A Renewed Commitment to Eliminate Childhood Lead Poisoning in the post-Flint Era

February 12, 2019

Accessible Version: https://www.youtube.com/watch?v=GQK0rrbzK_U
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Vision: To eliminate childhood lead poisoning as a public health problem.

Mission: CDC’s Childhood Lead Poisoning Prevention Program is committed to the Healthy People goals of reducing blood lead levels in children and eliminating differences in risk based on race/ethnicity and social class.
Lead Can Be Found Throughout Our Environment

1) Paint and contaminated soil
2) Water pipes
3) Toys and jewelry
4) Foods, candies, or spices
5) Jobs or hobbies
The Impact

1,135,000
U.S. children ages 1 to 5 years have blood lead levels ≥2 μg/dL

24 million
homes in the U.S. contain significant lead hazards

6 million
lead service lines in the U.S.

At least 3.6 million of these are home to young children, as indicated in blue.
No Safe Level of Lead Has Been Identified

Damage to the brain and nervous system

Slowed growth and development

Learning and behavior problems

Hearing and speech problems

Geometric mean is a special type of mean, or average, that is used for a skewed, or off-centered, distribution. Geometric means better reflect blood lead levels for the individuals in the middle of the population. Arithmetic means are generally used for more normally distributed populations.

U.S. National Health and Nutrition Examination Survey (NHANES)
All Children Face Some Exposure Risk, but Racial and Ethnic Disparities Persist

Share and Number of 1–5-year-olds with Blood Levels Below and Above 2 µg/dL by Race and Ethnicity, 2011–2014

- **White**: 9,376,000 (8.6%), 808,000 (8.9%)
- **Hispanic**: 4,797,000 (8.9%), 428,000 (8.9%)
- **Black**: 2,363,000 (17.9%), 424,000 (10.7%)
- **Other**: 1,905,000 (10.7%), 203,000 (10.7%)

Lead is Local: Distribution of Risk Varies by Location

Estimated Distribution of Children’s Blood Lead Levels ≥5.0 µg/dL (2010)

California Environmental Health Tracking Program. A Hidden Problem: Lead-Poisoned Children in the United States. April 2017
Only About 60% of Children Identified

Estimated Percent of Children with Blood Lead Levels ≥10 µg/dL Missed by State, 1999–2010

Percent of children missed:
- more than 80%
- 61-80%
- 41-60%
- 40% or less
- not reported

California Environmental Health Tracking Program. A Hidden Problem: Lead-Poisoned Children in the United States. April 2017
CDC’s Childhood Lead Poisoning Prevention Program

**Core Strategies**

- Strengthen blood lead testing and reporting
- Strengthen surveillance
- Strengthen linkages of lead-exposed children to recommended services
- Strengthen targeted, population-based interventions
Preventing Childhood Lead Exposure Is Cost-Effective

Economic Gains by Avoided Blood Lead Levels in Children Ages 1–5, Born in 2018

Economic Gains by Blood Lead Level

- **$60.4 B** 0–1.9 µg/dL
- **$17.1 B** 2–4.9 µg/dL
- **$3.8 B** 5–9.9 µg/dL
- **$2.6 B** 10+ µg/dL

Prevention at lower blood levels results in higher gains

Adapted from: Pew/RWJF Report, August 2017
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Michigan State University/Hurley Children’s Hospital
Meet Lilly....
Crisis
April 2014: Switch to Flint River
Summer 2015: Reports of Lead in Water

Lead testing results for water sampled by residents

FLINT HAS A VERY SERIOUS LEAD IN WATER PROBLEM

Note: We will update results from the remaining 25 samples by 10/8/15
Pb = *Plumbum* = Plumbing

**Lead in water levels:**

- 0 ppb = EPA maximum contaminant level goal
- 1 ppb = American Academy of Pediatrics recommendation for schools/child care
- 5 ppb = FDA standard for bottled water
- 10 ppb = World Health Organization action level
- 15 ppb = EPA action level for water system
- 22,000 ppb = Flint home
Lilly

Electronic Medical Records
September 24, 2015 Press Conference
Immediate Response

- City “lead” emergency (September 25, 2015)
- Water switch back to Great Lakes (October 2015)
- City → county → state → federal emergency (January 2016)
- Coordinated crisis response: water delivery/stations, filters, risk communication, water and blood testing
Elevated Blood Lead Levels in Children Associated With the Flint Drinking Water Crisis: A Spatial Analysis of Risk and Public Health Response


On June 24, 2016, this report was posted online as an MMWR Early Release.

