



2023 VIRTUAL **LEARNING COLLABORATIVE** ON CHILDHOOD LEAD poisoning prevention

AUGUST 23RD, 2022 8:30am - 4:00pm

Public Health



Institute of Public Health Research and Policy

AGENDA

8:30am – 9:00am	The Current State of Childhood Lead Pois Impact Can Achieve Greater Impact – Vio
9:00am – 10:00am	Aluminum Cookware As a Source of Lead Working with Community Partners to Ide Sources – Katie Fellows, Ashley Bullock &
10:00am – 10:15am	Break
10:15am – 12:00pm	A Panel Discussion: Lead & Water in Iowa Cwiertny & Michelle Scherer
12:00pm – 12:30pm	Collaborate to break the link between un – Nancy Van Milligen
12:30pm – 1:00pm	Lunch Break

soning Prevention and How Collective ckie Miene, Alexa Andrews, Kevin Officer

d Exposure in the United States/ entify and Address Lead Exposure Hena Parveen

– Carmily Stone, Lyn Jenkins, David

healthy housing and unhealthy children

AGENDA

1:00pm – 2:00pm	Childhood Lead Poisoning: New Challer Alan Woolf
2:00pm – 2:15pm	Break
2:15pm – 3:15pm	Childhood Lead Poisoning: A Case Repo McCabe
3:15pm – 3:30pm	Q&A Discussion Session
3:30pm – 4:00pm	Next Steps and Closing Remarks – Vickie Officer

nges from an Old Adversary – Dr.
ort – Tammy Noble & Dr. Dan
ie Miene, Alexa Andrews, Kevin

The Iowa Institute of Public Health Research and Policy strives to ensure balance, independence, objectivity and scientific rigor in all of its educational programs. All planners, faculty members, moderators, discussants, panelist and presenters participating in this program have been required to disclose any real or apparent conflict(s) of interest that may have a direct bearing on the subject matter of this program. This includes relationships with pharmaceutical companies, biomedical device manufacturers or other corporations whose products or services are related to the subject matter of the presentation topic. The intent of this policy is to identify openly any conflict of interest so that the attendees may form their own judgments about the presentation with full disclosure of the facts. In addition, faculty is expected to openly disclose any off-label, experimental and/or investigational uses of drugs or devices in their presentation. Disclosures, Conflict of Interest (COI) and Resolution of COI policies are available via the <u>APHA's</u> website and in the printed program.

Nursing Accreditation

This nursing continuing professional development activity was approved by the American Public Health Association's Public Health Nursing Section Approver Unit, an accredited approver by the American Nurses Credentialing Center's Commission on Accreditation.

Medicine (CME) Accreditation Statement

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education through the joint sponsorship of the American Public Health Association (APHA) and the Iowa Institute of Public Health Research and Policy. The APHA is accredited by the ACCME to provide continuing medical education for physicians. Designation Statement: The APHA designates this (insert type of activity-live, enduring, web) educational activity for a maximum of 6 AMA PRA Category 1 Credit (s)^M.

Health Education (CHES) Statement

Sponsored by the American Public Health Association (APHA), a designated approver of continuing education contact hours (CECH) in health education by the National Commission for Health Education Credentialing, Inc. This program is designated for Certified Health Education Specialists (CHES®) to receive up to 6 total Category I contact education contact hours.



Participants must complete the evaluation online in order to earn credit hours and obtain a CE certificate. A link to the online evaluation system will be sent to all registered participants who attend the activity that will contain instructions and a personal ID number for access to the system. All online evaluations must be submitted by 09/23/23 to receive continuing education credit for this activity.



WHERE WE STARTED

Iowa CLPPP Needs Assessment

- Completed December 2018-February 2019
- Targeted those in the CLPPP and providers
- Highlighted strengths and weaknesses in the program

Some areas for improvement included:

- Inconsistent communication and training
- Lack of data communication
- Struggles with collaboration

ĥ THE UNIVERSIT te of Public Hea

Iowa Childhood Lead **Poisoning Prevention Program Needs** Assessment

February 2019

COLLECTIVE IMPACT



- Addressing health disparities is best done through difficult to implement.
- shared agenda and uses resources efficiently.
- Collective Impact is a model of collaboration that

multiple sectors working together to solve the identified problem, but true collaboration is incredibly

 Each collaborating entity has its own vision, goals, and regulatory and funding streams. Therefore, it's difficult to collaborate effectively in a way that fully supports a

supports collaboration across sectors, encourages a shared agenda, and is adaptable to local strengths.

COLLECTIVE IMPACT



Collective Impact Is why we are all here today!

We are here to:

- Learn from one another
- Establish new connections

- Begin conversations with the end goal of preventing lead poisoning In lowa



Collective Impact starts at the program level and has an impact down to the patient level – the work we are all doing together is impacting the lives of children in Iowa. There is still work to be done, and an impact to be made, but progress is happening thanks to all of you.



of all IOWA CHILDREN o to 6 years old only 23.9%

WERE TESTED FOR LEAD

2021 Healthy Homes and Lead Surveillance System (HHLPSS) 2022 WOODS & POOLE ECONOMICS, INC., www.woodsandpoole.com



2020 v. 2021 Blood Lead Testing – Statewide

	#Tested Dif			% Difference
	(2020 v 2021)	%Te	sted	(2020 v 2021)
Age (Years)	(+/-)	2020	2021	(+/-)
0-<6	2,568	22.40%	23.86%	1.46%
1-<2	83	70.23%	71.36%	1.13%
2-<3	906	35.70%	38.82%	3.12%
3-<4	954	7.14%	9.78%	2.64%
4-<5	342	10.13%	11.17%	1.04%
5-<6	349	8.48%	9.38%	0.90%

2020 v. 2021 Blood Lead Testing – County

• Under 6 Population:

- 59 counties showed an increase in the number of children tested
- 64 counties increased the rate of testing
- Children 1 Year in Age (1-<2 yrs.)
 - 50 counties increased the number of 1 year old's tested
 - 51 counties increased rate of testing
 - 44 counties met or exceeded the state goal of testing 75% of 1 year old's, an increase from 37 in 2020
- Children 2 Years of Age (2-<3 yrs.)
 - 51 counties increased the number of 2 year old's tested
 - 59 counties increased rate of testing of 2 year old's
 - In 2021, three (3) counties met or exceeded the state goal of testing 75% of 2 year old's, where only one county met the goal in 2020

Pre-v. Post-Pandemic Testing

- Continuing to recover from height of COVID period
- Average decline in overall testing of 21% in 2020
- 56% decrease in testing in April 2020.

	# Tested Dif			%
Age	(2019 v 2021)	%Te	sted	(20
(Years)	(+/-)	2019	2021	
0-<6	-9,368	25.66%	23.86%	
1-<2	-2,824	67.73%	71.36%	
2-<3	-1,812	37.97%	38.82%	
3-<4	-1,074	12.16%	9.78%	
4-<5	-1,690	15.17%	11.17%	
5-<6	-1,200	12.35%	9.38%	

g ID period in 2020

Difference
019 v 2021)
(+/-)
-1.80%
3.63%
0.85%
-2.38%
-4.00%
-2.97%

The Avg. Rate of Testing for 2019 & 2020 for 1 & 2 Yr. Olds in the State of Iowa

1	Lyon 60% 358	Osc 78 11	eola 3% 14	Dicki 72 34	nson % 4	Em 89 21	met 9% 15	Kos 81	suth	Winr 6 2	neba 6% 244	igo	Wo 72 1	orth 2% 66	Mi	Mitchell 61% 285 Floyd 48% 358		Aitchell H 61% 285		Howard 84% Wi 250		Vinne 96 42	inneshiek 96% 422																				
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Median Year Structure Built in Iowa from 2017-2021: 1971



Mentimeter



Aluminum Cookpots: A Previously Unrecognized Source of Lead Exposure in the United States

Katie M Fellows, MS, PhD Public Health – Seattle & King County

2023 Learning Collaborative on Childhood Lead Poisoning Prevention





Childhood Pb Exposure

 Childhood lead poisoning is 100% preventable Exposure to lead can seriously harm a child's health









Damage to the brain Slowed growth and nervous system and development behavior problems speech problems

Learning and

Hearing and

This can cause:

- Lower IQ
- Decreased ability to pay attention
- Underperformance at school

There is no 'safe level' of lead



Pb Exposure Sources/Pathways

Inhalation

- Lead Paint
- Dust
- Soil
- Water from pre-1986 pipes
- Traditional medicine/home remedies
- Religious/ceremonial powders
- Keys
- Imported candy
- Imported spices
- Toys
- Jewelry
- Pottery/dishware
- Cosmetics (e.g. Kohl/surma)
- Leaded gasoline/exhaust
- Vinyl mini blinds
- Leaded bullets



Blood Lead Level (BLL) Screening % Children with Blood Lead Levels above the BLRV, FFY 2016 to 2020, WA State

5-9 μg/dL ‡ ≥10 μg/dL

ning	All cour	ntries, N=6,050	1	.2%	3%	
untry of origin, No. with BLL screer	Uk	raine, N=1,897	1%			
	Afghan	istan, N=1,669				34%
		lraq, N=495	5%			
	S	omalia, N=339	9%	0		
		Burma, N=222	10)%		
ပိ	Со	ngo DR, N=196	9%	6		

[‡] For All countries combined and for Afghanistan the rate represents children testing in the 5-9 μg/dL range. For other countries, the number of children testing in the ≥10 µg/dL range was either 0 or did not meet small numbers standards, so the rate reflects children testing in the $\geq 5 \,\mu g/dL$ range.

Refugee and Immigrant Health Program | Washington State Department of Health

10%

Engaging with Community

- "Public Health Partnership"
- 2018
- In-home evaluations
- XRF analysis
- Cookpots with 1000s ppm Pb





Lead in Aluminum Cookware

Aluminum cookware in low- and middle-income (LMIC) countries is typically made from discarded scrap metal

- Drinking cans
- Car and motorbike engine parts
- Vehicle radiators and transmissions
- Airplane fuselages
- Lead batteries
- Computer and electronic components

















Aluminum Cookware in King County



Pots donated by Afghan families



member

and Renton

Online marketplaces



Pots purchased with an **Afghan community**

Local shops in Kent, Federal Way

Surface Swabs: Lead Check

3M Lead Check swabs

- Detection limit 0.2% (2,000 ppm)
- Only found a positive result on Afghan pressure cooker valves (60,000 - 70,000 ppm)
- Must scrape surface to clean off food/oxide





Surface Swabs: Full Disclosure Kit

SKC Full Disclosure Kit

- Developed/tested/patented by NIOSH, CDC
- Detection limit 18 µg
- Only found positive result on surfaces
 >10,000 ppm Pb
- Must use sandpaper first, to get Pb dust
- Yellow/orange if the result is negative, pink/red if positive



XRF Screening

- Non-destructive analytical technique to determine elemental composition and quantification
- Each pot screened
 25-40 times
 - Top and bottom of lid (if applicable)
 - Inside and outside walls; inside and outside base
 - Handles, valves, hardware, etc.



