

# Louisville Metro Council

Community Affairs, Health, Housing and Education  
Committee

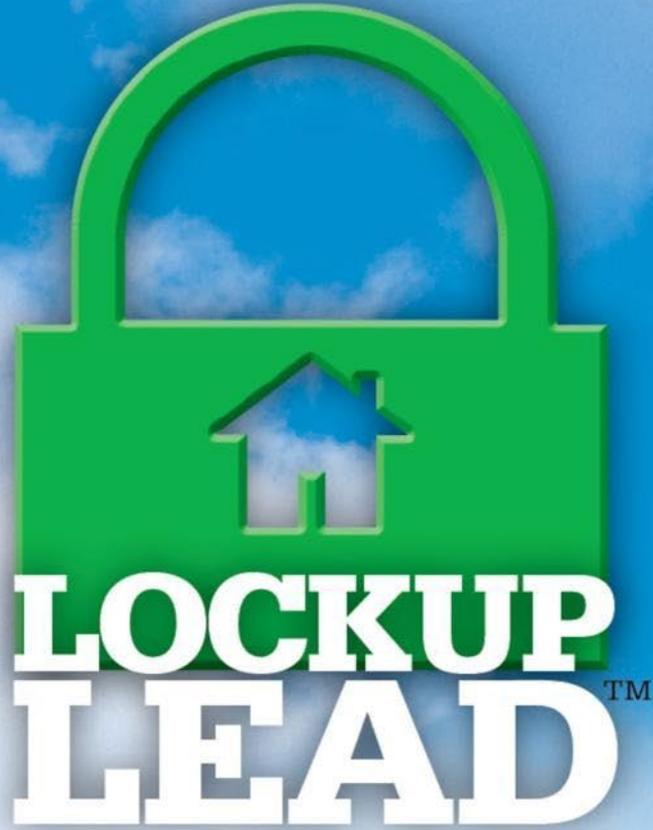
New Approaches and Tools to Protect Child Brain Health

John Cullen

*LockUpLead*

*6/15/22*









TRADE MARK  
REG. U. S.  
PAT. OFF.



