CITY OF MINNEAPOLIS

Building Lead-Resilient Kids Through Targeted Nutrition

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Minneapolis
City of Lakes

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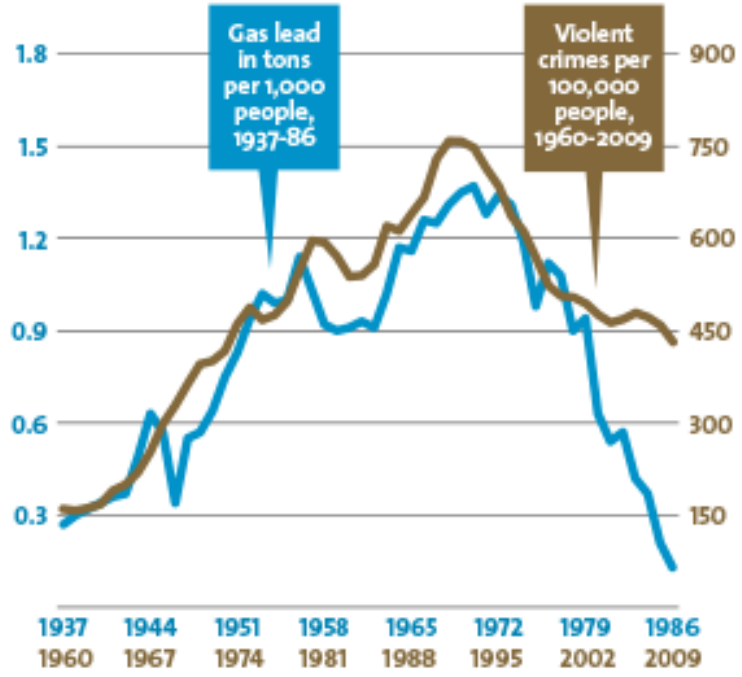
Lead leads to poor school performance, violence and pregnancy

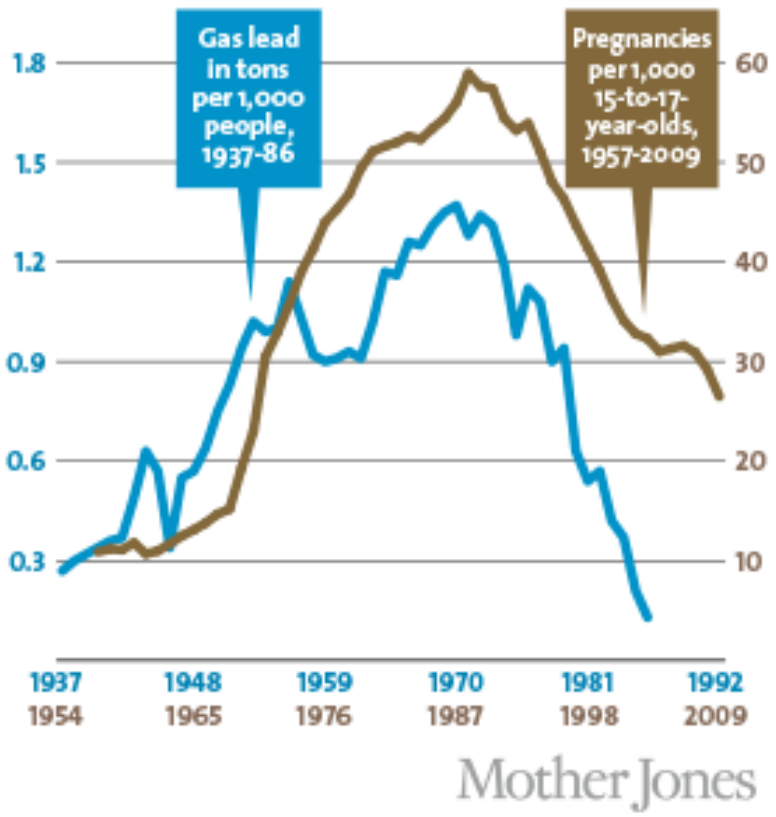
THE PB EFFECT

What happens when you expose a generation of kids to high lead levels? Crime and teen pregnancy data two decades later tell a startling story.

