

# IPPSR 3.16.16

## #FlintWaterCrisis

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# #flintwatercrisis

HURLEY  
CHILDREN'S  
HOSPITAL



# 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 Schnepf, 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)

percentage of lead pipes and lead plumbing, with estimates of lead service lines ranging from 10% to 80%.<sup>7</sup> Researchers from Virginia Tech University reported increases in water lead levels (WLLs),<sup>5</sup> but changes in blood lead levels (BLLs) were unknown.

Lead is a potent neurotoxin, and childhood lead poisoning has an impact on many developmental and biological processes, most notably intelligence, behavior, and overall life achievement.<sup>8</sup> With estimated societal costs in the billions,<sup>9–11</sup> lead poisoning has a disproportionate impact on low-income and minority children.<sup>12</sup> When one considers the irreversible, life-altering, costly, and disparate impact of lead exposure, primary prevention is necessary to eliminate exposure.<sup>13</sup>

Historically, the industrial revolution's introduction of lead into a host of products has contributed to a long-running and

# 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

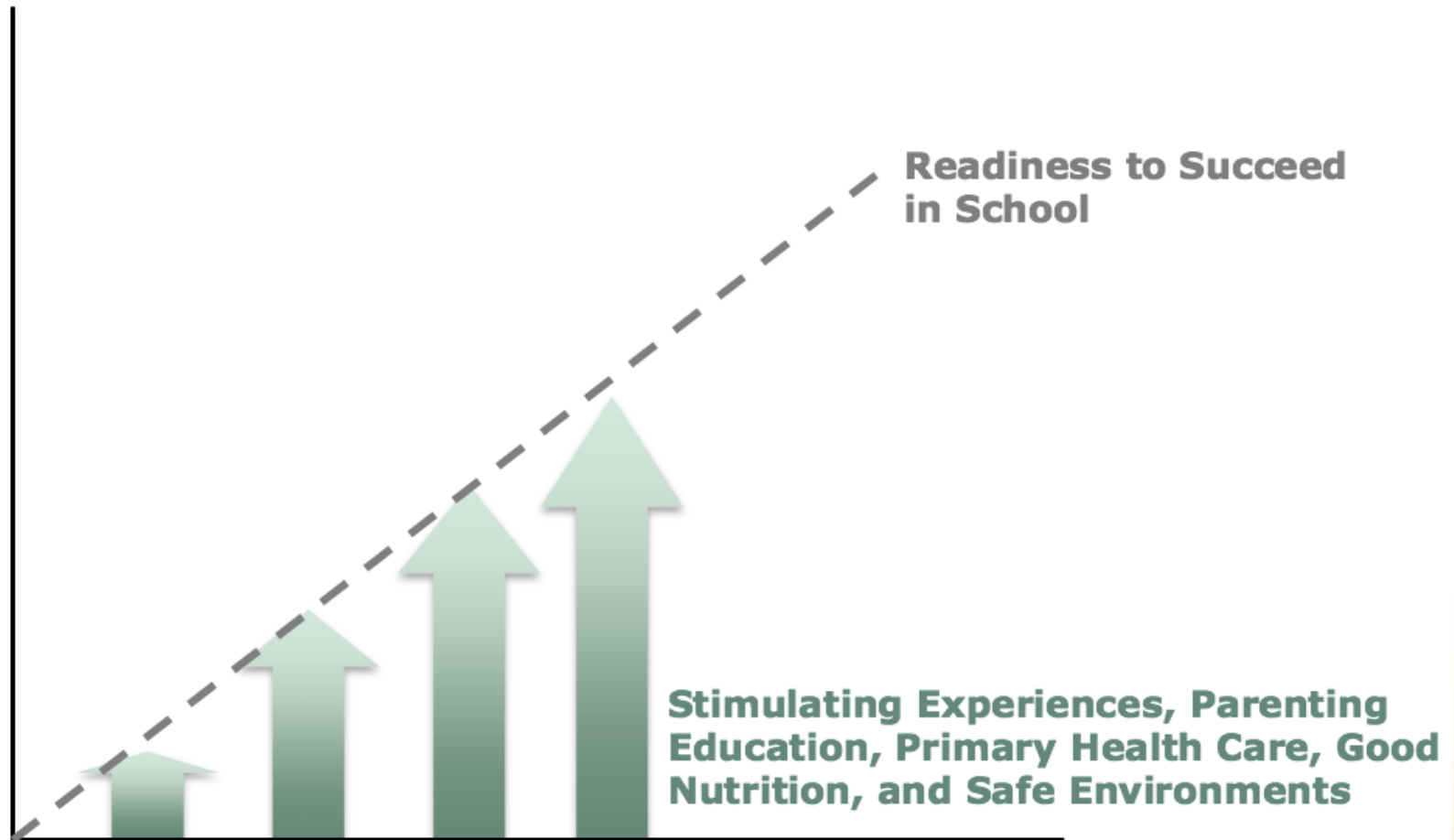
- Newborn blood spots – lead levels & epigenetics
- Maternal fetal complications
- Psychological trauma
- Economic impact

