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#flintwatercrisis

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Flint, Michigan

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#flintwatercrisis

- Perfect storm for lead leaching
 - Flint River water more corrosive
 - Lack of corrosion control
 - Aging infrastructure (up to 80% lead plumbing?)
 - Decreased water use - population loss, high water rates



Lead in Water

- Soluble metal (particulate and dissolved)
- Drinking and cooking risks
- Vehicle made for ingestion
- Impacts developmentally-vulnerable formula-fed infants and unborn
- Not what used to
 - Lead paint obsessed (CDC vs EPA)
 - But “plumbing”...



Lead in Water

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CHILDREN'S
HOSPITAL



Flint WATER STUDY UPDATES

Home Articles in the Press Information for Flint residents Share your story About

Home

Information for Flint residents

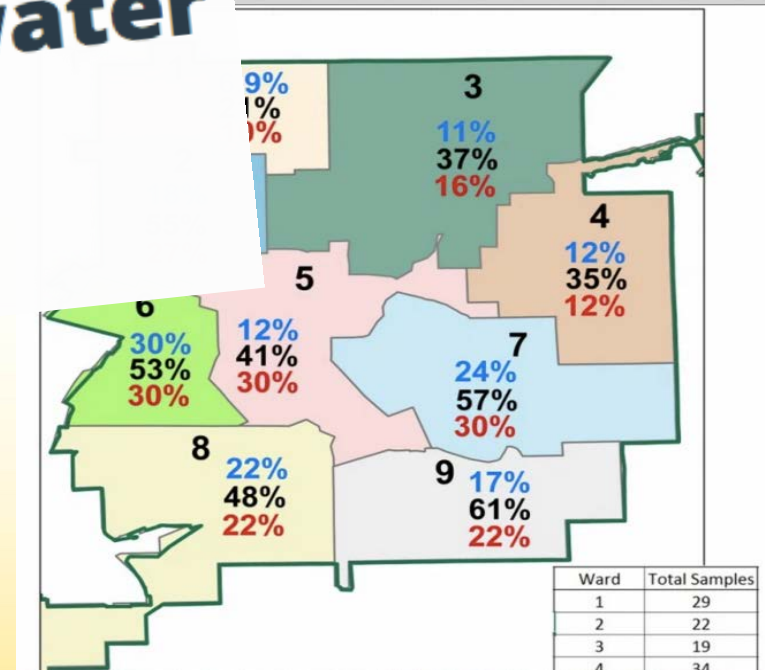
Lead testing results for water sampled by residents

