A Service of The City of Cincinnati

GREATER CINCINNATI WATER WORKS

city of CINCINNATI HEALTH DEPARTMENT

Council Motion 202200848

Initial Report

September 8, 2022

Report Goal

This report is intended to inform local policymakers about lead poisoning in Cincinnati in response to city council's request *(Motion 202200848*). It will discuss local lead hazards and how it affects Cincinnatians. This report will cover existing mitigation strategies and lead abatement projects in the City of Cincinnati and proposed recommendations and feasibility analysis for reducing exposure to lead hazards to address childhood lead poisoning.

Report Outline

1. The Scope of Lead Poisoning in Cincinnati
2. Health Department Lead Program
3. GCWW Enhanced Lead Program
4. Proposed Synergies and Feasibility to Reduce Lead Poisoning

Executive Summary

Lead poisoning is a condition that can cause severe health problems in children, from developmental delay and learning problems in low quantities to severe neurological problems like seizures or death at very high levels. A normal lead level is zero. In 2021, 3.0% of children tested for lead had elevated blood lead level (average level = 10.1 µg/dL). Cases of elevated blood lead levels in Cincinnati are commonly associated with exposure to lead paint and dust in the living environment. Lead pipes in the water supply have caused catastrophic poisoning events in other communities such as Flint, Michigan.

The Cincinnati Health Department (CHD) and Greater Cincinnati Water Works (GCWW) have long-established programs targeting various lead risk factors to mitigate exposure. GCWW has undertaken a large project of lead pipe replacement within Greater Cincinnati. CHD has an ongoing program that focuses on reducing blood lead levels in elevated children by abating hazards in the child's environment but does not have a program similarly scaled to address exposures from the current housing stock in the city.

Synergies can be found between the departments to work together on educational interventions and the pursuit of grant funding for lead remediation programs. Overall, housing stock abatement efforts could be targeted to high-risk and low-income areas with additional funds.

Lead Poisoning Background

Where is Lead Found

Deteriorating Lead Based Paint	Deteriorating Lead Pipes	Soil	Cultural Items	Hunting	Gasoline
• Paint for Housing Pre-1978 • Paint for Toys Pre-1978 • Ceramic Glazes	• Lead Service Lines • Pipes with Lead Solder • Lead Goose Necks • Galvanized and corroded pipes and faucets	• Deteriorating particles from leaded paint chips, leaded gasoline, and contaminated water present in soil. • Any lead containing items in the environment that settle into soil.	• Unregulated Herbs and Spices • Unregulated Cosmetics • Ceremonial Powders • Jewelry	• Lead Ammunition • Lead Fishing Lures	• Automotive Anti-Knock Additives Pre-1995 • Aviation Gasoline

Effects of Lead Poisoning

Prenatal and early childhood exposure to lead can disrupt the natural development process, making children under six, including during pregnancy, the most vulnerable to lead poisoning.

Symptoms In Children

- Development delays
- Irritability
- Loss of appetite
- Weight loss
- Fatigue
- Nausea
- Hearing loss
- Seizures

Adults

- High blood pressure
- Joint and muscle pain
- Headaches
- Abdominal pain
- Mood disorder
- Reduced follicle/sperm count

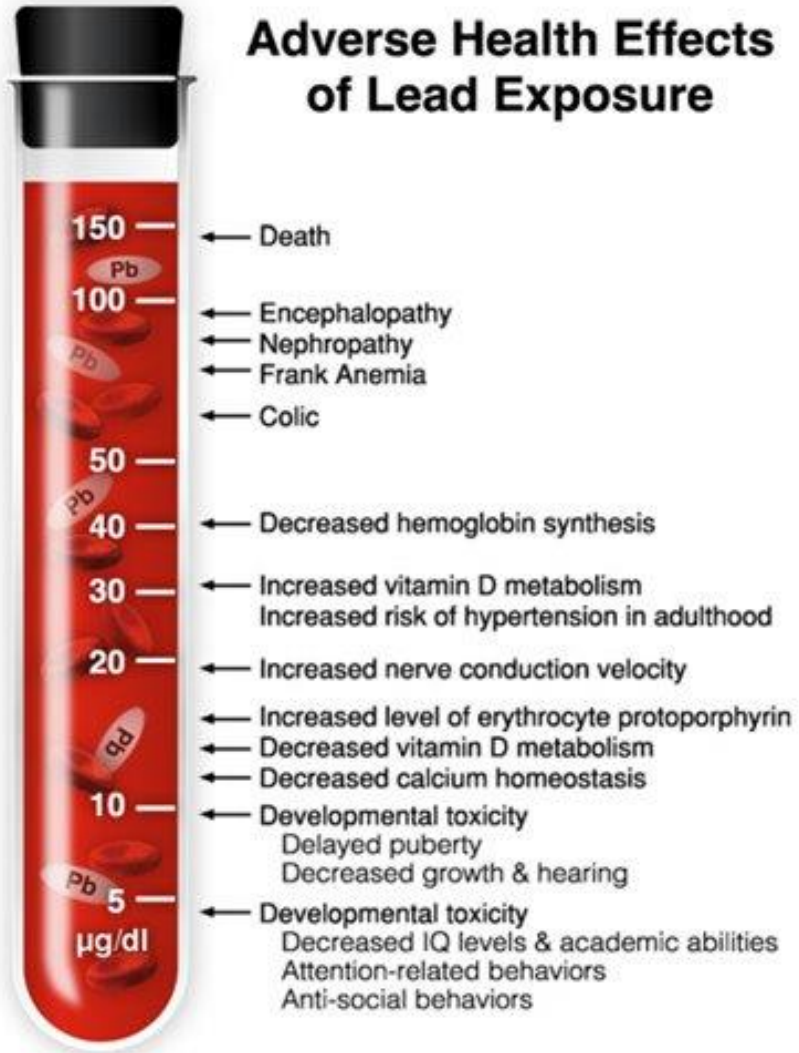
Pregnant Women and Newborns

- Miscarriage
- Mood swings
- Anemia
- Newborn premature birth
- Low birth weight
- Slowed growth
- Newborn Lead Exposure via Breastmilk

Lead in the Body

- Lead poisoning occurs when lead builds up in the body over a series of months or years.
- Lead enters the body when lead is consumed, inhaled, or absorbed through the skin.
- Lead poisoning can be hard to identify without a blood lead test since symptoms appear slowly over time.