Leachate Study

- How much Pb is leached into food during cooking?
- Leaching increases with temperature, age, and acidity
- Leachate study:
 - 4% acetic acid (~vinegar)
 - 15-minute simmer
 - 24 hours at room temperature
 - UW Lab: ICP-MS to quantify heavy metals in leachate¹
 - Pb, Al, Cr, Mn, Fe, Co, Ni, Cu, As, Cd

 Method: EPA 200.8 Metals in Waters by ICP/MS; EHLSOP – 07 Instrumental Analysis of Elements by ICP-MS (based on EPA 6020A Rev.1 2007)



Lead in Leachate

Estimated Pb/serving:

250 mL leachate



 FDA Interim Reference Level (IRL): 2.2 μ g/day 8.8 μ g/day

- IRLs correspond to a blood lead level (BLL) of 3.5 µg/dL
- NOT a health-based limit


Results



Leachate: 23.9 µg/svg











Fellows KM, Samy S, Rodriguez Y, Whittaker SG. Investigating aluminum cookpots as a source of lead exposure in Afghan refugee children resettled in the United States. Journal of Exposure Science & Environmental Epidemiology. 2022;32(3):451-460. <u>https://rdcu.be/cMwfu</u>





Research to Action

FDA U.S. FOOD & D	RUG	
ADMINISTRATION CENTER FOR FOOD SAFETY & APPLIED N	AFGHANISTAN	
Maythia Airhart Interim Director Hazardous Waste Management Pro 201 S. Jackson Street, Suite 5600	RASHKO BABA Date Published : 03/24/2022 5th District Comapny Square Baghedawood Road , Kabul, AF 52 A 54 Soup Pan/Pot, Roasting Pan, etc (Deep item capat Date Published: 01/26/2023 Desc: Pressure cooker Problems: LEAD;	GHANISTAN ble of holding liquid w/ or w/o lid)
Seattle, Washington 98104	52 A 99 Kitchen and Tableware, n.e.c., (Foodware, Cookwa Date Published: 03/24/2022	re & Tableware)
Dear Ms. Airhart:	Desc: Pressure cooker	
This correspondence is in response aluminum cookware determined to Hazardous Waste Management Pro U.S. Food and Drug Administratic importation, distribution, and sale adverse health effects of exposure these adverse health effects.	Problems: LEAD; RASHKO BABA CO LTD Date Published : 03/24/2022 Eno D 21353 , Jalalabad, AFGHANISTAN 52 A 54 Soup Pan/Pot, Roasting Pan, etc (Deep item capab Date Published: 01/26/2023 Desc: Pressure cooker	ble of holding liquid w/ or w/o lid)
You described that your researche and the University of Washington, cookers, pots, and pans) released s exceed FDA's interim reference le published on May 2, 2022, in the J and provided a link to the publicat imported lead-containing cookwar	Desc: Pressure cooker Problems: LEAD; 52 A 99 Kitchen and Tableware, n.e.c., (Foodware, Cookwa Date Published: 03/24/2022 Desc: Pressure cooker Problems: LEAD;	re & Tableware)
researchers shared their data on the	cookware containing leachable lead with FDA staff,	



Research to Action



amazon

Etsy



201 S. Jackson Street, Suite 5600, Seattle, WA 98104

January 31, 2023

Dear Etsy online corporation/official:

This letter is to notify you of our recent findings that some cod levels of lead (thereby being a significant source of lead expos recommend that such products be removed from your website lead-containing products are listed in the attached table.

The Hazardous Waste Management Program in King County, V coalition of local governments comprised of King County, the tribes, all located in King County, Washington state. Together, than 2.3 million Washington state residents. The Haz Waste Pr public health and environmental guality by reducing the threa and disposal of hazardous materials, many of which are found businesses. The Haz Waste Program also conducts investigatio children, which is how we came to understand that some cool levels of lead. Note that we are not a regulatory agency; we pr and communities to help prevent chemical exposures.

Between 2019 and 2021, Haz Waste Program researchers, in p King County and the University of Washington, discovered tha online, including from Etsy, contained very high lead levels. Yo an article published in May 2022, in the Journal of Exposure So (JESEE), entitled "Investigating aluminum cookpots as a source children resettled in the United States," available at: https://ro

The Hazardous Waste Management Program in King County, Washington (Haz Waste Program) is a coalition of local governments comprised of King County, the City of Seattle, 37 other cities, and two tribes, all located in King County, Washington state. Together, the Haz Waste Program represents more than 2.3 million Washington state residents. The Haz Waste Program works to protect and enhance public health and environmental quality by reducing the threat posed by the production, use, storage, and disposal of hazardous materials, many of which are found in common household products and small businesses. The Haz Waste Program also conducts investigations into exposure sources of lead-poisoned children, which is how we came to understand that some cookware available on Amazon contains high levels of lead. Note that we are not a regulatory agency; we provide advice and guidance to businesses and communities to help prevent chemical exposures.

Between 2019 and 2021, Haz Waste Program researchers, in partnership with Public Health-Seattle & King County and the University of Washington, discovered that some cookware purchased locally and online, including from Amazon, contained very high lead levels. You can learn more about these findings in an article published in May 2022, in the Journal of Exposure Science and Environmental Epidemiology (JESEE), entitled "Investigating aluminum cookpots as a source of lead exposure in Afghan refugee children resettled in the United States," available at: https://rdcu.be/cMwfu.

Hazardous Waste Management Program

201 S. Jackson Street, Suite 5600, Seattle, WA 98104 www.kingcountyhazwastewa.gov

January 31, 2023

Dear Amazon online corporation/official:

This letter is to notify you of our recent findings that some cookware sold on Amazon contains very high levels of lead (thereby being a significant source of lead exposure for your customers) and to recommend that such products be removed from your website in the interest of public safety. These lead-containing products are listed in the attached table.

Research to Action

- Engaging CBOs
- Educating community
- Cookware exchange program
- Cooking videos with Instant Pots (Dari & Pashto)
- Informing the media King 5 TV story:
 - Dangerous cookware still for sale despite warnings from King County health experts: A KING 5 investigation reveals imported cookware with dangerous lead for sale on Amazon and other online marketplaces: https://www.king5.com/article/news/investigations/dangerous-cookware-for-sale-warnings-health-experts/281-48cb6121-9b12-44d2-9648-8aed67ad541a
- Lead in cookware bill in the WA legislature
- Engaging global aid organizations on root cause & solutions



Health through Lived





Future Work

- Continue to share findings with stakeholders
- Further investigate the use of lead-containing cookware in other communities – in homes and restaurants
- Pb Isotopic Fingerprinting
- Field Study to assess lead exposure





Thank You!

Acknowledgements:

- Steve Whittaker KC Haz Waste Program Research Services Team
- KC Haz Waste Program's Residential Services Program
 - Mohamed Ali
 - Sharon Cohen
 - Matt Wilson
- University of Washington
 - Shar Samy Environmental Health Lab Manager
 - Yoni Rodriguez Department of Environmental and Occupational Health Sciences, Graduate Student Intern
- Afghan Health Initiative
- Washington State Department of Health
- Public Health-Seattle & King County Lead & Toxics Program

Contact



Katie Fellows, MS, PhD **Environmental Scientist** Management Program 401 Fifth Ave, Suite 1100 Seattle, WA 98104 206-848-0766 kfellows@kingcounty.gov

King County Hazardous Waste

Public Health – Seattle & King County

Questions?



Working with Community Partners to Identify and Address Lead Exposure Sources

August 23, 2023







Background: Who, what, why

Methods & Results

Leveraging the Data

What's Next for Product Testing



LEAD IN CONSUMER PRODUCTS: UNVEILING THE HIDDEN HAZARD

Lead in consumer products continues to raise serious concerns for public health and safety.

- □ For children, exposure to even a small amount of lead can cause health.
- Preventing the use of consumer products and foods that contain lead is an ongoing challenge.
- Important to educate families about lead sources and test at-risk kids to prevent exposure.



- PRODUCT TESTING EVENTS IN KING COUNTY

- Collaborative effort between Public Health- Seattle & King County (PHSKC) and CBOs.
- Community-wide events, where household items brought in by community members are screened/tested.

Goals:

- Increase awareness in focus communities
- Promote blood lead testing
- Assist PHSKC in gathering information sources of lead exposures
- Focus Populations: Medicaid-eligible children and their families, immigrant and refugee families with young children, and families of color with young children, with a focus on families living in South King County.



- FUNDING AND STAFFING



3 PHSKC Programs

Best Starts for Kids, Environmental Health Services Division, Hazardous Waste Management Program

10 Community Organizations

2 Contractors

Toxic Free Future and Joel Gregory

1 Volunteer Organization

University of Washington's Environmental Health Lab

A GLIMPSE INTO COMMUNITY-LED PRODUCT TESTING EVENTS

Community-Based Organization

- Identify event sites, dates, time
- Co-create and translate flyer
- Conduct community outreach
- Decide giveaways for participants
- Prepare event site, provide staff
- Provide interpretation services
- Disseminate community letters

Public Health- Seattle & King County

- Process lab samples





Support CBO with event planning, logistics Provide educational materials Provide 3-4 staff per event (data collection, lab sampling, XRF screening) Complete data entry, analysis, reporting

Develop community letters



COMMUNITIES SERVED IN 2022



Provided resources in 17 different languages

Amharic, Arabic, Dari, French, Hindi, Maay Maay, Oromo, Pashto, Punjabi, Somali, Spanish, Swahili Tamil, Tigrinya, Vietnamese, Yoruba

Methods 8 Results







Screening tool

Real time results

Limited accuracy at lower levels







Inductively coupled plasma mass spectrometry (ICP-MS)

Gold-standard

Items destroyed







The test results represent only the amount of lead present in the specific item tested at the event

The amount of lead in other similar products may vary.