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During April 25, 2014–October 15, 2015, approximately 99,000 residents of Flint, Michigan, were affected by changes in drinking water quality after the water source was switched from the Detroit Water Authority (DWA) sourced from Lake Huron to the Flint Water System (FWS), which was supplied by the Flint River. Because corrosion control was not used at the FWS water treatment plant, the levels of lead in Flint tap water increased over time. Adverse health effects were associated with lead exposure1-4. On January 2, 2015, a water advisory was issued because of detection of high levels of trihalomethanes, byproducts of disinfectants.5 Studies conducted by local and national investigators detected an increase in the prevalence of blood lead levels (BLLs) ≥ 5 μg/dL (the CDC reference level) among children aged < 6 years living in Flint, Michigan, and an increase in the prevalence of blood lead levels (BLLs) ≥ 5 μg/dL among children aged < 6 years before, during, and after the switch to DWA.6,7,8,9

In April 2014, the residents of Flint, Michigan, were advised to use alternative water sources to prevent lead exposure.10 Elevated blood lead levels were found in children aged < 6 years before, during, and after the switch to DWA.11-13,14 The analysis showed that the distribution of BLLs > 5 μg/dL among children aged < 6 years before, during, and after the switch was different.15

The adjusted probability of having BLLs > 5 μg/dL during the period after the switch from FWS to DWA before the January 2, 2015, water advisory was higher than during the period before the water advisory.
Flint Response

- Government, academic, philanthropic/non-profit partnerships
- Community informed/driven/participatory
- Grounded in science
- Trauma-informed
- Focused on secondary prevention
  - Home visiting, breastfeeding, childcare, literacy, school health, Medicaid expansion, behavioral health, nutrition support, mindfulness, etc
Flint Response

- **Lead elimination – FLINT LEAD FREE**
  - Pipe replacements, lead safe home (Medicaid CHIP), HUD, Flint Registry

- **Beyond pipes and people**
  - Economic development, restorative justice, self-determination, participatory democracy

- **Flint ripples**
  - Lead, drinking water, environmental justice, children’s health
Lilly’s Lessons

- **Flint is not isolated**
  - Legacy of lead lingers
  - Ongoing environmental injustices
  - Deteriorating infrastructure
  - Disrespect of science and facts
  - Lax regulations
  - Crisis vs. prevention
  - Child-phobic

- **Flint’s prescriptions for hope**
Tragedy to Beauty
THANK YOU!

@MonaHannaA
Opportunities for Lead Elimination

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National Center for Environmental Health/Agency for Toxic Substances and Disease Registry
Increased Awareness in the Aftermath of Flint
Water Infrastructure Improvements for the Nation (WIIN) Act, 2016

- **Enhance lead poisoning prevention and surveillance**
  - 14 new state and local health department partners

- **Flint Lead Exposure Registry**
  - Consortium led by Michigan State University

- **Federal Advisory Committee**
  - Lead Exposure and Prevention Advisory Committee (LEPAC)
Increased Collaboration between Federal Agencies to Protect Children’s Environmental Health

Goals are:

1. Reduce children’s exposure to lead sources
2. Identify lead-exposed children and improve their health outcomes
3. Communicate more effectively with stakeholders
4. Support and conduct critical research to inform efforts to reduce lead exposures and related health risks

ptceh.niehs.nih.gov
Public-Private Partnerships
Ongoing “Lead-Free” City Initiatives
“The problem is so well defined, so neatly packaged, with both causes and cures known, that if we don’t end this social crime, our society deserves all the disasters that have been forecast for it.”

–René Dubos (1967)