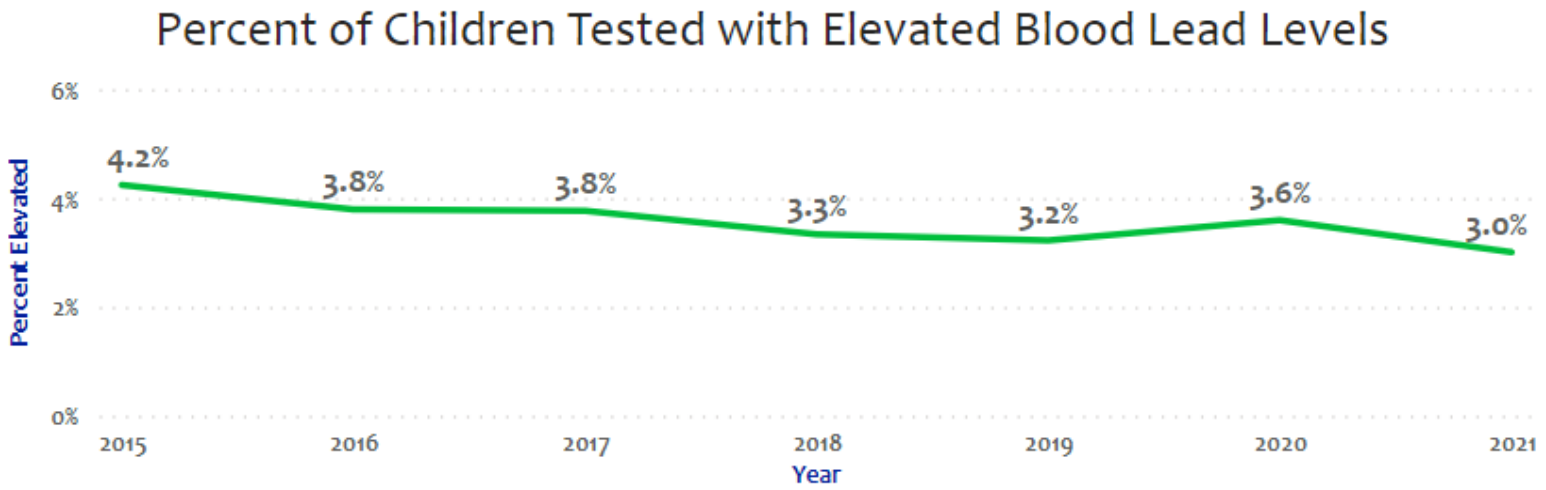
Effects of Elevated Blood Lead Levels

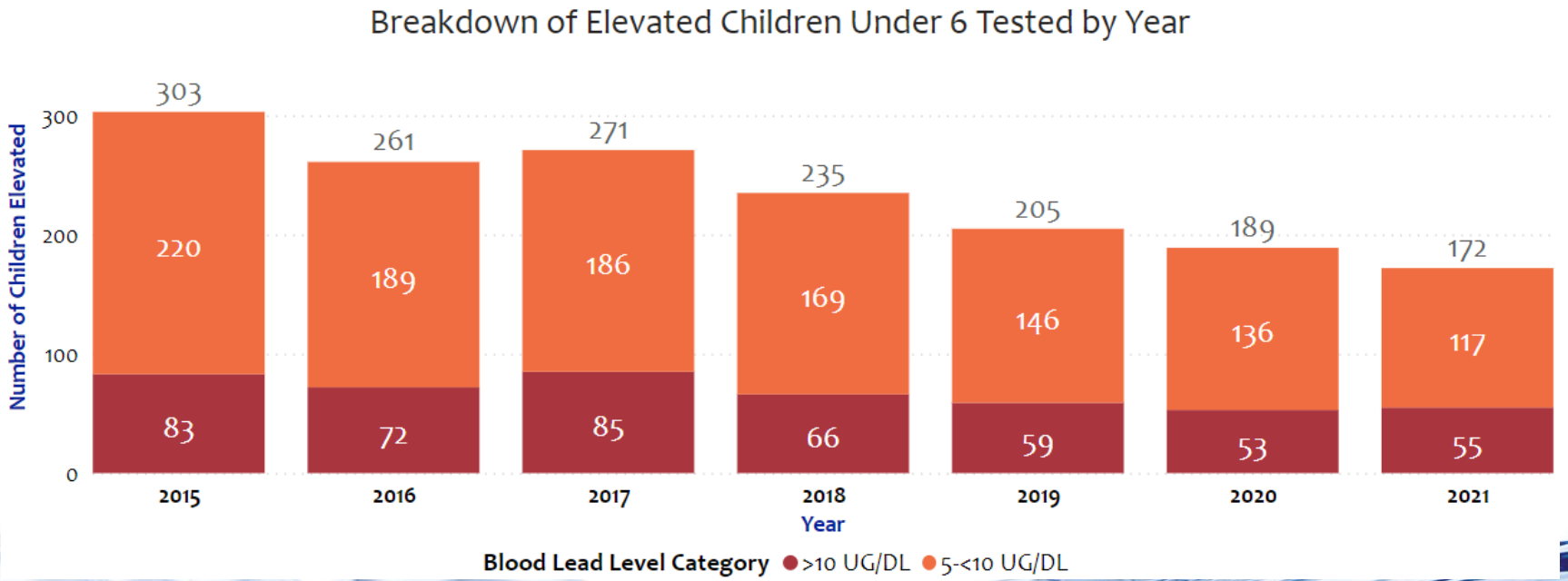


According to the Center for Disease Control and Prevention (CDC) **there is no safe level of lead**.

- In 1991, the advisory committee on Childhood Lead Poisoning Prevention (ACCLPP) defined Elevated Blood Lead Level (EBLL) greater than or equal to 10 µg/dL as " a blood level of concern".
- In 2012, that blood reference value (BLRV) was revised to EBLL at or above 5 µg/dL.
- In 2021, the CDC reference level has been decreased to 3.5 µg/dL. The impact on health program actions will be determined by Ohio Department of Health.

Children with Elevated Blood Lead Levels in Cincinnati



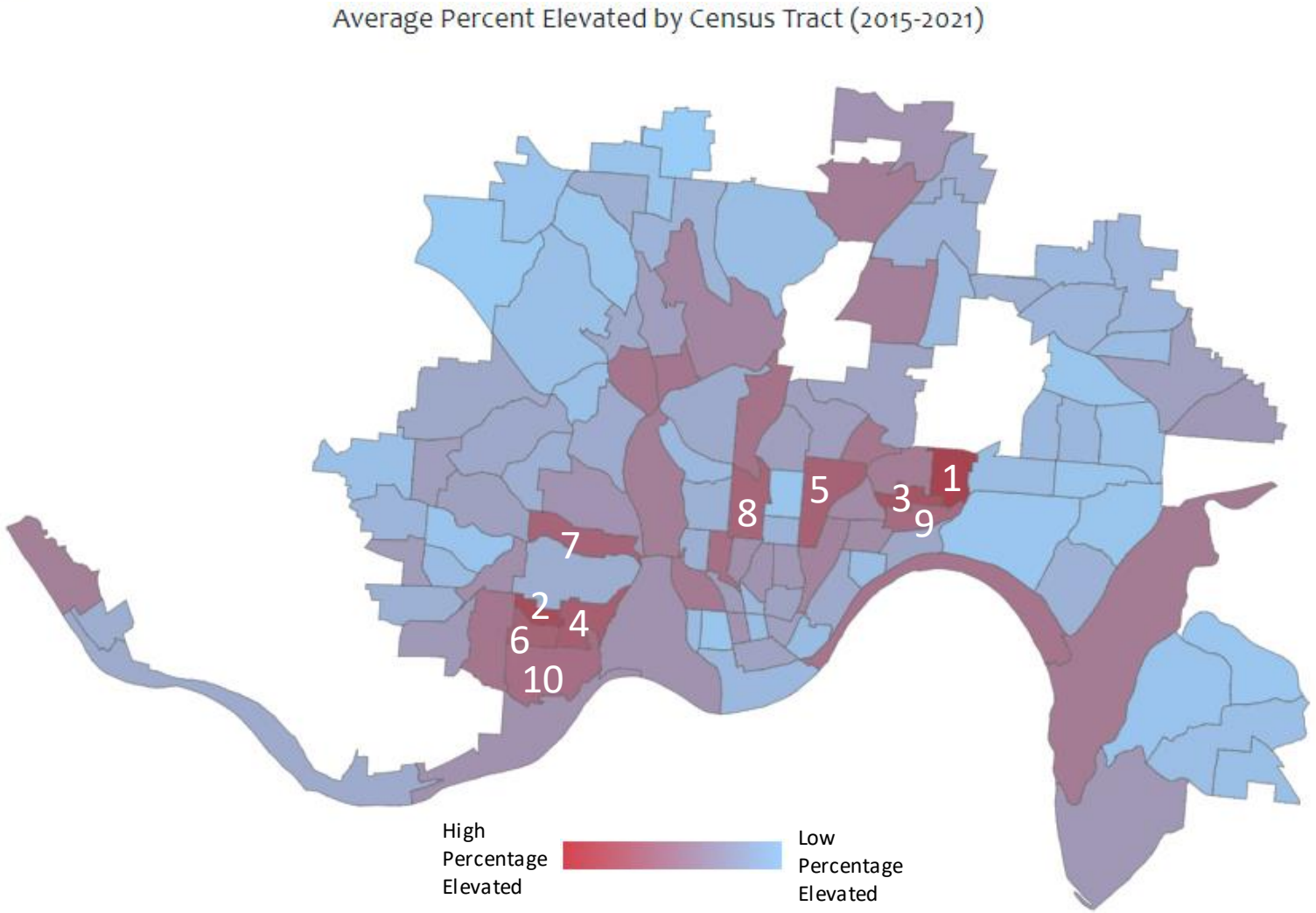


On average, 3.6% of children under six tested for lead had EBLL from 2015-2021.

