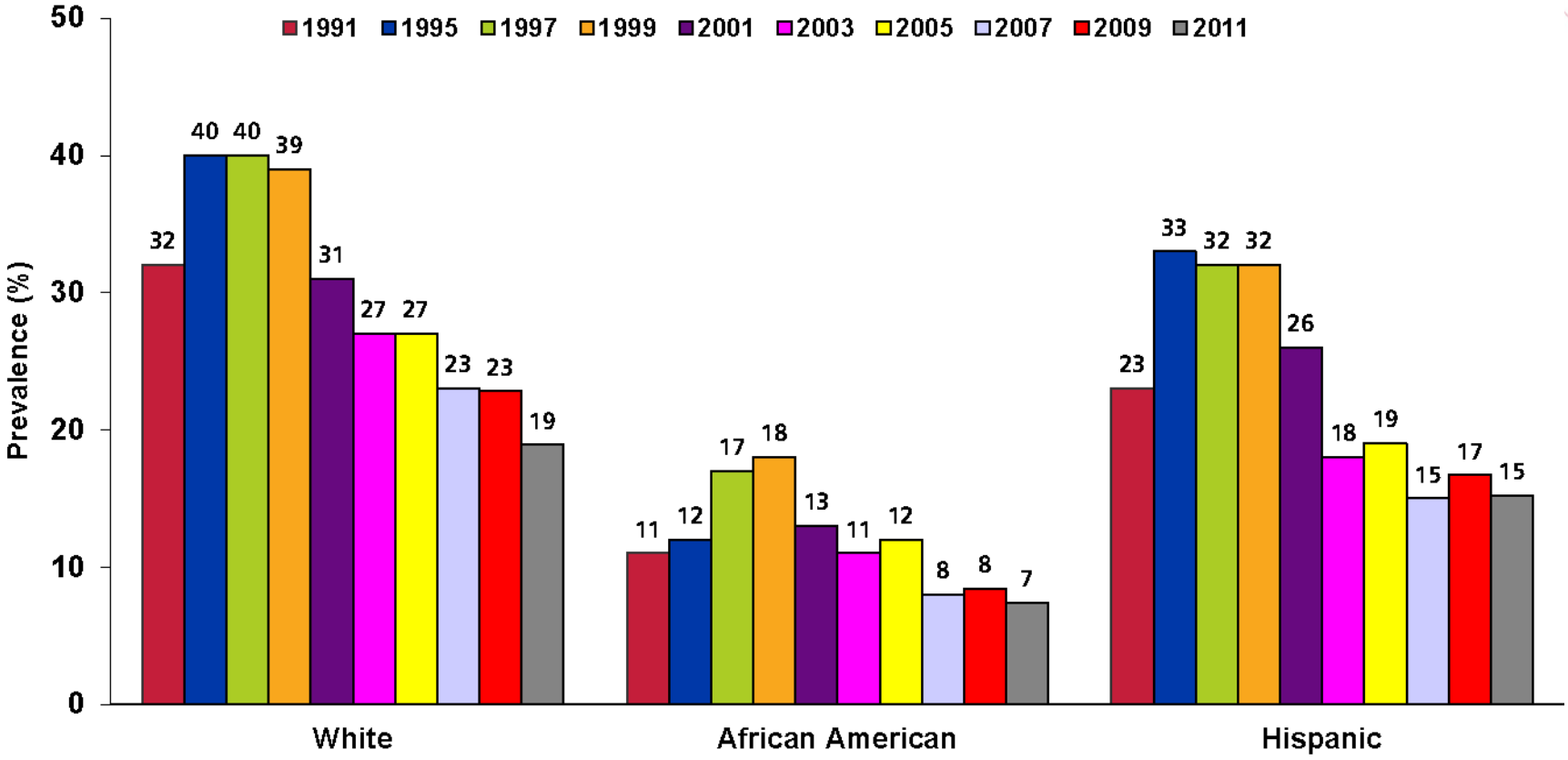
Tobacco Smoke

- 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

Trends in Cigarette Smoking* among Female High School Students, US, 1991-2011



*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!**

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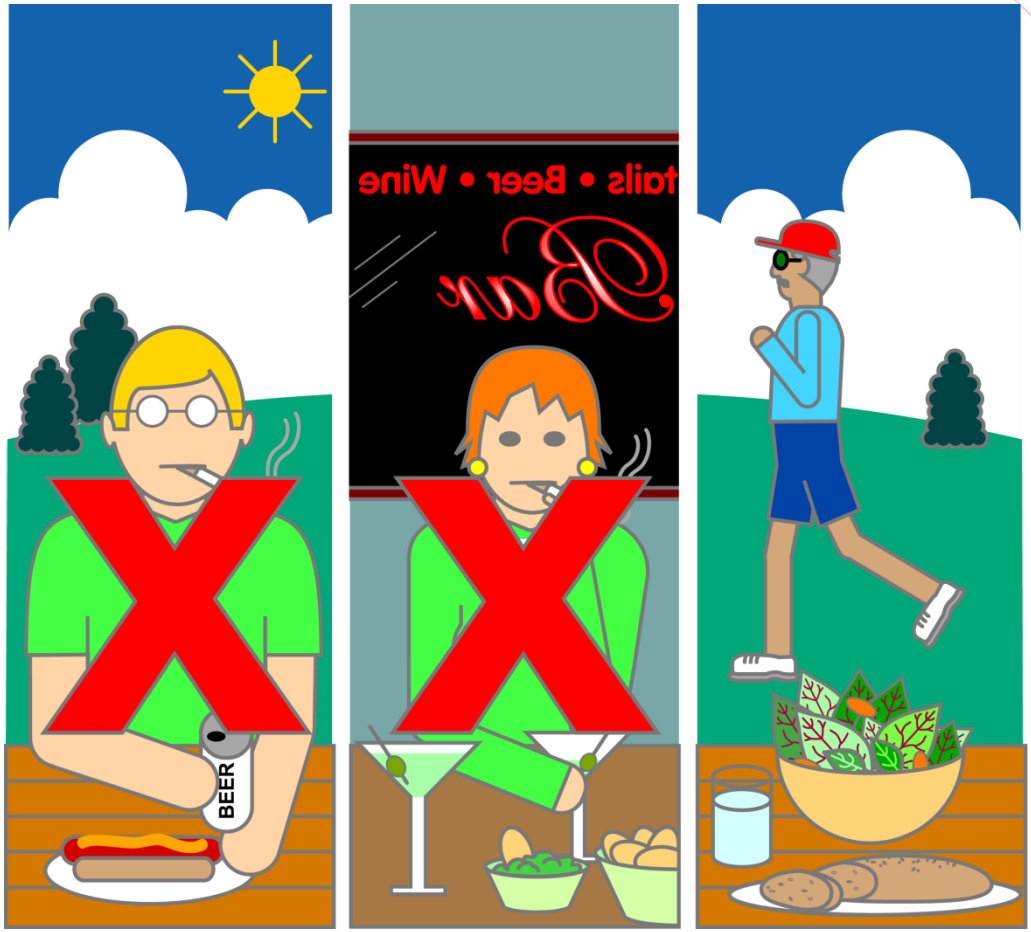
Choose Better Health

- 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

Hope. Fight. Breathe.