-• UNDERSTANDING THE RESULTS

PRODUCT TYPE	LEAD	SUPPORTI
	LIMIT	REGULATI
Candy	0.1 ppm	Food and Drug Adr
Spices, food, traditional medicines	2 ppm	Health based limit & King County from
Cosmetics, religious powders	10 ppm	<u>FDA's draft guidan</u> lip products and ex
Children's products, jewelry, craft supplies, other household items	90 ppm	The <u>2008 Consume</u> sets a limit for leac consumer product
Dishware and cookware	90 ppm	The FDA has set a l may leach from foo lab analysis is not p fore, we used the l <u>machine can reliab</u>

NG LAWS and ONS

ministration (FDA) limit in sugar

uring controls.

defined by Public Health—Seattle

n modeling and sampling.

<u>ce for industry</u> on lead in cosmetic (ternally applied cosmetics.

er Product Safety Improvement Act

d in paint and applies generally to coatings.

limit for the amount of lead that od contact surfaces; this type of possible at testing events. Thereowest limit that <u>the handheld XRF</u> oly detect, 90 ppm.





11% of items itested ontained concerning amounts of lead

16







• contained concerning levels of lead



3 tested

• contained concerning levels of lead



Other Foods

- 16 tested
 - contained concerning levels of lead
- **Traditional Medicines**
 - 16 tested
 - 0 contained concerning levels of lead







5 tested

1 contained concerning levels of lead





14 contained concerning levels of lead



Incense

- 5 tested
- **5** contained lead

Jewelry

11 tested

5 contained concerning levels of lead





tested

contained concerning levels of lead











19 tested

8 contained concerning levels of lead











12 tested

contained concerning levels of lead









Parts Per Million

Product Type





6 contained concerning levels of lead







COMMUNITY CENTERED

"There was a mother who brought her pots to the event. The pots tested positive for lead. The mother was upset and concerned since she had been cooking for her family for over five years with the products. We instructed her to connect with her provider to get her children tested for lead.

We are grateful for the opportunity to prevent further lead harm, connect this family with screening services, and provide lead education."

PRODUCT TESTING EVENTS IN 2023

- Increased funding to community partners
- Improved data management system
- 19 community events with 10 partners
- Results from first 7 product testing events in 2023: 13% of items tested high for lead (keys, dishware/utensils, jewelry)









LEVERAGING DATA FROM PRODUCT TESTING EVENTS





Supported WA State Bills



Prioritize Research and Education



Develop Open Data Portal



Shared With Local and National Partners

FUTURE OF PRODUCT TESTING EVENTS



Evaluate





Adapt Strategies



THANK YOU!

Ashley Bullock asbullock@kingcounty.gov

Hena Parveen hparveen@kingcounty.gov

10:00AM - 10:15AM

Check out all of the resources we have put together!

https://idph.iowa.gov/Environmental-Health-Services/Childhood-Lead-Poisoning-Prevention/resources



Healthy Homes Need Healthy Water: Toward a Lead in Drinking Water Assessment Tool

David Cwiertny, Mona Hanna-Attisha, and Michelle Scherer IAHHU0067-21





PEDIATRIC PUBLIC HEALTH INITIATIVE


















PEDIATRIC PUBLIC HEALTH INITIATIVE

MICHIGAN STATE UNIVERSITY







Drinking water is a significant, but often overlooked, source of lead exposure.

Figure 1: Relative contribution of main sources of children's exposure to lead



old)

Food

40%	36%	
12%	13%	
	540/	
50%	51%	

Infant (0-6 months Toddler (1-2 years Children (2-6 years old) old)

> Soil/Dust Water

http://blogs.edf.org/health/2017/12/15/child

We still struggle to define a "safe" level of lead in drinking water.







DEDICATED TO THE HEALTH OF ALL CHILDREN®





1 ppb = parts per billion = μ g/L

WHO 10 ppb





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGIONAL ADMINISTRATOR **REGION 5** 77 WEST JACKSON BOULEVARD CHICAGO, IL 60604-3590

DEC 2 9 2017

MEMORANDUM

Region 5's Experience in Implementation of the Lead and Copper Rule SUBJECT:

Robert A. Kaplan FROM:

median blood lead level in the nation's children -- since its promulgation in 1991. Nevertheless, our experience has made it clear that improvements to the Rule are needed to better protect public health. This is especially true with regard to young children, who are susceptible to the health impacts from even low levels of lead in drinking water – perhaps at levels less than the current Rule's Action Level (AL) of 15 $ppb.^1$

> technical issues and policy considerations. We provide this information in the hope that it will be of assistance to OW as it considers revisions to the LCR.

Region 5 has substantial experience in LCR implementation issues, given the abundance of leadcontaining plumbing in older, industrialized cities in the upper Midwest. Region 5's experience with LCR implementation and drinking water lead levels in a number of communities including Flint, Mich.; East Chicago, Ind.; Chicago, Ill.; Galesburg, Ill.; Sebring, Ohio and other cities has given the Region an understanding of how the protections of the Rule work in actual practice.

9) Jut A K

Elevated water lead levels (WLLs) have been shown to increase BLLs.



Levels in Children Associated with the Flint Drinking Water Crisis: A Spatial Analysis of Risk and Public Health Response. Am. J. Public Health 2016.

Currently, risk assessment models do not consider water lead.

Lead Risk Model by Census Tract



Age of home Poverty ESL

Can we use Flint, MI data to develop a Water Lead Risk Score? And, can we apply it elsewhere (like lowa)?



II. Apply Flint WLRS

III. Adapt & generalize WLRS

Figure 6. Study Design Healthy homes need healthy water: A lead in drinking water assessment tool

IV. Validate and promote assessment



I. Build and refine Flint WLRS

II. Apply Flint WLRS

III. Adapt & generalize WLRS

Promote into assessment practices



Working toward a lead-in-water assessment tool: Where we are so far



IV. Validate and promote assessment

Water Lead Levels (WLLs)

first-draw (FD) one-minute flush (1MF) three-minute flush (3MF)

FIVE Flint home sampling events

Census block-level information

Socioeconomic distress indicators Percent Black residents Vacancy rate Neighborhood housing info. Land use mix August 2015 (n = 268)March 2016 (n = 186)July 2016 (n = 176)November 2016 (n = 164)August 2017 (n = 150)



Address level information

Private service line material Public service line material Water usage Home SEV Demolition density Predicted BLLs Predicted change in BLLs Land value

During the FWC (August 2015), even homes with full copper service lines exceeded lead in water guidelines.





BLLs in homes with LSLs were higher than in homes with full copper service lines.

The odds of having higher BLLs doubled in all homes after the switch to FRW, regardless of service line type.

Clearly, exposure to lead from drinking water increased even in homes with full copper service lines.

But where did it come from?



Mineral Passivation Layer



By investigating the correlations between corrosion-related metals from drinking water samples, we can differentiate and identify the sources of lead.

First Draw Lead Service Line



First Draw Copper Service Line

First Draw Lead Service Line



First Draw Copper Service Line

Aug 2015 FDR correction

In copper service lines, evidence of these scales is also seen. However, these correlations are weaker (especially between phosphate and Pb and Fe).



First Draw Copper Service Line

Γ	0.24	0.21	0
?	018	016	0
	0.33	0.07	0
	0.39	0.1	
	0.28	0.23	C
Mn	0.48	0.23	0
Fe	0.34	019	0
Ρ	0.31	0.37	
AI	0.21	AI	
	Pb		



Aug 2015 FDR correction

First Draw Lead Service Line



Al

correlations between lead and premise-plumbing related metals such as copper, nickel, and zinc.

Al

0.21

Pb

First Draw Copper Service Line

Aug 2015 FDR correction

We know there are two different sources of lead in water: service lines and premise plumbing. But it is difficult to disentangle the effects of either source.

Using metals as fingerprints for presence of certain sources, we can see that lead service lines were not the only source of water lead contamination during the FWC.





WHITE HOUSE

White House unveils plan to replace every lead pipe in the U.S.

Up to 10 million households, schools and care facilities get their drinking water through lead pipes, and each pipe can cost thousands of dollars to replace.



"Replacing all of them could cost more than **\$60 billion**, according to an estimate from the American Water Works Association"



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Q



Environmental Topics VLaws & Regulations VReport a Violation VAbout EPA VGround Water and Drinking WaterCONTACT USGround Water and Drinking Water HomeRevised Lead and Copper RuleBasic InformationLead and Copper Rule Revisions Service
Line Inventory Guidance

Based on the findings from the 7th DWINSA, the total projected LSL in the United States is 9.2 million (see Exhibit 4). There are also an estimated 2.8 million standalone galvanized service lines. Currently, some states require that galvanized pipe be identified, and some states require that it be removed. The 7th DWINSA provides the best available national and state-level projections of service line materials and counts. Exhibit 5 shows the distribution of LSLs across the nation and Exhibit 6 shows the total number of projected LSLs in each state, along with their percentage of the total. This information was used to develop the LSL-specific allocation formula for distributing the DWSRF BIL LSLR fund.

Exhibit 4: National	Projected Servi	ce Lines by Material
---------------------	------------------------	----------------------

Service Line Material	Projected Count		
Lead Content	9,223,745		
Stand-Alone Galvanized	2,800,839		
No-Lead Content	87,929,975		
National Total Service Lines	99,949,560		

Exhibit 5: Projected Number of Lead Services Lines by State



Total Projected LSL 9.2M

Projected Number of LSLs

Less than 46,000 46,000 to 92,000 92,000 to 230,000 230,000 to 460,000 Greater than 460,000 Based on our findings so far, homes without LSLs are still at risk of water lead exposure.

Constructing predictive models of lead in water risk must differ for homes with lead lines and homes with copper lines. The power of one variable at predicting the occurrence of lead in homes with LSLs may not be as important in homes with copper service lines. **Ongoing:** By leveraging parcel and neighborhood-level characteristics with water lead data, we will investigate the prediction power of various models (such as logistic regression, random forest) at predicting the occurrence of water lead.

Variables to be investigated include:

- Year of construction
- Condition of home
- Land and home value
- Rented vs home ownership
- Sociodemographic characteristics (such as income level, educational attainment)
- Historical housing discrimination (such as block busting and redlining) ullet
- Water source types (system size, surface vs. groundwater, wells vs. community) \bullet water system)
- Water bulk chemistry (pH, alkalinity, hardness, TDS)
- Water use

There are many challenges when trying to predict water lead risk.

- Water lead levels vary, even at the same tap
- Service line records are often inaccurate or incomplete
- Impossible to know what type of premise plumbing is inside the home without inspection
- Trade-offs between using simpler, easier-to-understand prediction models and more complex methods
- Exposure risk is not only a factor of environmental hazards complex racial ecology intersects exposure risks and this can be difficult (or impossible) to account for in a model
- Can we extrapolate a risk score from Flint to other communities? How dependent on residential information will an accurate risk assessment be?

