



Perspective Change of Historical Chemicals

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History...

- ▶ Doctors once recommended cigarettes.
- ▶ People drank radioactive water for health.
- ▶ Asbestos was called the miracle mineral.
- ▶ Lead was used in substitute for sugar.



Chemicals considered great

- ▶ Asbestos
- ▶ Lead
- ▶ Radioactive materials
- ▶ DDT
- ▶ PCB
- ▶ CFC
- ▶ PFAS
- ▶ Thalomid
- ▶ BPA
- ▶ Mercury



Asbestos

- ▶ Archaeological evidence 4500 BC in pottery. Concerns 1980s
- ▶ Miracle material
- ▶ Widely used in household and industries for insulation
 - ▶ Fireproof
 - ▶ Non-biodegradable
 - ▶ Chemically stable

- ▶ Long term effects
- ▶ Lung damage
- ▶ Mesothelioma



Asbestos Cigarette (1950s)



Lead

- ▶ Archaeological evidence 6500 BC. Concern 1970s
- ▶ Gasoline additive and paint
- ▶ Cosmetics
- ▶ Sugar substitute
- ▶ Ancient Romans used lead compound was used as a sweetener of wine
 - ▶ Boiled grape juice in leaded vessels
 - ▶ Toxins leached into wine
- ▶ Hormonal issues
- ▶ Lead poisoning



Radioactive materials

Uranium glass

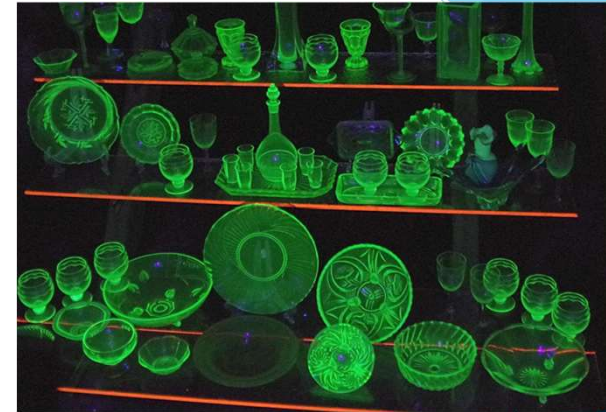
Considered healthy and fashionable

Radium Watches (Book 'The Radium Girls')

Radium Enamel on to paint on outside oil and gas stoves

Thorium in toothpaste

“Radiation increases defenses of teeth and gums. The cells are loaded with new life energy, the bacteria are hindered in their destroying effect”



DDT (Dichlorodiphenyltrichloroethane)

- ▶ First used in 1939 as insecticide. Concerns 1972
- ▶ WHO 1950s and 1960s malaria campaign used DDT
- ▶ Used as insecticide in crops

- ▶ Bioaccumulation/Biomagnification
 - ▶ Small organism -> Fish -> Bird -> Humans
- ▶ Nervous system and liver issues in animals
- ▶ Eggshell thinning



PCB (Polychlorinated Biphenyls)

- ▶ Transformers and electrical equipment
- ▶ Caulking
- ▶ Fluorescent light ballasts
- ▶ Paint

- ▶ Manufactured in 1929. Found in lakes in 1966. Started bans 1977

- ▶ Bioaccumulate in food chains
- ▶ Can accumulate in body and remain for years
- ▶ Hormonal issues
- ▶ Carcinogen (Kidney and liver)



CFC

- ▶ Refrigerants (1930s)
- ▶ Aerosol sprays
- ▶ Global warming cause 1974. 1990 banning started.
- ▶ Damages ozone layer



PFAS

- ▶ Per- and polyfluoroalkyl substances (1938 discovered, 1998 concerns)
- ▶ Widely used in consumer products (Non-stick pans)
due to their ability to repel both grease and water
- ▶ Forever Chemical
- ▶ Immune dysfunction



Thalomid

- ▶ Used for treating leprosy during 1957
- ▶ 1961 removed from market
- ▶ When pregnant women used this drug - caused severe birth defects in children
- ▶ Changed the perspective of drug testing



BPA (Bisphenol A)

- ▶ First 1891. Concern in 2010s
- ▶ Can leach into food products when heated
- ▶ Plastics
- ▶ BPA free labels