*Dutch Boy*

**WHITE LEAD**

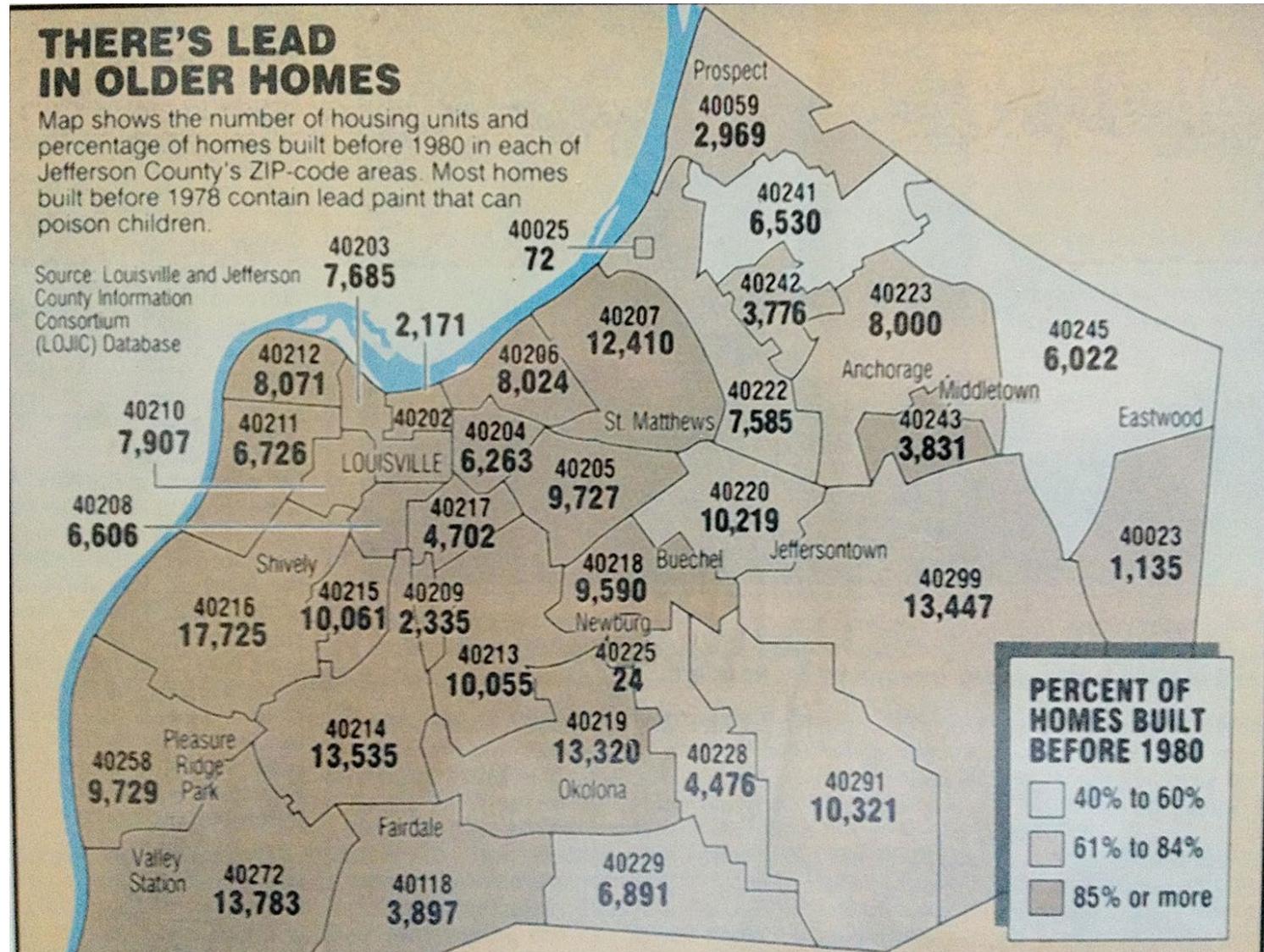
NET

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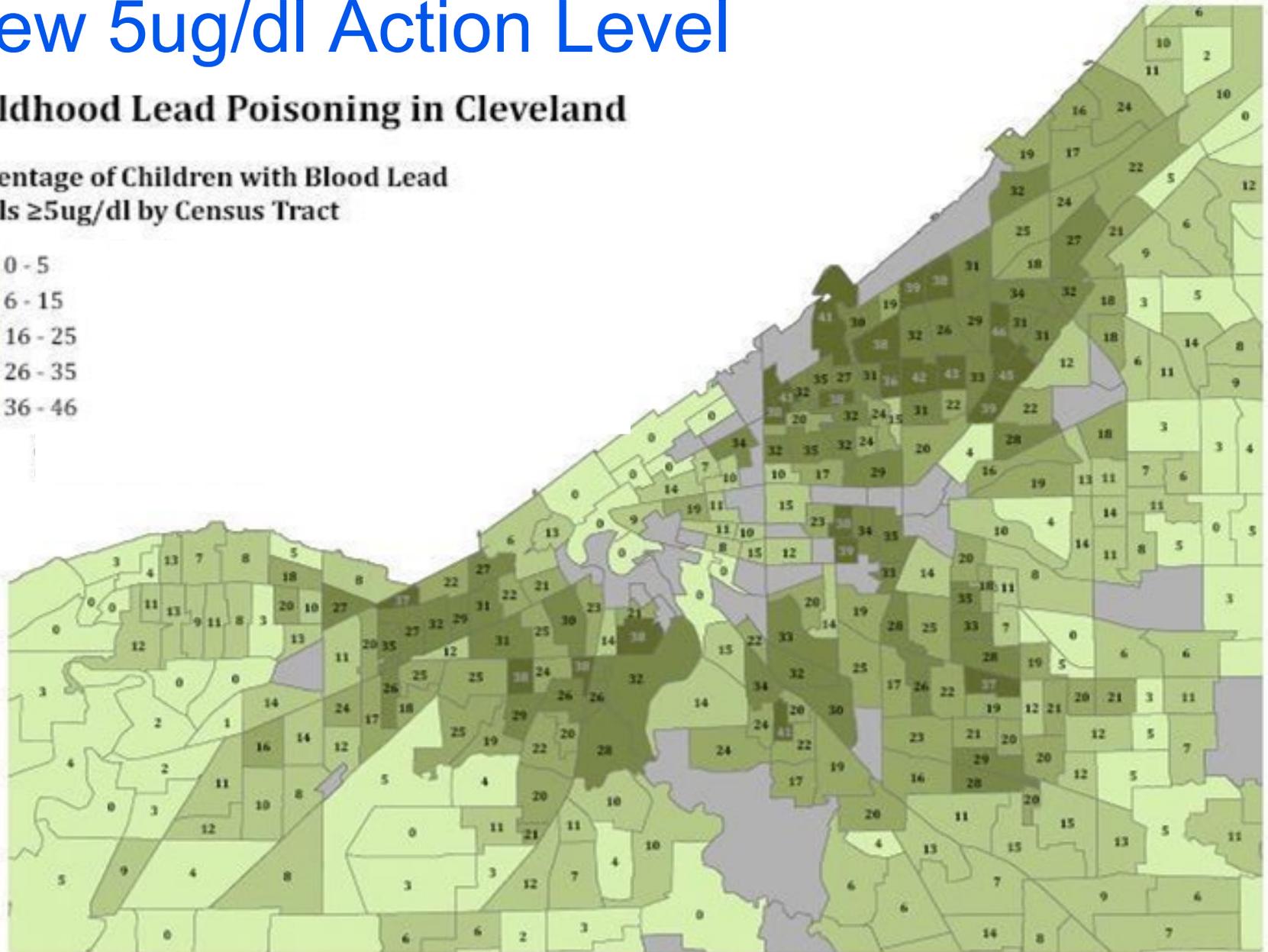
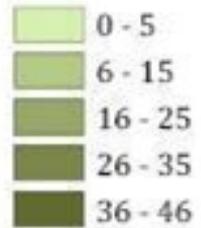
# Louisville