Sampling Instructions

(1) Unpa Supp

Not sure

Step 0. Wait 6 or more hours to sta

Please read both sides of the instructions before

When do I take my water samples?

You should sample your water after six (6) hours of no water use, such as doing laundry, running a faucet, run flushing a toilet, taking a shower, or watering a yard/g guests, roommates, or family members at home abou your water can sit for 6 hours without being used!

Where do I take my water samples?

Please take your sample at the kitchen sink (preferred Please do not remove the aerator on your faucet. If treatment on your kitchen sink, please use your most you are unsure about the point-of-use treatment, use

Step 2. Answer some questions ab

Does the tap you are	sampling hav	e hard or	soft water?	Check one:
		it water		I do not know.
My water supply sou	rce is: 🗌 M	unicipal	A well	Not sure
What year was your	house/dwellir	ng built?		□ Not s
What is the line that called a water "service	brings water i	nto your	house made	of? This is often
Lead	Copper	Ga	vanized/Iron	/Steel
Plastic	Not sure			

What Do My Results Mean?

Find out what your lead test results mean for you and view possible next steps

How Does Lead Impact Health?

Apply for a testi

Lab Use Only:

Discover the risks of lead in their drinking water

How to Sample

See instructions for completing an at home drinking water test kit

About the Project

Learn about this initiative and why we started it



Assess the risk of lead in your

ck lies 12332	Fill Bottles
art	Step 1. Record sampling information
e sampling.	STOP : Did you use your water in the past 6 hours? This includes running the dishwasher, showering, watering the lawn, turning on the faucet, and so on.
o use. This includes all	If "yes", please wait 6 hours before starting.
garden. Talk to any it this study to ensure	What is today's date?///
	What is the time? : AM / PM
d) or bathroom sink. you have point-of-use used bathroom sink. If the kitchen sink.	Where are you sampling your tap water? Check one:
out your water	Step 3. Fill Bottle 1
er? Check one:	Place Bottle 1 under your tap. Turn on the cold water at the highest
🗌 I do not know.	flow and fill Bottle 1. Bottle 1 will be tested for first-draw lead.





CHEEC provides funding to support testing for drinking water lead in schools and childcare facilities

- Initiated Spring FY2019
- Free lead and copper testing lowa elementary schools with older drinking water infrastructure
- Funding provided for testing and to assist with removing/replacing high priority drinking water outlets with unsafe levels of lead or copper.
- Comprehensive sampling of every outlet in each school.

NEWS>

lowa schools test for lead in drinking water

UI program offers free testing and remediation up to \$10K



A S S O C I A T I O N

The Gazette

Amina Grant, a third-year Dh.D. environmental engineering student at the University of Iowa, collects a sample from a rawberry Hill Elementary School in Anamosa on Saturday. ind the one faucet that tested above federal standards had iz Martin/The Gazette



WEST CENTRAL COMMUNITY ACTION

EPA's revisions to the LCR will require testing in schools and licensed childcare facilities

- Community Water Systems (CWSs) must test at 20% of K-12 schools and licensed child cares every year by 2024
- Samples from 5 outlets at each school and 2 outlets at each child care facility
- Complete sampling at all schools and child care facilities in CWS distribution system every five years.
- Excludes facilities built after Jan 1, 2014



Ground Water and Drinking Water Home	P
Basic Information	21
Private Wells	a
Consumer Confidence Reports	EPA's
Regulatory Requirements	expo the r
Standards and Regulations	most
All Drinking Water Topics	actic
Safe Drinking Water Information System	drinl



roposed Revisions to the Lead nd Copper Rule

s proposed Lead and Copper Rule (LCR) udes a suite of actions to reduce lead osure in drinking water where it is needed most. The proposed rule will identify the t at-risk communities and ensure systems e plans in place to rapidly respond by taking ons to reduce elevated levels of lead in king water.







EPA's plan to test for lead in schools will do more harm than good

76 COMMENTS BY DAVID CWIERTNY AND ANDREW WHELTON, OPINION CONTRIBUTORS – 02/12/21 02:30 PM EST THE VIEWS EXPRESSED BY CONTRIBUTORS ARE THEIR OWN AND NOT THE VIEW OF THE HILL **44** SHARES SHARE TWEET

Just In...

Virgin Hyperloop shifts focus from passengers to freight, lays off employees

CHANGING AMERICA - 4M 33S AGO

Biden describes Russia as eager to expand into Ukraine

ADMINISTRATION - 10M 34S AGO





Most Popular

2



1,403 SHARES



Required sampling locations miss well-known sources of lead contamination in schools

Table SI-2. First draw and flushed sample lead concentrations by fixture type.

			First	draw		Flushed			
	Fixture type ^a	n	Median	P90 ^b	% ≥15 ppb	n	Median	P90 ^b	% ≥15 ppb
2	Water fountain	8,963	1.0	13.2	8.9%	5,274	<1.0	4.9	3.1%
1	Classroom faucet	9,836	2.3	21.4	14.5%	8,237	<1.0	3.4	2.0%
•	Home economics faucet	181	1.5	14.9	9.9%	176	<1.0	3.1	4.0%
	Bathroom faucet	669	2.3	15.4	10.5%	602	<1.0	3.4	2.0%
1	Kitchen faucet	2,077	2.0	18.1	12.3%	1,795	<1.0	3.0	2.2%
	Kitchen icemaker	106	0.5	2.3	3.8%	26	<1.0	5.3	0.0%
\Rightarrow	Kitchen kettle	524	6.6	128.9	35.5%	495	<1.0	11.6	8.7%
1	Nurse's office	845	1.7	15.9	10.7%	809	<1.0	3.1	2.5%
-	Other	1,119	1.9	19.2	12.9%	1,020	<1.0	3.1	3.7%
	Water cooler / chiller	3,607	0.5	3.2	1.8%	2,699	<1.0	3.4	2.3%
	Service Connector	2	3.9	6.0	0.0%	2	<1.0	<1.0	0.0%
	Unclassified ^c	19,801	1.6	19.0	12.7%	15,505	<1.0	4.0	2.8%
	TOTAL ^d	47,730				36,640			

^aFixture type was recorded in 738 of the 1,094 schools

^bP90: 90th percentile lead value

^cUnclassified included fixtures with labels as comment strings that could not be parsed. ^dFour fixtures (3 first draws and 1 flushed sample) were labeled with more than 1 identification code.

Drinking water is a potential lead (Pb) source and can contribute to lead poisoning.

To eliminate lead poisoning, we need to start assessing the **risk of lead** in drinking water.



Thanks & Questions





PEDIATRIC PUBLIC HEALTH INITIATIVE

HOSPITAI







WIIN GRANT





Lyn Jenkins Education Program Consultant

WIIN (Water Infrastructure Improvements for the Nation Act)

LEAD Testing In School and Child Care Programs

Drinking Water Grant


Background

The WIIN Lead Testing in School and Child Care Program Drinking Water Grants provide an opportunity for schools and child care programs to bring awareness to water quality through voluntary testing, communication, and education.

- WIIN 1 \$460,000 (09/30/2019 06/30/2022)
- WIIN 2 \$289,000 (10/01/2020 09/30/2023)
- WIIN 3 \$295,000 (10/01/2022 09/30/2024)

WIIN Grant Objectives

- Reduce children's exposure to lead in drinking water;
- Help states target funding toward schools and child care programs unable to pay for testing;
- Utilize the 3Ts model or model no less stringent to establish best practices for a lead in drinking water prevention program;
- Foster sustainable partnerships at the state and local level to allow for more efficient use of existing resources and exchange of information among experts in various educational and health sectors; and
- Enhance community, parent, and teacher cooperation and trust.

Partners

- State Hygienic Lab, University of Iowa \bullet
- Department of Natural Resources (DNR)
- Health & Human Services- Childhood Lead Poisoning \bullet Prevention
- Iowa PBS & University of Northern Iowa
- University of Iowa College of Public Health

WHO CAN ACCESS THE GRANT

Child Care Centers-1)

The term 'child care program' has the meaning given the term 'early childhood education program' in section 103(8) of the Higher Education Act of 1965 (20 U.S.C. 1003(8)).

2) Local Education Agency- Public Schools

The term 'local education agency' means:

- a local education agency (as defined in section 8101 of Elementary and Secondary Education Act of 1965 (20 U.S.C. 7801));
- a tribal education agency (as defined in section 3 of the National Environmental Education Act (20 U.S.C. 5502)); and
- a person that owns or operates a child care program facility.



HOW TO PARTICIPATE?

Educateiowa.gov

EPA's 3T's – TRAINING, TESTING AND TAKING ACTION

Participant Trainings

- Module 1: Overview
- Module 2: Communication and Education
- Module 3: Conduct a Walkthrough and Plumbing Profi
- Module 4: Collect Water Samples
 - public schools will test at least 3 water outlets
 - child care centers will test at least 2 water outlets
- Module 5: Results and Requirements
- Module 6: Remediation and Additional Resources





Communication

Before & After Testing

- Testing Date
- Resource link To EPA's 3 T's Program
- Awareness of some health effects and risks associated with lead exposure
- Results of testing
- Community contacts where individuals may seek blood-level testing
- Additional resources on lead in drinking water

*Annual Water Quality Report - DNR



Education

Healthy Habit All Stars

Iowa HHS

Science Phenomenon

- lowa PBS
- UNI



Your child watched a cartoon featuring the Healthy Habit All-Stars from the Iowa Department of Health and Human Services (Iowa HHS) and the Iowa Department of Education. In the video, the All-Stars talked about lead and why it's dangerous to kids' health. We want to give you a little background on lead to prepare you for some questions you might be asked later.

 \checkmark

- in their mouths.



Protect your toddler from lead!

Why is lead dangerous to little kids especially?

Lead is toxic and can cause developmental delays, learning difficulties, headaches and more.

WHAT IS LEAD POISONING AND HOW DOES IT HAPPEN?

Lead poisoning is when a child has lead in their body. This can happen if your child:

· Breathes in dust from lead-based paint that's being sanded, scraped or removed during home renovations - especially in homes built before 1978.

· Puts lead-based paint chips or dust in their mouth.

· Chews on items that may contain lead, including toys, jewelry or household items.

· Places dusty or dirty hands, toys, bottles or pacifiers

· Plays in dirt or a sandbox near an old building or where an old building was torn down.

· Drinks water contaminated with lead from old pipes in the home.

Get your child tested for lead once a year, every year until age 6.