Lead testing results for water sampled by residents

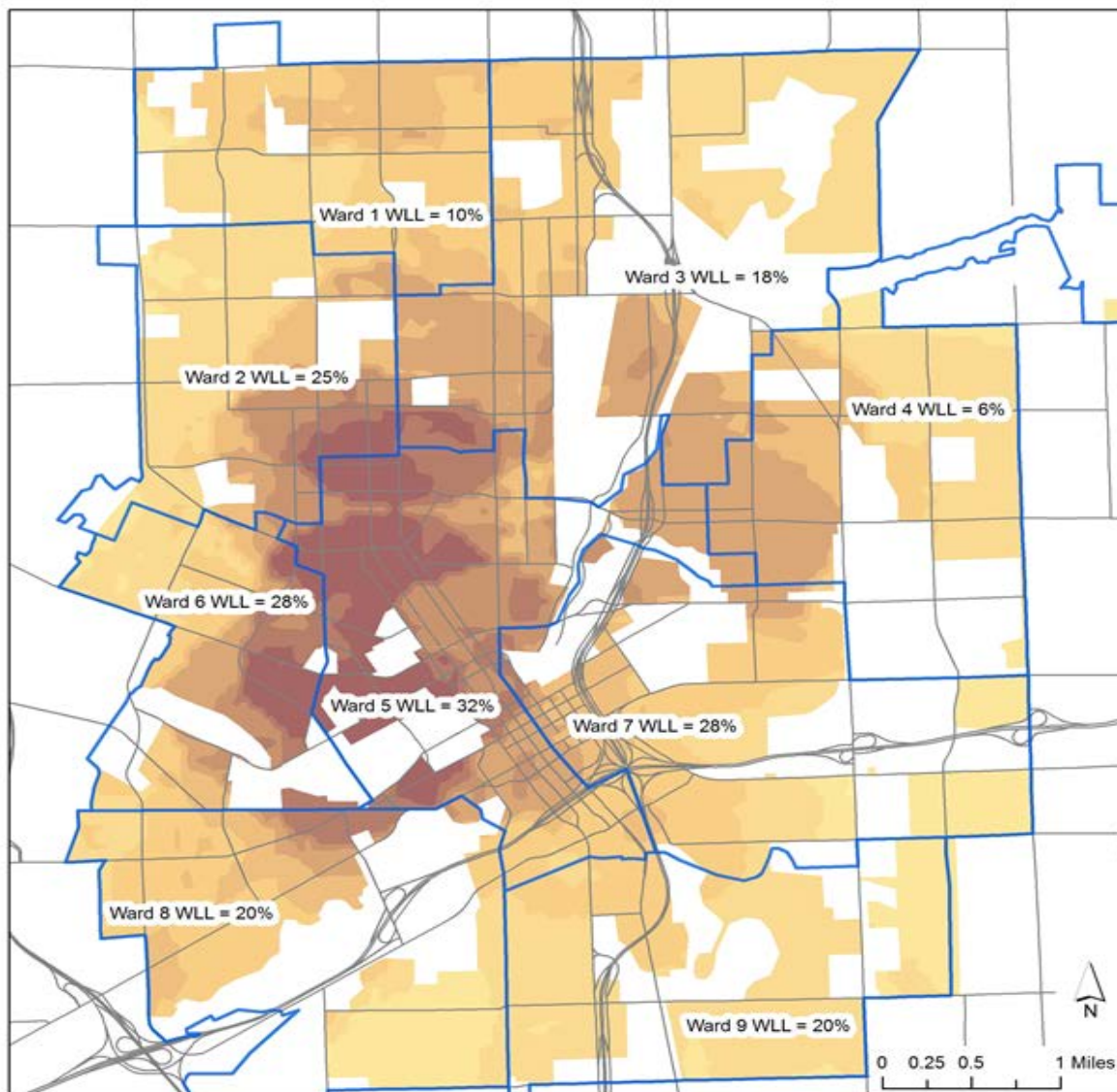
FLINT HAS A VERY SERIOUS LEAD IN WATER PROBLEM

Virginia Tech.
VT

<http://flintwaterstudy.org/>



- Data from all blood lead levels processed at Hurley Medical Center
- Two periods of comparison (same seasons):
 - PRE-SWITCH: January 1, 2013 – September 15, 2013
 - **WATER SWITCH APRIL 26, 2014**
 - POST-SWITCH: January 1, 2015 – September 15, 2015
- Analyzed % Elevated Blood Lead (EBLL)
 - EBLL = Blood lead Levels ≥ 5 ug/dL



Flint City Wards

Major Streets

Predicted BLL based on Ordinary Kriging Geostatistical Analysis

0.7 - 0.75
0.76 - 1

1.01 - 1.25
1.26 - 1.5
1.51 - 1.75
1.76 - 2
2.01 - 2.25
2.26 - 2.5
2.51 - 2.75
2.76 - 3.36

"Ward Y WLL = XX%" → % of ward where any water sample exceeded 15 ppb

*Non-residential zones screened from results

Flint Results:

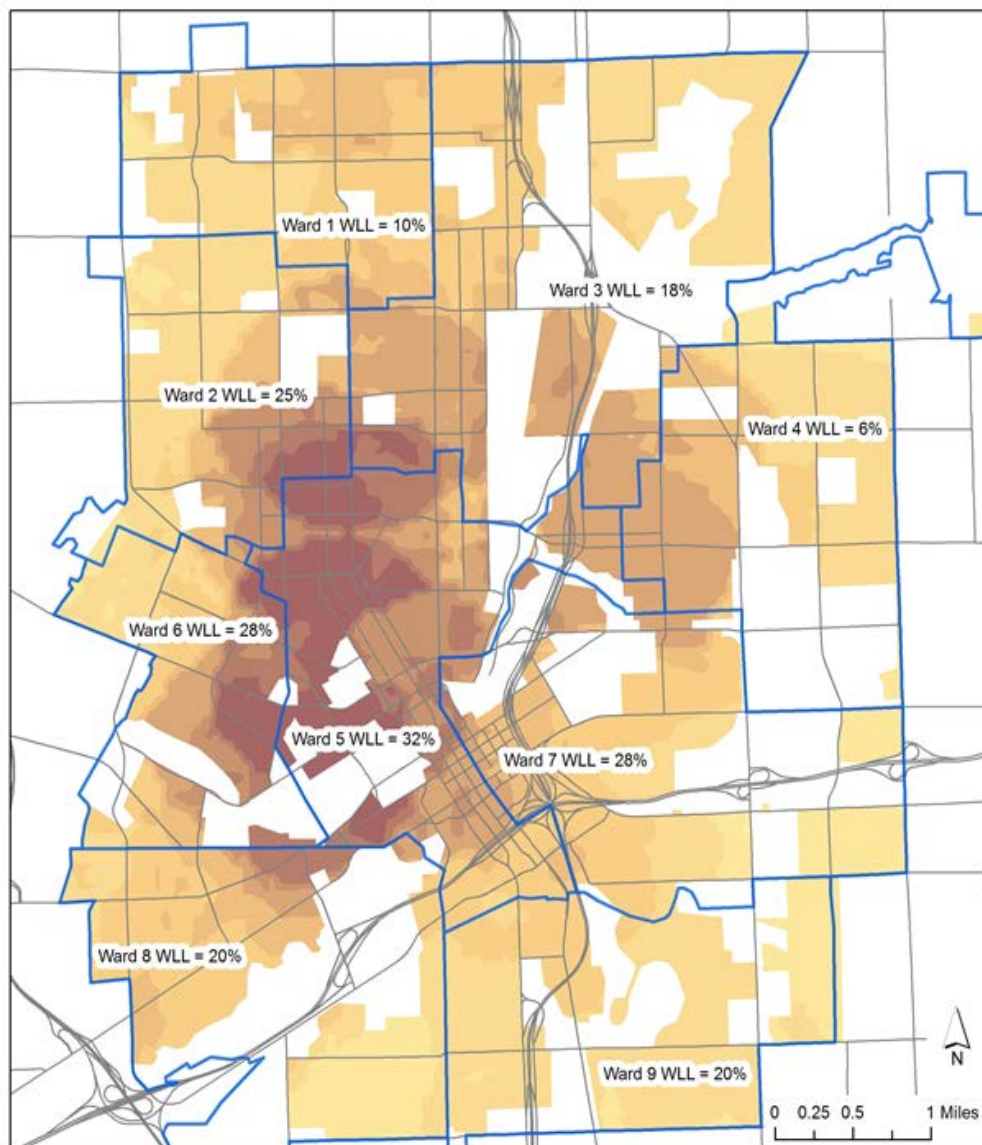
- PRE-SWITCH % EBLL: **2.4%**
- POST-SWITCH % EBLL: **4.9%**
- $p < 0.05$; STATISTICALLY SIGNIFICANT CHANGE

High WLL Wards Results:

- PRE-SWITCH % EBLL: **4.0%**
- POST-SWITCH % EBLL: **10.6%**
- $p < 0.05$; STATISTICALLY SIGNIFICANT CHANGE

Ward 5 Results:

- PRE-SWITCH % EBLL: **4.9%**
- POST-SWITCH % EBLL: **15.7%**
- $p < 0.05$; STATISTICALLY SIGNIFICANT CHANGE



Flint City
Wards

Major
Streets

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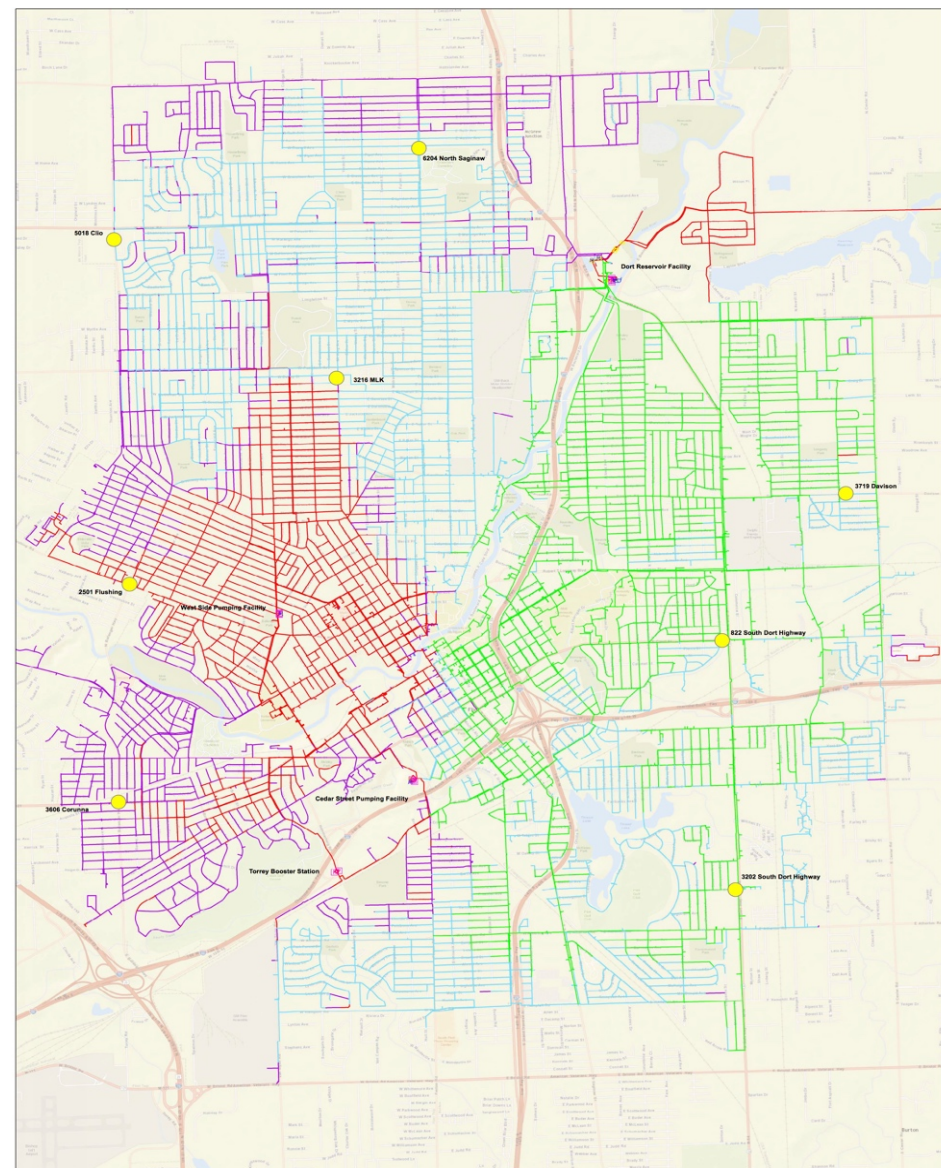
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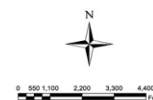
Legend
Water Quality (Hrs)

less than 24.0
24.0 to 72.0
73.0 to 144.0
greater than 144.0

Water sample location

CITY OF FLINT MAJOR WATER INFRASTRUCTURE WATER AGE & WATER SAMPLE LOCATION MAP

January 21, 2015



Research results

- % of children with EBLI in Flint increased
 - Most striking increase in areas with highest water lead levels
- **Results significantly underestimate exposure:**
 - Infants not screened for lead
 - Missed peaks
- Widened disparities
- Failure of primary prevention

- Jan 2016 Federal State of Emergency
- Preventable potentially 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...