# New 5ug/dl Action Level

## Childhood Lead Poisoning in Cleveland

Percentage of Children with Blood Lead Levels  $\geq 5\mu\text{g}/\text{dl}$  by Census Tract



# Widespread Poisoning

Researchers connected the health records and the 2008-10 test scores of 21,281 students in grades 3, 5, and 8 in the Detroit school district. They found widespread lead poisoning in the district, including some schools where 54 percent of the population had elevated blood lead levels, said Randall E. Raymond, a geographic information specialist in the district's office of research, evaluation, assessment, and accountability.

**ED WEEK**

...has been making strides: He scored "proficient" on a recent test and moved into a more advanced classroom, his mother said.

...erton said, "but we keep moving forward."

...ad is in keeping with two not-yet-published pieces of research that highlight lead's negative effect on student performance, but also offer hope for remediation.

...tive trends in lead levels among poor and minority children in Chicago, North Carolina, Rhode Island, and Texas, among other places, but there is little research on how schools can help affected children.

**A Lead 'Epicenter'**

One of the new studies pulls together public health and education data to draw attention to the large numbers of Detroit children who have been exposed to lead.

"Detroit is one of the epicenters for lead in the country," said Jane L. Nickert, the director of the childhood-lead program in the city's department of health and wellness. "And educators don't know what they're dealing with because no one's told them."

Ms. Nickert was not part of the new study, which was conducted by researchers from her agency, the Detroit Public Schools, the University of South Florida in Tampa, the University of Michigan in Ann Arbor, and **HPRO**, a nonprofit health-care group.

It demonstrates a link between blood lead levels and lower performance on the Michigan Assessment of Educational Progress, or MAEP: **Students with an early-childhood blood lead level of 10 milligrams per deciliter of blood—about half of what Reginald's was at age 1—were more than twice as likely to score less than proficient on all three subjects in the state assessment than students with less than 1 milligram per deciliter, after controlling for factors like family income and maternal education.**

The research is being reviewed for publication by the *American Journal of Public Health*.