In Cincinnati from 2015-2021 among elevated (≥ 5 µg/dL) children:

- mean 10.1 µg/dL
- median 7.0 µg/dL
- max 108.8 µg/dL

Children with Elevated Blood Lead Levels in Cincinnati



Highest Rate of Elevation	Census Tract (Neighborhood)	Average Annual Percent Elevated
1	40 *(Evanston)*	10.7%
2	94 *(East Price Hill)*	10.1%
3	39 *(Evanston)*	9.4%
4	93 *(East Price Hill)*	8.7%
5	270 *(Avondale)*	8.4%
6	95 *(East Price Hill)*	8.4%
7	272 *(South Fairmount)*	8.3%
8	30 *(CUF)*	8.1%
9	41 *(Evanston)*	7.7%
10	96 *(East Price Hill)*	7.5%

Health Department Lead Program

High Level Breakdown of CHD Lead Program

Childhood Blood Lead Testing

- Lead Testing for Children 6 years and under is **required** in the state of Ohio.
- Ohio Dept of Health (ODH) sends a refferral to CHD for children under the age of 6, with an EBLL of 5 µg/dL or higher who live within Cincinnati jurisdiction.

Case Management

- Cincinnati Health Department Nurses contact the families and complete a case investigation and provide education materials on lead hazards and prevention.
- Case Management is done for all children who have an EBLL of 5 µg/dL or higher.

Risk Assessment

- For children with EBLL of 10 µg/dL or higher, an Environmental Health Specialist will conduct a site visit to collect soil, dust, and water samples for analysis of possible lead hazards in the home.

Orders Are Issued

- Orders to abate lead hazards are issued to the property owner based on the findings of the risk assessment. Orders to vacate may also be issued if the property is deemed unsafe for tenants.

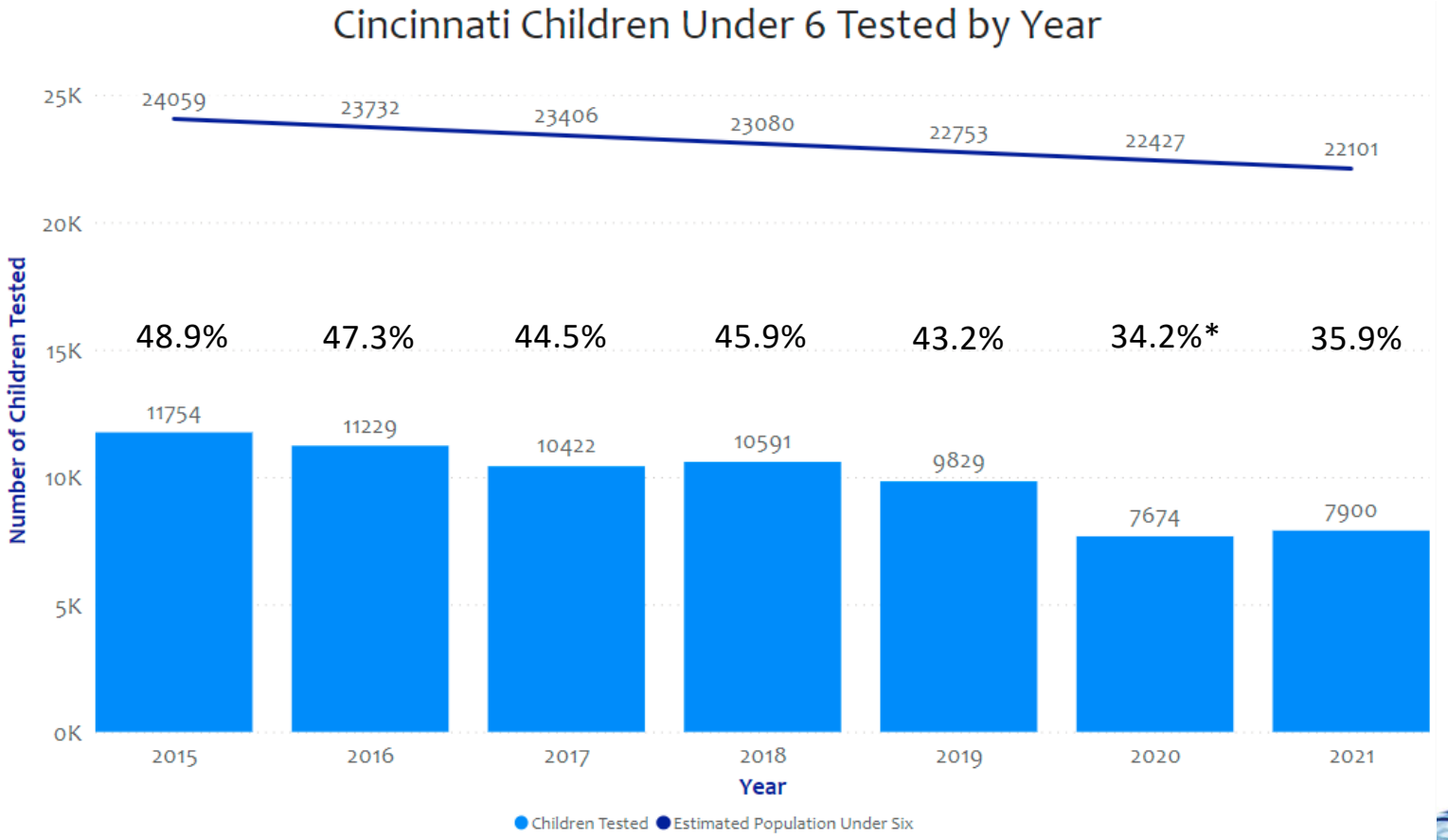
Lead Testing

Ohio is ranked 5th nationally and Cincinnati ranks 2nd in Ohio for the highest number of lead poisoned kids.

Testing: It is Ohio law that all children should be tested for lead per Ohio Administrative Code 3701-30. The code outlines that it is the primary health care provider's responsibility to test all children aged one and two, with additional testing for children under six if they are considered to live in a high-risk environment. According to the Ohio Department of Health, **all of Hamilton County is considered high-risk**.