Gasoline lead and violent crime



Gasoline lead and teen pregnancy



Top: Rick Nevin, USGS, DOJ; Bottom: Rick Nevin, Guttmacher Institute, CDC

Lead 101

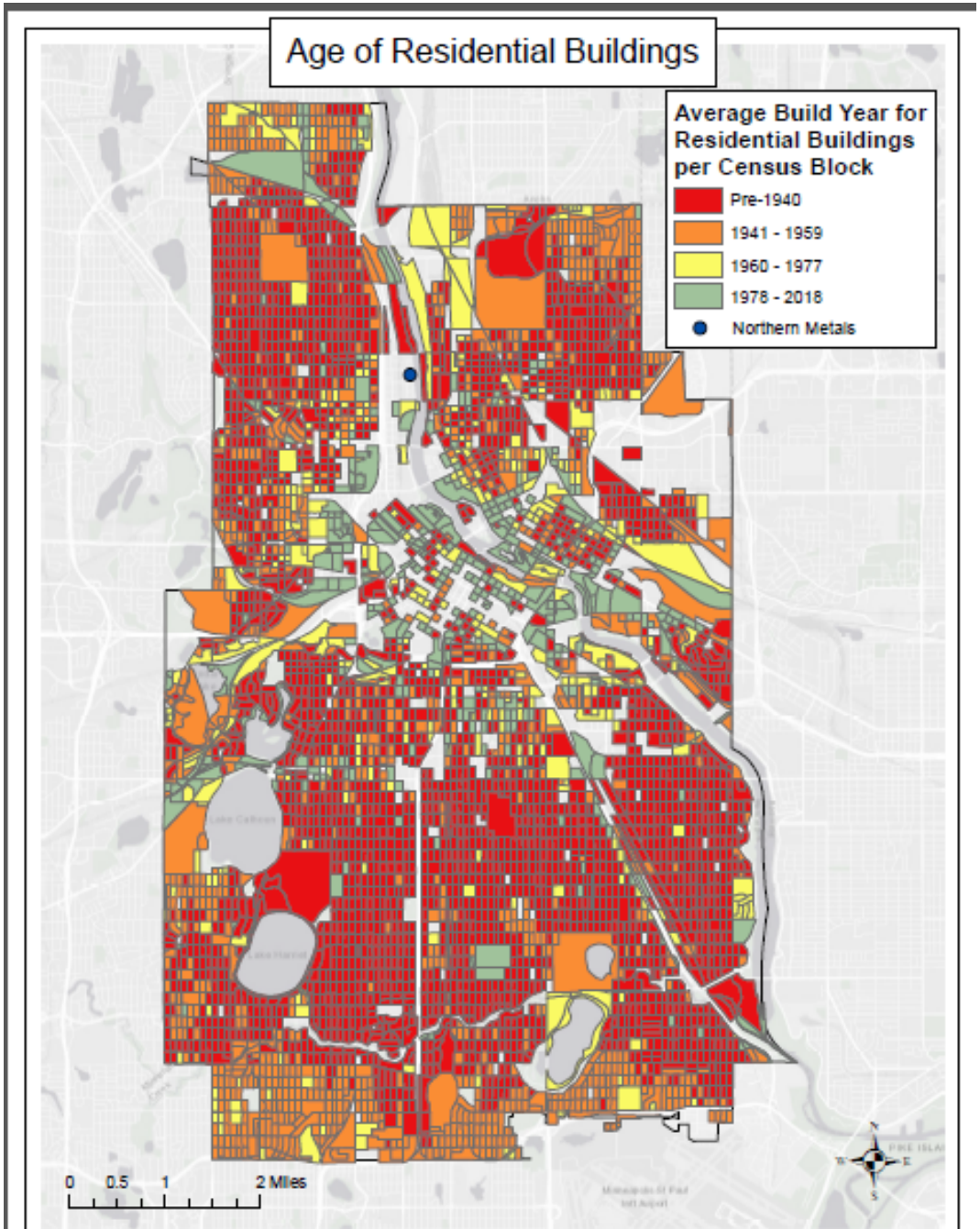
- Because lead can cause permanent physical damage to developing bodies and brains, the state medical guidelines recommends children get tested
- Children are usually tested at their regular medical check-ups
- All blood lead test results are collected by the Minnesota Department of Health
- Minneapolis is required by law to investigate elevated blood lead levels, identify the source and enforce removal or repair of lead hazards

