#FlintWaterCrisis

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#flintwatercrisis
Lead

- NO safe blood lead level
- Impacts cognition and behavior
- Epigenetics
- Smaller, the greater impact
- Cost implications

- Disproportionately impacts low income and minority children
Elevated Blood Lead Levels in Children Associated With the Flint Drinking Water Crisis: A Spatial Analysis of Risk and Public Health Response

Mona Hanna-Attisha, MD, MPH, Jenny LaChance, MS, Richard Casey Sadler, PhD, and Allison Champney Scheppe, MD

Objectives. We analyzed differences in pediatric elevated blood lead level incidence before and after Flint, Michigan, introduced a more corrosive water source into an aging water system without adequate corrosion control.

Methods. We reviewed blood lead levels for children younger than 5 years before (2013) and after (2015) water source change in Greater Flint, Michigan. We assessed the percentage of elevated blood lead levels in both time periods, and identified geographical locations through spatial analysis.

Results. Incidence of elevated blood lead levels increased from 2.4% to 4.9% ($P<.05$) after water source change, and neighborhoods with the highest water lead levels experienced a 6.6% increase. No significant change was seen outside the city. Geospatial analysis identified disadvantaged neighborhoods as having the greatest elevated blood lead level increases and informed response prioritization during the now-declared public health emergency.

Conclusions. The percentage of children with elevated blood lead levels increased after water source change, particularly in socioeconomically disadvantaged neighborhoods. Water is a growing source of childhood lead exposure because of aging infrastructure. (Am J Public Health. Published online ahead of print December 21, 2015: e1-e8. doi:10.2105/AJPH.2015.303003)
Now - Trauma

- Preventable population-wide exposure
- Loss of trust in government and agencies
  - In 2016, in the middle of the great lakes, no guarantee of safe drinking water
- Task forces, federal investigation, lawsuits, resignations, international media, celebrities...
- Jan 2016 Federal State of Emergency
NOW

Water still not safe; water & filters

Moving Forward

Unique opportunity to be proactive, to build a model public health program to buffer impact of exposure

Serve as a model for other communities
MSU/Hurley Pediatric Public Health Initiative

- Assess
- Monitor
- Intervene

Experts, community and government

http://humanmedicine.msu.edu/pphi/
Assessment

- Newborn blood spots – lead levels & epigenetics
- Maternal fetal complications
- Psychological trauma
- Economic impact
Monitoring

- Cohorting/database building
- Long term neurodevelopmental follow-up/surveillance
Evidence Based Interventions
We know what works....

Stimulating Experiences, Parenting Education, Primary Health Care, Good Nutrition, and Safe Environments

And we know what hurts...

Toxic Stresses...

LEAD!!

- Limited Transportation
- Poor Nutrition
- Teenage Pregnancy
- Challenged Mental Health
- Inadequate Social Network
- Single Parent Home
- Lack of Money
- No Recreation
- Health
- Underemployment
- Discrimination
- Death of Loved One
- Poor Parenting
- Family Violence
- Lack of Health Care
- Education Deficit

Mechanisms by Which Adverse Childhood Experiences Influence Health and Well-being Throughout the Lifespan

http://www.cdc.gov/violenceprevention/acestudy/
Evidence Based Interventions

An Ecobiodevelopmental Framework for Early Childhood Policies and Programs

Policy and Program Levers for Innovation
- Primary Health Care
- Public Health
- Child Care and Early Education
- Child Welfare
- Early Intervention
- Family Economic Stability
- Community Development
- Private Sector Actions

Caregiver and Community Capacities
- Time and Commitment
- Financial, Psychological, and Institutional Resources
- Skills and Knowledge

Foundations of Healthy Development
- Stable, Responsive Relationships
- Safe, Supportive Environments
- Appropriate Nutrition

Biology of Health and Development
- Gene-Environment Interaction
- Physiological Adaptations or Disruptions
- Embedded During Sensitive Periods

Outcomes in Lifelong Well-Being
- Health-Related Behaviors
- Educational Achievement and Economic Productivity
- Physical and Mental Health

Ecology

Biology

Health and Development

http://pediatrics.aappublications.org/content/129/1/e232/F2.expansion.html
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Interventions

- Education
- Nutrition
- Health

## Recommendations to EOC

Submitted 01/11/16
M. Hanna-Attisha

Below are evidence-based interventions for inclusion in the emergency response to the Flint lead exposure. These recommendations, which span the domains of education, nutrition, medical/health, are proven interventions to optimize children’s health, especially for children with toxic stress exposures. Secondary Prevention interventions are targeted for all exposed children to prevent manifestation of the consequences of lead. Note: all children who lived in Flint water city limits from April 2014 until end date unknown (since water not safe yet) are considered exposed and at-risk. Estimated 8,000-9,000 children under the age of 6 years, as per census data. Tertiary prevention interventions are targeted for children already experiences the consequences of lead exposure. Several interventions are considered HIGH PRIORITY as noted.