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**National Challenges**

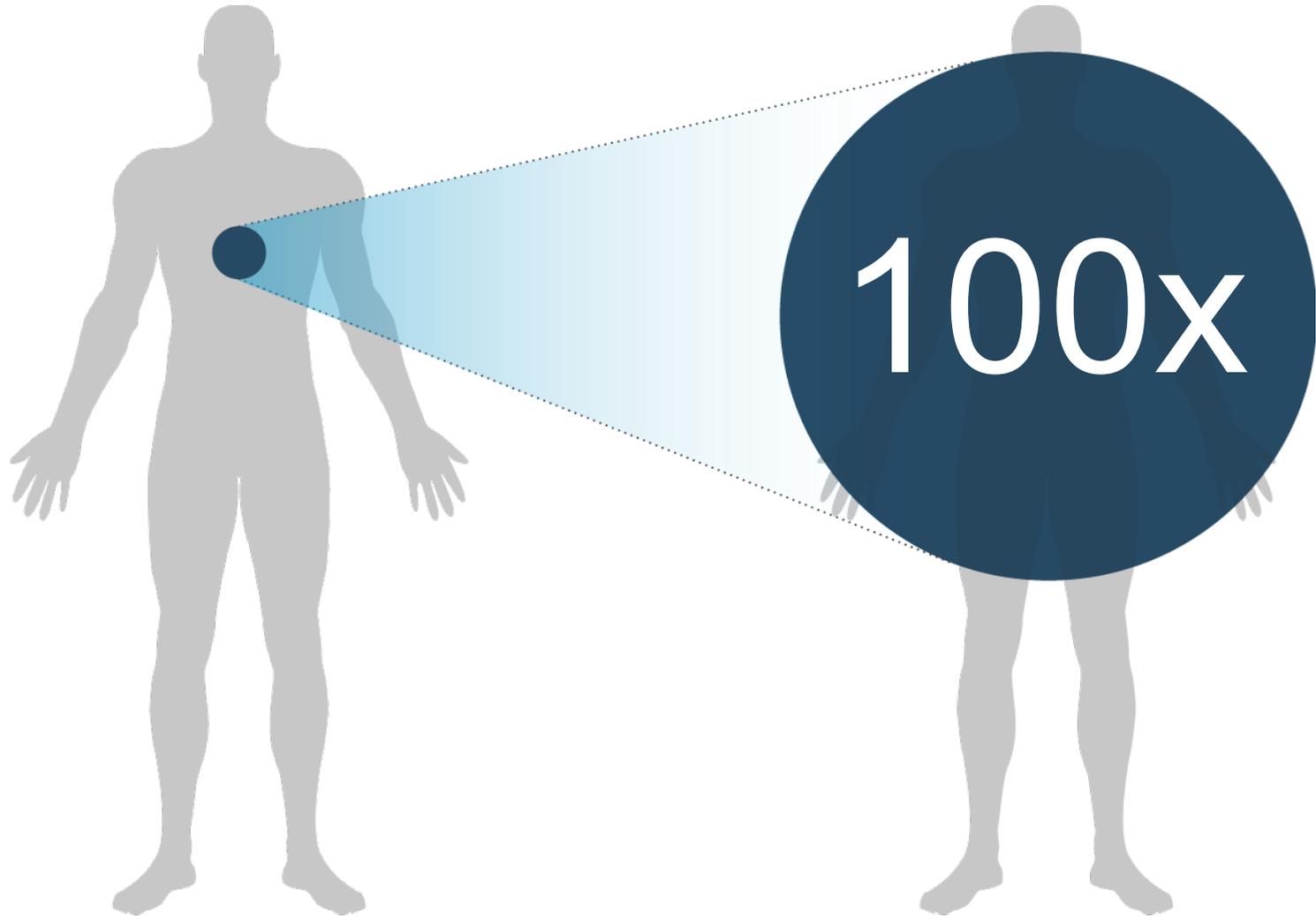
The Detroit research comes as advocates nationwide are calling for more awareness about recognizing and ameliorating lead's impact on students, and for an increase in funding from the Atlanta-based federal Centers for Disease Control and Prevention, which recently set a lower threshold for identifying children as lead-poisoned but cut funding for lead education and surveillance programs from \$29 million a year to \$2 million a year.

The CDC last spring lowered the level of lead considered dangerous from 10 milligrams of lead per deciliter of blood to 5, responding to years of research showing detrimental



Reginald Cureton, a Detroit 7th grader who was found to have high lead levels in his blood at age 1, closes the hatch on his family's car after school last fall at the Detroit Mount Academy. A new study links widespread lead poisoning in the district to lower achievement. —Brian Widens for Education Week