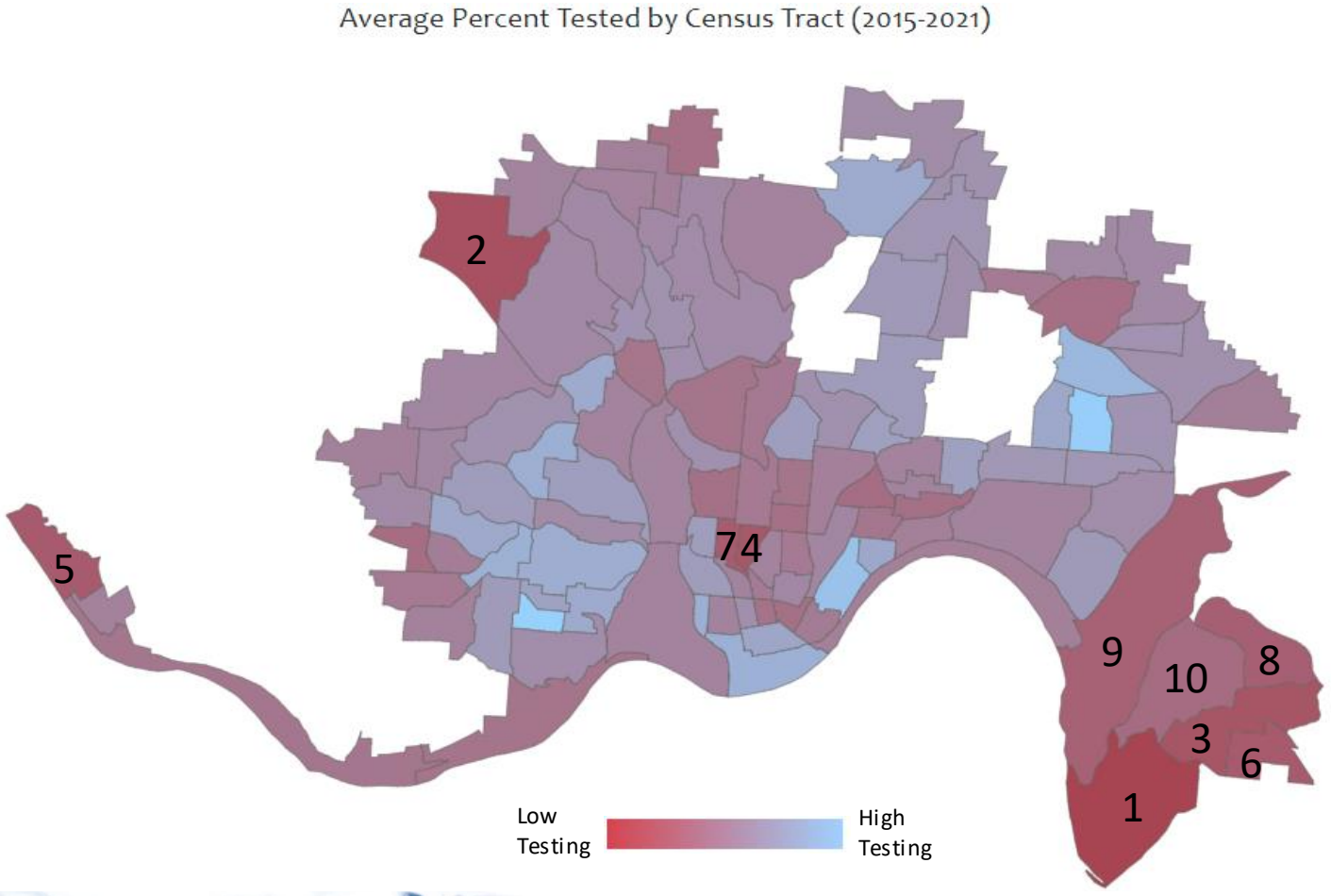
Childhood Blood Lead Testing in Cincinnati

- City-wide Blood Lead Level testing has decreased over the past 7 years.
- A significant decrease in testing was observed in 2020 from the prior year. This is suspected to be a result of the COVID-19 pandemic.



The Population of children under six years who reside within city limits is a linear regression of population change from U.S. Census data from 2000-2010, data is provisional and subject to change. $\alpha = 0.05$*

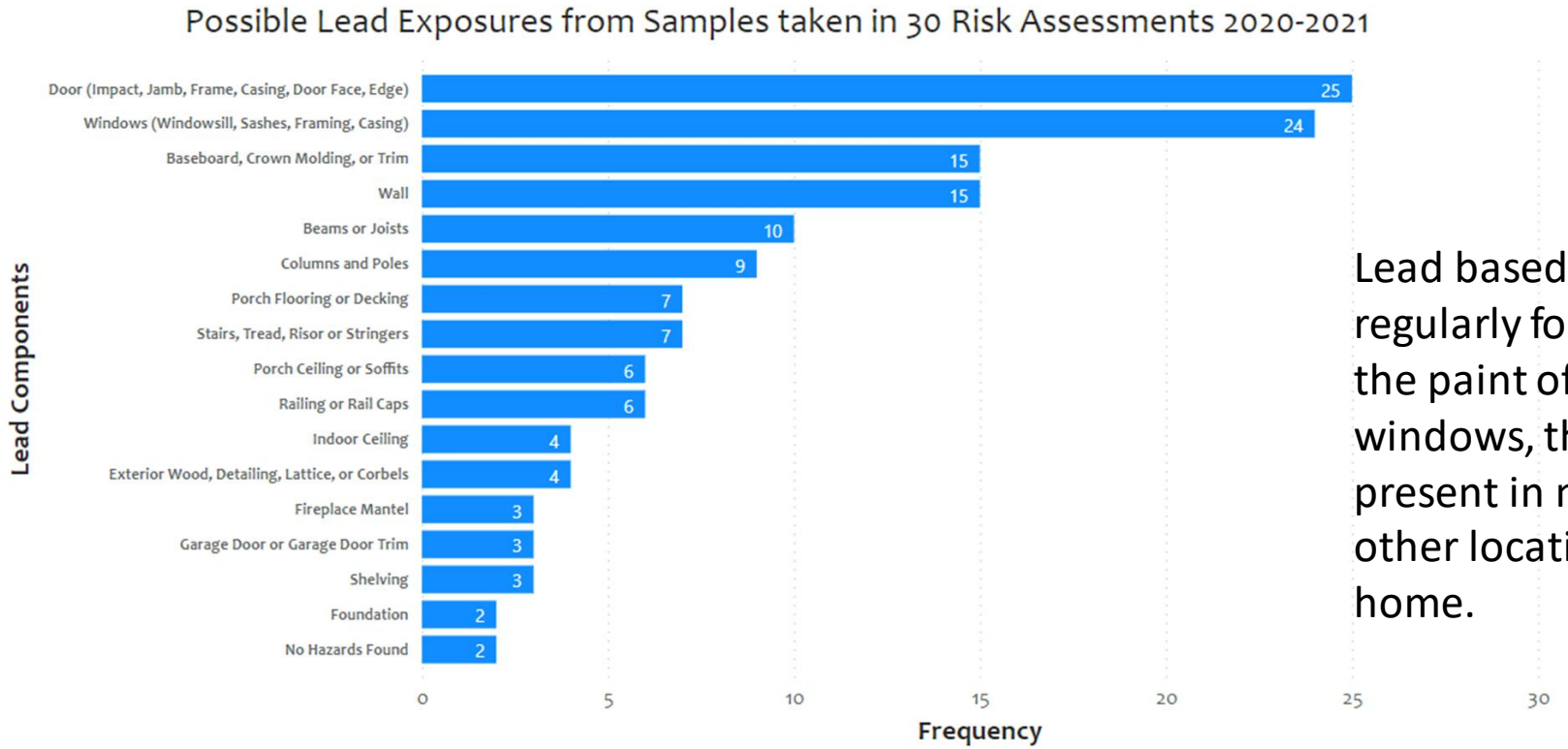
Childhood Blood Lead Testing in Cincinnati



Lowest Testing	Census Tract (Neighborhood)	Average Annual Percent Tested
1	45 *(California)*	5.97%
2	208.11 *(Mt. Airy)*	10.43%
3	46.02 *(Mt. Washington)*	11.91%
4	25 *(CUF)*	13.21%
5	106 *(Sayler Park)*	13.70%
6	46.03 *(Mt. Washington)*	13.70%
7	26 *(CUF)*	14.55%
8	46.04 *(Mt. Washington)*	15.59 %
9	47.02 *(Linwood)*	16.23%
10	46.05 *(Mt. Washington)*	19.89%

