

# Are We Scaring Ourselves To Death?

by

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# Drinking Water

- Can I Drink It?



# Water well at mountain cabin

- Minimum detectable level for lead
  - ppm (0.0000001) 1950's
  - ppb (0.0000000001) 1965
  - ppt (0.000000000000001) 1975
  - ppq (0.0000000000000000001) today

The case of the vanishing zero

0 0 0 0 0 .



# One ppq

- One part in  $10^{15}$
- One drop in

13,000,000,000 gallons

45,000 rail cars

# Toxicologists

- Small amounts are not a problem
- Body is made to ward off environmental pollutants
  - Intestinal lining
  - Covering of eye
  - Skin
  - Liver



# Toxicologists

- Everything is harmful in the right amount
- Most things are not harmful in small amounts
- How much and how often
- Constant warnings make us numb to real dangers

# Focus on real hazards

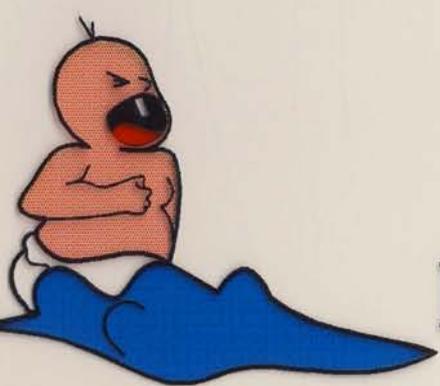
Cigarette smoking  
Seat belt usage  
Smoke detector use  
Diet  
Drug/alcohol abuse  
Unsafe sexual behavior



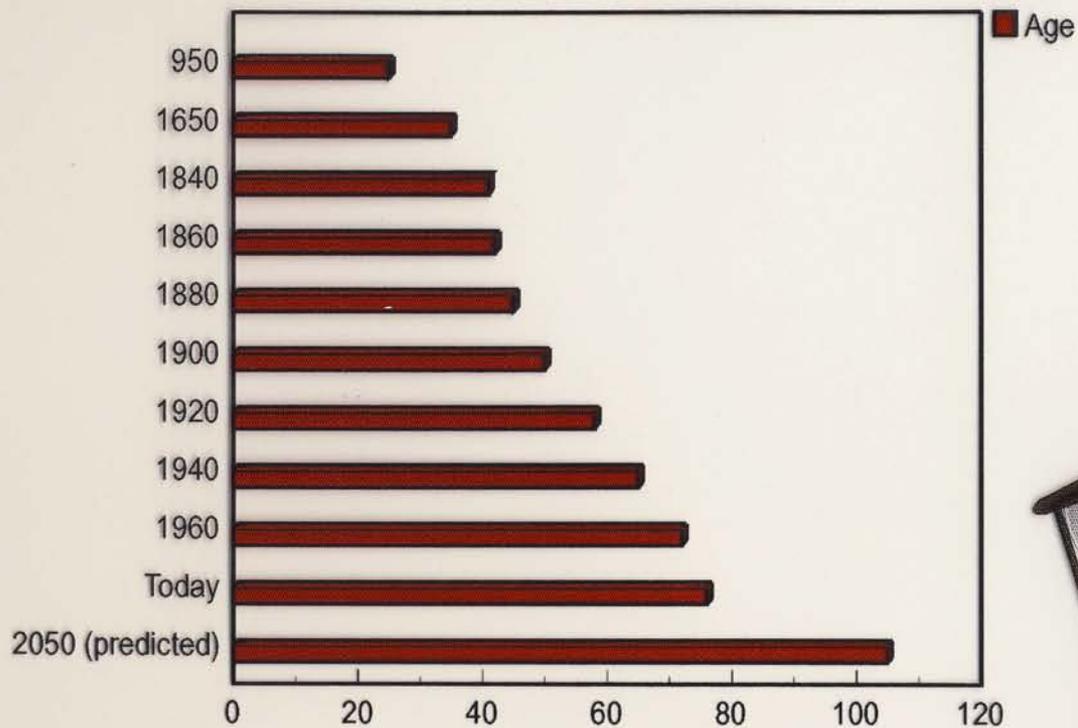
We are the healthiest we have ever been –  
increasing life expectancy

# Tanning Booths

- Teenagers call them “Fake and Bake”
- Increase melanoma incidences in women aged 20-40 by two (based on one visit per month)
- See dermatologist regularly if used



# Life Expectancy in Years



# ***Big Fear – Little Risk***

- Carcinogens and mutagens are everywhere
- Plants make them to ward off insects
- High dose – problems  
Low dose – no known problem
- Irradiation of food/canning of food



# Cleanup at Landfill

- HF spill
- Cleanup of contaminated soil
- To what level do you clean?