# Lead levels in the body 100 times higher



Natural average, prior to lead paint

Average levels today

# Paradigm Shift (tech & reg)



**Abatement**

VS

**Safe Lead Practices**





Traditional solutions



Traditional solutions



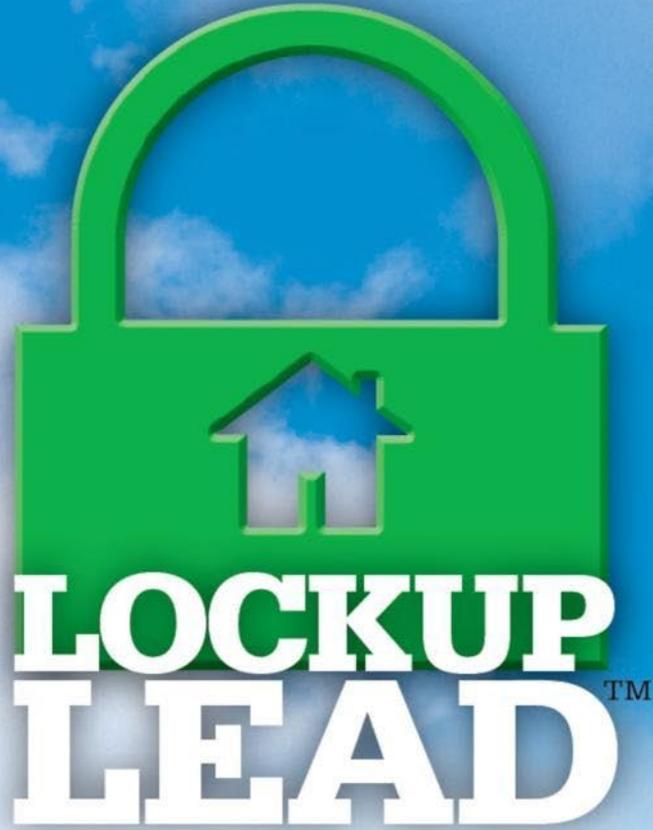
Traditional solutions

# LockUpLead solution



# LockUpLead solution





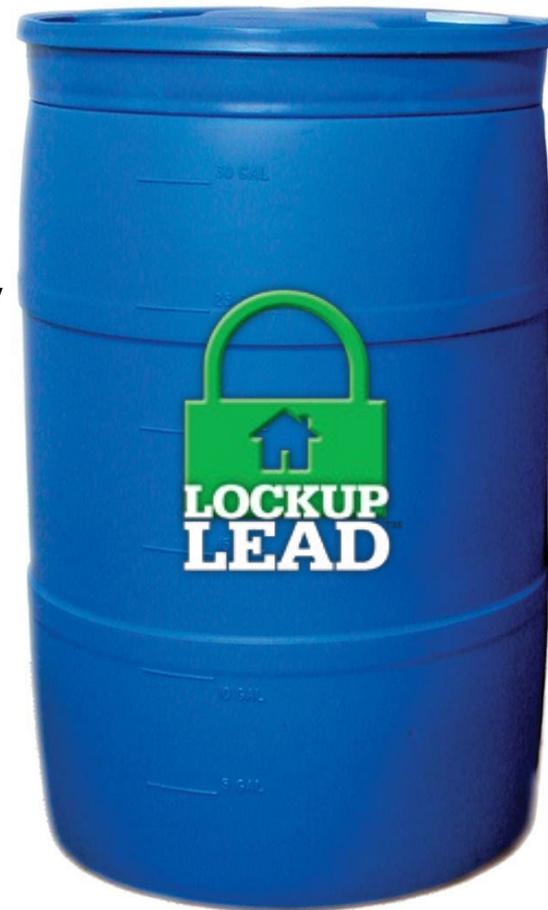


- **Technology neutralizes toxic lead compounds upon contact. Products for cleaning, painting, soil, testing.**
- **Proven by USEPA to convert lead compounds on a molecular level to be 99.5% less bioaccessible**
- **Safe for all users, cost is 1% of other methods**
- **Lead tester spray turns red, showing poisonous lead -- perfect for health departments and families**



## Instant Lead Test Kit

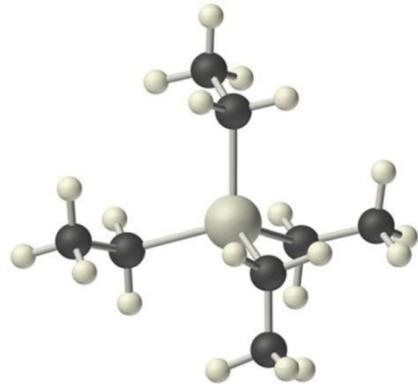
**Cleaner and dust suppressant to detoxify and immobilize**



