

Children near lead smelters exposed to lead in the womb

15 May 2019, by Jill Johnston



A worker recycling lead in a lead acid battery recovery facility. Credit: [National Institute for Occupational Safety and Health](#)

The environmental tragedy in Flint, Michigan, in which drinking water contaminated with lead raised fears of potential health effects for exposed children, revealed the [failure of a regulatory system](#) to protect residents from lead exposure.

Until 2015 the Exide Technologies [lead-acid battery smelter](#), in southeast Los Angeles County, California, recycled approximately [11 million lead acid batteries](#) per year while operating on temporary state permits. This [violated multiple federal environmental regulations](#) and exposed over 100,000 residents to lead and other toxic metals. The result was large-scale environmental disaster with [lead contamination](#) of the air and soil in largely Latino communities.

As an environmental scientist and epidemiologist, I sought to understand lead pollution in children growing up in this area. For my research I collaborated with local community organizations and relied on an archive of biological samples that families often save: [baby teeth](#).

Understanding lead exposure

Measuring historic [exposure](#) at toxic waste sites is often one of the most challenging aspects to understanding and anticipating future health impacts. Blood levels reflect exposure only from the past four weeks. But past exposure may be important indicators of harm.



A worker recycling lead in a lead acid battery recovery facility. Credit: [National Institute for Occupational Safety and Health](#)

Deciduous [teeth](#), or "baby teeth," incorporate minerals, including toxic metals, beginning in around the second trimester and continuing through early childhood. The formation of teeth occurs incrementally, like tree rings, so it is possible to reconstruct a child's exposure to lead while in the womb and during the first year of life.

An initiative called the [Truth Fairy Project](#) aimed to address this. Academics collaborated with the community living in southeast Los Angeles County to examine 50 shed deciduous teeth from 43 children living their entire lives within two miles of the Exide smelter.

[My team compared the levels of lead](#) in teeth to lead levels in the soil. We discovered a significant trend. The more lead in the soil in residential neighborhoods, the higher the levels in the teeth – both prenatally and during the first year of life.

We continue to collaborate with the community to work toward prevention of lead exposure and cleanup of the contaminated soil.

How are people exposed to lead?

- AIR:** Industrial emissions
- SOIL:** Contact with contaminated dirt or dust
- WATER:** Due to lead water pipes

How is health affected?

Children exposed to lead may have...

- Brain damage
- Decrease in IQ
- Stunted growth
- Problems with learning & behavior

As an adult, a child who is exposed to lead may also have...

- Headaches
- Memory loss
- High blood pressure
- Kidney disease
- Joint pain

Credit: [USC Environmental Health Centers](#), [CC BY-SA](#)

Lead is still a potent toxicant

Compelling [scientific evidence](#) concludes that there is [no safe threshold of childhood lead exposure](#).

Lead (Pb) is a toxic metal that can cause [damage to almost all organs and organ systems](#). [Cognitive deficits](#) and neurodevelopmental delays are associated with [even very low levels of Pb exposure](#).

Lead poisoning persists nationwide, with over [500,000 children still burdened by elevated blood lead levels](#) (>5 microgram per deciliter, ug/dL) as of 2016. [Outdated regulations for lead](#) have failed to protect children's health.

Who is most vulnerable?

People: Infants & kids, Pregnant women, Workers in lead industries

Communities: Low income people of color, Older homes with lead paint, Homes near lead industries

Understanding lead levels

- <80 ppm:** residential "safe" (State of CA)
- > 400 ppm:** priority clean-up
- > 1000 ppm:** immediate cleanup

Soil: ppm = parts per million

Teeth: can provide information on lead levels during pregnancy & early childhood

Blood: Elevated > 5 ug/dl

Exide battery recycling plant - lead smelter

- Released massive amounts of lead, arsenic and other toxins into the community
- Contaminated soil in schools, parks and homes
- A comprehensive clean-up of contaminated soil will prevent future lead exposure

7 million pounds of lead that residents have been exposed to over **30 years**

#NoMoPlomo

Credit: [USC Environmental Health Centers](#), [CC BY-SA](#)

Lead-acid battery smelters in the US

Despite marked reductions in the use of lead in gasoline additives, [ambient air emissions from lead-smelting](#) operations remain high in neighboring communities. The U.S. is second only to China as a producer of refined lead, producing about 11% of the world's refined lead [through recycling lead-acid batteries](#) at smelters. The tonnage of [lead-acid batteries](#) recycled in U.S. smelter facilities has more than doubled over the last 40 years, as the industry has rapidly consolidated production to a handful of facilities. Currently, [a few urban communities in the U.S.](#) bear the majority of pollution from recycling lead-acid batteries.

The Truth Fairy project provides further evidence that environmental injustice can be transmitted from mother to child via [lead pollution](#). This burden is [disproportionately borne by disadvantaged communities](#).

However, lead exposure in children is preventable.

The most effective way to prevent lead poisoning involves reducing exposure through the identification and control of lead sources in air, water, dust, soil and paint – before exposure occurs.

Today, however, agencies by and large focus on secondary prevention, [investigating causes of elevated blood lead levels](#) only after individuals have suffered exposure. This leaves major gaps in the US public health system for [lead exposure](#) prevention, particularly with respect to low-income and communities of color.

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APA citation: Children near lead smelters exposed to lead in the womb (2019, May 15) retrieved 30 September 2022 from <https://medicalxpress.com/news/2019-05-children-smelters-exposed-womb.html>

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