Lead Poisoning

- When did it start?
  - Tetraethyllead as a fuel additive (mimics calcium in our body as there is no efficient way to get rid of it)

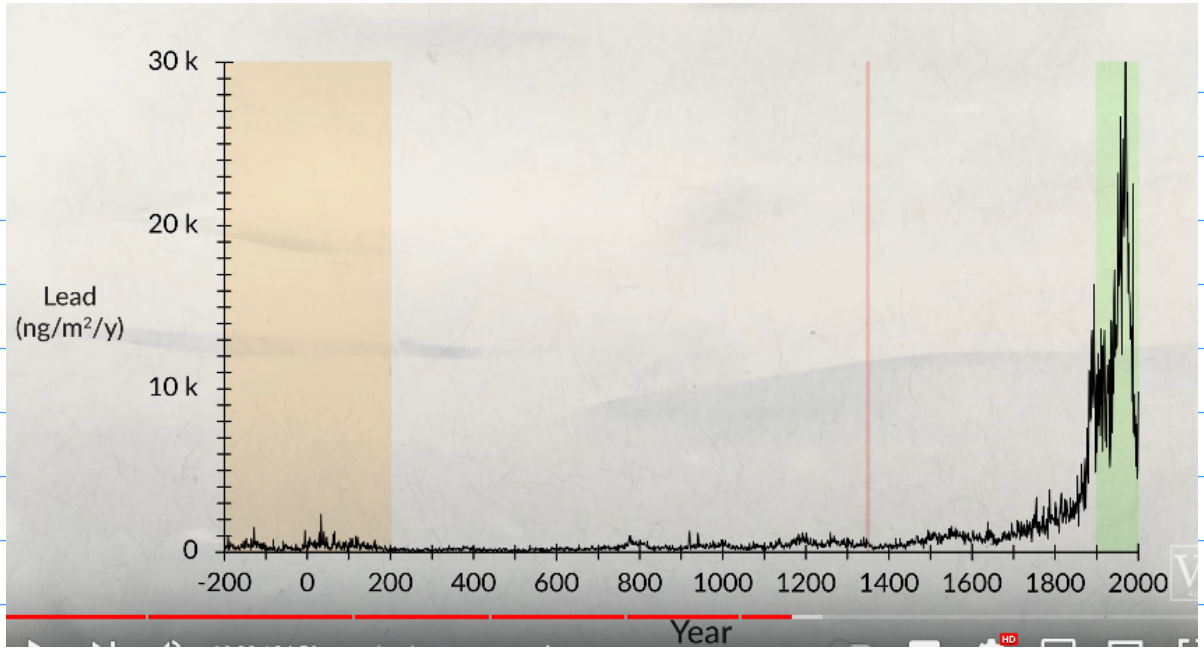
And like calcium lead can be stored in bones for years, meaning it can continue to poison the body long after the initial exposure.

Organ most sensitive to lead? The Brain.

That's why
common symptoms of lead poisoning are headaches, memory loss and tingling in the hands and feet. And children are particularly susceptible, lead exposure can cause permanent learning disorders and behavioral problems

Clair Patterson

He began by measuring lead in the oceans. If it were natural, he expected the concentration of lead to be the same regardless of depth. But if lead pollution had increased recently, it would be more concentrated near the surface. He took samples in the Pacific and Atlantic Oceans down to a depth of four kilometers. And sure enough, lead concentrations were nearly 10 times higher near the surface. Lead pollution was clearly recent, but when exactly had it occurred?
To find out Patterson had to go to Greenland and Antarctica. Ice cores record the level of lead in the air going back 1000s of years, the levels of lead in the atmosphere have been elevated for the last 4500 years. All of it is due to human activity mainly smelting ores to make metal.



You can see the rise and fall of the Greek and Roman Empires. The dip caused by the Black Death in the 1300s. And of course, the spike in the 20th century due to industrialization and Tetraethyl lead.

So what did this do to people? Well, Patterson looked at the lead levels in the teeth and bones of recently deceased Americans. And for comparison, he measured the lead in bones and teeth of Peruvian and Egyptian mummies. Since they lived over 1600 years ago, they would have been exposed to much less lead in their lifetimes. He expected to find modern Americans had about 100 times as much lead in their bones. But results showed it was closer to a factor of 1,000. 20th century Americans had 1000 times more lead in

their bones than their ancestors.

Studies of baby teeth revealed that even Lead exposure well below the level considered safe resulted in delayed learning, decreased IQ and increased behavioral problems. A follow up study showed that those with higher levels of lead in their baby teeth were many times more likely to fail out of high school. As a result of studies like these, the CDC's guidelines for the acceptable level of lead in children's blood dropped from 60 micrograms per deciliter down to 3.5. And as far as we

know, today, there is no safe level of lead.

Globally, lead
is believed to be responsible for nearly two thirds of all
unexplained intellectual disability. According to a
study published in 2022, more than half of the current
US population, that's 170 million people were exposed to
high levels of lead in early childhood. Those born between
1951 and 1980, are disproportionately affected.
The author's estimate that in aggregate lead caused a loss
of more than 800 million IQ points. The world is less
intelligent today because of leaded gasoline. But there are
even more troubling correlations. The US saw a
steady rise in crime from the 1970s to the 1990s, then it

abruptly declined. This graph looks eerily similar to a plot
of preschool blood lead levels just offset by 20 years. The

obvious question is did kids who were exposed to higher
levels of lead grow up to commit more crimes than they
otherwise would have? You might think this is just a
spurious correlation. But the same pattern appears in many
countries, including Britain, Canada, and Australia. And we
know there's a causal connection between lead
exposure and antisocial or violent behavior. A study of
340 Teenagers found that those who were arrested were four
times as likely to have elevated lead in their bones
than similar demographic controls who didn't have run
ins with the law. Now, this doesn't mean that lead is
responsible for all of the increase in crime, but it's
very likely responsible for some of it.
Now, it's tough to estimate the precise death toll of
lead. One of its lesser known effects is a hardening of the
arteries, leading to increased cardiovascular disease. A
study from 2018 found lead was likely responsible for 250,000

heart disease deaths per year in the US, assuming a constant
rate over the past century, that amounts to 25 million
deaths in the US alone. Globally, the figure may
approach 100 million. Most of those deaths are due to
Midgley's decision to put lead in gasoline, as substance he
knew firsthand was toxic, but he did it anyway to maximize
profits. And the problem is not over. Current estimates of
deaths caused by lead range from 500 to 900 thousand per
year. The 2020 UNICEF report warns that one in three
children globally, that's over 800 million children have
blood lead levels at or above five micrograms per deciliter.

The UN

calculates that the elimination of lead from gas saves over a million lives per year, and $2.45 trillion

dollars.
But leaded gas is still used, by the way in piston driven airplane engines. That's now the largest source of lead emissions into the air in the US.

So, Lead Poisoning effects:

- Our brain (especially children)
  - ↳ affects their mental and physical development
  - ↳ makes them more violent and dumb