Lead poisoning – terminology

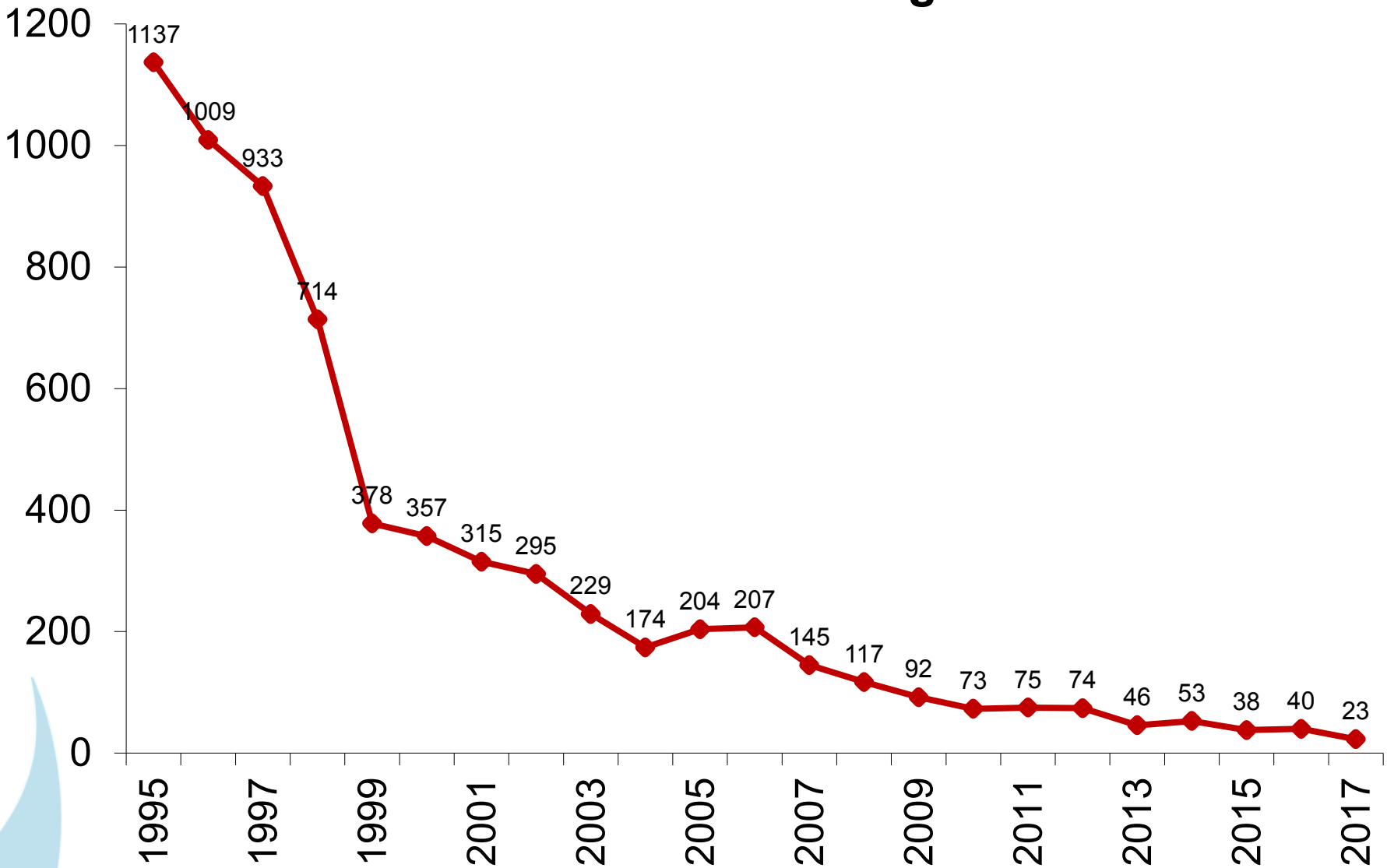
- Capillary tests – blood from the finger – used for screening
- Venous tests – blood from vein – legally enforceable
- Elevated Blood Lead Level – amount lead per deciliter of blood, what is considered “poisoned” has varied over time. **Current rate of concern is 5 ug/dl.**