Scan to learn more about preventing lead poisoning



WHAT ARE THE SYMPTOMS OF LEAD POISONING IN KIDS?

Symptoms include:

- · Getting easily excited
- Problems paying attention
- Stomachaches and headaches
- More tired than usual

SO, HOW CAN YOU HELP PREVENT LEAD POISONING?

- · Check your home and other homes where your child visits for lead-based paint that's chipping or peeling.
- · Wash your child's hands before meals, snacks and naps.
- · Keep your child's play area clean by wet mopping or wet wiping with a disposable cloth.
- Regularly clean high-risk areas like windows to remove possible lead dust or paint chips.
- · Wash your child's toys, blankets and pacifiers often.
- . Test your water and pipes for lead to make sure their water is safe and lead free.
- · Eat healthy foods with calcium, iron and vitamin C.



Let's use our head and help kids stay safe from lead

Testing

- Schools at least 3 drinking water sources •
- Childcare at least 2 drinking water sources
- First Draw & Flush Sample

Iowa's lead "Action Level" is 15 ppb (DNR)



Remediation and Good Practice

- Routine
- Interim
- Permanent





WIIN Lead Testing

2022 WIIN Sites

6

0

SIEDA Community Action HS

Carroll Early HS

S NE IA Community Action HS

Community Action

0

Green Mountain Schools

Des Moines Public Schools

2023 Sites

0

0

0

St. Alphonsus Early Childhood Education Center

New Opportunities HS

Cedar Rapids Community School District

Community Action of Southeast Iowa HS



Project Evaluation

To identify program strengths, limitations, and opportunities and to make recommendations for quality improvement

WIIN 1

1.Partners

2. Program participants

WIIN 2

- Patterns in participation 1.
- Healthy Habit All Stars material 2.

IOWA WIIN PROGRAM Ε\/ΔΙΙΔΤ EXECUTIVE SUMMARY

Sofie Dollison, MPH, CHES, Vickie Miene, MS, MA LMHC. & Shannon Lea Watkins, PhD



Contacts

Lyn Jenkins

lyn.jenkins@iowa.gov

Melissa Walker

melissa.walker@iowa.gov

(515)689-3607

(515)864-6701



IOWA DEPARTMENT OF NATURAL RESOURCES

LEADING IOWANS IN CARING FOR OUR NATURAL RESOURCES

The Countdown to Iowa's Lead Service Line Inventory **Due Date**

Carmily Stone, MPH Water Supply Engineering Section Supervisor Iowa Department of Natural Resources



Background on Lead and Copper Rule

- 1991 EPA published a regulation to control lead and copper in drinking water. This regulation is known as the Lead and Copper Rule (LCR).
- 1998 2007 EPA made minor and short term revisions
- January 2021 EPA releases Lead and Copper Rule Revisions (LCRR)
- December 16, 2021 EPA announces that there are significant opportunities to improve the rule to support the overarching goal of proactively removing lead service lines and more equitably protect public health—Lead and Copper Rule Improvements (LCRI)
- Initial LSL inventory must be completed by October 16, 2024



How does lead get into the water?

Lead can enter drinking water when pipes and plumbing fixtures that contain lead corrode, especially where the water has high acidity or low mineral content. There are three main sources of lead:

- Lead pipes Lead service lines, the pipe that connects the water main under the street to a building's plumbing. Lead pipes were also used in inside plumbing but it is unusual. Congress banned use of lead pipes in 1986.
- Leaded solder Solder is used to connect copper pipe and fittings. Congress 0 banned the use of leaded solder in 1986.
- Leaded alloys Brass is frequently used in faucets and other plumbing 0 components. In 1986 Congress limited the amount of lead in brass to 8% (close to the level of lead typical of products at the time) and later in 2014 reduced the limit to a much lower level (0.25%).



What is a service line?





What We Know-LSLI

- All CWSs and NTNCWSs must develop an inventory of service lines that meets the LCRR requirements, including service line materials classification, information sources, and public accessibility
- Water systems must submit their initial inventories to their state by October 16, 2024
- All CWSs and NTNCWSs must notify all persons served by the water system at the service connection with a lead, GRR, or lead status unknown service line within 30 days of completing their service line inventory
- All LCRR requirements other than the initial inventory requirements are subject to change under the LCRI



Lead Service Line Inventory (LSLI)

- Why do LSL Inventories?
 - Assess the extent of the LSLs within the systems,
 - Identify better lead and copper sampling locations, and
 - Begin planning for LSL replacements, including applying for state and federal grants and loans (i.e., Bipartisan Infrastructure Law (BIL) may provide \$15 Billion for lead service line replacement)
 - It's required



What is required in the LSLI?

- According to EPA (Presentation on 2/2/22), the LSL Inventory Requirements are:
 - Water systems must develop an initial inventory by October 16, 2024 —
 - Must include <u>all service lines</u> connected to the public water distribution system regardless of ownership status
 - Where service line ownership is shared, the inventory would include both the portion of the service line owned by the water system (public) and the customerowned (private) portion of the service line
 - Each service line, or portion of the service line where ownership is split, must be categorized



What's required in the LSLI?

• • •	
SL Category	Description
Lead	SL made of lead (confirmed lead)
Galvanized Requiring Replacement (GRR)	Is or was at any time downstream of being downstream of LSL
Non-Lead (NL)	Evidence-based record, method, or to may classify as actual material (i.e., or alternative to classifying as "Non-lead
Lead Status Unknown (LSU)	SL material is not known

LSL or if no record of NOT

echnique – copper, plastic)) as an d″



What's required in the LSLI?

- EPA recommends including lead connectors (i.e., goosenecks, pigtails) where records exist but it is not required.
- EPA recommends site investigations for unknown lines but it is not required
- Must be publicly available ٠
- Must be available online for systems serving more than 50,000 people
- Must include a location identifier associated with each service line



City of Ames LSL Map





LSLI Template – Required Fields

	А	В	С	D	E	F	G	Н		J	К
1		lowa Depa	rtment of Na	tural Resour	rces-Lead Se	ervice Line In	ventory				
2		MUST ENTER FIRST↓	Click On Colun	nn Headers For Inpu	t Message	MUST ENTER FIRST↓					
3	PWS ID		PWS Name		Date of Current Inventory		Official Service Line Ownership Policy				
4	4 MUST ENTER FIRST↓ REQUIRED										
5	OWNERSHIP OF SERVICE LINE	SYSTEM SPECIFIC ID	SERVICE ADDRESS	LEAD CONNECTOR CURRENTLY PRESENT? (E.G., GOOSENECK, PIGTAIL, OTHER)	WAS LEAD EVER UPSTREAM OF THIS SERVICE LINE? (EXCLUDE CONNECTOR)	PWS-OWNED SERVICE LINE MATERIAL	WAS PWS-OWNED SERVICE LINE EVER LEAD?	YEAR PWS- OWNED SERVICE LINE INSTALL DATE	PRIVATE SIDE SERVICE LINE MATERIAL	YEAR PRIVATE SIDE SERVICE LINE INSTALL DATE	VERIFICATION SOURCE
6											
7											



Optional & Auto Populated Fields

OPTIONAL							
BUILDING TYPE	POINT OF ENTRY OR POINT-OF USE TREATMENT PRESENT?	STRUCTURE- PRIMARY PLUMBING MATERIAL 1	STRUCTURE- PRIMARY PLUMBING MATERIAL 2	YEAR(RANGE)STRUCTURE PLUMBING MATERIAL INSTALLED	THIS LOCATION WILL BE USED FOR LEAD AND COPPER SAMPLE SITE PLAN?		

FORMULA -AU	TO POPULATED

FOR	OPTIONAL				
LSL CATEGORY IN INVENTORY	SAMPLE SITE SELECTION CRITERIA (SITE TIER)	WOULD THIS COUNT AS FULL LEAD SEVICE LINE REPLACEM	REQUIRES RESIDENT NOTIFICATION IF LSL DISTURBED	REQUIRES RISK MITIGATION (POU OR PITCHER FILTER)	GENERAL NOTES



Who can I contact for funding?

- State Revolving Fund (SRF) Inquiries for Funding for Lead Service Line **Replacement Projects**
- water-infrastructure@dnr.iowa.gov
- This funding is for water systems to apply for lead service line replacement projects. \bullet This is not for homeowners.



Ultimate Goal

• Get the lead out



Sign up for the listserv!

Visit the Iowa DNR Water Supply Engineering webpage and scroll to the bottom and click:

Water Supply Listserv:

C The Water Supply Program has a Water Supply Listserv, which is an e-mail newsletter that is sent to subscribers on a periodic basis. It is targeted to those actively engaged in the operation and regulatory compliance of Iowa's public drinking water systems, providing regulatory news, program updates, and technical guidance to the public water supply owners, water supply operators, and consultants.

Sign up for Water Supply News



Resources

- https://www.iowadnr.gov/Environmental-Protection/Water-Quality/Drinking-Water-Compliance/Lead-Service-Line-Inventories
- https://www.lslr-collaborative.org/







Green & Healthy Homes Dubuque

Presented by



Nancy, Van Milligen

President and CEO Community Foundation of Greater Dubuque



Mary Rose Corrigan, RN

Public Health Director *City of Dubuque*















5 Most Common






Social Determinants of Health



Overcrowded Housing Healthy Foods Clean Water

Culture & Beliefs Family Relationships Social Support Networks



Costs to communities

- \$38,000 extra spent on educating a child with lead poisoning
- 885 Asthma visits to emergency rooms (2009-10) costing \$362,000 annually
- \$300,000 lost annually to inefficient doors, windows, furnaces, etc.
- Homes valued at \$49 000 in targeted neighborhoods vs. city-wide average of \$111 000



Past solutions







GHHI solutions







5 GHHI Principles

- Break the link between unhealthy housing and sick children & 1. adults
- Replace stand-alone programs (weatherization, lead hazard 2. control, fire safety, etc.) with a comprehensive strategy
- Increase public demand for and expand access to green 3. housing
- Reduce number of programs clients must apply for 4.
- Create jobs by certifying assessors and contractors to GHHI 5. standards



BEE BRANCH HEALTHY HOMES PROGRAM



Over 100 families have received some level of advocacy support through the program.

