What are you afraid of?

Image: philosophytalk.org

At the end I hope you will have:

- A realization that some “risks” should be ignored
- Skepticism is justified: especially “accepted environmental wisdom” from:
  - celebrities
  - mainstream news
  - NGOs
  - legislative bodies
  - all electronic media
- Environmentally responsible means trade-offs: The law of unintended consequences.
- Informed decision making!
- The Skeptical Environmentalist: Measuring the Real State of the World, Bjorn Lomborg

Audience Participation!

Write down your “fears” during the talk.

At the end we will share our “fears”.

(Don’t worry: I’ll go first and you can laugh if you want.)

Question 18 Article 1.

We must therefore say that every action has goodness, in so far as it has being; whereas it is lacking in goodness, in so far as it is lacking in something that is due to its fullness of being; and thus it is said to be evil : for instance if it lacks the quantity determined by reason, or its due place, or something of the kind.

St. Thomas Aquinas, Summa Theologica

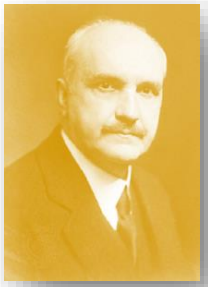
Risk Perception

- Acceptability of risk proportional to the third power of the benefit derived from the activity
- Example: The public will accept risks from voluntary hazards that are (quantitatively) 1,000 times greater than those from involuntary hazards, e.g. skiing versus food preservatives
- Thus risk perception drives much environmental legislation/regulation

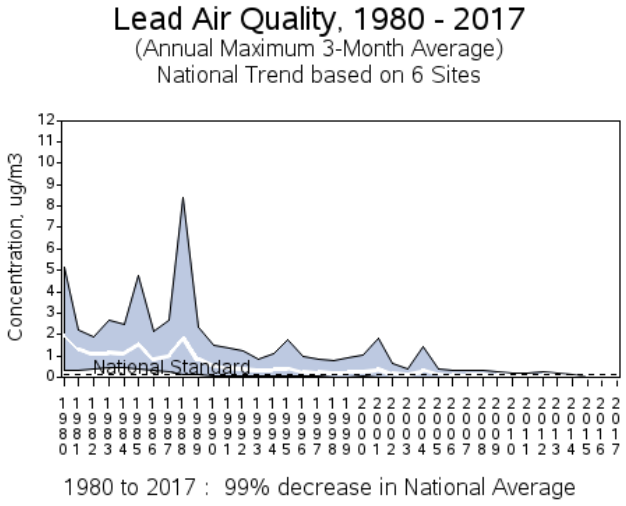
Slovic, Science Vol. 236, 1987
Wilson and Crouch, Science Vol. 236, 1987
Simmons vs Georgia Pacific 1992

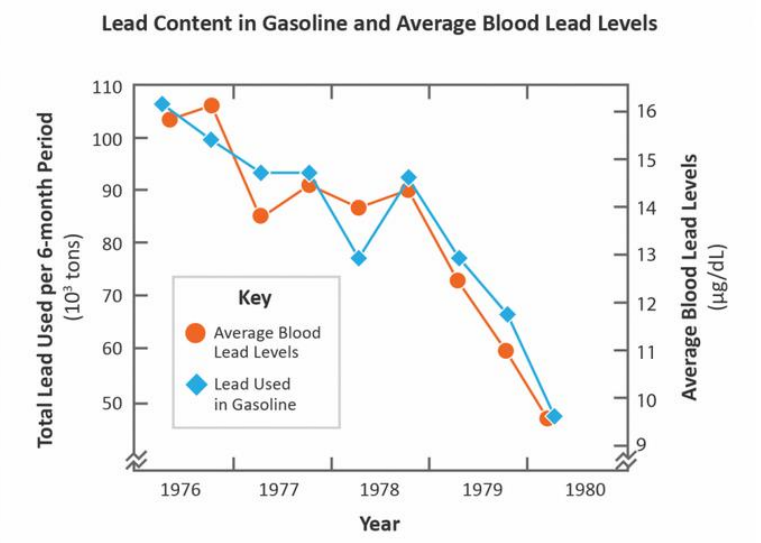
Lessons from History

"Those who cannot learn from history are doomed to repeat it."
~George Santayana



LEAD





Source: U.S. EPA

Sportsman's Park Community Clubhouse and Trapshooting Range

- Several hundred tons (estimated) lead shot on a 27 acre wooded lot with standing and flowing water near Naperville Central High School and the Naperville Park District Garden plots
- Legal action threatened by local homeowners and NGOs unless the site was cleaned up and all lead removed
- Tested by the Illinois EPA and shut down for 30 months between 1998 and 2001: The "most tested site for water contamination in the state of Illinois."
http://www.epa.state.il.us/water/permits/npdes/forms/il0073253-summary.pdf
- How much lead was found in the water?