# Cleanup of Uranium Mill Tailings

- Radioactivity
- Grand Junction, Colorado
- Moab, Utah to begin



# Cleanup of Nuclear Facilities

- How clean is clean?
- No detectable activity
- Half life of contaminant
- Leave in place
- Remove to another site
- Public relations



# Perception

- Some hazards are perceptions by people
- Which is the most hazardous
  - Airline travel
  - Automobile travel
  - Train travel

# Fatalities for 2005

- 22 - Commercial aircraft
- 887 – Trains (includes crossings)
- 43,443 - Automobiles

# Fatalities per 100M miles

Type	fatalities	injuries	m/miles
Planes	2.7	1.6	8,166
Trains	18	993	90
Autos	14.7	941	2,989,807

Source: DOT Transportation Statistics

# Perspective

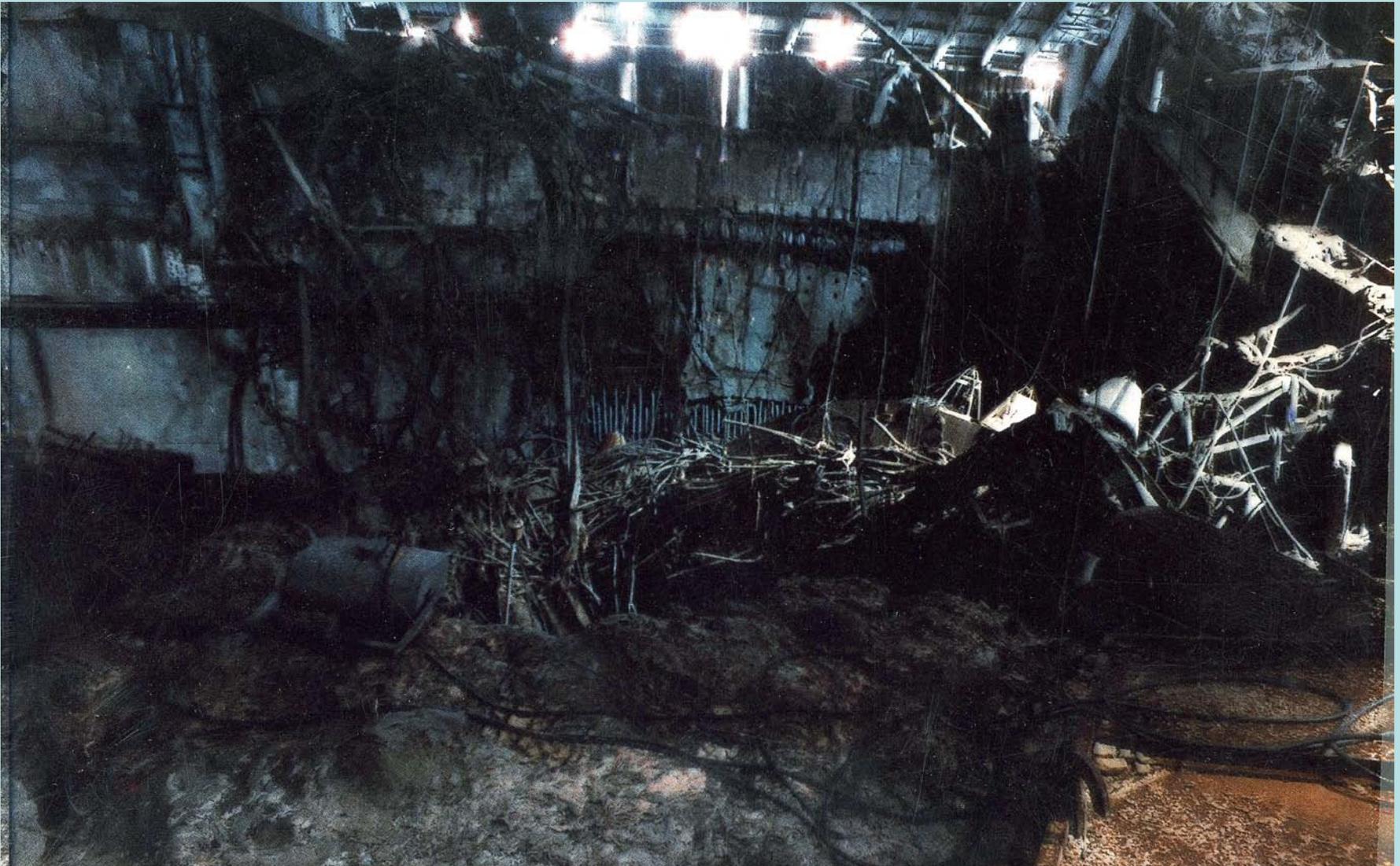
- Cars have 6.2 million accidents/year
- 2.7 million injured/year
- 4.3 million crashes with other cars/year