Intake Challenge Buckets 21% 32% SOCIAL BUILT Childcare **ENVIRONMENT** Youth Activity Home Maintenance **Parent Education** Weatherization Food CO2/Smoke alarm Legal Lead Hazards **Transportation** Pest Control Clothing Pests Housing Counseling Social Support (lack of)

Local Collaborative Solutions





Empowered homeowners in green and healthy homes



Comm OF GREATER DUBUQUE





- A network of community members, organizations and institutions
- Advancing equity by:
 - o Learning together
 - \circ Aligning
 - $\circ~$ Integrating their actions
- Achieving population- and systemslevel change

Collective Impact



5 Conditions of Collective Impact

- 1. Starts with a common agenda
- 2. Establishes shared measurement
- 3. Fosters mutually reinforcing activities
- 4. Encourages continuous communication
- 5. Has a strong backbone

anent activities munication



6 Conditions of Systems Change



Resource Flows

Structural Change (explicit) Relational Change (semi-explicit) **Transformative** Change (implicit)



GHHI impacts the community

- 185 green/healthy homes
- Collaboration efficiencies achieve15-20% savings
- 25 green jobs created in 2012
- Home Advocate engages social services/supports
- Targeted approach creates stability in at-risk neighborhoods
- Opportunities for expansion to rural communities





After



Performance Metrics

More stable families

- Improved health outcomes
- Childs educational success
- Wealth retention \bullet

Green and Healthy Neighborhoods

- Increased property values
- Improved neighborhood stability
- Increased job creation, improved placement/retention \bullet



Support Joint Assessment Agreement

Current barriers

- DOE/HUD assessments do not match ullet
- Requires multiple assessors on site

The solution

- Single home assessment \bullet
- Allows one assessor to perform inter-agency home ${}^{\bullet}$ assessments saving \$\$

Collaborating agencies

- (DOE)Operation: New View Community Action Agency
- (HUD) City of Dubuque



Support Single Contractor Bid Process

Current Barriers

- Multiple bids
- Increased time/\$\$
- Deters quality contractors

The Solutions

- One bid process
- Expands pool of contractors
- Federal DOE model for bidding

Collaborating agencies

- (DOE) Operation: New View Community Action Agency
- (HUD) City of Dubuque



Contract signing



Support the Home Advocate Role

Innovative Home Advocate Role

- For the GHHI homeowner
 - Point of contact
 - Advocate
 - Link to community resources
 - Facilitates behavior/lifestyle changes
- For the GHHI program
 - Data collector
 - Homeowner perspective
 - Sustainability "guarantee"





Contact Information

Nancy Van Milligen

President and CEO, Community Foundation of **Greater Dubuque**

nancy@dbqfoundation.org

Mary Rose Corrigan, RN Public Health Director, City of Dubuque mcorriga@cityofdubuque.org









12:30PM - 1:00PM

Check out all of the resources we have put together!

https://idph.iowa.gov/Environmental-Health-Services/Childhood-Lead-Poisoning-Prevention/resources

Childhood Lead Poisoning: New Challenges from an Old Adversary

Alan Woolf, MD, MPH, FAAP, FAACT, FACMT

Director, Region 1 New England Pediatric Environmental Health Specialty Unit (Region 1 PEHSU) Director, Pediatric Environmental Health Center, Boston Children's Hospital Professor of Pediatrics, Harvard Medical School



Region 1 New England Pediatric Environmental Health Specialty Unit

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www.pehsu.net



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Lead...an emerging toxic threat then...



League of Nations ban - 1921



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Pb is still with us today...



- 37 million homes = lead-based paint hazards
- 6 million lead service lines
- ~ \$1 trillion to upgrade, repair, maintain infrastructure over next 25 years

Sources: NRDC; <u>www.EPA.gov</u>; Benfer et al Health Affairs 2017







Testing Interrupted During COVID

Morbidity and Mortality Weekly Report (MMWR)

CDC

Decreases in Young Children Who Received Blood Lead Level Testing During COVID-19 — 34 Jurisdictions, January–May 2020

Weekly / February 5, 2021 / 70(5);155-161

Joseph G. Courtney, PhD¹; Stella O. Chuke, MBBS¹; Kelly Dyke¹; Kimball Credle¹; Carolina Lecours, MPH¹; Kathryn B. Egan, <u>affiliations</u>)

The New York Times

Published March 11, 2021 Updated March 12, 2021

By Emily Anthes

More Childhood Lead Poisoning Is a Side Effect of Covid Lockdowns

Lead screenings for children plummeted last spring, and stay-athome orders may have increased household exposure to the toxic metal.

"Hundreds of thousands of children have missed their essential tests for lead," said Joseph Courtney, a senior epidemiologist at the C.D.C.'s lead poisoning prevention and environmental health tracking branch, who conducted the analysis. "And it's something that has potentially permanent lifetime effects."







* CDC requested that state and local health departments report the total number of children with BLL tests by month during January–May 2019 and January–May 2020. Data for children aged <6 years were received from 34 state and local health departments, including the District of Columbia and New York City.

Mar

Month

Apr

May

Feb

[†] Alabama, Alaska, Árizona, California, Colorado, Delaware, District of Columbia, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Kansas, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nevada, New Hampshire, New Mexico, New York (excluding New York City), New York City, Ohio, Oregon, Rhode Island, Tennessee, Texas, Washington, West Virginia, and Wisconsin.

34% less testing (9603 eBLL missed)

Testing in Iowa During COVID





By Age 70.23% 35.70%



https://tracking.idph.iowa.gov/Health/Lead-Poisoning https://hhs.iowa.gov/sites/default/files/portals/1/userfiles/106/2020-lead-report-cards.pdf



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Pathways of Today's Talk

Participants will be able to:

- Describe aspects of the epidemiology of childhood lead exposure. 1.
- Cite vulnerable populations and racial/ethnic disparities in childhood 2. lead poisoning.
- 3. Describe how lead can impact children's health.
- Explain the difference between screening and testing. 4.
- 5. Cite points in the case management.







1976-1980 Mean BLL 14.9 ug/dL 99.7% BLL <u>></u> 10 ug/dL



_.



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2011-2016 Mean BLL 0.76 ug/dL 0.76% BLL> 10 ug/dl

Figure: Prevention of Childhood Lead Toxicity | Pediatrics | AAP

Why are we still talking about lead?

- Lead toxicity in childhood has health effects for a lifetime
- Lead toxicity results in substantial, population-level effects on children's intellectual abilities, academic abilities, problem behaviors. At high levels, it can cause coma, seizures & death.
- Lead poisoning is the most common and 100% preventable (*if resources were widely available to all*) environmentally related medical condition
- ROI: lead paint hazard control
 - \$1 invested \rightarrow \$17-\$221 benefit (net \$181-269 billion)
- Reducing BLL to <1 mcg/dL in all children (0-6 yrs)
 \$1.2 trillion savings

Childhood Lead Poisoning: Conservative Estimates of the Social and Economic Benefits of Lead Hazard Control | Env Heal Perspect | 117: 7 The Social Costs of Childhood Lead Exposure in the Post–Lead Regulation Era | Pediatrics | JAMA Pediatrics | JAMA Network





s for a lifetime on-level effects on ilities, problem , seizures & death. 00% preventable environmentally

81-269 billion) -6 yrs)

Sources of Lead



Pediatrics. 2016;138(1). doi:10.1542/peds.2016-1493



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Lead-Containing Paint

vBLL 97 ug/dL What is that?





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3 Gastric Body



Upper Gastrointestinal Tract







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Growing List of Non-Housing Sources







- Fishing weights
- Pots & pans
- Toys, Jewelry
- Glazed pottery
- Herbs, Spices
- Dietary supplements •
- Ethnic remedies
- Marksmanship •
- Religious powders
- Medicines
 - Ayurvedics
 - Greta, Azarcon
- Breast creams ٠
- Cosmetics: Kohl, Tiro, Sindoor
- African/Middle East eye cosmetics
- **Occupational "Take Home"**

Images: Sources of Lead | Lead | CDC; Cosmetics and Your Health (nih.gov); Questions and Answers on Lead-Glazed Traditional Pottery | FDA





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tate of California Prop 65 Wa















Factors Influencing Toxicity

- Age at exposure
- Duration of exposure
- Genetics
- Amount entering body
 - Dose % absorbed (bioavailable dose)
 - Fe status [4x risk eBLL in deficiency]
 - (Ca, Mg, Zn, Vitamin D status)









Children Are More Vulnerable





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Vulnerable Families

Published in final edited form as: *Clin Pediatr (Phila).* 2018 July ; 57(8): 988–991. doi:10.1177/0009922817734364.

Lead Poisoning and Children in Foster Care: Diagnosis and **Management Challenges**

Marissa Hauptman, MD, MPH^{1,2,3}, Alan D. Woolf, MD, MPH^{1,2,3}

¹Boston Children's Hospital, Boston, MA, USA

²Harvard Medical School, Boston, MA, USA

³New England Pediatric Environmental Health Specialty Unit, Boston, MA, USA

Published in final edited form as: Clin Pediatr (Phila). 2019 June ; 58(6): 605-612. doi:10.1177/0009922819839237.

Children With Autism Spectrum Disorder and Lead Poisoning: Diagnostic Challenges and Management Complexities

Marissa Hauptman, MD, MPH^{1,2,3,*}, Bryan Stierman, MD, MPH^{1,2,3,*}, Alan D. Woolf, MD, MPH^{1,2,3}

¹Boston Children's Hospital, Boston, MA, USA

²Harvard Medical School, Boston, MA, USA

³Region 1 New England Pediatric Environmental Health Specialty Unit, Boston, MA, USA



- Spontaneous abortion
- Gestational hypertension
- Impaired neurodevelopment



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- Pregnancy outcomes of lead exposure
 - Low BW
Environmental Justice

- Immigrant/refugee children
- Housing built before 1978
- Fewer owners = HIGHER BLL
- Low income communities 3X as likely eBLL
- Black children 2.5x lead poisoning as white children
- **Disparities for decades**, newly revealed by COVID





Sources: JAMA Ped 2021 MA Dept of Public Health, 2019 Pediatrics (2016) 138 (1): e20161493. https://doi.org/10.1542/peds.2016-1493 •President's Task Force on Environmental Health Risks and Safety Risks to Children





Lead Toxicity Pathogenesis: Neuron

- Competitive enzyme inhibition
- Promotes DNA/RNA polymerase infidelity
- Activates protein kinase C
- Reduced NMDA neurotransmitter
- Reduced dendritic branching
- Injured auditory hair cells
- Affects cns mitochondrial function
- Disrupts signal transduction/nerve conduction
- Interferes with Ca⁺²/Zn⁺² functions
 - Synaptosome
 - voltage-gated channels
 - calmodulin



Photo Credit: Garza Med Sci Monitor 2006







Elevated Zinc-Chelated ProtoPorphyrin (ZPP)







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What we see in the clinic...