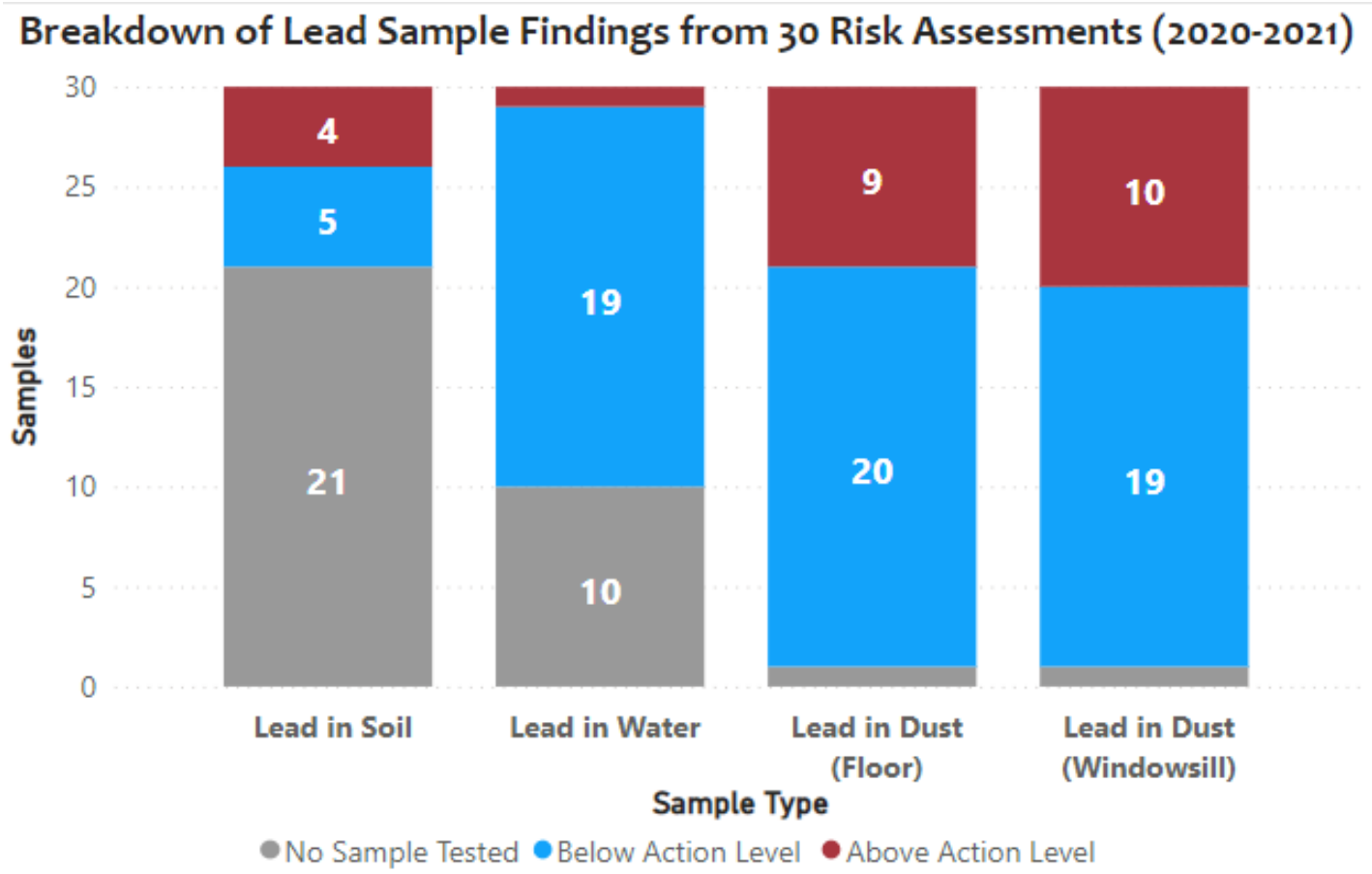
Where is Lead Found in Cincinnati

- Based on a sample of 30 Risk Assessments of homes with children with elevated blood lead levels from 2020-2021, hazards such as lead paint and lead dust were present in most homes.
- Risk assessments test for lead paint, lead dust, and lead traces found in soil and water.



Lead based paint is regularly found primarily in the paint of doors and windows, though it is present in many other locations in the home.

Where is Lead Found in Cincinnati, Continued

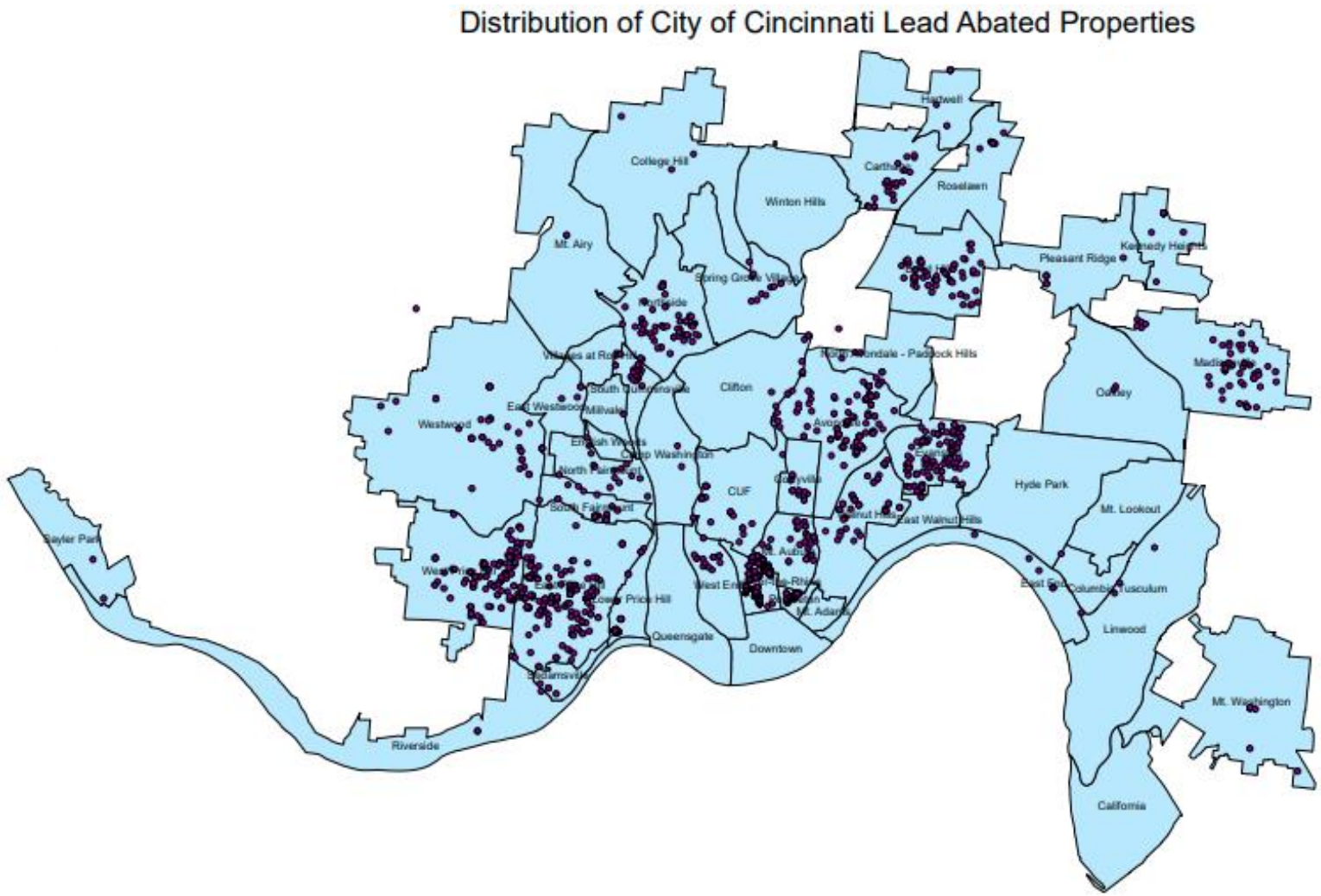


When lead paint peels or cracks, it makes lead chips and dust that can be found in areas of high friction or rubbing such as windowsills and doorways or could accumulate in the soil. During risk assessments, CHD takes dust and soil samples and tests them for lead. Water samples are taken and sent to GCWW to test for lead.

Each sample has a threshold, referred to as an action level at which immediate action to remove the lead hazard is required.