None!

- The Chicago area overlays a vast, 400 million year old, Silurian reef
- The reef is mainly limestone/calcium carbonate, thus the soil is alkaline in nature
- Lead reacts in alkaline media in the presence of CO_2 to form ($PbCO_3$), and basic carbonate ($Pb_3(OH)_2(CO_3)_2$) salts
- These salts are insoluble in water

Illinois State EPA Responsiveness Summary 2000

- Comprehensive environmental investigation of the Park
- From 1995 to mid-1997
- Conclusions:
  - The site did not pose a threat to
    - The groundwater
    - Nearby private wells
    - Surface water
- Result?
  - Civil lawsuits
  - Remediation of the site from 2014 to 2016
  - Removal of all trees and vegetation and top layers of soil
- More suits are in the works: It appears the primary motivation was objection to noise from the shooting range

Lead Free Solder: Restriction of Hazardous Substances (RoHS) European Union Directive 2002/95/EC

Why Not Eliminate Lead in Solder for Electronics?

Why Not Eliminate Lead in Solder for Electronics?

- What could be a downside to the directive?
- The law of unintended consequences?

- **Make it Fair**
  - "In November 2008, FinnWatch visited Indonesia's tin mining centre, Bangka Island, to update the makeITfair report (2007) on social and environmental consequences of tin mining for consumer electronics. FinnWatch witnessed severe environmental destruction, unregulated mining operations and unacceptable working conditions of artisanal miners."
    - makeitfair.org
- **Reuters**
  - "Indonesia's crackdown on illegal tin mining and smelting has fueled meteoric price rises for the metal, but there are doubts if the boom will last for a sector often labeled as the sunset industry."
    - Reuters February 28, 2007
- **IPC**
  - **"**The cost of Tin and Silver have reached 19 year highs and it is important for our industry to understand the implications of this kind of cost increase on the supply of Solder Alloys. This price volatility on the Electronics Assembly industry is particularly acute due to the increased consumption of Tin by our industry due to the accelerating transition to high Tin Lead Free Alloys."
    - IPC Solder Products Value Council March 2007
- **Antemedius.com**
  - "The DRC is rich in natural resources. Many of the metals that are used in green technology are found there. Electrodes in your cell phones, components in your computer, and materials of the green economy are mined in The Democratic Republic of Congo. You might find electronic devices that funded this conflict in your pocket right now. These metals must be regulated just like the blood diamonds of Sierra Leone. Advocacy groups concentrate on "Three T" metals: Tantalum, Tin, and Tungsten."

    Antemedius, July 6, 2009

Where is Lead Used?

Product Use (U.S. Geological Survey 2007)	Amount in metric tons	% of Total
Batteries	1,380,000	87.91 (99% recycled[a])
Ammunition	69,400	4.42
Miscellaneous	32,990	2.10
Casting metal	31,500	2.01
Construction	28,600	1.82
Pigments and chemicals	15,800	1.01
Solder	7,220	0.46
Brass and bronze	2,870	0.18
Bearing metals	1,410	0.09
Total	1,569,790	100

[a] http://www.epa.gov/waste/nonhaz/municipal/pubs/msw2008rpt.pdf

Lead in the Water: Flint, Michigan

How did the lead get in the water?

- The city switched from water from Detroit, MI to the Flint river
- Many of the pipes for this water were lead lined
- Lack of corrosion inhibitors allowed lead to dissolve
- Between 2.5 and 5% of children in the 2013 to 2015 period had elevated blood lead levels
- Water supplies are now below regulated limit of 15 ppb
- Cost savings resulted in increased health risks! But who would have known additional inhibitors were needed?