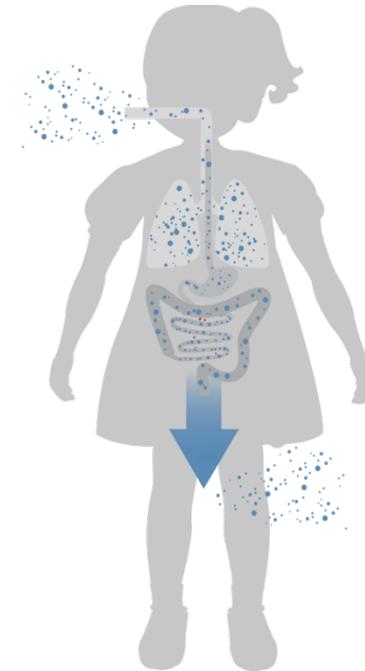
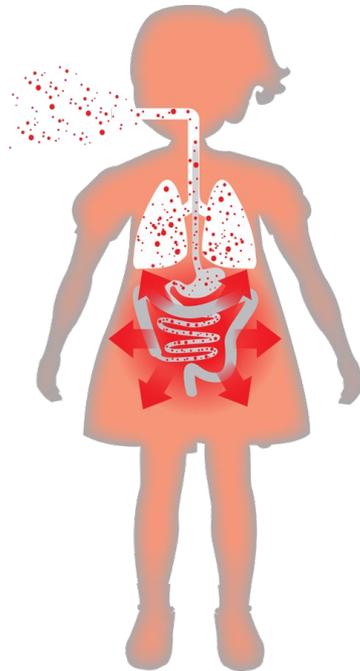
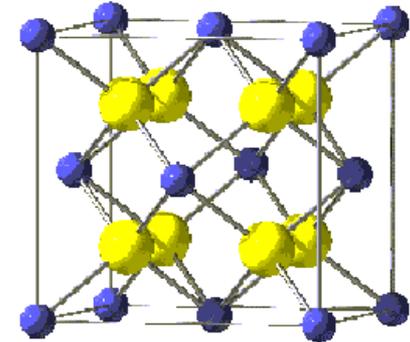
**Detoxify soil in place, avoid removal costs**

# Not all lead is created equal

Absorbed into body



Not absorbed into body



# USEPA Evaluation



- Tested competing technologies in variety of soils
- Including this neighborhood with 2500 ppm lead

