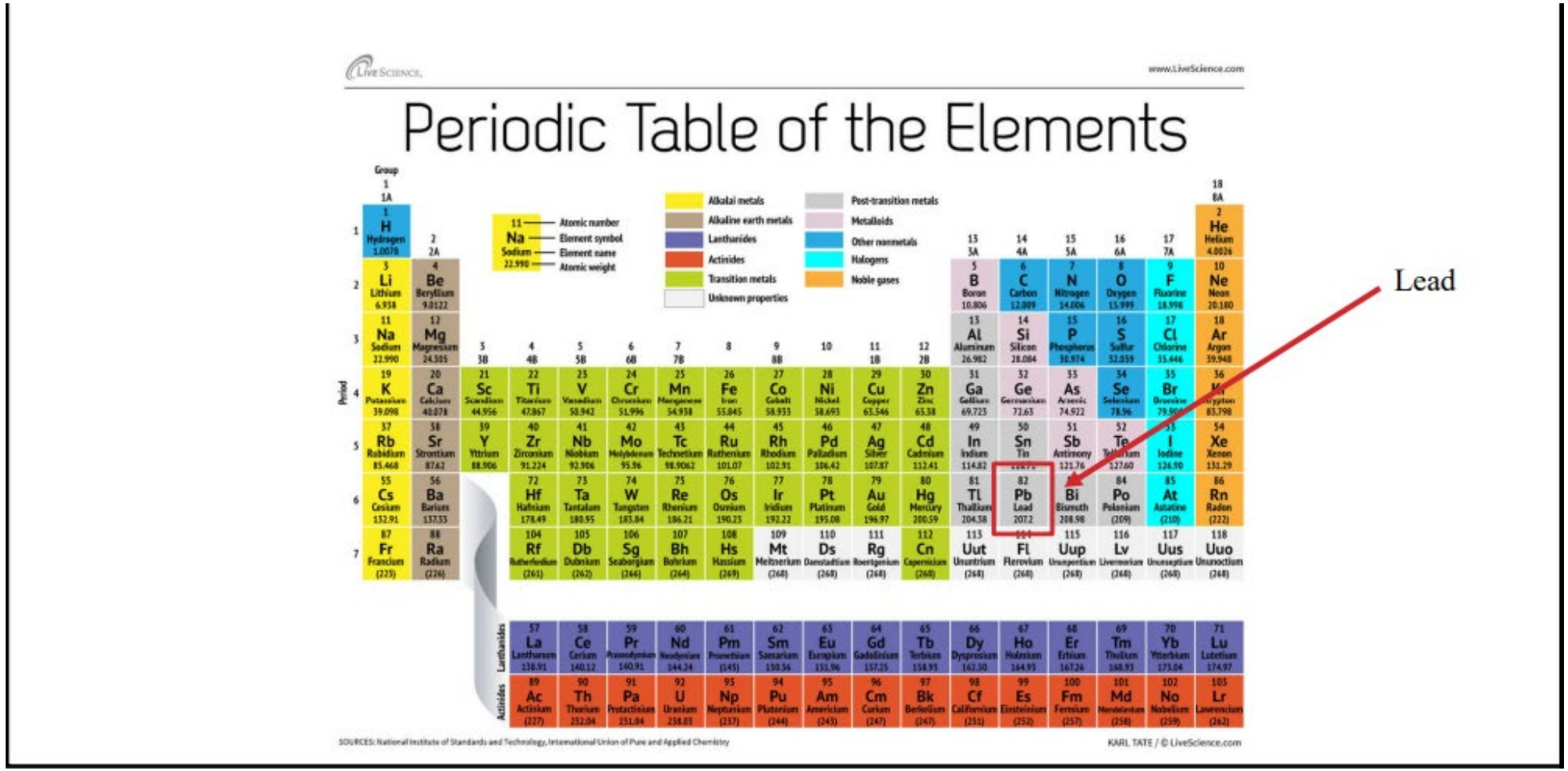


Lead Exposure

MPH 778

Old Dominion University

Brandon Clarida

What is Lead?

Properties

- Soft
- Highly Malleable
- Low melting point
- Resistant to corrosion
- Naturally occurring

Dangers of Exposure

Damage to brain and nervous system

Slowed growth and development

Learning and behavioral disorders

Hearing and speech disorders

Target Population- Children

Children are at high risk

Increase intake per body weight compared to adults

50% uptake compared to 10-15% in adults

Young children tend to put objects in their mouths

Children breath in lead dust crawling on the floor or soil

Sources of exposure

- Household exposure from deteriorating lead paint
- Homes built before 1986 more likely to have lead paint and pipes
- Soil contamination near lead mining operations
- Leaded gasoline (banned in 1978)

Geographical area affected

- Institute for Health Metrics and Evaluations (IHME) for 2019 estimated lead exposure accounts for 900,000 deaths worldwide.
- The burden of disease is higher in low- and middle-income countries.
- In the U.S. 535,000 children ages 1-5 have blood lead levels high enough to cause health deterioration.
- Homes built before 1978 have a higher risk of containing lead pipes and paint that has deteriorated and become inhalable dust particles.

Sustainable Development Goals

The WHO has classified lead as one of ten chemicals in public health needing action to protect the health of workers, children, and pregnant women.

Public health authorities and health professionals utilize evidence based guidance to protect the health of children and adults from lead exposure.

The WHO joined the United Nations Environment Programme to form the Global Alliance to Eliminate Lead Paint.