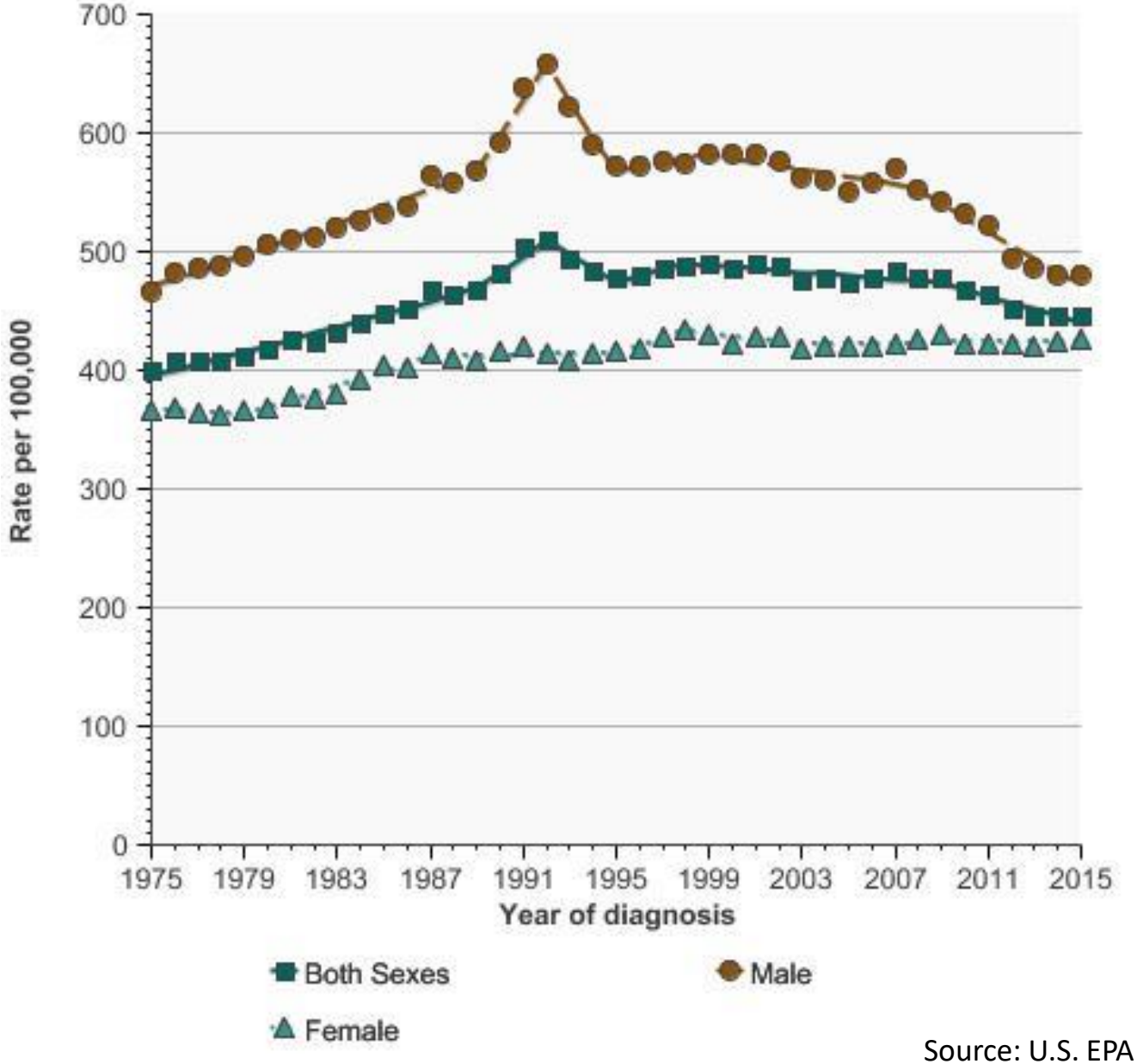
Which of the previous three issues do you rate as more dangerous?

(Remember: Acute vs Chronic; Size matters.)

How Environmentally “Woke” Are You?

Let’s Find Out

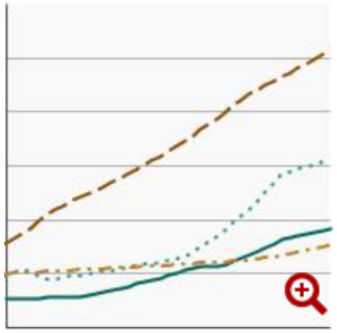
Are Cancer Rates of Incidence and Death Rising in the U.S. ?



Source: U.S. EPA

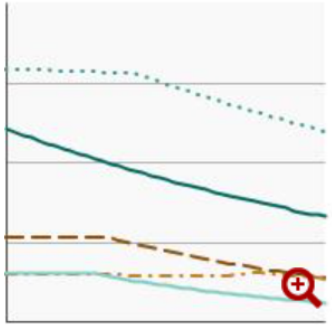
– Increasing Greater than 1% Annually

Rates of selected cancer sites that are increasing by 1% or greater per year^, delay-adjusted cancer incidence, 1975–2015

Overview Graph	Detailed Trend Graphs	Most Recent Estimates (2015)	
		Rate per 100,000	95% Confidence Interval
	Liver and Intrahepatic Bile Duct	9.2	8.9 – 9.6
	Melanoma of the Skin	26.3	25.7 – 26.9
	Thyroid	15.2	14.8 – 15.7
	Myeloma	7.7	7.4 – 8.0

– Decreasing Greater than 1% Annually

Rates of selected cancer sites that are decreasing by 1% or greater per year^, delay-adjusted incidence^, 1975–2015

