

LECTURE NOTES: EMGT 234

ANALYZING THE DAILY RISK OF LIFE:

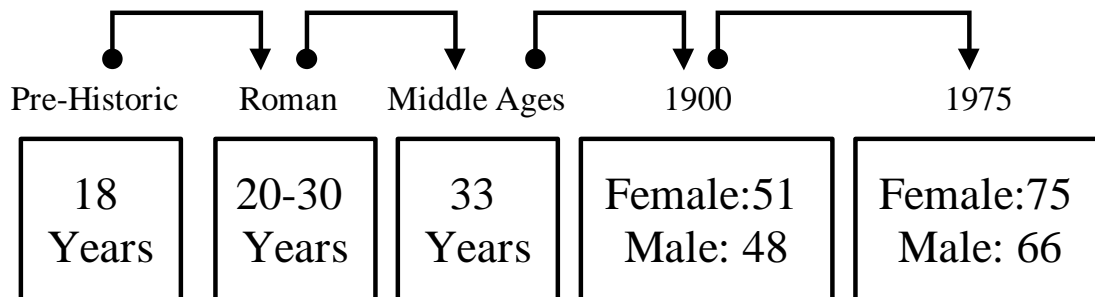
SOURCE:

Richard Wilson
Technology Review, Vol. 81, No. 4, 1979, 41-46

INTRODUCTION

World = a very hazardous place.
Everybody wants simpler world with less risk.
Does this world exist?

Change in Life Expectancy:



Conclusion: Total risk is less now than before.

Many of the large risks of the last century have been eliminated, leaving lots of small risks, most of which have always existed.

DAILY RISKS OF LIFE

1. Getting out of bed and turning on light; **500 deaths per year** due to electrocution
2. Taking a shower and washing with soap. Are chemicals in soap good for skin?
3. Putting on clothes which are washed with bleaching detergent. Bleach contains chemical that fluoresces in sunlight. Carcenogenic?
4. Walk down the stairs for breakfast; **Falls kill 16000 people per year**, mostly in domestic accidents.
5. Drink a cup of coffee or thee; Caffeine carcenogenic?
6. What to put in coffee to make it sweet?
 - Sugar \longrightarrow Fat \longrightarrow Hart Disease
 - Sacharine \longrightarrow Cancer
7. Prepare peanut butter sandwhich for lunch; Peanut butter may develop mold with is strongly carcenogenic.
8. Prepare sandwhich with lunch meat; Eating too much meat may cause colon cancer.
9. Commute to work; Use car, bycycle, or bus?
 - Bicycle \longrightarrow Weight \downarrow \longrightarrow Pr(Hart Disease) \downarrow
 - Bicycle \longrightarrow Pr(Accident with Big Consequence) \uparrow

- Car would be safer, Bus would be safest.
- 10. Exposed to air pollution when approaching city; Air pollution kills 20,000 people per year. London 1952, 3000 people killed in 4 days due to Air Pollution.
- 11. Committee Meeting where people smoke; Smoking "causes" 40 % of all cancers and kills 15 % of all Americans.
- 12. Drink a cup of water mid-morning; Introduction of chloring nearly wiped out cholera and thypus. Chlorine reacts with organic matter which causes cancer.
- 13. Office Walls are off brick and cincer block. Contain radioactive materials Cancer.

Question:

Radiation is required by State Law to detect tuberculosis and protect students. Is it correct to demand that I accept the risk of increased cancer, even when it protects the rest of society for a greater one?

- 14. Frequently to meetings. Use Car, Bus, Train or Airplaine? 30 years ago, airplane was more dangerous than others Now, for journeys of 1000 miles or more, air travel is safest. However;

Airplane → increased cosmic radiodiaton → Cancer

MANAGING THE DAILY RISK OF LIFE

- Above concerns may be personal and I could decide to avoid them. However doing that could **increase the risk to others**.
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Example:

- Use **Electricity** in stead of **Burning Coal** to reduce **Air Pollution** by. However, Power Company typically uses fossil fuel burning for electricity. **Are they careful?**
 - Either way, coal is used and is won through mining. **100 years ago** mining was **most dangerous occupation**:
 1. 156 miners out of 100000 were killed in US in 1972.
 2. 25% of all US miners in 1977 probably **attract black lung disease** in their life time.
 - Environmentalist are against **Open Mining**. Do they have the right to allow miners to die by refusing to let them work above the ground?
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- Society (through media) focuses **on infrequent large accidents** as opposed to **numerous small accidents** which, in total per year, may cause more death.
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Examples:

- Public very concerned about nuclear power accident. None had happened at time of the paper. (Tsjernobyl, is past 1979, Three Mile Island incident, 1984), and experts are optimistic that none will never happen.

