LEAD Poisoning

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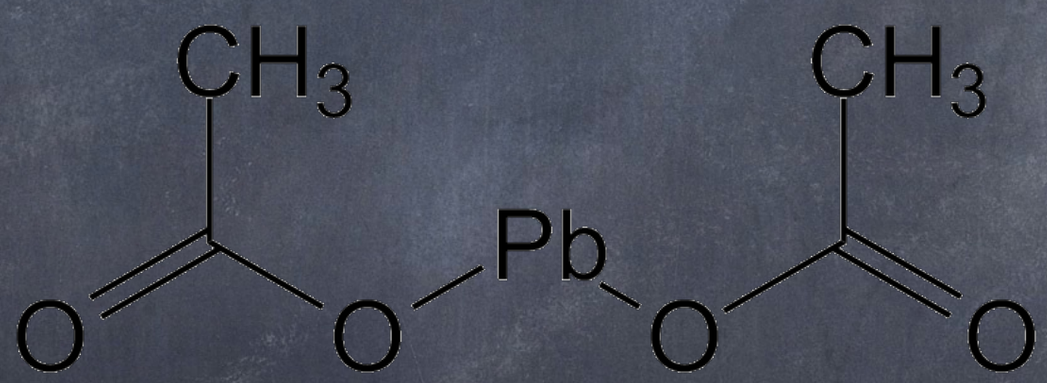
Chemical Structure

- Lead is classified as a post-transition metal and is also a member of the carbon group
- post-transition metals are the metallic elements in the periodic table located between the transition metals (Gold, Silver, Platinum...) and the metalloids (Boron, Silicon, Germanium...)
- Atomic Number: 82
- Atomic Mass: 207.2 amu (heavy metal)