- Soil Sample in play area ≥ 400 µg/g
- Water Sample ≥ 15 µg/L
- Dust Sample, Floors ≥ 10 µg/ft^2
- Dust Sample, Windowsills ≥ 100 µg/ft^2

Lead Remediations to Date



Since 2008, CHD has worked to abate ~1600 units, most of which were results of lead poisoning in children. The HUD grant covers approximately $10,000 to abate lead hazards per unit.

*Note: This does not include properties abated by homeowners.

Current Funding for CHD lead Program

Program Name	Fund Source	Administering Agency	Focus	Eligibility
General Fund ***(~$1,020,000 annually)***	City	CHD	Case Management, Environmental Risk Assessment & Administration	All Children with Lead Levels of 5ug/dL and above
CDBG (Community Development Block Grant) ***($200,000)***	Federal	CHD / Department of Community and Economic Development	Environmental Risk Assessments	All Children with Lead levels of 10 ug/dL and above
HUD (Housing and Urban Development Grant) ***($3,500,000 over three years)***	Federal	CHD / Department of Community and Economic Development	Remedition of Lead Hazards (up to $10,000 worth of work per unit) Covers ~200 units over 3 years	Low-income (80% AMI) families with kids under 6 years of age
Medicaid Reimbursement ***(~$72,000 annually)***	State	CHD / ODH	Environmental Risk Assessments of Children on Medicaid	Children on Medicaid

GCWW Enhanced Lead Program

GCWW Water Quality

Cincinnati's water is lead-free when leaving the water treatment plant and in water mains. Lead can be introduced to the water from lead services lines and internal plumbing fixtures with lead.

The solution for mitigating lead risk in drinking water:

- Removal of lead service lines.
- Removal of lead bearing fixtures within the home.
- Water corrosion control treatment.
- Using water filters.
- Flushing after long periods of stagnation.

High Level Breakdown of GCWW Lead Program

Water Corrosion Control Treatment

- Water is treated to create a protective coating inside lead service lines to minimize the lead leaching into water.

Education and Outreach

- Lead service line look-up map available to the public.
- Lead website with resources and information.
- Free water testing available upon request.

Lead Service Line Replacements (LSLR)

- LSLR on water main projects
- One-off LSLRs for missing meters, leaks and high lead.
- Provide free water filter kits after LSLR
- No cost to customer

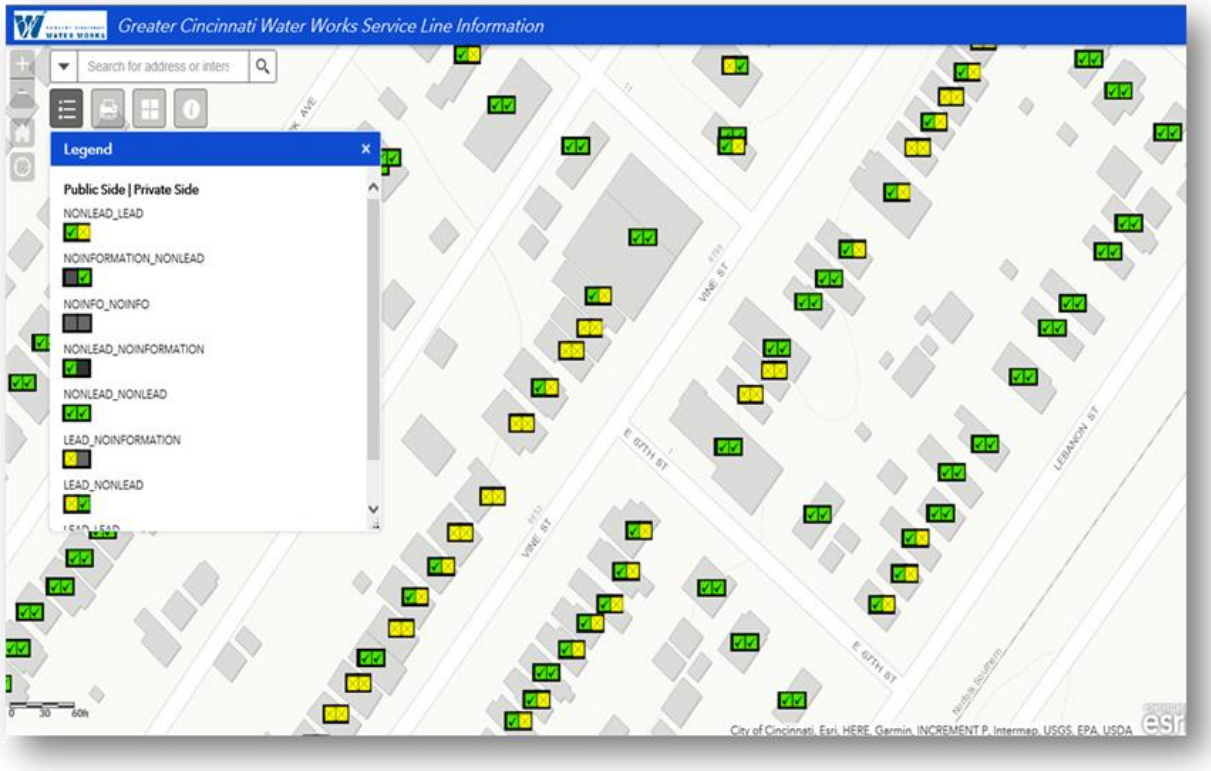
Water Corrosion Control Treatment (CCT)

- Water Treatment Plants adjusts the water chemistry by raising the pH to form a protective coating on the inside of the pipe.
- However, the coating relies on regular flow through the pipe. Disturbances in the pipe coating and water shut-off can break down the existing coating allowing lead to leach into the water. and therefore as long as the lead pipe is there, the risk remains.

Wasserstrom, et al. 2015

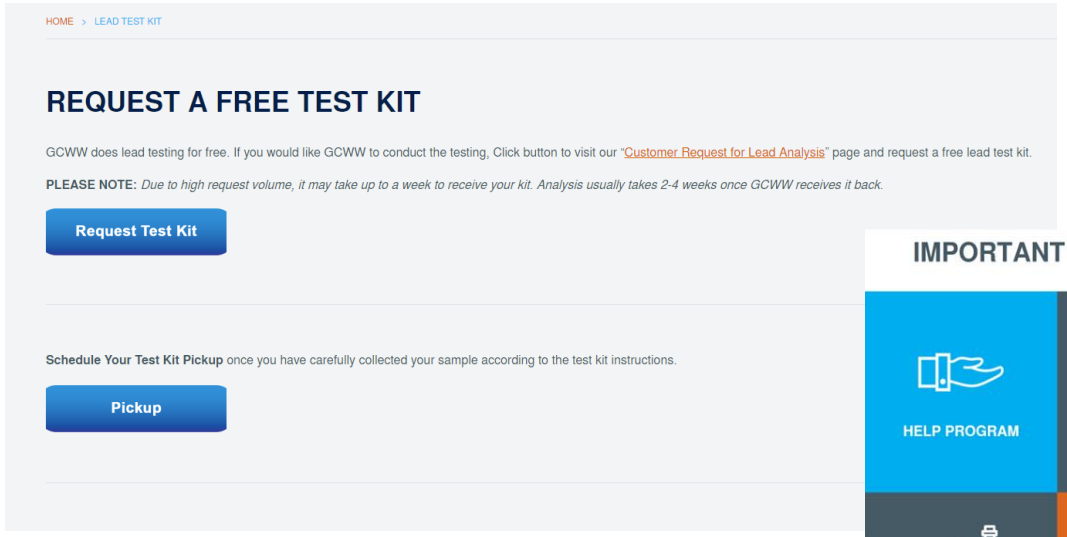
GCWW Outreach and Education: Lead Look-up Map