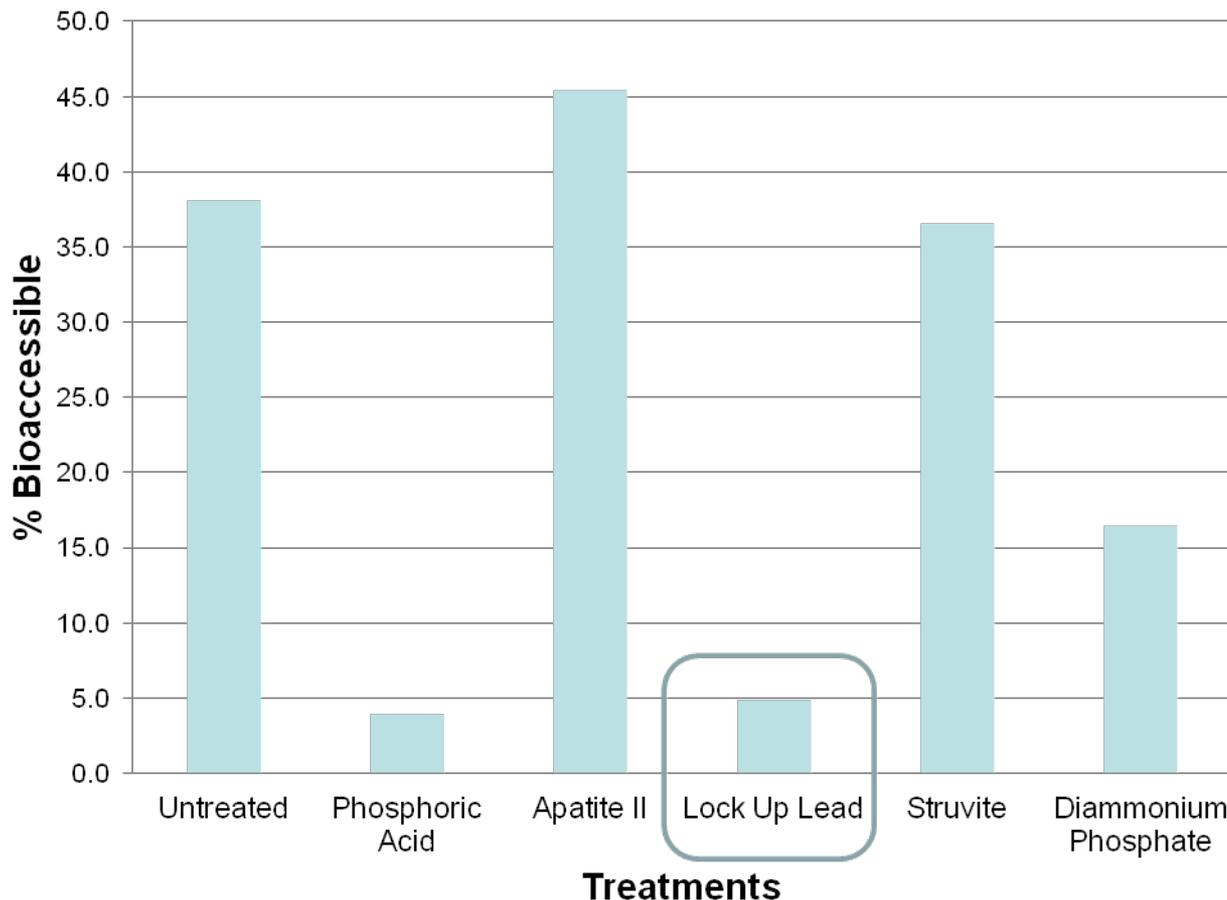


information provided by USEPA

# USEPA Evaluation



## Barber Orchard



LockUpLead reduced the toxicity of the soil by over 87%, rendering it under the USEPA limit.

Treating in place with LockUpLead avoids disturbance and hazardous waste handling and costs about 3% to 4% of “dig and haul” method.

information provided by USEPA

# USEPA Evaluation of LockUpLead



- The residential soil lead standard is 400 mg/kg or parts per million
- Barber Orchard soil contains 2500 mg/kg, thus requiring remediation
- Bioavailability-based risk assessment for site clean up allows increasing the 400 mg/kg soil lead standard if significant reductions in bioavailability are demonstrated
- For the Barber Orchard treated soils, Lock Up Lead results show that only 4.9% of the Pb in the treated soil is bioaccessible and 87.3% less bioaccessible than the untreated soil
- Total Barber Orchard Concentration (2500 mg/kg) X Reduction Factor (100% - 87.3% = 12.7%) = **Effective Bioavailability Corrected Concentration (317.5 mg/kg) → Lower than the 400 mg/kg residential standard**
- Conclusion: Phosphate amendments can be a cost-effective remediation strategy for large scale sites and impacted urban soils