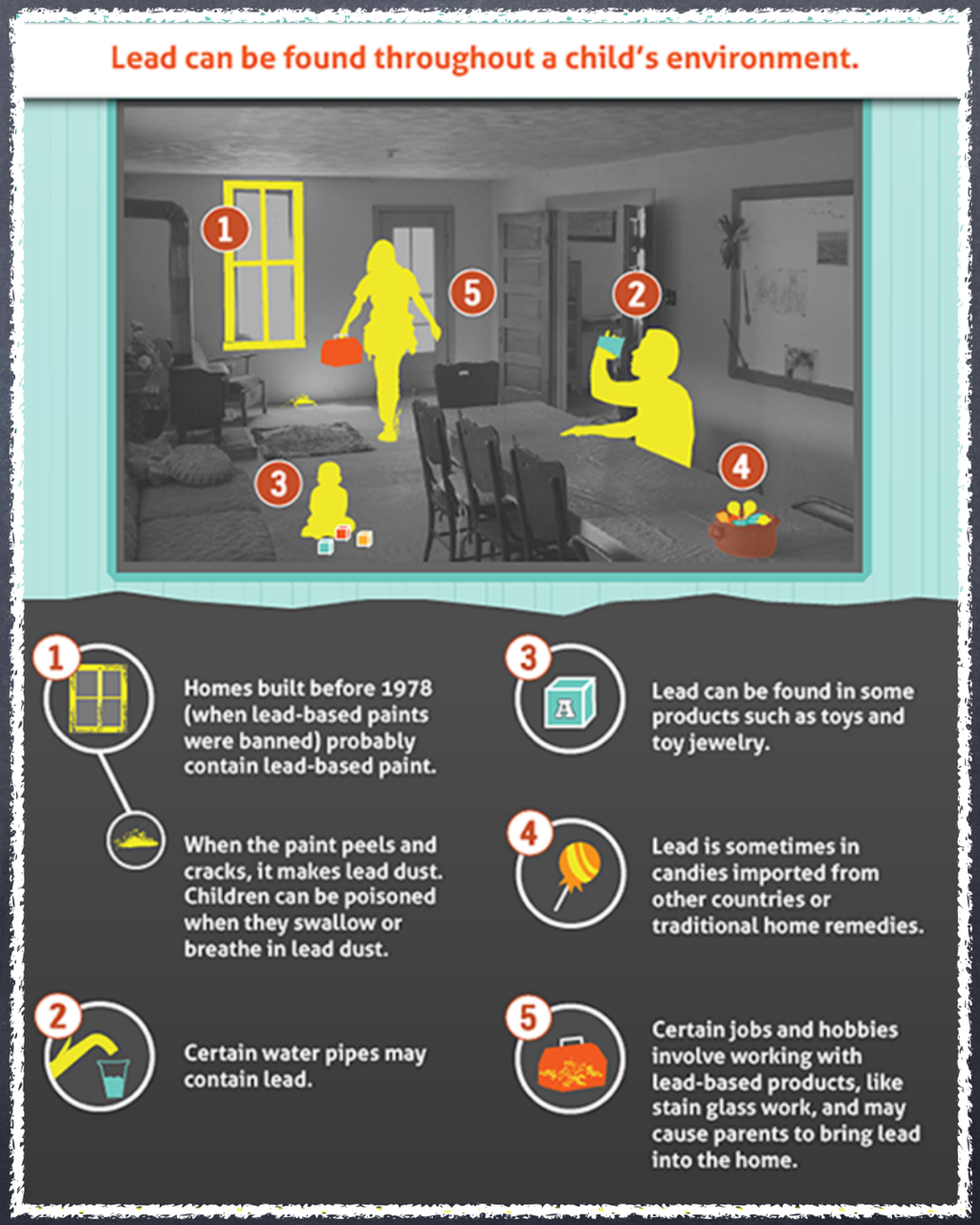


LEAD POISONING

What are the potential affect of daily lead exposure in every day products?

Where is Lead Found?

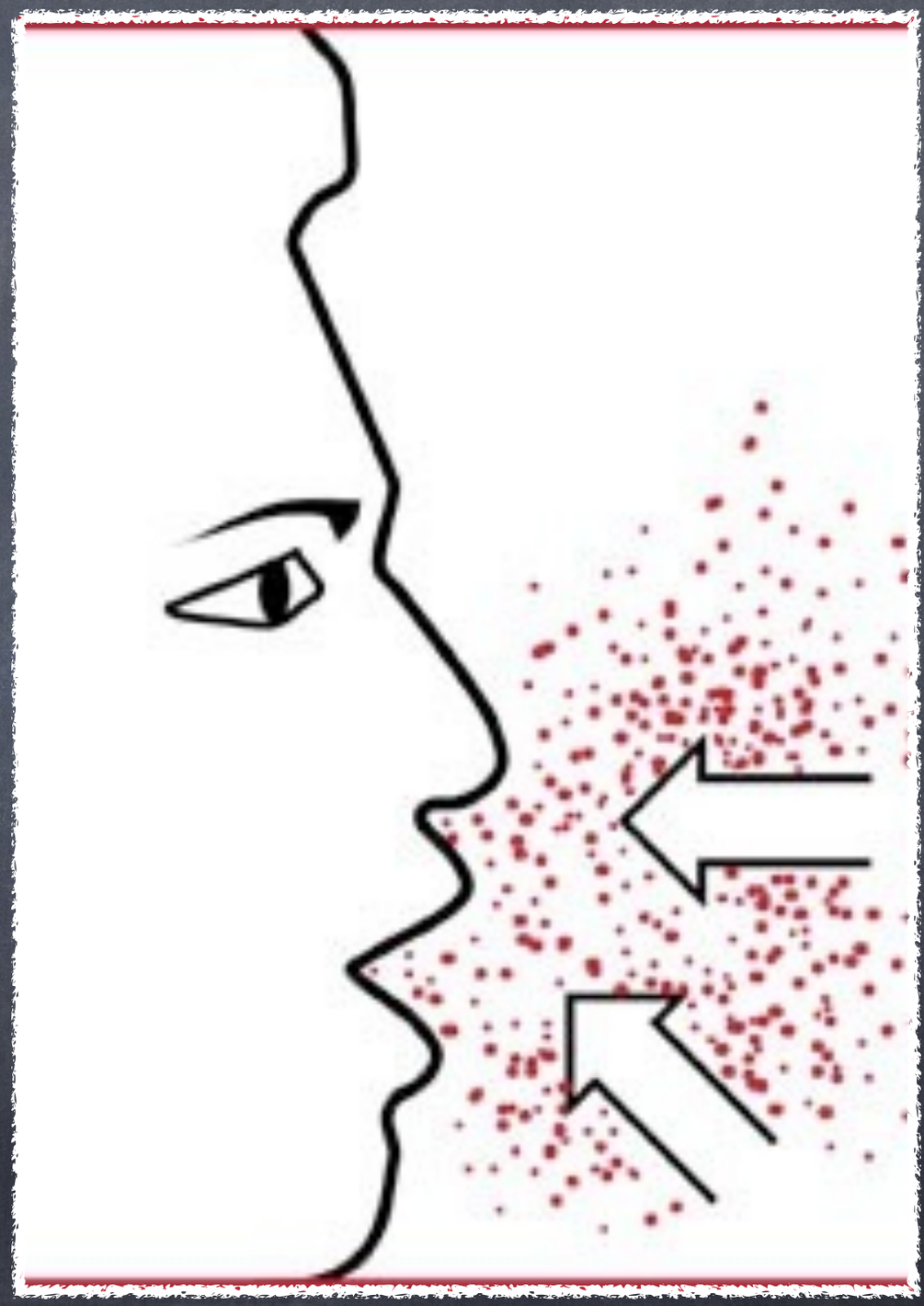
- Air, soil, water
- Older paint (1978)
- pipes and plumbing material
- toys and toy jewelry
- batteries
- cosmetics
- Ceramics



http://www2.epa.gov/lead/learn-about-lead#found

How are individuals exposed to Lead?