Headache Irritability Distractible Vomiting Constipation Stomachache Poor appetite Trouble sleeping





What we may not see but is also there...

105

95

90

85



- 100 • 2.4 to 10 μ g/dL $\rightarrow \downarrow$ 3.9 IQ (95%) Cl, 2.4-5.3) 0
- 10 to 20 μ g/dL \rightarrow \downarrow 1.9 (Cl, 1.2 2.6)
- 20 to 30 μ g/dL $\rightarrow \downarrow$ 1.1 (Cl, 0.7) 1.5)

Lanphear B et al. Environ Heal Perspect 2005; 894-899.







IQ LOSS: U.S. Children <5 yr

Risk Factor	FSIQ Points Lost
Preterm Birth	34,031,025
Lead Poisoning	22,947,450
Organophosphates	16,899,488
ADHD	16,799,400
Fe Deficiency	9,409,500
Pediatric Bipolar Disorder	8,164,080
ASDs	7,109,899

Bellinger DC. EHP 2012; 120: 501-7.



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Neurodevelopmental Effects

Multiple studies document developmental, motor, cognitive, behavioral damage in vulnerable children

Byers & Lord AJDC 1943 Needleman et al NEJM 1979 **Bellinger et al Neurobehav Toxicol Toxicol 1984 Bellinger et al Neurobehav Toxicol Toxicol 1986 Bellinger et al NEJM 1987 Dietrich et al NEJM 1987** McMichael et al NEJM 1988 **Ruff & Bijur Dev Behav Peds 1989** Needleman et al NEJM 1990 Needleman & Gatsonis JAMA 1990 Lozoff et al NEJM 1991 **Bellinger et al Pediatrics 1992** Sciarillo et al AJPH 1992 **Baghurst et al NEJM 1992** Ruff et al JAMA 1993 Teng et al JAMA 1998 Lanphear et al Pub Heal Rep 2000 **Canfield et al NEJM 2003**



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Academic Performance

Negative associations: BLLs 2-10 ug/dL vs. tests of academic performance, class rank, end of grade in multiple prospective + cross sectional studies (North America, Europe, Africa)

> Al-Saleh et al 2001 PALS-K Score **Rhode Island pre-K reading readiness (N=3406)** Wang et al 2002 Surkan et al 2007 Min et al 2009 Chandramouli et al., 2009 Miranda 2010 & 2011 N=57,000 Strayhorn 2012 BLL explains 8-16% variance reading/math Ann Evens 2013 Chicago N=48,000 Zhang 2013 Detroit Amato et al 2013 Milwaukee McLaine et al 2013 Providence RI Magzeman et al 2013









Lead & Behavior

- Learning disabilities
- Inattention/impulsivity
- Hearing & speech
- Hyperactivity
- Aggression, anti-social other behavior problems
- Police Reports; Conduct disorders; Delinquency
- School Drop-out









Persistent Brain Organization Impact



High BLL

•N=42 Cincinnati Cohort 20 years later (mBLL 14 ugm/dL mFSIQ 87

•fMRI measured during verb generation

 Diminished Activation: Left Frontal Cortex & Left Middle Temporal Gyrus

•Enhanced Compensatory Right Hemisphere Homolog – Wernicke's area

Yuan et al, 2006



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Low BLL

Other Adverse Outcomes

- Speech problems
- Decreased hearing

Reference: Prevention of Childhood Lead Exposure. *Pediatrics* (2016) 138 (1): e20161493. https://doi.org/10.1542/peds.2016-1493



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 Reduced growth Delayed puberty Kidney problems Hypertension





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Primary Prevention: "Upstream"



Image: Streamflow and the Water Cycle | U.S. Geological Survey (usgs.gov)



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2ndary Prevention: Roles for Health Care Providers

- Case-finding
- **Prevent further exposure (Inspect Mitigate Abate)** \bullet
- **Neurodevelopmental assessment** ullet
- **Dietary counseling** ullet
- **Social management** ullet
- Chelation \bullet







Secondary Prevention: Blood Lead Testing





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Treat and Support



Roles for Health Care Providers: Secondary Prevention



Case Finding: Screening to identify diseases in the earliest stages.



Goal = lead poisoning prevention: Screen children at early ages to identify exposure, eliminate the source, remediate the environment, and link affected children to critical medical and behavioral services



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Advantages of Lowering Blood Lead

Reaching more children at risk Early identification of children potentially exposed



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Maximizing effectiveness of intervention with timely linkage to care

Screening vs Testing

Screening – Questions and epidemiological data that define the degree of a child's risk

Testing – the measuring of lead in the blood



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Screening Questions

Child

- Is this child an immigrant, refugee, or international adoptee?
- Does this child's siblings or playmates have venous BLL ≥ BLRV?
- Is this child in foster care with numerous housing transitions? •
- Does this child have persistent pica habits (e.g. children with autism)?
- Does this adolescent engage in marksmanship or hobbies or occupations involving lead?

Family

- Does this child live in or regularly visit a home built before 1978?
- Has this child been exposed to repairs, repainting, or renovations of a pre-1978 home?
- At any time, has this child lived near a factory where lead is used (e.g., a lead smelter)?
- Does this child reside in a high lead prevalence ZIP code?
- Does this family use imported spices, cosmetics, religious powders, cookware, pottery, etc? ۲
- Does this child live with someone whose job or hobby may involve lead?
- Has this child been to any country where exposure to lead could have occurred?







Screening Guidance

- Universal testing in high-risk states
- Universal testing of Medicaid recipients
- **AAP Guidance**
- Risk assessment: at 6, 9, 12, 18, & 24 mos, at 3, 4, 5, and 6 years
- Obtain BLL if risk assessment is positive

CDC Guidelines

- Screening in zip code where >27% pre-1950 housing or \geq 12% prevalence of \geq 10 mcg/dL BLL in children 12-36 mos.
- Targeted screening: high risk groups in low prevalence communities
- Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)







Source: https://www.fns.usda.gov/wic

Capillary vs. Venous









Blood Lead Reference Value

- Derived from national data
- 97.5th percentile: 1-5 year-olds (NHANES 2015-16 and 2017-18) 2021: CDC lowered BLRV from 5 to 3.5 mcg/dL ullet- ~500,000 U.S. children have BLL > 3.5 mcg/dL
- BLRV = screening tool, not health-based or regulatory \bullet
 - Used to identify children who have higher BLL
 - A prompt to take action on behalf of your lead-exposed patient

Update of the Blood Lead Reference Value — United States, 2021 | MMWR (cdc.gov). Blood Lead Reference Value | Lead | CDC Revised blood lead reference value: progress, but more work to be done | AAP News | American Academy of Pediatrics NHANES: National Health and Nutrition Examination Survey







Triage: BLL Results

<3.5 ug/dL	20-44 ug/
 Repeat BLL 6-12 months 	–Con
3 5-9 ug/dl	–Rete
J.J-J ug/ul	45-69 ug/
- Confirm within 1 month	–Con
- Repeat BLL in 3-6 months	–Cons
10-14 ug/dL	<u>></u> 70 ug/d
 Confirm within 1 month 	-MIC
 Retest within 1-3 months 	
15-19 ug/dL	

- Confirm within 1 month
- Retest within 1-3 months







/dL

firm within 1 week est every 1-2 months /dL

firm within 48 hours sider hospitalization

U hospitalization

Keep Your Guard Up...

- Overt signs or symptoms of toxicity are rare
- Factors that delay decisions on testing, prevent recognition of lead exposure \bullet
 - Belief that one practices in a low-risk area
 - Belief that only certain populations are at risk
 - Belief that health effects are unlikely at low BLLs
- Inconsistent state/local testing and reporting practices
- Inadequate resources
- Families skip the lab
- Lost to follow-up

Elevated Blood Lead Levels and Blood Lead Screening Among US Children Aged One to Five Years: 1988–1994 | Pediatrics: 106(6), 2000. Childhood Lead Poisoning in Wisconsin | WMJ:118(1):16-20, 2019 (wmjonline.org) Decreases in Young Children Who Received Blood Lead Level Testing During COVID-19 — 34 Jurisdictions, January–May 2020 | MMWR (cdc.gov) Magellan Diagnostics, Inc. Expands Voluntary Recall of LeadCare[®] Test Kits | FDA







Temporary Mitigation



http://www.hud.gov/offices/lead/training/LBPguide.pdf



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Inspection



Lead Check Swabs

- Errors: false pos, false neg
- Only checks surface paint



X-ray Fluorescence (XRF) • Licensed professional • Cost \$400-500 • Not covered in P&S inspection • Identifies lead in all paint layers







Home Pb Abatement

- Beware! Unsafe repair makes problem WORSE
- Financing, Certified Contractors
- Family Relocation
- Abatement



- **Alternative Housing**
- **Containment, Clean-up**
- **Re-inspection**
- **Monitoring Post-occupancy**

<u>Reference: AMERICAN ECONOMIC JOURNAL: APPLIED ECONOMICSVOL. 10, NO. 3, JULY 2018</u>.(pp. 315-44)







Water Sources & Lead



and Risks to Children

Alan D. Woolf, MD, MPH, FAAP,ª Bryan D. Stierman, MD, FAAP,ª Elizabeth D. Barnett, MD, FAAP,^b Lori G. Byron, MD, FAAP,⁴ and the COUNCIL ON ENVIRONMENTAL HEALTH AND CLIMATE CHANGE, COMMITTEE ON INFECTIOUS DISEASES

Woolf AD et al. Pediatrics 2023; 151 (2): e2022060644

Problem

Lead may enter tap water from corrosion of plumbing materials

Increased risk in pre-1986 homes

"lead free" plumbing could contain up to 8% lead until 2014

Solutions

POU

Access to information: local public water systems and DoH Private wells: Water testing policies & resources

https://www.epa.gov/ground-water-and-drinking-water/funding-lead-service-line-replacement







POLICY STATEMENT Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of all Children

American Academy of Pediatrics



DEDICATED TO THE HEALTH OF ALL CHILDREN

Drinking Water From Private Wells

Neurodevelopmental Assessment

- Milestones
- Hearing, Speech & Language
- Cognition
- **Executive Function, Behavior**
- **Referrals:**

 \geq EIP/Headstart (85% eBLL referrals qualified)

> Behavior/Development/Neurological Specialists







Nutritional Guidance





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Family Guidance: *it takes a village*

- Economic issues
- Family Relocation
- Self-Help Courses
- Community Resources
- Advocacy









Chelation: CDC Class IV/V Plumbism





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Key Roles for Pediatric Care Providers