## ● Monitoring

- Cohorting/database building
- Long term neurodevelopmental follow-up/surveillance

# **Evidence Based Interventions**

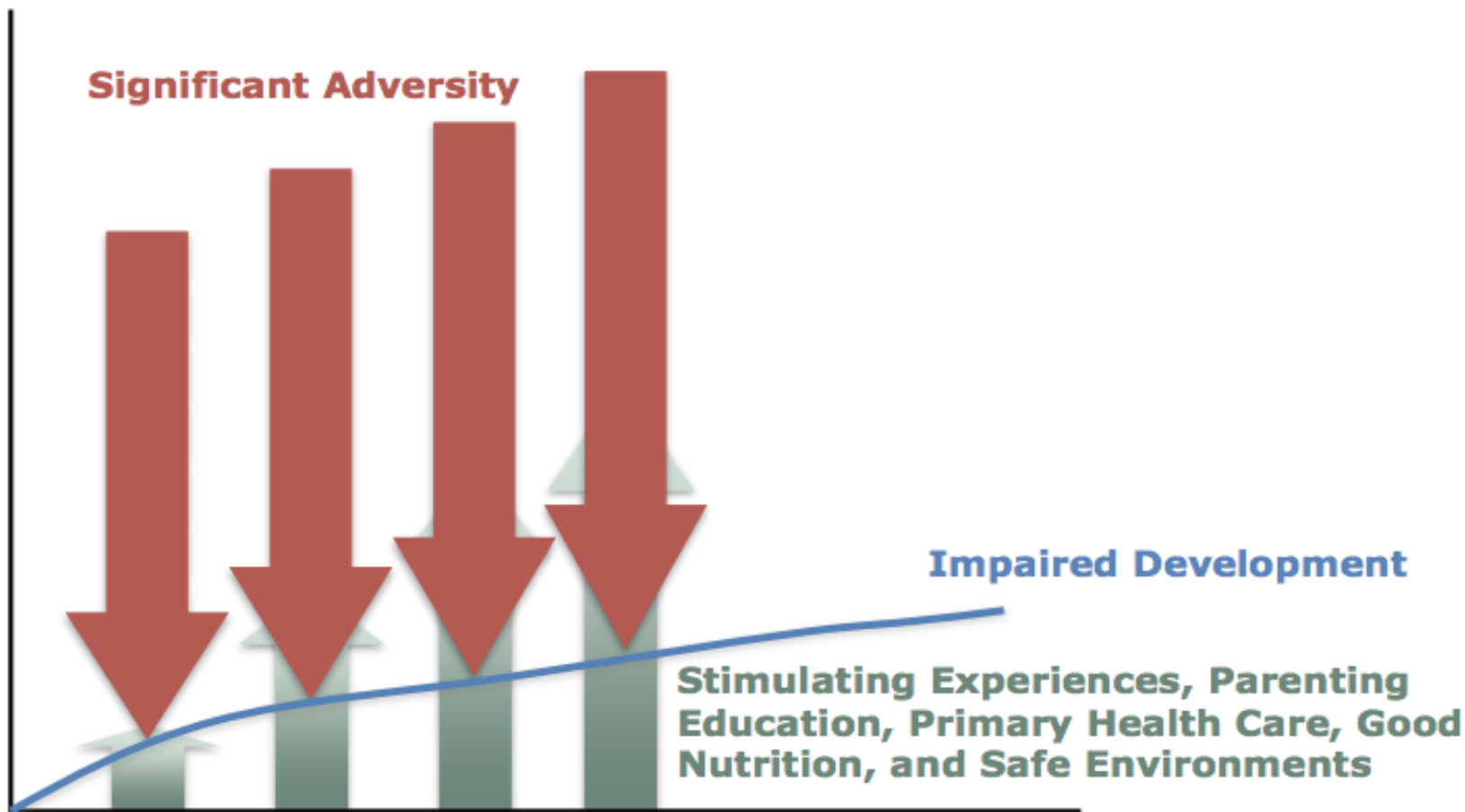
# We know what works....