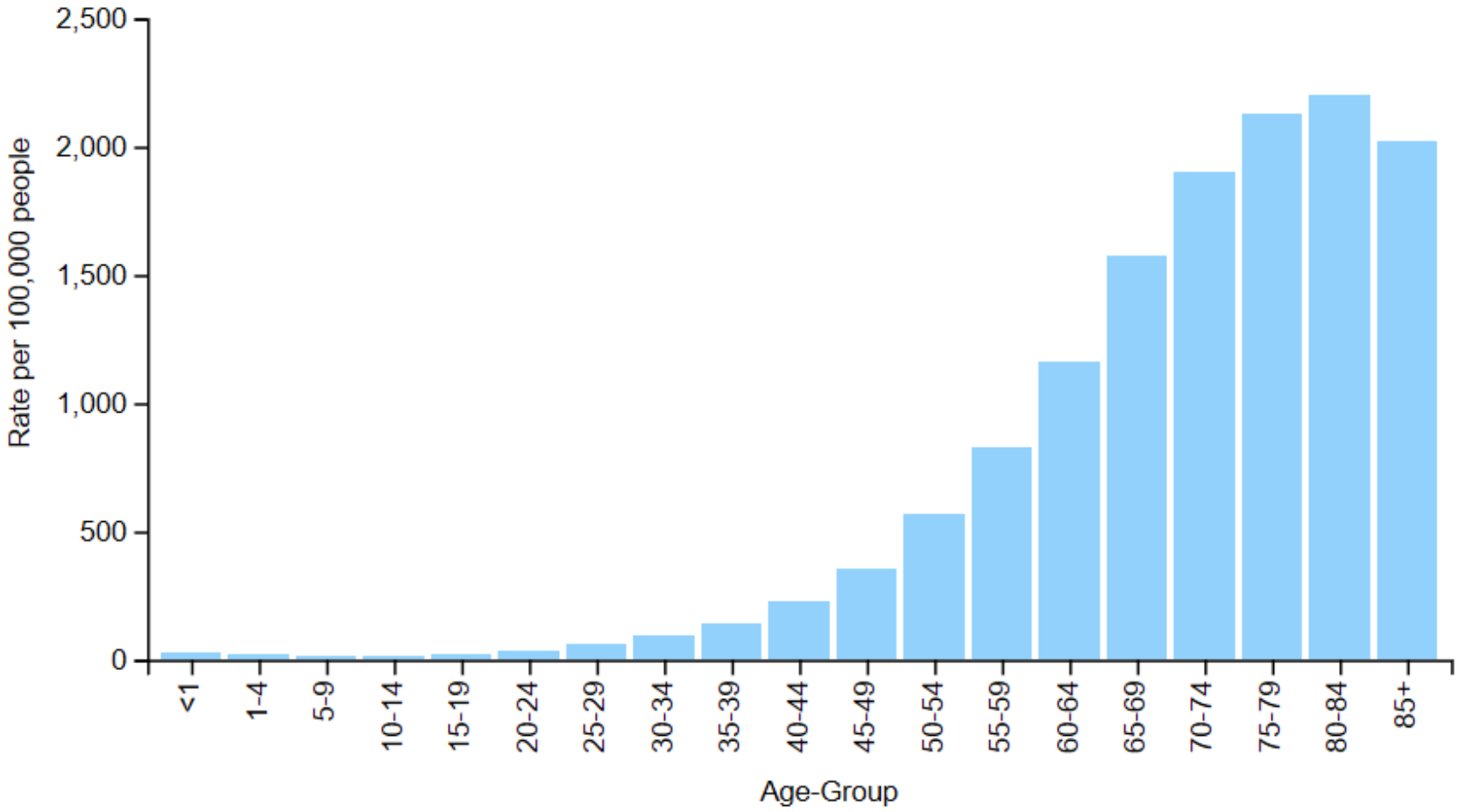
Overview Graph	Detailed Trend Graphs	Most Recent Estimates (2015)	
		Rate per 100,000	95% Confidence Interval
	Stomach	6.6	6.3 – 6.9
	Larynx	2.6	2.5 – 2.8
	Ovary	11.8	11.3 – 12.4
	Hodgkin Lymphoma	2.7	2.5 – 2.9
	Esophageal squamous cell carcinoma	1.4	1.2 – 1.5