- ▶ Can cause hormone related defects



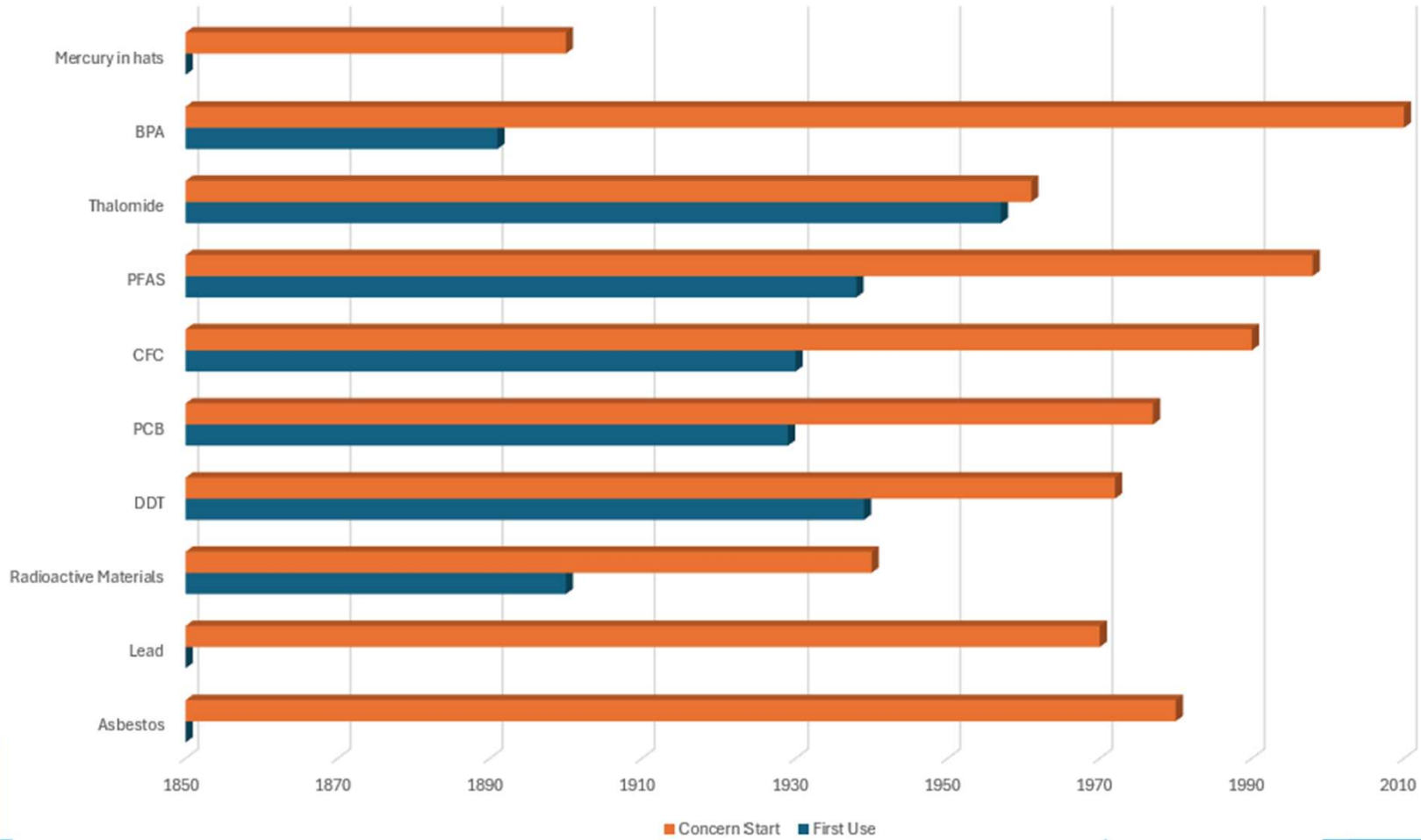
Mercury in Hats

- ▶ 1600s used. 1900s concerns.
 - ▶ Used for softening animal furs to make hat
 - ▶ Limited to factory workers due to dosage and exposure
-
- ▶ Mad Hatters Disease
 - ▶ Hallucination, insomnia



Graph

Latency Period of Previously Considered Safe Chemicals



Factors

- ▶ Persistence
 - ▶ Bioaccumulation
 - ▶ Latency period
 - ▶ Endocrine activity
 - ▶ Disposal
-
- ▶ Millions exposed before data mature
 - ▶ Diseases appear years later



Why this happens?

- ▶ Short time benefits are obvious
- ▶ Long term negative effects data/results take time
- ▶ Decades later
 - ▶ Environmental persistence found
 - ▶ Chronic toxicity



Current Chemicals on Question

- ▶ Insulation - fine particles - inhalation affects?
- ▶ BPA alternatives (BPA Free label) BPS and BPF may have similar effects
- ▶ Cosmetics/Sunscreen use of nanoparticles - nanoscale materials data still developing

- ▶ Vaping chemicals - inhaling vaporized metal/chemicals initially appears harmless - data still developing

- ▶ Some Processed food preservatives/additives - may be carcinogenic

What can we do

- ▶ Excess of anything is bad
- ▶ Green/Positive marketing narrative?
 - ▶ Balancing benefits and risks - Trade-offs
 - ▶ *WE DON'T KNOW WHAT WE DON'T KNOW*
- ▶ Lifecycle analysis
- ▶ More data
- ▶ AI can help out processing vast data



References

- ▶ WHO. Lead Poisoning and Health.
- ▶ EPA. Asbestos.
- ▶ CDC/NIOSH.
- ▶ EPA. PFAS Explained.
- ▶ <https://www.asbestos.com/products/insulation/>
- ▶ <https://www.britannica.com/science/mesothelioma>
- ▶ <https://www.asbestos.com/products/cigarette-filters/>
- ▶ <https://www.bbc.co.uk/news/health-44208504>
- ▶ <https://www.wineenthusiast.com/culture/wine/lead-toxicity-wine-history/>
- ▶ <https://www.decorativecollective.com/blog/a-beginners-guide-to-uranium-glass>
- ▶ <https://www.orau.org/health-physics-museum/collection/brands/radium-enamel.html>
- ▶ <https://www.charmingmilesdentist.com/wait-radioactive-toothpaste-was-a-thing>

References (Contd.)

- ▶ <https://www.canada.ca/en/health-canada/services/healthy-living/your-health/environment/pcbs.html>
- ▶ <https://www.eti-swiss.com/en/pollutants/pcb/>
- ▶ <https://www.cantechletter.com/2013/05/waterloostudycfcs0530/>
- ▶ https://en.wikipedia.org/wiki/Timeline_of_events_related_to_per-_and_polyfluoroalkyl_substances
- ▶ <https://www.aboutlawsuits.com/teflon-coated-pans-pfas-study/>
- ▶ <https://pubmed.ncbi.nlm.nih.gov/21507989/>
- ▶ <https://en.wikipedia.org/wiki/Thalidomide>
- ▶ <https://www.niehs.nih.gov/health/topics/agents/sya-bpa>
- ▶ <https://unsplash.com/s/photos/time>

Questions?