### EDUCATION

Please refer to “Educational Interventions for Children Affected by Lead” for additional information and references:

<table>
<thead>
<tr>
<th>TYPE</th>
<th>PRIORITY</th>
<th>INTERVENTION</th>
<th>RATIONALE</th>
<th>COST</th>
<th>NOTES</th>
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| Secondary Prevention  | HIGH     | Universal Early Education; Flint Pre-Promise       | To mitigate toxic stress, buffer potential cognitive impact of lead exposure, promote school readiness, proven return on investment | Estimated cost of head start per child per year approx. $6000/child/yr. | - Limited preschool capacity in Flint (only about 1200 children enrolled) with wait lists  
- Early Head Start – Ages 0-3, federally funded  
- Head Start – Ages 3-5, federally funded  
- Great Start Readiness Program – Age 4, state funded  
- Relax income eligibility for above programs so ALL Flint children are eligible  
- Campaign to promote enrollment |
| Early literacy promotion |        | To buffer potential cognitive impact of lead and to address word/literacy gap, promote school readiness |                                                                                                 |                               | - Support expansion of Reach Out and Read is evidence based early literacy program – free books given to every kid at each medical visit starting at 6mos of age: http://www.reachoutandread.org/  
- Consider support of additional early literacy programs such as LENA is an evidence based 8-week |
Interventions

Education

- Expand early literacy programs
- Universal preschool
- School health
- Strengthen special education capacity
Investing in Children: Younger The Better

Rates of Return to Human Capital Investment at Different Ages: Return to an Extra Dollar at Various Ages

- Programs targeted towards the earliest years
- Preschool programs
- Schooling
- Job training

Interventions

Nutrition

- Short-term mitigation/protection
- Promotion/education of Iron, Calcium, Vit C diets
FIGHT LEAD WITH NUTRITION

The foods we prepare and serve to our families can help limit the effects of our kids’ exposure to lead. Three steps you can take in choosing and preparing food can make a difference:

1. When preparing food, be sure to wash and cook it with filtered water.
2. Serve your kids small, healthy snacks between meals.
3. Serve foods that are high in a few really important nutrients: iron, calcium and vitamin C.

LEAD-FIGHTING NUTRIENTS

**CALCIUM**
Calcium keeps your bones strong and the lead out! Calcium-rich foods include:
- Milk and milk products, like cheese and yogurt
- Green leafy vegetables, such as spinach, kale, and collard greens
- Calcium-enriched orange juice
- Tofu
- Canned salmon and sardines (both with the bones in)

**IRON**
Iron keeps too much lead from getting.

**VITAMIN C**
Vitamin C works with iron to keep too much lead from getting into your body. Good sources of vitamin C include:
- Citrus fruits, like oranges and grapefruit and their juices
- Tomatoes and tomato juice
- Peppers
- Oranges like kiwi, strawberries and melons

LEAD FACTS
Lead isn’t good for anyone’s health and it especially isn’t for kids.

PARTNER COOKING DEMOS
at the Flint Farmers’ Market
12:30 pm • January-March 2016

FOCUS = NUTRITION & LEAD
Everyone who attends receives a guide and recipe set to help your family prevent lead poisoning

- Thursday, Jan. 14th: Peanut Butter & Banana Pockets
- Saturday, Jan. 16th: Cheesy Hamburger Skillet
- Tuesday, Jan. 19th: Asian Noodles & PB Sauce
- Thursday, Jan. 21st: Chocolate Strawberry French Toast
- Tuesday, Jan. 26th: Peanut Butter & Banana Pockets
- Thursday, Jan. 28th: Vegetable Lasagna
- Tuesday, Feb. 2nd: Roasted Butternut Squash
- Thursday, Feb. 4th: Asian Noodles & PB Sauce
- Tuesday, Feb. 9th: Bean & Rice Botana
- Thursday, Feb. 11th: Tuna Melt
- Tuesday, Feb. 16th: Cheesy Hamburger Skillet
- Thursday, Feb. 18th: Bean & Rice Botana
- Tuesday, Feb. 23rd: Tuna Melt
- Tuesday, Mar. 1st: Veggie Lasagna
- Thursday, March 3rd: Hearty Egg Burrito
- Tuesday, Mar. 8th: Chocolate Strawberry French Toast

OFFERED BY:
Hurley Wellness Services and Michigan State University Extension, along with Chef Sean Garland, Culinary Director, Flint Food Works

Get Healthy! Call 844.WELL4ME (844.935.5463) | hurleymc.com
Interventions

Nutrition

- WIC, SNAP, DUFB, MTA
- Expand WIC eligibility, access, benefits
- Long-term - Improve food access/security efforts (food hub sites, mobile groceries)
- Breastfeeding support
WASHINGTON -- The Obama administration on Thursday approved a waiver that will immediately allow thousands of pregnant women and children up to age 21 in Flint to receive Medicaid coverage for the next five years in response to the high levels of lead detected in the city’s tap water.

The Department of Health and Human Services made the announcement, which comes in response to Michigan Gov. Rick Snyder’s request last month that he said could help provide needed medical services for as many as 15,000 children and pregnant women in Flint.
Medical home
- WIC RD/Nutrition
- Transportation
- Social work
- Peds Psychology
- Training site
Interventions
Medical/Health

- Aggressive long-term neurodevelopmental screening
- Improve access to pediatric behavioral health
- Trauma informed care
- Maternal-infant support and parenting programs
- Access to trusted information
Empower Flint App

ALERT: Boil Water Advisory in Effect

11 minutes ago - Flint residents are reminded to boil their water due to the drinking water warning issued by the city of Flint on Feb. 9. Until further notice, boiled filtered water or bottled water should be used for drinking, brushing teeth, washing dishes, preparing food and for pets.

Dashboard

- Water: 7 unread
- Food: 8 unread
- Health: 9 unread
- Pets: 5 unread

Nutrition is one of the first lines of defense against the harmful effects of lead. Some foods will help keep lead from being stored in the body - foods with a lot of calcium, vitamin C and iron.

Calcium

Nutrient-rich foods include:

- Broccoli
- Kale
- Spinach
- Fortified milk and cereals
- Tofu
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