Source: U.S. EPA

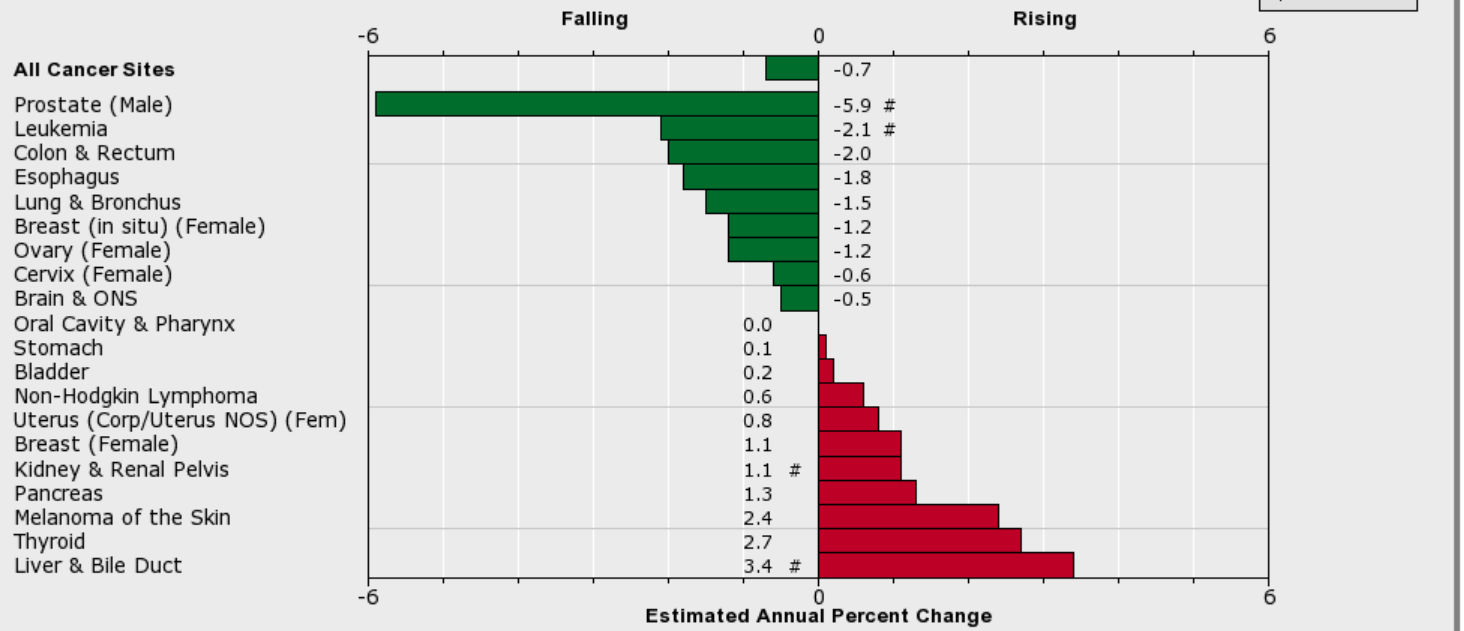
Rate of New Cancers by Age Group, All Races, Both Sexes

All Types of Cancer
Rate per 100,000 people

Chart | Table | Export



5-Year Rate Changes - Incidence
Illinois, 2011-2015
All Ages, Both Sexes, All Races (incl Hisp)



Created by statecancerprofiles.cancer.gov on 12/05/2018 2:33 pm.

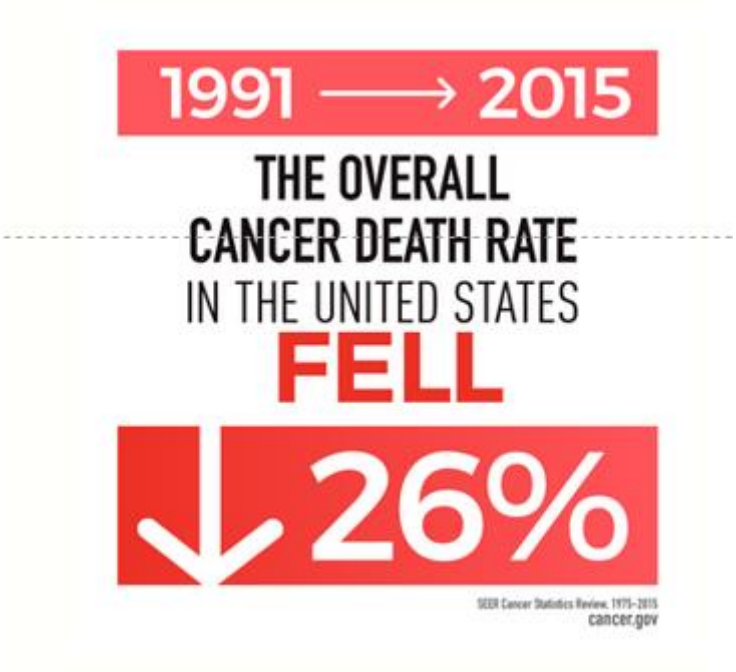
Source: Incidence data provided by the National Program of Cancer Registries (NPCR). EAPCs calculated by the National Cancer Institute using SEER*Stat. Rates are age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9, ... , 80-84,85+). Rates are for invasive cancer only (except for bladder cancer which is invasive and in situ) or unless otherwise specified. Population counts for denominators are based on Census populations as modified by NCI. The 1969-2015 US Population Data File is used with NPCR November 2017 data.