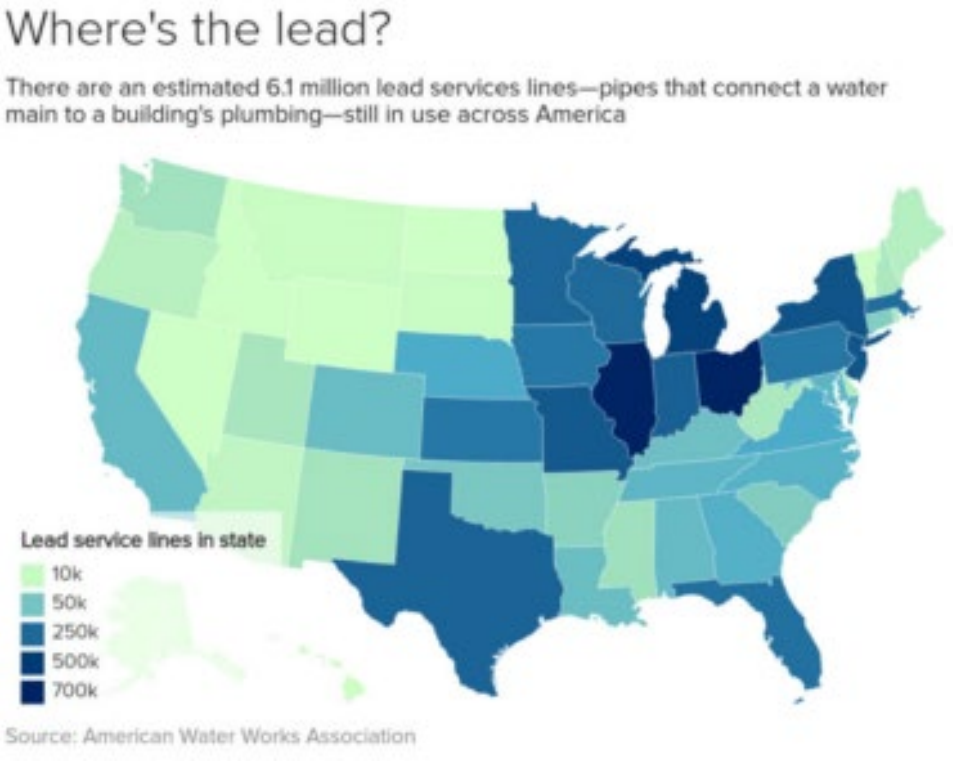
The WHO partnered with projects funded by the Global Environment Facility to support 40 countries in enacting lead paint controls.

Improving the Environment and Reducing the Burden

- The most important step in reducing the burden of disease is prevention of exposure to lead in the first place
- Education and familiarizing individuals with practical preventative measures
- Educating homeowners about possible lead sources in the home
- Consulting a physician if children are suspected of being exposed to lead
- Use of appropriate personal protective equipment when working in suspected areas with possible lead contamination

Historical and Current Efforts

- Historical Changes
  - The federal government banned use of lead in paint in 1978
  - Leaded gasoline was official phased out of use in 1986
- Current Concerns
  - Lead in drinking water becoming a concern example Flint, Michigan in 2014
  - U.S. Government in response has allocated 15 billion to remove and replace lead pipes around the country



Programs and Policies

The Clean Air Act regulates the release of lead into the atmosphere.

The Clean Water Act and Safe Water Act protects and regulates the use of lead pipes.

The Environmental Protection Agency (EPA) regulates and provides guidelines for the removal of residential and industrial sites.

The Occupational Safety and Health Administration establish standards and surveillance programs to prevent occupational exposure to lead sources.

Conclusion

- Educating parents on the dangers lead presents to children is especially important as understanding the most common and uncommon sources of lead exposure may be a surprise. Using a fear communication approach is not advisable as overall the effects will be short lived and stopping a practice will only cease for a brief time. Communication in an honest and clear fashion is the best approach to help parents gain a true understanding of keeping their children safe from sources of lead. Communicating the dangers of lead exposure to the homeowners needs to be done with the understanding that they may not have a high health literacy, meaning using scientific and confusing terms will only confuse and frustrate those being educated. Detailing the protective measures that can be done to prevent unnecessary exposure to lead, particularly for those of the community living in households at elevated risk of containing lead paint and those restoring historic homes are needed in the education design process. Communicating the information in an easily understood manner would yield the best retention of what was taught.

References

References

AN, I. (2014). An overview of qualitative research methodology for public health researchers. *International Journal of Medicine and Public Health*, 318-323.

Barbara Nussbaumer-Streit, V. M. (2020). Household intervention for secondary prevention of domestic lead exposure in children. *Cochrane Library*.

Centers for Disease Control and Prevention. (2012). *Infant Lead Poisoning Associated with Use of Tiro, an Eye Cosmetic from Nigeria - Boston, Massachusetts, 2011.* CDC.

Frumkin, H. (2016). *Environmental Health from Global to Local.* San Francisco: Jossey-Bass.

Kennedy, C. L. (2014). Primary prevention of lead poisoning in children: a cross-sectional study to evaluate state specific lead-based paint risk reduction laws in preventing lead poisoning in children. *Environmental health : a global access science source*, 93.

World Health Organization. (2021, October 11). *Lead Poisoning*. Retrieved from WHO: https://www.who.int/news-room/fact-sheets/detail/lead-poisoning-and-health