Screening of preschool children to identify those at high-risk



when indicated



Ensure all BLL results exceeding BLRV with shared with local & venous BLL obtained state-level public health agencies in a timely fashion





Counsel families: interpret BLL results



Initiating follow-up management

Referral, as needed, to other resources













Prevention counseling

Multidisciplinary Management





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Temporary and Sustainable Lead Hazard Remediation

> Chelation Therapy

Key Points

1. No safe level of lead exposure in children.

- \downarrow academic achievement, IQ
- \uparrow inattention, problem behaviors
- Other systems: growth, endocrine, renal
- Disparity in access to care impacts health effects

2. Considerable long-term costs to society.

- Educational attainment
- Economic productivity
- Criminal behavior
- Forfeited health
- 3. Thousands of children are still exposed.





nal effects



Summing Up






Resources

- Iowa Resources: https://hhs.iowa.gov/Environmental-Health-Services/Childhood-Lead-Poisoning-Prevention/resources
- Hotlines: 1-800-426-4791 1-800-897-LEAD
- AAP: https://www.aap.org/en/patient-care/lead-exposure/
- CDC: https://www.cdc.gov/nceh/lead/default.htm
- www.pehsu.net
- Book: "Happy, Healthy, Lead-free Me!" https://leadfreekidsnh.org/happy-healthy-lead-free-me-resources/

Photo: Courtesy NH DHHS: photo of Dr. Christine Arsnow, Concord Pediatrics, NH with permission







HARVARD MEDICAL SCHOOL TEACHING HOSPITAL

Virtual SafeHome[©] QR Code



https://www.childrenshospital.org/programs/pediatri c-environmental-health-center/patientresources/virtual-safe-home-interactive



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Thank you!

2:00PM - 2:15PM

Check out all of the resources we have put together!

https://idph.iowa.gov/Environmental-Health-Services/Childhood-Lead-Poisoning-Prevention/resources

Childhood Lead Poisoning: A Case Report



Tammy Noble, RN, BSN, CSPI Clinical Educator Tammy.Noble@unitypoint.org Dan McCabe, MD Medical Director daniel-j-mccabe@uiowa.edu

Today's Objectives:

1. Explain why lead continues to be a chemical hazard of great concern.

2. Describe known factors contributing to lead poisoning.

3. Identify evaluation and treatment protocols for leadexposed patients.







Conflict of Interest

There are no conflicts to disclose





Lead Hazards

- Lead was used historically in common products
 - Paint, gasoline, water pipes
 - These sources still contribute to present day lead exposures
- Parent occupation/hobbies
 - Batteries, ammunition, lead sinkers, pottery glaze, stained glass work
- Imported items
 - Spices, toys, ayurvedic medicine





NO SAFE **BLOOD LEAD** LEVEL IN CHILDREN HAS BEEN IDENTIFIED.



For children, even low-level exposures to lead have been shown to affect IQ, ability to pay attention, impulse control, behavior and academic achievement.







Lead Screening

lf you don't test, you don't diagnose.





If you don't diagnose, you can't intervene.





Case Presentation:

March 2022:

Iowa Poison Control is called for recommendations in managing an elevated blood lead level (BLL) of 47 mcg/dL in a 5 year 7 month-old male.

Initial fingerstick (i.e., capillary) BLL 52 mcg/dL one week prior.

Unknown source of lead.

Questionable autism diagnosis; child is hyperactive with speech and developmental delays. Underweight at 40 lbs.





Where to Begin:

- Look for the source!
- Get an abdominal xray (AXR)
- Get labs
 - An elevated capillary BLL needs a confirmatory venous BLL
 - CBC, Serum Iron, EPP/ZPP
- Test rest of family
- Get public health involved





Findings

RBC 4.94 /uL Hgb 13.3 g/dL MCV 78.3 fL Iron 106 mcg/dL (49-181) Zinc protoporphyrin 376 (ref 0-69)







Case Progression

- Day 1: Unable to get in touch with public health (Friday) late afternoon) – child admitted to hospital for chelation until home inspection done.
- Day 4: AXR now clear of radiopaque flecks
- Day 5: Home inspection done by public health; chelation begins
- Day 6: Family working on lead hazards in the home





Chelators

- Succimer (Chemet®)
 - Oral agent
 - Mercaptan smell and taste
- Dimercaprol (British Anti-Lewisite or BAL)
 - Given IM
 - Dissolved in peanut oil (avoid with peanut allergies)
- Calcium disodium edetate (EDTA)
 - Given IV





Home #1

- Family reported to the physician they have been doing house renovations per a contractor
- Dad purchased home lead test kit and found lead in the front entry of the house.
- Home inspection by Public Health
 - Window troughs with visible paint chips
 - Visible chipping and peeling pain on a door that leads to an upstairs balcony





Home #2











Management at Home

- Diet high in calcium, iron, zinc
 - Consider if iron supplement is needed
- Wash hands regularly, especially before eating and bedtime
- Regular cleaning of home
- Cover any open soil outdoors
- If child has PICA, close observation of child
- Avoid candy and spices that may contain lead





Follow-up BLLs

- After chelation: End chelation, 2 weeks and 4 weeks post-chelation
- BLL 20 mcg/dL or higher: Recheck in 4-6 weeks
- BLL <20 mcg/dL: Recheck in 3 months.
- Monitor BLL through age 6 years





Repeat BLLs:

- 3/30/22 mid-chelation: BLL 38.4 mcg/dL
- 4/10/22 end-chelation: BLL 15 mcg/dL
- 4/20/22 2 weeks post-chelation: BLL 42.9 mcg/dL
- 5/8/22 4+ weeks post-chelation: BLL 47.4 mcg/dL - Succimer (round 2) 5/17/22 - 6/4/22
- 5/25/22 mid-chelation: BLL 12.3 mcg/dL
- 6/6/22 end-chelation: BLL 18.4 mcg/dL





Repeat BLLs:

- 6/18/22 2 weeks post-chelation: BLL 35.6 mcg/dL
- 7/2/22 4 weeks post-chelation: BLL 42.8 mcg/dL
- 8/1/22 BLL 43.5 mcg/dL
- 8/15/22 BLL 40.1 mcg/dL
- 9/13/22 BLL 42.2 mcg/dL
- 10/12/22 BLL 45 mcg/dL

- Succimer (round 3) 10/16/22 - 11/3/22





SLL 35.6 mcg/dL L 42.8 mcg/dL



Repeat BLLs:

- 11/4/22 end-chelation: BLL 9.9 mcg/dL
- 11/17/22 2 weeks post-chelation: BLL 31.9 mcg/dL
- 12/1/22 4 weeks post-chelation: BLL 35.8 mcg/dL
- 1/5/23 BLL 40.8 mcg/dL
- 2/13/23 BLL 36 mcg/dL
- 3/28/23 BLL 39.4 mcg/dL
- 5/9/23 BLL 37.8 mcg/dL
- 6/6/23 BLL 36.4 mcg/dL



• 8/9/23 – BLL 35.2 mcg/dL



cg/dL BLL 31.9 mcg/dL SLL 35.8 mcg/dL

National 800 Phone Number

Add this 24/7 number to your smartphone



Works just like 911 Federally funded by HRSA













New logo/brand Oct 11, 2022

AMERICA'S CENTERS





Set U.S. Environmental Protection Agency ERA 747-H-58-402







Send your questions for presenters In the chat!

DISCUSSION SECTON









CALL TO ACTION

Childhood Lead Advisory Workgroup

- (CLAW) Is practicing collective Impact
- throughout the year.

CLAW Contributions:

- Meaningful Metrics
- Lead and Housing Survey
- Annual Lead Report Cards
- Training Modules
- Annual Learning Collaborative
- Lead Stakeholder Survey
- Updated Lead Testing Screening Tool
- Social Media Message Review



O TO 6 YEARS OLD ONLY 23.9% WERE TESTED FOR LEAD

2022 WOODS & POOLE ECONOMICS, INC., www.woodsandpoole **ALL CHILDREN SHOULD BE TESTED**

2021 Healthy Homes and Lead Surveillance System (HHLPSS)

OF ALL IOWA CHILDREN

Percent of Children Receiving a Blood Lead



2021 Healthy Homes and Lead Surveillance System (HHLPSS) 2022 WOODS & POOLE ECONOMICS, INC., www.woodsandpoc

2021 STATE LEAD **REPORT CARD**

961 children under the age of 6 had a confirmed elevated blood lead level above 3.5 µg/dL in Iowa in 2021



That is enough to fill 13 school buses

Iowa Public Health Tracking Portal. (2021). Children Tested. Retrieved from

HEALTH IMPACTS



Damage to brain & nervous system



Slowed growth & development



Hearing & speech problems



Learning & behavior problems

CHILDHOOD LEAD POISONING IS **100% PREVENTABLE**

> IF YOU DON'T TEST, YOU DON'T DIAGNOSE.

IF YOU DON'T DIAGNOSE, YOU CAN'T INTERVENE.

Scan the QR code to get more information on childhood lead poisoning:



800-972-2026

AT 1 AND 2 YEARS OF AGE

Test By Age

— State goal for children 1 & 2 years in age

of the under 6 population tested in 2021 had an elevated blood lead level*

961

KIDS

to or greater than CDC blood lead eference value of 3.5 mcg/d



Public Health **IOWA HHS**



2023-2024

Health Literacy Phase **1:** Prioritize and Review

Community Engagement to Address Lead Double **Burden Risks:**

Woodbury County Implementation, Scott & Lee County Focus Groups

Development of Academic Detailing Pilot

Lead & Housing **Resource Directory**

CLAW Quarterly Meetings and Subgroup Meetings

2022 Report Cards

2024 Learning Collaborative

2024-2025

Health Literacy Phase 2: Material Creation -Clinical

Community **Engagement to Address Lead Double** Burden Risks: Scott & Lee County Implementation

Academic Detailing **Pilot Evaluation and Strategic Plan**

Lead & Housing **Resource Directory**

CLAW Quarterly **Meetings** and **Subgroup Meetings**

2023 Report Cards

2025 Learning Collaborative

Health Literacy Phase 3: Material Creation -Housing

Academic Detailing Dissemination and Implementation

Lead & Housing **Resource Directory**

CLAW Quarterly Meetings and **Subgroup Meetings**

2026 Learning Collaborative

2025-2026

2024 Report Cards

CALL TO ACTION

BE PART OF THE CONVERSATION, JOIN THE CLAW TODAY!



Check out our website! Don't forget to fill out your CEU evaluation. The recording of today's learning collaborative and slides will be posted online for viewing!





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