<https://www.aap.org/en-us/advocacy-and-policy/federal-advocacy/Documents/Panel%201%20-%20Shonkoff%20Center%20on%20the%20Developing%20Child%20Presentation.pdf>

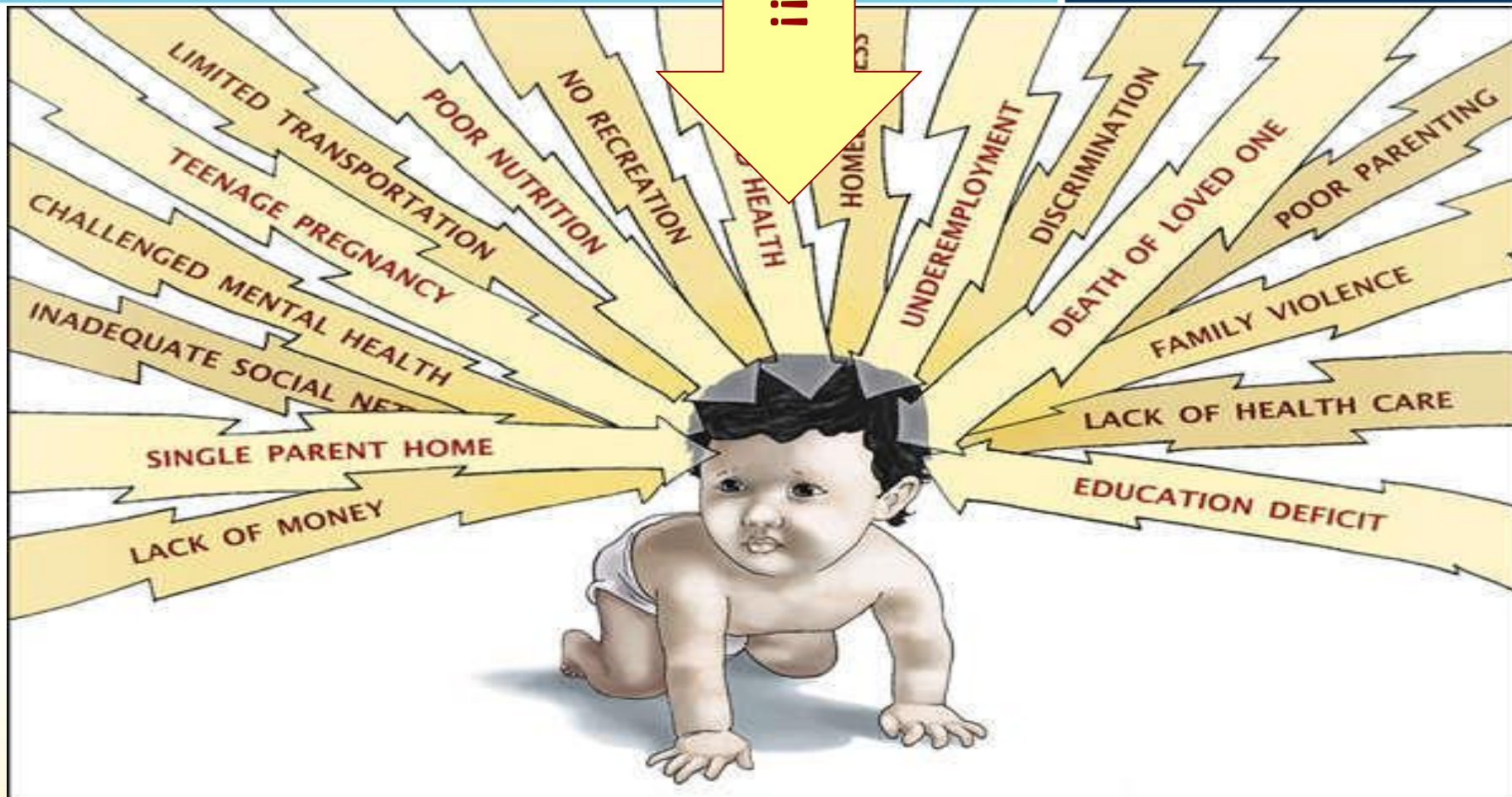


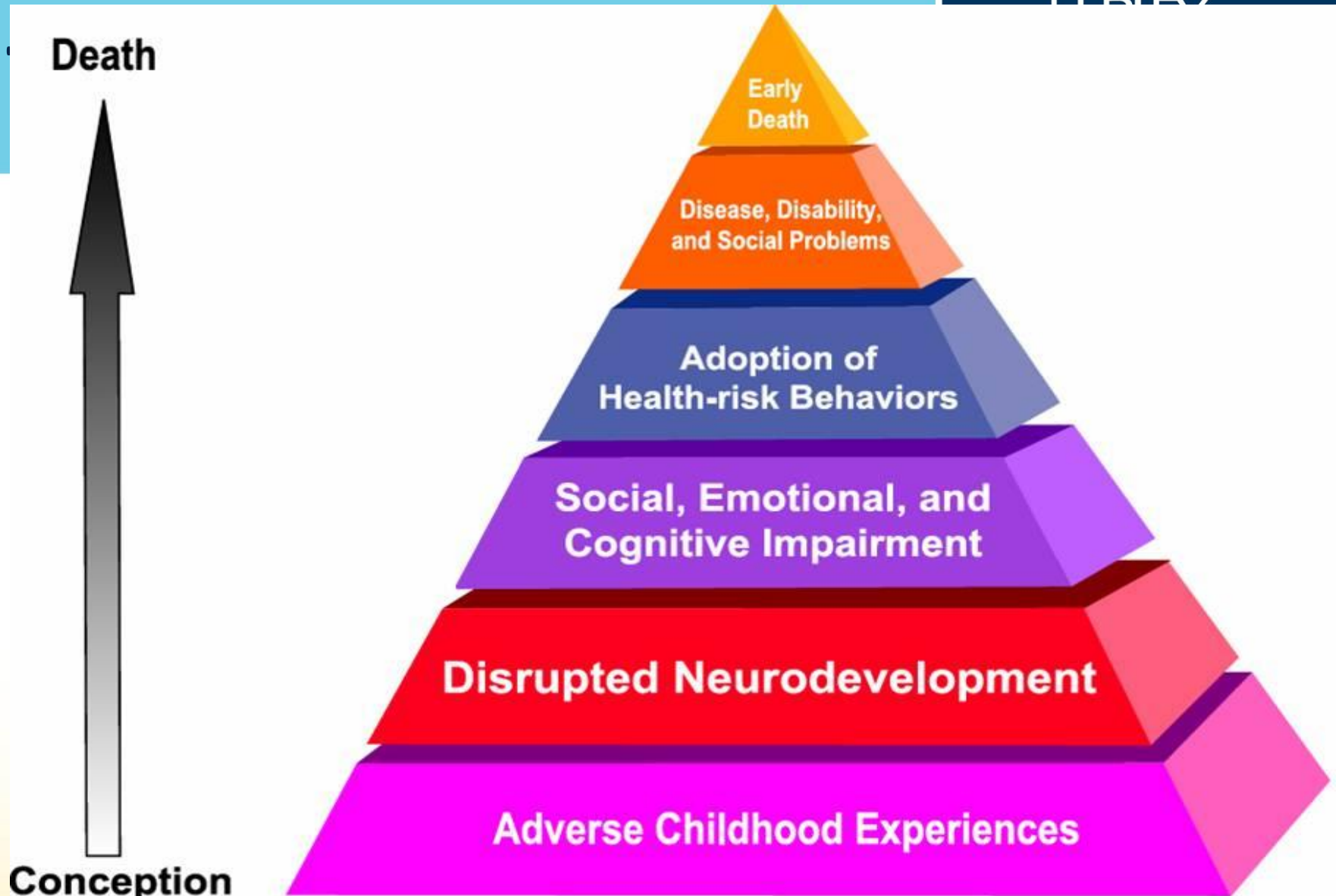
# And we know what hurts...



# Toxic Stresses...

LEAD!!