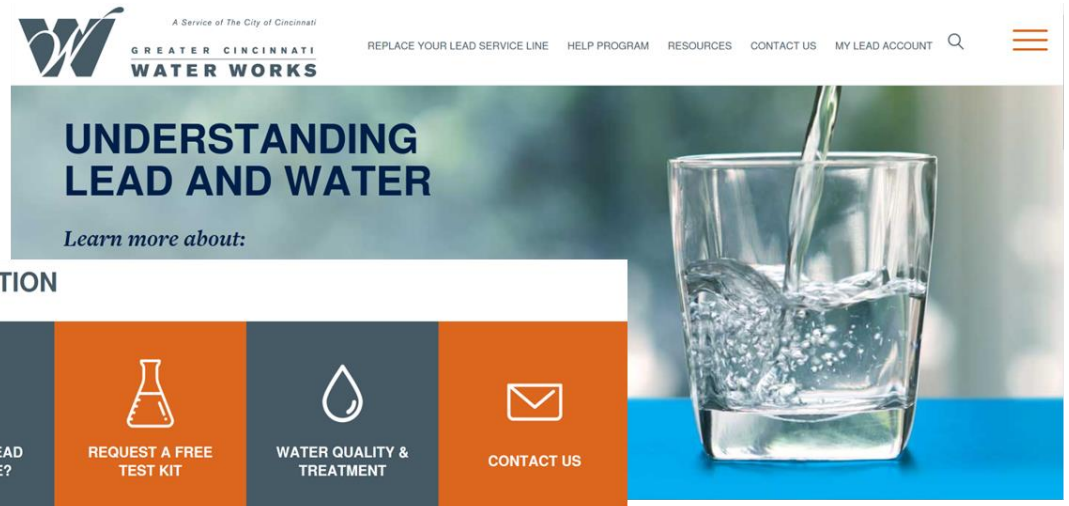
Searchable online map available to the public to inform customers of lead service lines.



GCWW Outreach and Education: Lead Website

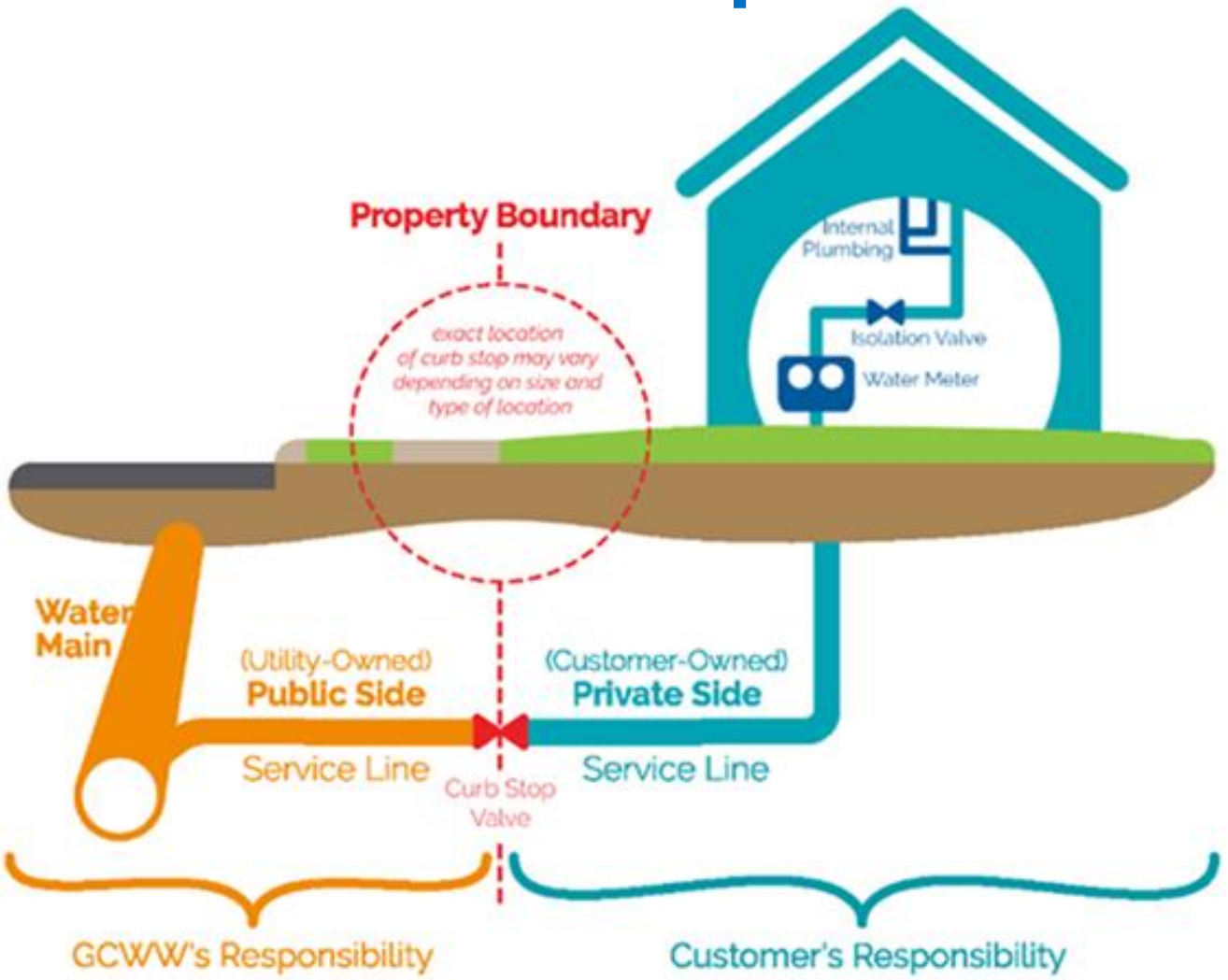
Lead.myGCWW.org





Dual Service Line Ownership

- There are ~38,400 lead service line in the GCWW distribution system
- ~25,700 on private side only
- ~12,700 full lines (both private and public)



GCWW Lead Service Line Replacements

City Council passed an Ordinance in December 2021 modifying the previous 40% cost share program to cover 100% of the cost of replacement. The funding is limited annually.

GCWW generally replaces lead service lines in one of two ways:

- Included on a large, multi-street water main replacement project where properties on multiple streets are included in replacing both the public and private-side LSLs.
- One-off process where an individual property has a lead service line with a high lead sample, leaking service, or missing water meter.

Lead Service Line Replacements
Phase 1: 2016 - 2021

For decades, GCWW has been removing public-side lead lines. But *owners were not removing private-side lead lines often due to the obstacle of cost. (average cost $3000-5000).*

In 2017 GCWW initiated a private lead service line replacement program

- City managed the work
- City would cover 40% of cost (max $1500)
- Remaining balance can be put on property taxes to be paid over 5 or 10 years.

Additional "Help" for low-income owners (80% AMI)

- **100% cost reduction** funded through donations; non-rate revenue ($200,000 per year)

GCWW Lead Pipe Replacement Program
Phase 1: 2016-2021- Accomplishments

- Online searchable lead map was created
- **2,250** private lines replaced
- Over 12,000 free lead tests analyzed for customers
- Over 14,000 lead test done for schools and childcares
- **$750,000** H2Ohio Grant for free child-care replacements
- **$1.3M** DWSRF low-income LSL replacement Grant
- 11 contractor and plumbing removal partners

GCWW is a leading utility in drinking water lead prevention.

We know and map the location of lead lines.
We provide free lead testing.
We assist customers with LSL replacement.

Most other cities/utilities are not doing this or just starting.

Lead Service Line Replacements

Next Phase: USEPA Lead and Copper Rule Update

Even with the cost–sharing and HELP programs, affordability was still an issue.