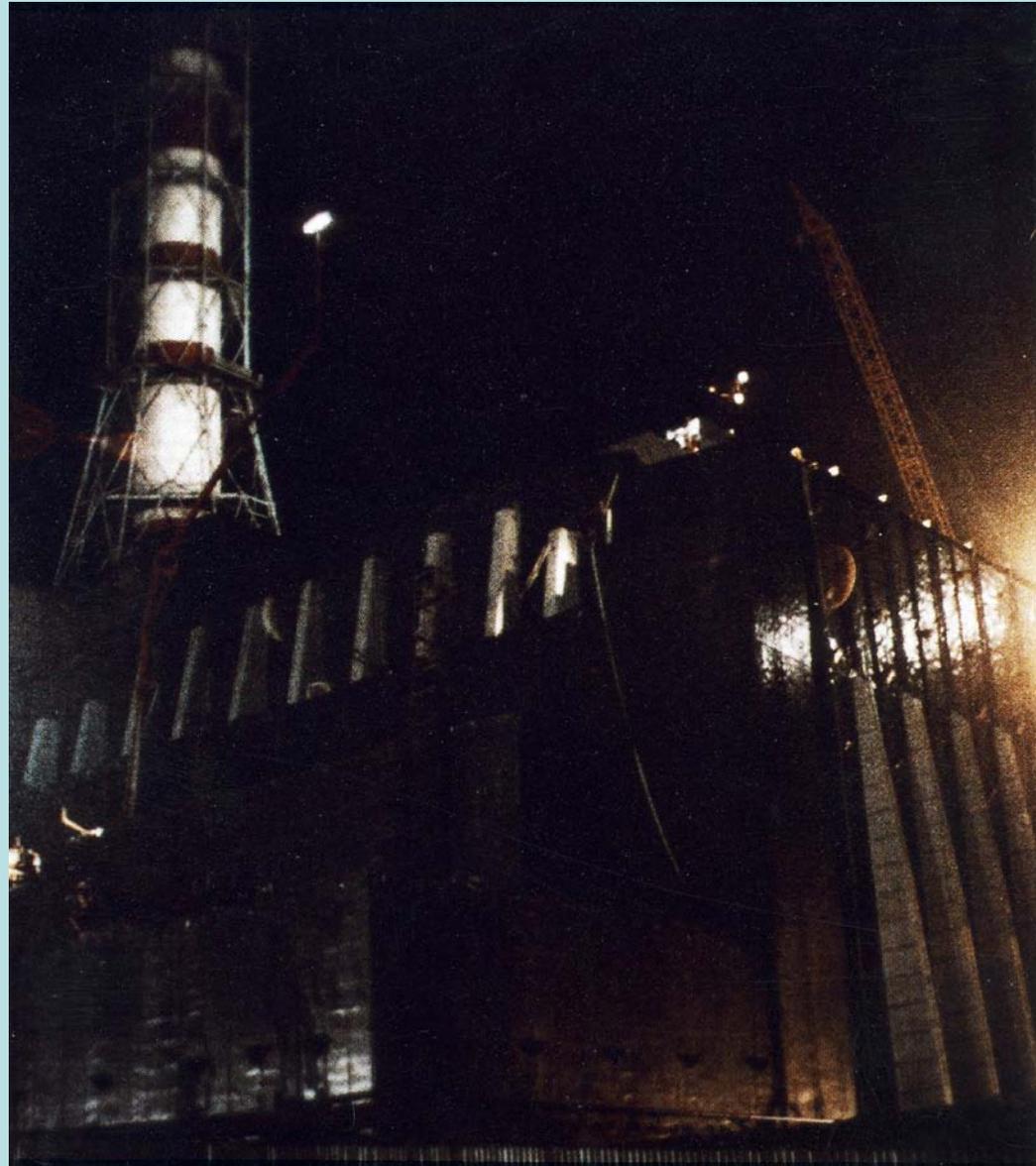
# Hazardous Activities/Technology

- Pick the top five – in order
  - Surgery
  - Motorcycles
  - Nuclear power
  - Mountain climbing
  - Alcoholic beverages
  - Police work
  - Large construction
  - Handguns
  - Food preservatives
  - Fire fighting
  - Swimming
  - Motor vehicles
  - Smoking
  - Railroads
  - School football
  - Pesticides
  - Hunting
  - Contraceptive use

# Chernobyl Reactor Accident



# Chernobyl Sarcophagus



# Chernobyl

- Worst reactor accident in history
- Radioactive material dispersed throughout the entire world
- 33 people died
- Many cases of thyroid cancer
  - Primarily children
  - Could have been prevented
  - Thyroid cancer is operable

# Child Safety Seats

- Millions \$ spent on compliance
- Police setup checks on installation
- Major news media coverage
- Many emails
- Warning labels

# Child Seat Fatalities

- Less than 10 nationwide

# Other Concerns

- E-coli
- Salmonella
- Lead paint
- Bird flu
- Taxes
- Guns in classrooms
- Transportation of hazardous materials
- Others