information provided by USEPA

# USEPA Evaluation of LockUpLead

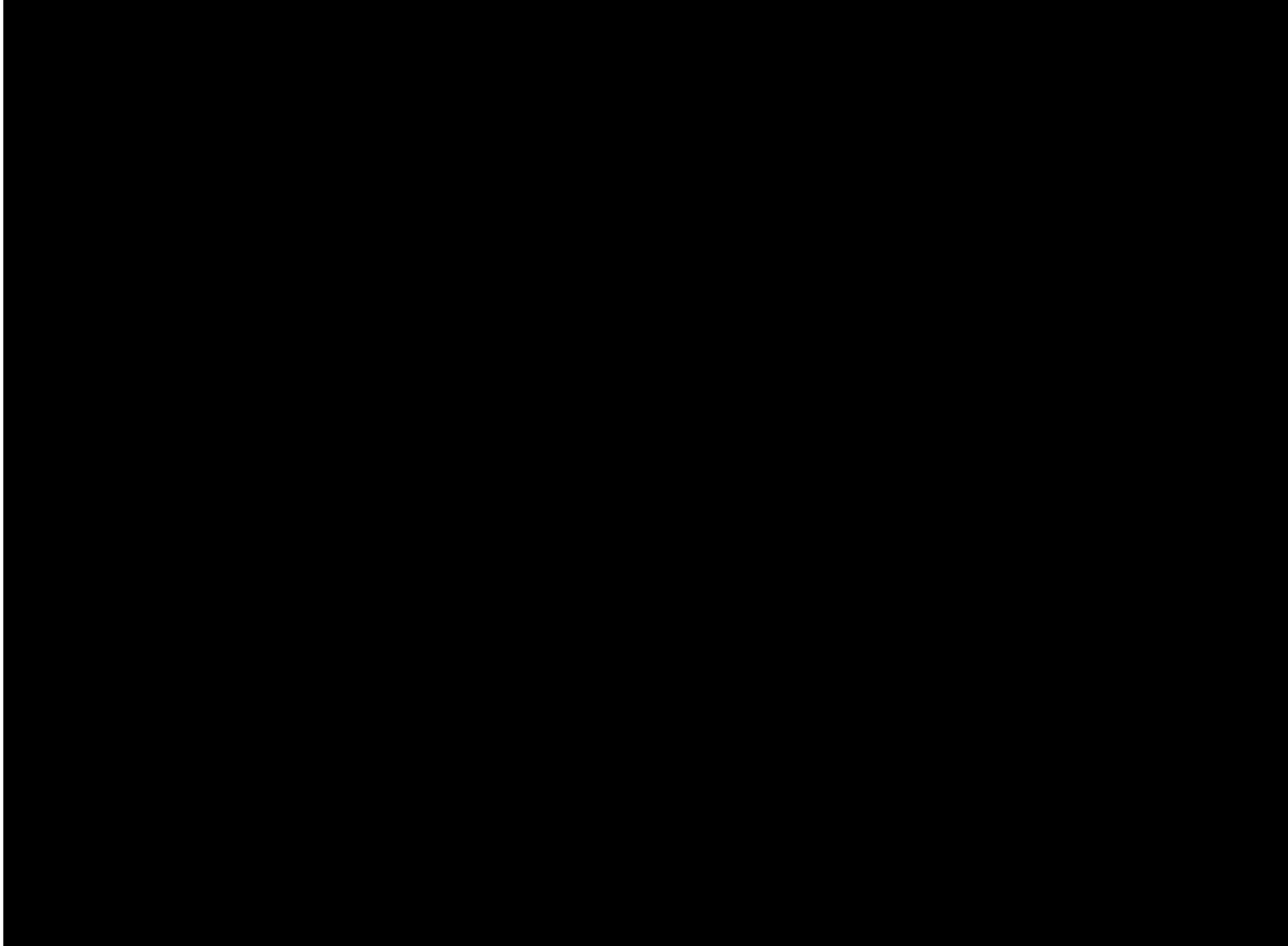


Toxic Lead (Pb) compounds + LockUpLead  $\rightarrow$   $\text{Pb}_5(\text{PO}_4)_3\text{Cl}$

LockUpLead technology forms pyromophite, a form of lead that is nonhazardous waste and has greatly reduced bioaccessibility.



# Interim Controls anyone can use



# Partners & Projects



# Case Study: Lead Safe Louisville, HUD Grantee



***Results: 1500 more homes tested, under \$7/home. Over 360 families received home lead cleaner, under \$14/home***



# Case Study: Vacant Property, Codes Dept.



***Results: Workers were trained in lead-safe practices  
Eliminated vacant property hazards impacting 140 homes  
New funding source, new partners***

***Cost: Avg \$920 per vacant property, including treating soil around perimeter of home.***

***Benefits on-site and also adjacent homes***

# Case Study: Public Museum Historic Renovation



***Results: dust treated and immobilized to reduce worker exposure, public liability, risk of lawsuits, reduce hazardous waste and avoid dust during disposal, transport***



# Case Study: Community Garden



***Results: upcoming project will reduce elevated lead hazards below regulatory limit without soil excavation, which would normally cost \$30-\$75 per square foot***

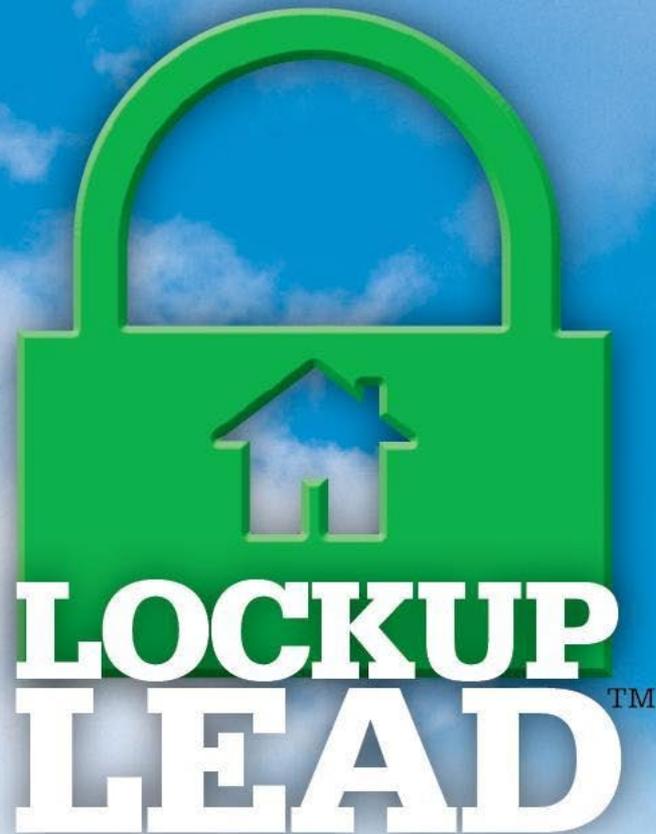


***Cost: About \$1 per square foot for community garden with nonprofit pricing.***

# Lead Safe Neighborhoods Program

- Civic & non-profit pricing
- Technical support
- Project and funding advice
- Starter kits





**Tough on Lead Dust. *Gentle on Your Family.***<sup>TM</sup>

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