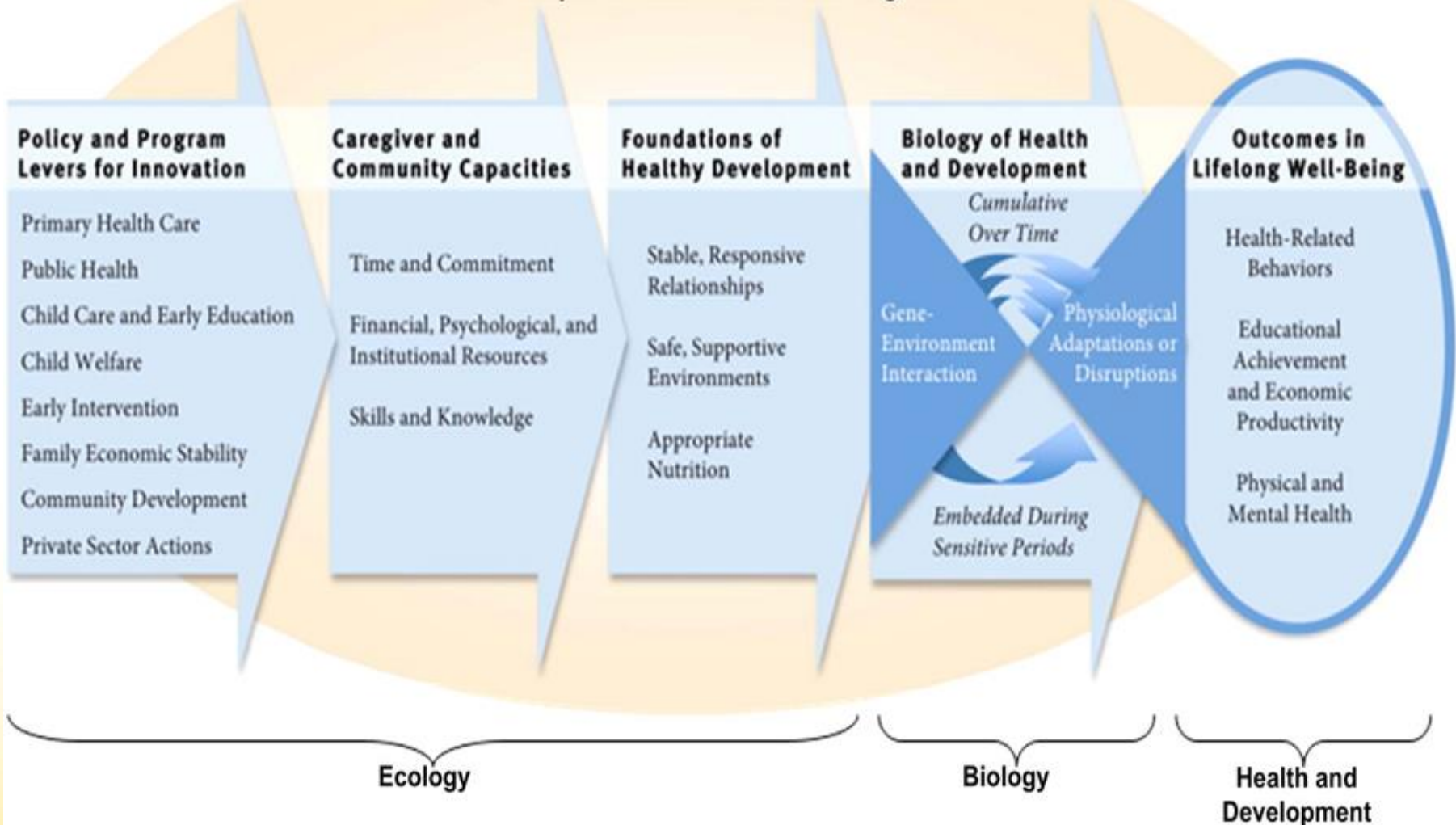


**Mechanisms by Which Adverse Childhood Experiences Influence Health and Well-being Throughout the Lifespan**



# Evidence Based Interventions

## An Ecobiodevelopmental Framework for Early Childhood Policies and Programs





# #flintwatercrisis 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

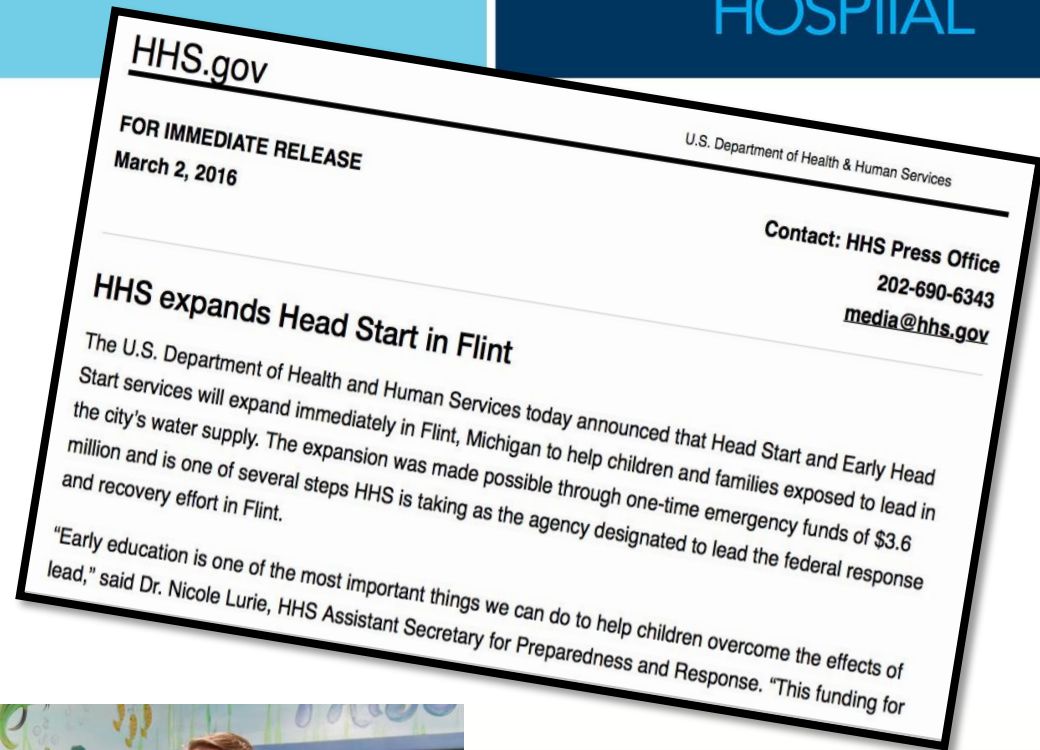
Please refer to "Educational Interventions for Children Affected by Lead" for additional information and references:  
[http://www.cdc.gov/nceh/lead/publications/Educational\\_Interventions\\_Children\\_Affected\\_by\\_Lead.pdf](http://www.cdc.gov/nceh/lead/publications/Educational_Interventions_Children_Affected_by_Lead.pdf).

TYPE	PRIORITY	INTERVENTION	RATIONALE	COST	NOTES
Secondary Prevention	HIGH PRIORITY	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	<ul style="list-style-type: none"> <li>● Limited preschool capacity in Flint (only about 1200 children enrolled) with wait lists</li> <li>● Early Head Start – Ages 0-3, federally funded</li> <li>● Head Start – Ages 3-5, federally funded</li> <li>● Great Start Readiness Program – Age 4, state funded</li> <li>● Relax income eligibility for above programs so ALL Flint children are eligible</li> <li>● Campaign to promote enrollment</li> </ul>
		Early literacy promotion	To buffer potential cognitive impact of lead and to address word/literacy gap, promote school readiness		<ul style="list-style-type: none"> <li>● 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: <a href="http://www.reachoutandread.org/">http://www.reachoutandread.org/</a></li> <li>● Consider support of additional early literacy programs such as: LENA is an evidence based 8-week</li> </ul>

