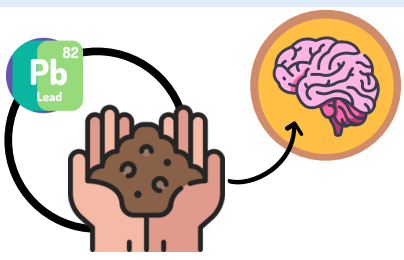
Testing Soil for Lead in Urban Agricultural and Residential Spaces

A HERCULES Pilot Project in collaboration with Historic Westside Gardens that measured soil lead levels and sources

Why does this matter?

Lead is harmful to human health, especially children's brain development.

Children from low-income families in urban areas are at higher risk of exposure to heavy metals.



One of the main ways people are exposed to lead is by swallowing or breathing in soil dust.

Other key exposures include paint, food, and water pipes.



Urban farming and gardening are important to improving access to healthy foods, and it is important to ensure the soil is healthy.

What did we want to know?

What are lead concentrations in urban agricultural and residential sites in Atlanta's Westside and in rural sites in Georgia?

What did we do?

In 2018 we partnered with Historic Westside Gardens (HWG), a nonprofit organization that promotes and supports home and community gardens on Atlanta's westside, to collect soil samples.

1. We collected soil samples from 19 sites in Atlanta's Westside and 3 comparison sites in rural Georgia.
2. While collecting soil samples, we identified and collected ***slag*** pieces found at two sites in the Westside.
3. We tested soil samples and slag pieces for arsenic, chromium, cadmium, and lead using ***XRF*** as per EPA methods

Slag is a by-product of iron smelting and has contaminated soil with heavy metals in some areas of Atlanta.

X-ray Fluorescence (***XRF***) uses x-rays to determine what metals are in the sample.

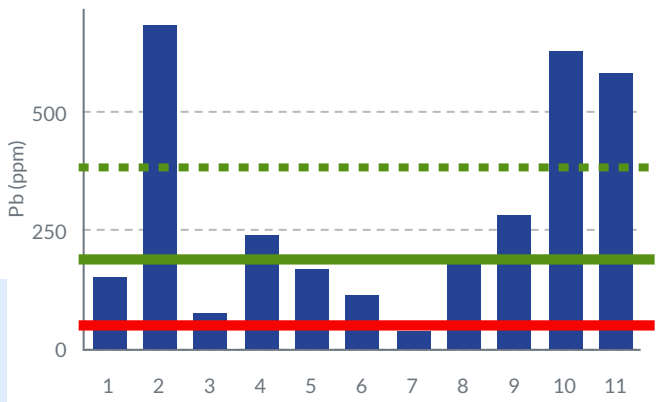
What did we find?

Lead Screening Levels:

Overall, there were lower lead concentrations in sites with crops compared to sites without crops, both had levels above the University of Georgia (UGA) LRL and below the Environmental Protection Agency (EPA) RSL. The 3 sites above EPA RSL were not growing crops. This was also true for sites containing slag.

- **UGA Low-risk levels (LRL)*** - guidelines to determine the lowest level at which chemical contamination at a site could be a risk to human health
- **EPA Regional screening levels (RSL)** - guidelines to determine if chemical contamination at a site could be a risk to human health.
- **Updated EPA RSL** - As of January 2024, the residential soil screening level for lead is now 200 mg/kg.

Lead Concentration of Urban Residential Sites



11 urban residential sites were analyzed:
10 of 11 were **above** the UGA LRL*
3 of 11 were **above** the EPA RSL
5 of 11 were **above** the 2024 EPA RSL

**UGA LRL at time of publication*

More →

Growing Practices and Lead in Sites with Crops:

There were **lower lead levels in raised and mound beds** compared to bare soil.

- Mound beds had overall lower lead concentrations than UGA LRLs.
- Raised beds* and bare soil were above the UGA LRL and below the EPA RSL.

Mound Beds: soil from another location added above the existing soil

Raised Beds: soil from another location added above the ground and contained in a structure

Bare soil: the existing soil in the ground

* This finding differs from previous studies and may be because raised beds were more likely to be close to homes that could be contaminated with lead paint.

What does this mean?

To prevent exposure to lead from soil:

Wash garden fruits and vegetables before eating.

Keep children out of contaminated soil.

Remove shoes before entering the house.

Wash hands after gardening or playing outside.

Key Takeaways

Slag in Atlanta's Westside significantly increased lead concentrations in residential soil.

Gardening or farming in mounds or raised beds may still be a safer way to grow your own food, but **testing is important.**

What's happened since?

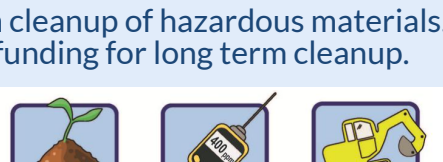
Due to this work, the EPA designated an area of Atlanta's Westside as a Superfund site.

A **Superfund site** is a location contaminated by hazardous waste that has been designated by the EPA for management and cleanup. It was placed on the National Priorities List in 2022.

The **National Priorities List** is a list of sites that require long term cleanup of hazardous materials. Being on the list means the Site is now eligible to receive federal funding for long term cleanup.

As of July 2024:

- 1,446 properties have been sampled
- Of those 600 require remediation (lead levels >400 ppm)
- Of those 296 have been completed



Additional Resources

Host a soilSHOP with the Saikawa Lab

Get more information about the Westside Lead Superfund Site from the EPA.

Explore ATSDR's Soil, Gardening, and your Health

Read about Soil Contaminants from the Soil Science Society of America (SSSA)

Concerned about your children's blood lead levels? Fulton County Lead Screening is conducting blood lead level testing to screen for lead exposure.

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Westside Lead Superfund Metrics graphic courtesy of the EPA

This infographic summarizes a community-engaged project by the Saikawa Lab and funded by the HERCULES Exposome Research Center:
Peters, S. J. W., Warner, S. M., Saikawa, E., Ryan, P. B., Panuwet, P., Barr, D. B., D'Souza, P. E., Frank, G., Hernandez, R., Alvarado, T., Hines, A., & Theal, C. (2023). Community-Engaged Assessment of Soil Lead Contamination in Atlanta Urban Growing Spaces. GeoHealth, 7(3), e2022GH000674. https://doi.org/10.1029/2022GH000674