Now

- Water still not safe



Moving Forward

- Unique opportunity to be proactive, to build a model public health program to buffer impact of exposure
 - Focus on secondary prevention
- Serve as a model for other communities

MSU/Hurley Pediatric Public Health Initiative



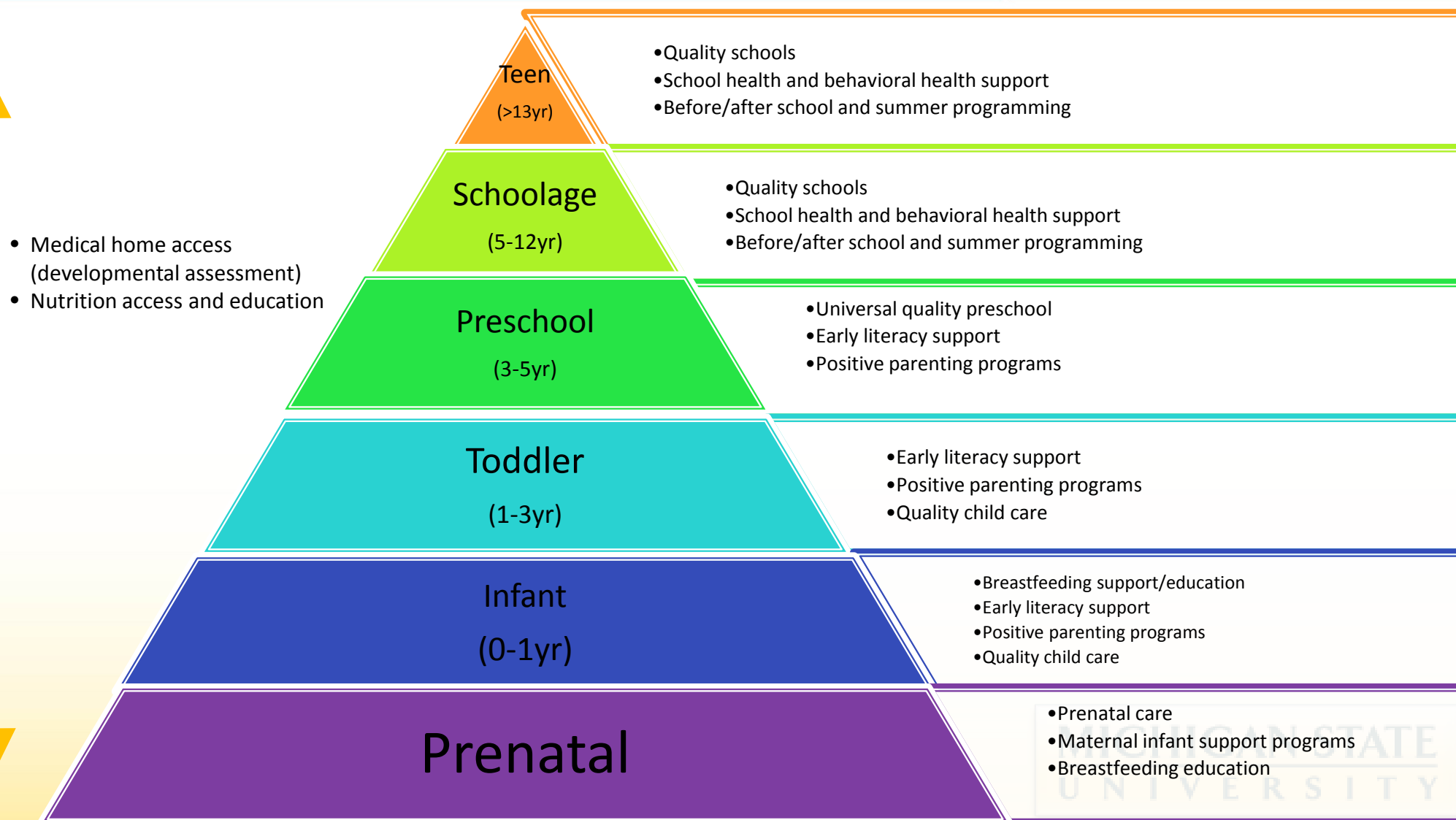
- Assess
- Monitor
- Intervene



- Experts and community
- <http://humanmedicine.msu.edu/pphi/>



Interventions: Education, Nutrition & Health



Flint Summary

- Ongoing public health emergency
- Lessons from Flint
 - Lead is not a problem of yesterday
 - Failed water and public health protections
 - Environmental injustice
 - Opportunity to mitigate exposure

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Thank you!

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