# Interventions

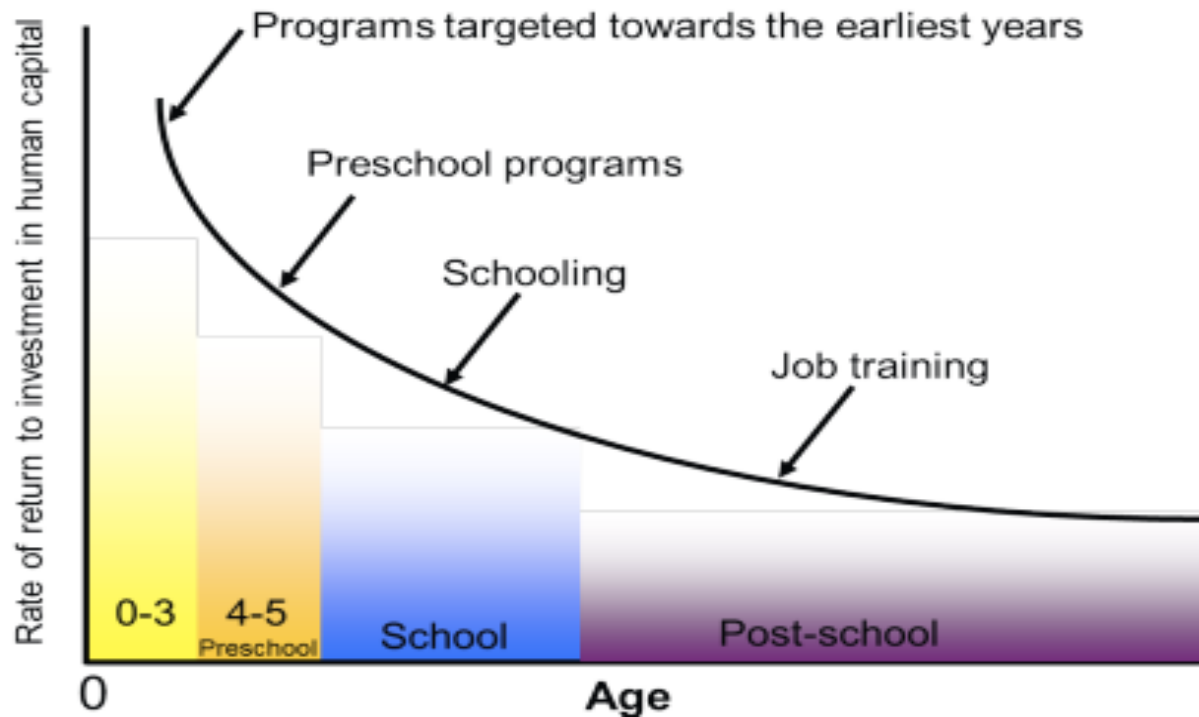
## Education

- Expand early literacy programs
- Universal preschool
- School health
- Strengthen special education capacity



# Investing in Children: Younger The Better

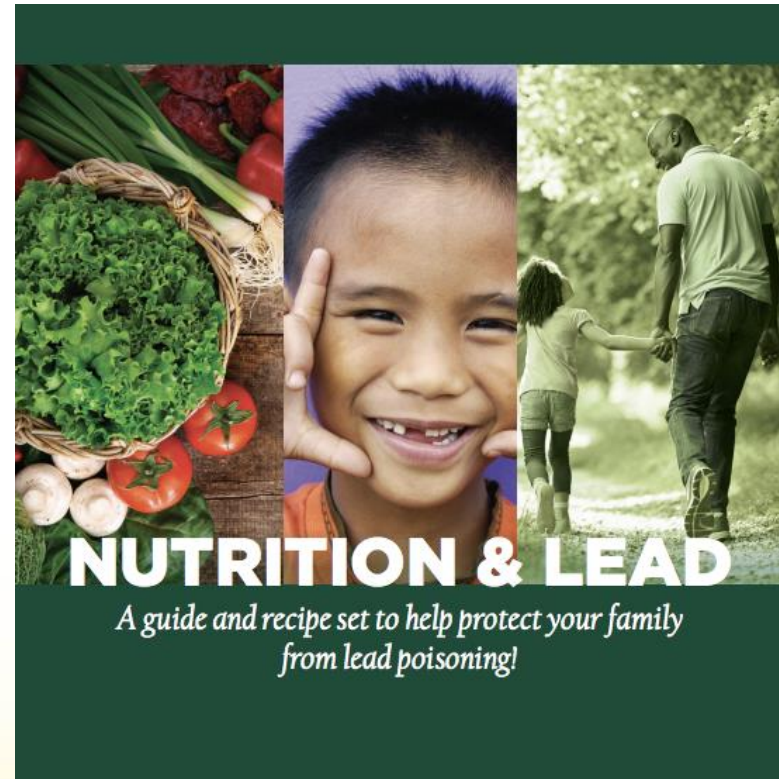
## Rates of Return to Human Capital Investment at Different Ages: Return to an Extra Dollar at Various Ages



# 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)

#### 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
- Other fruits like kiwi, strawberries and melons

#### LEAD FACTS

Lead isn't good for anyone's health and is especially bad for

#### IRON

Iron keeps too much lead from getting



## 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
- Saturday, Jan. 16th
- Tuesday, Jan. 19th
- Thursday, Jan. 21st
- Tuesday, Jan. 26th
- Thursday, Jan. 28th
- Tuesday, Feb. 2nd
- Thursday, Feb. 4th
- Tuesday, Feb. 9th
- Thursday, Feb. 11th
- Tuesday, Feb. 16th
- Thursday, Feb. 18th
- Tuesday, Feb. 23rd
- Tuesday, Mar. 1st
- Thursday, March 3rd
- Tuesday, Mar. 8th