Please note that the data comes from different sources. Due to different years of data availablility, most of the trends are AAPCs based on APCs but some are EAPCs calculated in SEER*Stat. Please refer to the source for each graph for additional information.

- The annual percent change is significantly different from zero (p<0.05).

Is it going to kill you?

U.S. Cancer Mortality Trends



death rates decreased by:

- 1.8% per year among men from 2006 to 2015
- 1.4% per year among women from 2006 to 2015
- 1.4% per year among children ages 0–19 from 2011 to 2015

What Carcinogens Should you be Afraid of?

Relative carcinogen ranking as determined by Human Exposure/ Rodent Potency

Non-Epidemiological (bigger is expected to be worse)

- Well water 1 liter (Woburn, MA) 0.0004 (TCE)
- Tap water 1 liter 0.001 (Chloroform)
- Ethylenethiourea 0.002
  - (Reference only: ETU, EPA standard 8E-5mg/kg/day)
- Cooked Bacon 100g 0.003 (Dimethylnitrosamine)
- Peanut Butter 32 g 0.03 (Aflatoxin)
- Lettuce 15 grams 0.04 (Caffeic acid)
- Diet Cola 12 oz. 0.06 (Saccharin)

Relative carcinogen ranking as determined by Human Exposure/ Rodent Potency

Non-demographic (HERP units: bigger is worse!)

- Brown Mustard 5g 0.07 (Allyl isothiocyanate)
- Dry Basil 1g 0.1 (Estragole)
- 1 mushroom raw 0.1 (Hydrazine)
- Coffee 3 cups/day 0.1 (Caffeic acid)
- Beer 12 oz. 2.8 (18 ml, alcohol)
- Wine 250 ml 4.7 (30 ml, alcohol)

Ames et al, Science, Vol. 236, 1987
Ames et al, Science, Vol. 258, 1992

Causes of Cancer: Doll and Peto, 1981

- Tobacco 30%
- Diet 35%
- Reproductive and sexual behavior 7%
  - Promiscuity
  - Delaying having children
- Alcohol 3%
- Infection 10%
- Exposure to sunlight 3%
- Carcinogens and radiation:
  - Occupational exposure 4%
  - Air food and water 2%
  - X-rays etc. 1%
  - Paints, plastics, solvents, food additives 1%

If you party hardy your cancer risk is a factor of 10 greater than that for food additives.

Is Life Expectancy in the U.S. Going Up or Down? And What is the Reason for the Change?

Per the CDC:

- U.S. life expectancy has fallen for 2 years in a row
- 1.5 years behind the OECD average
  - Organization of Economic Cooperation and Development
- Opioid deaths:
  - Up 21% last year
  - Up 137% since 2000
- Suicide up 24% in 1999 to 2014
- Increased deaths from:
  - Alcohol (especially among white males)
  - AIDS
  - Diabetes

We are killing ourselves.

Common effects of stress on your body

- Headache
- Muscle tension or pain
- Chest pain
- Fatigue
- Change in sex drive
- Stomach upset
- Sleep problems

Common effects of stress on your mood

- Anxiety
- Restlessness
- Lack of motivation or focus
- Feeling overwhelmed
- Irritability or anger
- Sadness or depression

Common effects of stress on your behavior

- Overeating or undereating
- Angry outbursts
- Drug or alcohol abuse
- Tobacco use
- Social withdrawal
- Exercising less often