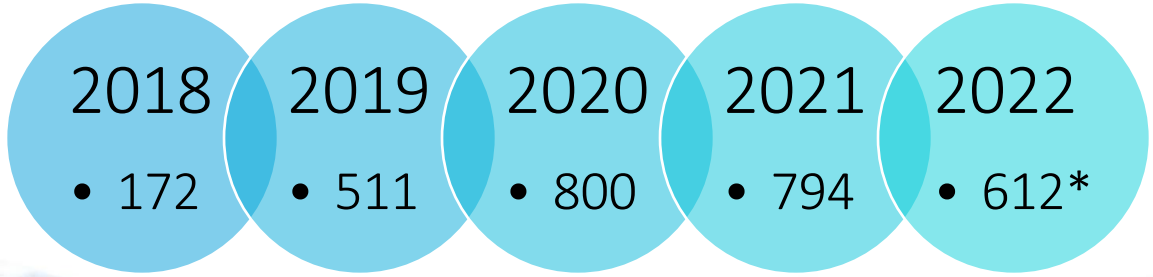
In June 2021, City Council approved an increase in water rates

- Small fraction of this increase would fund 100% private-side LSLR for homeowners

In December 2021, City Council authorized 100% funded LSLR Program

- This funding will allow GCWW to meet new Federal regulations, which go into effect in 2024
  - Replacement rate required is 3% (1,200 per year for GCWW)
  - Requirement *includes both private-side and public-side lead service lines*
  - USEPA will invoke penalties if the required LSL replacements are not met

Historical private-side lead service line replacements by year:



*** 2022 LSLRs reflect only the first 6 months. 100% funded has motivated customers to replace their LSL. GCWW is on target to replace 1,200/year.**

GCWW Funding

Currently, GCWW Lead Program is funded mostly by water revenue.

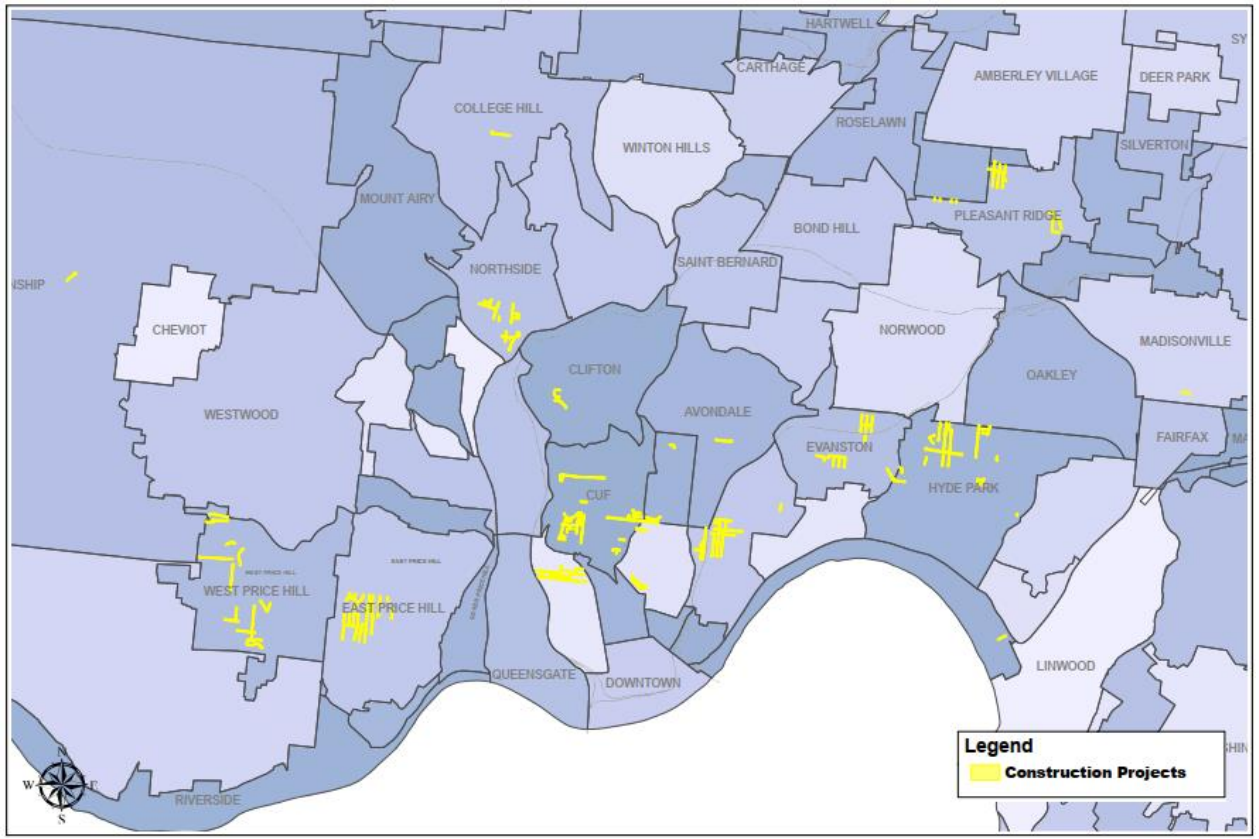
GCWW can apply for Bipartisan Infrastructure Law (BIL) funds BUT…

- BIL funds are targeted towards "*Disadvantaged Communities*" for LSLs
  - In the past, GCWW has not been considered "disadvantaged"
- BIL funding is limited: $71M available across the entire state for LSLs
  - 54% principal forgiveness and 46% no-interest loans (no 100% grants available)
  - Ohio has approximately 650,000 LSLS remaining in service (~ $2 Billion need)

- **Update: GCWW has been working with Ohio EPA for many months to re-evaluate the disadvantaged community criteria; Cincinnati is now eligible for grant funding**

BIL Funding: Proposed Water Main Projects with Lead Service Lines

GCWW nominated 16 water main replacement projects for loan/grants.
GCWW has plans to nominate 2 projects for grant funding that will replace private-side only LSLs.



Proposed Synergies and Feasibility

Program Expansions

Additional funding received would be used to protect public health by reducing childhood lead exposure:

GCWW

- Accelerate replacement rate
  - Eliminate lead lines in less than 30 years
    - 38,400 lead service lines remain in GCWW Service Area that would take $120 million to replace all private service lines barring labor and resource restraints
- Prioritize underserved areas for lead service line replacement to promote equity
- GCWW has over 900 customers on the LSL replacement waiting list

CHD

- Interventions to Pediatricians and Clinics reminders regarding testing.
- Targeted Educational Materials
  - New parents in hospitals (at birth)
  - Parents and families (through City of Cincinnati Primary Care Health Centers and CPS)
  - Homeowners cleaning practices can reduce lead poisoning (cleaning kits)
- A city fund that provides cleaning equipment to families with elevated blood lead level children.

Synergies and Next Steps

1.) Increasing Public Education Program by creating a Joint New Water Service Welcome Packet distributed when individuals turn on water service to help inform tenants and new property owners.

- Include what to look for in identifying lead hazards
- Water Test kit request
- Links to resources such as the public lead pipe map and the health lead exposure/ remediation dashboard
- Guide on Lead-safe practices to renovations and HEPA rental information

2.) Increase Lead Safe Housing Stock in order to potentially reduce lead poisoning risk before exposure.

- Proactive repair of lead hazard risks (primarily lead paint) in conjunction with lead service line replacement, similar to Toledo's "Historic South" Initiative to neighborhood revitalization.
  - Toledo's project has bought and renovated vacant homes to create lead safe housing stock as well as funding specific projects in owner occupied homes to replace windows, doors, and other lead hazards to prevent lead poisonings.
  - The cost would be lower than post-exposure removal since licensed lead remediation specialists would not be required.
  - Create a whole house approach to lead hazard removal, including water service lines and lead safe housing.

3.) GCWW and CHD will expand collaboration and explore joint funding.

Take Aways

- Lead hazards are widespread across Cincinnati neighborhoods.
- CHD and GCWW have long standing existing programs dedicated to reducing risk and mitigating the problem of childhood lead poisoning.
- Additional funding will enable reaching the goal of a lead safe Cincinnati sooner by creating programs that can lead the country in lead remediation and reducing the risk of childhood lead poisoning.
- Improving the lead safety of the existing housing stock would provide another avenue to address lead risk and would promote health equity.
- Synergies exist and GCWW and CHD will continue to work cooperatively to maximize resource impact.