Inhalation or Ingestion



https://www.health.ny.gov/publications/2584/
http://www2.epa.gov/lead/learn-about-lead#exposure

Mechanism of action & Target of injury

- Exposure can occur through inhalation, ingestion and dermal contact. Most exposure occurs through ingestion or inhalation

Lead inhibits processes essential to blood production

Lead is a highly poisonous metal (regardless if inhaled or swallowed), affecting almost every organ and system in the body. The main target for lead toxicity is the nervous system, both in adults and children.

- It is rapidly absorbed into the bloodstream and is believed to have adverse effects on the central nervous system, the cardiovascular system, kidneys, and the immune system.

Dose Response for Toxic Action

- The component limit of lead (1.0 μg/g)

benchmark for pharmaceuticals, representing the maximum daily intake an individual should have.

5 micrograms per deciliter (μg/dL), the reference level at which the CDC recommends public health actions be initiated

How is Lead Metabolized and eliminated from the body?

Lead Body Burden:
94% Adults
73% Children

Ingestion and or Inhalation

Half life of 28 to 36 days

Bone & Teeth

Blood

Soft Tissues

Eliminated

accumulates over a lifetime

Half life of 30 to 60 days

Urine & feces

http://www.atsdr.cdc.gov/csem/csem.asp?csem=7&po=9
http://www.cdc.gov/biomonitoring/Lead_BiomonitoringSummary.html

http://www.clinchem.org/content/46/8/1171.full

Risk of Exposure & Prevalence

Lead-based paint and lead-contaminated dust in older buildings are the most common sources of lead poisoning. Other sources include contaminated air, water and soil. Adults who work with batteries, do home renovations or work in auto repair shops

Approximately 9% of children aged 1-5 years have blood levels higher than 10 µg/dL

16.4% of children living in cities with more than 1 million people and in homes built before 1946 have elevated lead levels.

According to a report from the CDC's Adult Blood Lead Epidemiology and Surveillance (ABLES) program, the incidence of BLLs of 25 µg/dL or higher in adults (persons aged 16 years or older) declined nationally from 14.0/100,000 in 1994 to 6.4/100,000 in 2011

Components of care management that will eliminate or reduce the risk of adverse events from the exposure to lead

- Discover and have patient remove source of contamination
- Educate patients about exposure and potential health effects
- Refer to medical for blood work
- neurological and psychological test to determine any effects of exposure
- Medical chelation or EDTA therapy as needed
- Recommendation of Healthy nutrient Rich foods especially calcium rich foods to prevent subsequent bone lead release.
- Prevention: Wash hands and toys, dust home often, have door mats outside and take shoes off inside, be aware of older plumbing and older paint in or around home, read labels - imported candies and products can contain lead,

http://www.atsdr.cdc.gov/csem/csem.asp?csem=7&po=12
http://www.mayoclinic.org/diseases-conditions/lead-poisoning/basics/treatment/con-20035487

Resources

http://www2.epa.gov/lead/learn-about-lead#found

http://www2.epa.gov/lead/learn-about-lead#exposure

https://www.health.ny.gov/publications/2584/

http://www.atsdr.cdc.gov/csem/csem.asp?csem=7&po=9

http://www.clinchem.org/content/46/8/1171.full

http://www.mayoclinic.org/diseases-conditions/lead-poisoning/basics/treatment/con-20035487

http://pubchem.ncbi.nlm.nih.gov/summary/summary.cgi?cid=9317#itabs-2d

http://www.niehs.nih.gov/health/topics/agents/lead/

http://www.cdc.gov/nceh/lead/default.htm

http://www.cdc.gov/mmwr/preview/mmwrhtml/su6104a1.htm?s_cid=su6104a1_w

http://www.cdc.gov/biomonitoring/Lead_BiomonitoringSummary.html

Resources

"Lead Acetate." - PubChem. N.p., n.d. Web. 29 Aug. 2014. <http://pubchem.ncbi.nlm.nih.gov/summary/summary.cgi?cid=9317#x395>.

"Chemical Elements.com - Lead (Pb)." Chemical Elements.com - Lead (Pb). N.p., n.d. Web. 29 Aug. 2014. <http://www.chemicalelements.com/elements/pb.html#isotopes>.

"Lead." ATSDR. N.p., n.d. Web. 29 Aug. 2014. <http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=22>.

Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, 19 June 2014. Web. 29 Aug. 2014. <http://www.cdc.gov/nceh/lead/>.

"Lead Poisoning." Definition. N.p., n.d. Web. 01 Sept. 2014. <http://www.mayoclinic.org/diseases-conditions/lead-poisoning/basics/definition/con-20035487>.

"Lead Toxicity ." Lead Toxicity. N.p., n.d. Web. 01 Sept. 2014. <http://emedicine.medscape.com/article/1174752-overview#a0156>.