- Public is concerned about LNG transport because **30 years ago** an accident killed **133 people**. Even though the cause of that accident has been found and such a cause will likely not happen again, we continue to be concerned with LNG transportation.

“Once a thief, always a thief”

Proposed Risk Management Strategies:

- Manage Risk by quantification of our port-folio of Risks. Next, reduce the largest one first, and so-on. Stop reduction is reduced to 1 death per million per year.
- Tax risk creator at a rate of \$1 for an increased risk of 10^{-6} per year or, “1 million dollars for 1 life lost per year due to the activity”.

Examples:

1. Tax tobacco industry with **70 cents per cigarette**. This would pay for social cost of estimated at \$1 to \$2 dollars per packet of cigarettes.
2. Tax a diet soda can by 5 cent.

“Taxes should be collected according to their risk source and should be used to invest into risk reduction measures towards such a risk source”.

Example:

Invest in using **Ozone** in existing sanitation system instead of **Chlorine**.

COMPARING THE RISKS WE FACE

Risk which increases chance of death by 0.000001 (or 1 part in 1 million)	
Smoking 1.4 cigarettes	Cancer, heart disease
Drinking 0.5 liter of wine	Cirrhosis of liver
Spending 1 hour in a coal mine	Black Lung Disease
Spending 3 hours in a coal mine	Air Pollution
Living 2 days in New York or Boston	Accident
Travelling 6 minutes by canoe	Accident
Travelling 10 miles by bicycle	Accident
Travelling 300 miles by car	Accident
Flying 1000 miles by jet	Accident
Flying 6000 miles by jet	Cancer caused by Cosmic Radiation
Living 2 months in Denever on vacation from N.Y.	Cancer caused by Cosmic Radiation
Living 2 months in average stone or brick building	Cancer caused by natural radio activity
One chest X-Ray taken in a good hospital	Cancer caused by radiation
Living 2 months with a cigarette smoker	Cancer, heart disease
Eating 40 tablespoons of peanut butter	Liver cancer caused by aflatoxin B
Drinking Miami drinking water for one year	Cancer caused by chloroform
Drinking 30 12 oz. Cans of diet soda	Cancer caused by sacharrin
Living 5 years at site boundary of a typical nuclear power plant in the open	Cancer caused by radiation
Drinking 1000 24 oz. Soft drinks from recently banned plastic bottles	Cancer from acrylonitrite monomer
Living 20 years near PVC Plant	Cancer caused by vinyl chloride (1976 standard)
Lving 150 years within 20 miles of a nuclear power plant	Cancer caused by radiation
Eating 100 charcoil broiled steaks	Cancer from benzopyrene
Risk of accident by lving within 5 miles of a nuclear power reactor for 50 years	Cancer caused by radiation

CONTINUING OUR DAILY RISKS OF LIFE

15. Cooking dinner in a microwave with doors not properly closed; Microwaves give people nervous problems.

16. Cooking at a gas stove; Fills kitchen with noxious carbon monoxide and nitrogen oxides.

17. Take a glass of beer before night time;

Alcohol → liver cirrhosis liver → oral cancer.

Relaxing effect → reduce stress → prolongs life.

18. Beer in green glass containing chromium;

Small amounts of chromium enter beer → cancer

19. Drink beer from a plastic bottle?

Plastic chemical dissolves in beer → cancer

20. Going to bed and putting on one's inflammable pajama

Flame retardant pajamas → cancer

TRUISM

"MORE PEOPLE DIE IN BED
THAN ANYWHERE ELSE"

Author argues: "At least I am in the right place"