- Peanut Butter & Banana Pockets
- Cheesy Hamburger Skillet
- Asian Noodles & PB Sauce
- Chocolate Strawberry French Toast
- Peanut Butter & Banana Pockets
- Vegetable Lasagna
- Roasted Butternut Squash
- Asian Noodles & PB Sauce
- Bean & Rice Botana
- Tuna Melt
- Cheesy Hamburger Skillet
- Bean & Rice Botana
- Tuna Melt
- Veggie Lasagna
- Hearty Egg Burrito
- Chocolate Strawberry French Toast

#### OFFERED BY:

Hurley Wellness Services and Michigan State University Extension, along with Chef Sean Gartland, Culinary Director, Flint Food Works



Extension



# Interventions

## *Nutrition*

- WIC, SNAP, DUFEB, MTA
- Expand WIC eligibility, access, benefits
- Long-term - Improve food access/security efforts (food hub sites, mobile groceries)
- Breastfeeding support

# Interventions

## *Medical/Health*

- Medicaid expansion

## Feds expand Medicaid for Flint women and children

Todd Spangler, Detroit Free Press 3:37 p.m. EST March 3, 2016



WASHINGTON – The Obama administration on Thursday approved a waiver that will immediately allows 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.



# Hurley Children's Clinic

*Thinking Outside The Box*

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## Medical home

- WIC RD/Nutrition
- Transportation
- Social work
- Peds Psychology
- Training site



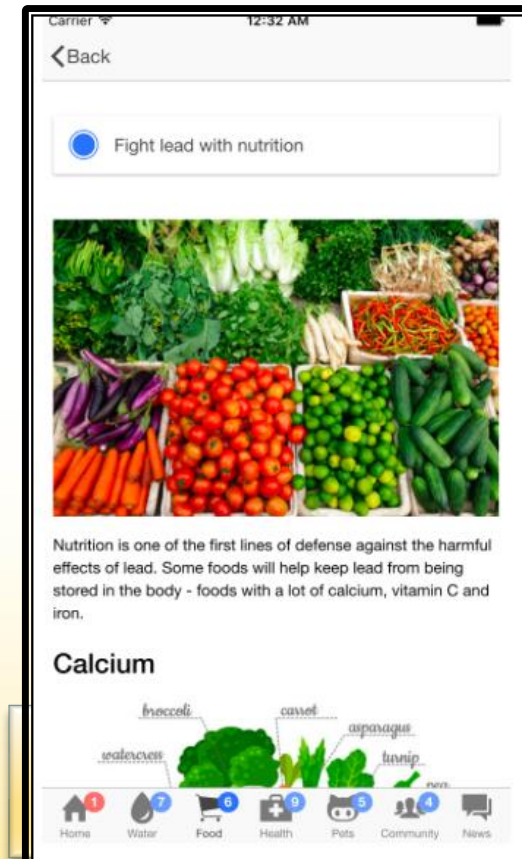
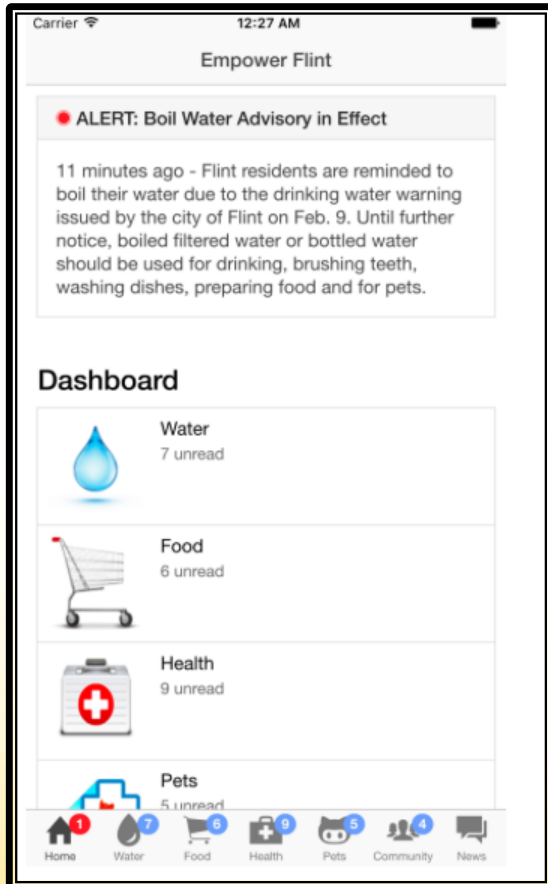


# Interventions

## *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



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