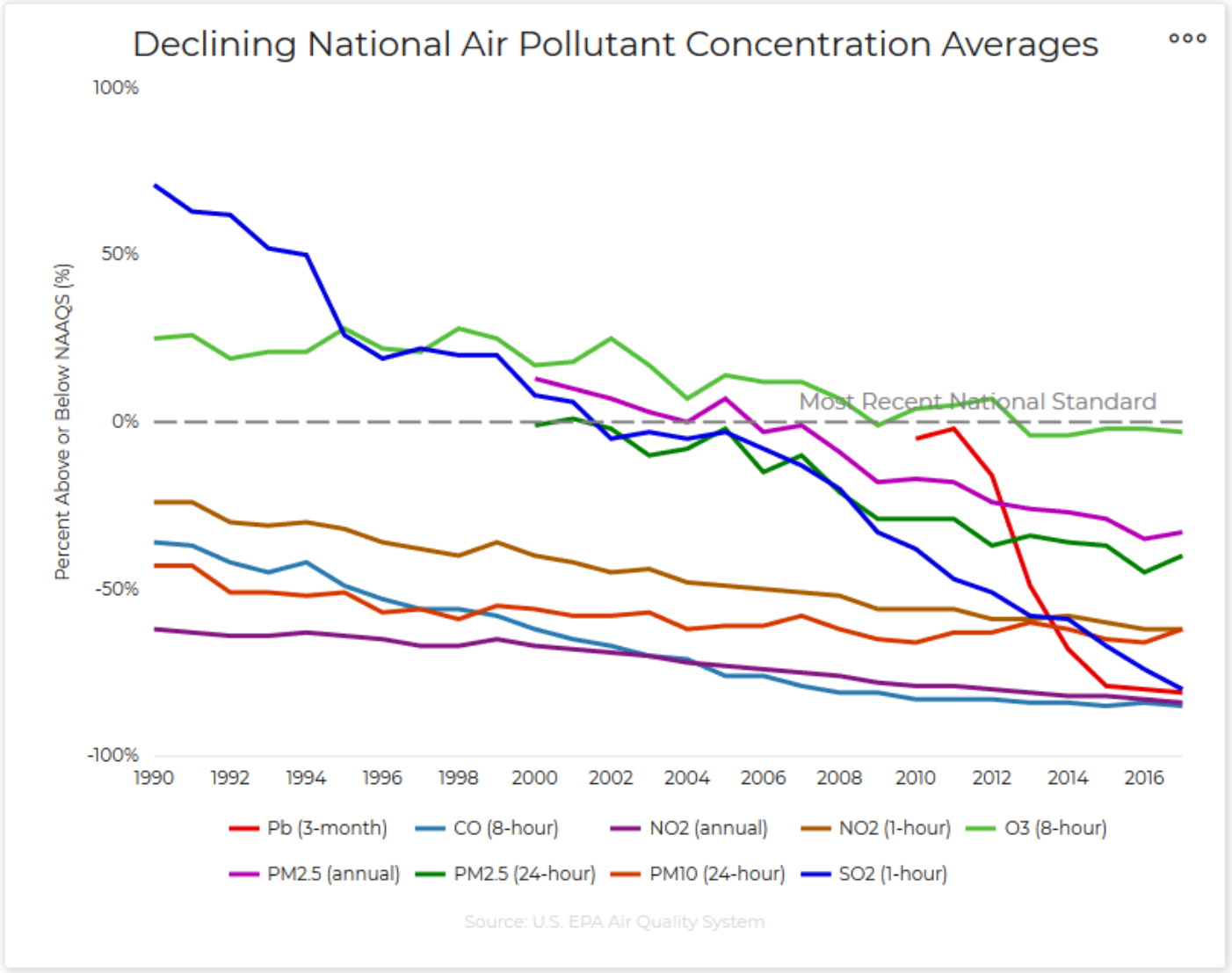
Mayo Clinic

In general:

- Poverty is an indicator of poor health
- The effect is higher for children
- Regular health care and check ups less likely to occur
- Adult show more:
  - Obesity
  - Risky sexual behavior
  - Substances abuse
  - Less regular exercise
- All these reflect an increased risk of cancer
- Lifestyle, even if imposed by economic systems, is a greater risk factor than environmental exposure.

Closer to home, i.e. you: Get a good night's sleep, eat your fruits and vegetables, exercise, avoid the "party hardy" mentality. (paraphrase from Bruce Ames)

Is Air Quality in the U.S. Going Up or Down?


Declining National Air Pollutant Concentration Averages
100%
50%
0%
-50%
-100%
Percent Above or Below NAAQS (%)
Most Recent National Standard
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
Pb (3-month)
CO (8-hour)
NO2 (annual)
NO2 (1-hour)
O3 (8-hour)
PM2.5 (annual)
PM2.5 (24-hour)
PM10 (24-hour)
SO2 (1-hour)
Source: U.S. EPA Air Quality System

U.S. EPA 2018

How Dangerous is Nuclear Power?

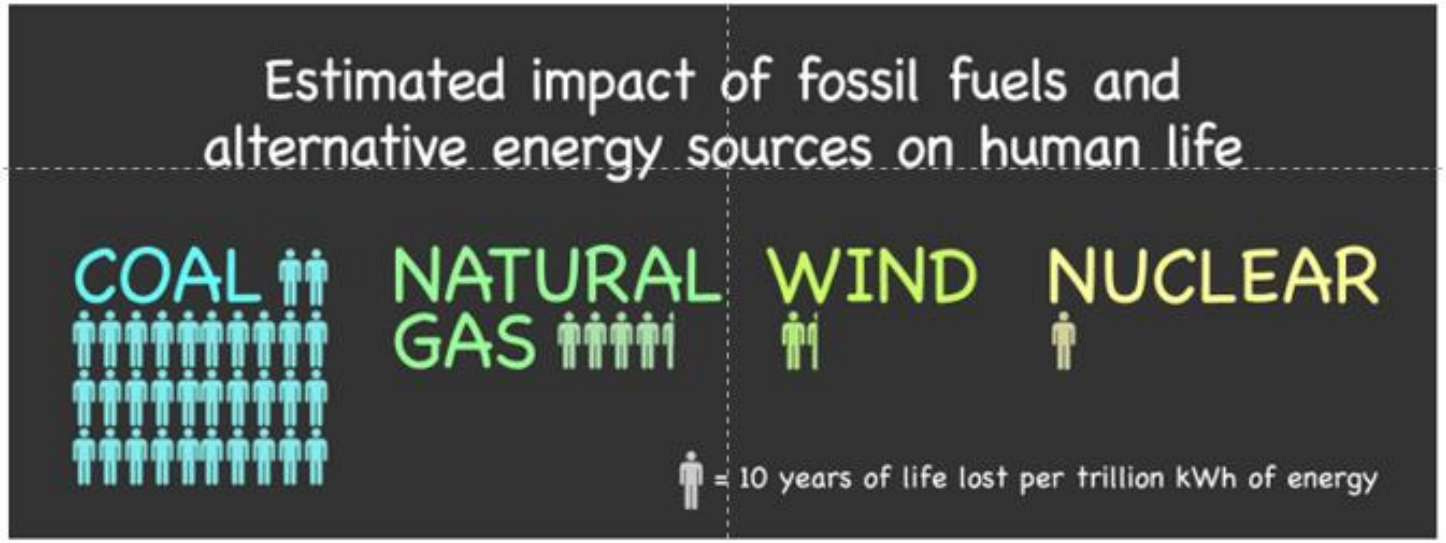


Figure 3: The figure is based on estimates from Europe Union, which account for immediate deaths from accidents and projected deaths from exposure to pollutants. These estimates do not incorporate fatality rates in countries such as China where cheap coal combined with poor regulation are causes of considerably more fatalities.

Harvard University, Reconsidering the Risks of Nuclear Power October 25, 2016

Is water quality in the U.S. going up or down?

Clean Water Act dramatically cut pollution in US waterways

Date: October 9, 2018

Source: University of California - Berkeley

Summary: The 1972 Clean Water Act has driven significant improvements in US water quality, according to the first comprehensive study of water pollution over the past several decades. The team analyzed data from 50 million water quality measurements collected at 240,000 monitoring sites throughout the US between 1962 and 2001. Most of 25 water pollution measures showed improvement.

What am I most likely to die of?

Deaths: Leading Causes for 2016 [PDF – 2 MB]Data are for the U.S.

Number of deaths for leading causes of death

- Heart disease: 635,260
- Cancer: 598,038
- Accidents (unintentional injuries): 161,374
- Chronic lower respiratory diseases: 154,596
- Stroke (cerebrovascular diseases): 142,142
- Alzheimer's disease: 116,103
- Diabetes: 80,058
- Influenza and pneumonia: 51,537
- Nephritis, nephrotic syndrome, and nephrosis: 50,046
- Intentional self-harm (suicide): 44,965

Source: Health United States, 2017 Table 19 [PDF- 11.1 MB] (Data are for 2016)

U.S. CDC 2016

Does not include 70,200 overdose deaths: https://www.drugabuse.gov/related-topics/trends-statistics/overdose-death-rates
See arrow above.

Let’s Share Our Fears!

Me First!

And what are my concerns?

- A declining population: That's right, declining
  - Blatant examples: Japan, Korea, Malta, most of Europe
    - The U.S. https://www.cdc.gov/nchs/data/nvsr/nvsr68/nvsr68_01-508.pdf
    - World peak at 9 billion in 2050
    - Back to 7 billion by 2100: many more older than younger people
  - Sex selective abortion targeting females
    - Estimated 100 million missing in India alone https://en.wikipedia.org/wiki/Sex-selective_abortion
  - Rich, white people targeting people of color in the name of "reproductive rights"
    - Gates, Soros, Buffet: https://newspunch.com/scientist-bill-gates-funding-population-control-africa/
  - Abortion ended 40 - 50 million lives last year; a total of 56 million die naturally (WHO)
- Deforestation: Not as bad as you read in MSM. But not good especially in sub-Sahara Africa:
  - Needed: Better technology for cooking, illumination
- Lack of fresh water in poorer areas of the world.
- Over fishing
- Environmental activists: Straining at gnats, swallowing camels!