What is the main source?
Lead paint

- 75% of Minneapolis residential housing was built before lead paint was banned
- 80% of lead poisonings occur in housing built before 1935 (50% of Minneapolis residential housing)
- It is the first coat of paint put on a surface and it is a brain damaging neurotoxin that is a heavy metal legacy poison

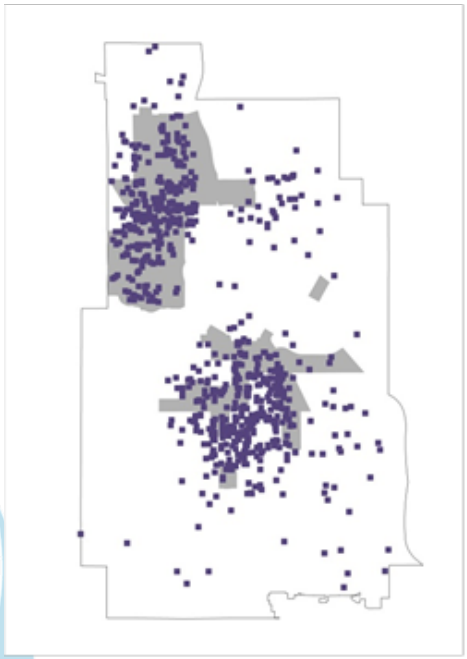

Age of Residential Buildings
Average Build Year for Residential Buildings per Census Block
Pre-1940
1941 - 1959
1960 - 1977
1978 - 2018
Northern Metals
0 0.5 1 2 Miles

Elevated Blood Lead Rates in Minneapolis Children with BLL >10ug/dbl

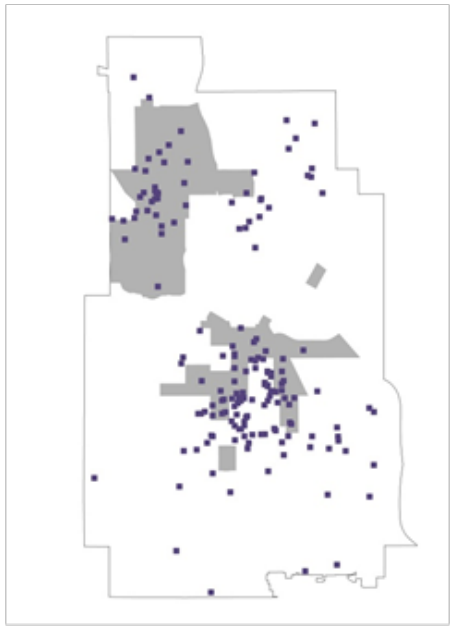


EBL over 10 µg/dl 1997-2017

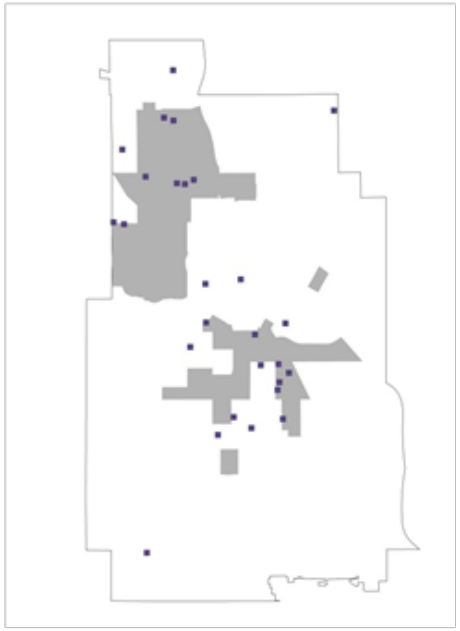
1997



2007



2017



Low lying fruit

- 98% drop in elevated blood lead rates in children
- Improvement in housing stock
- Increased inspections correlating with decrease in cases

However…..

- Still using kids as lead detectors

- **How do we proactively get ahead of the issue**?

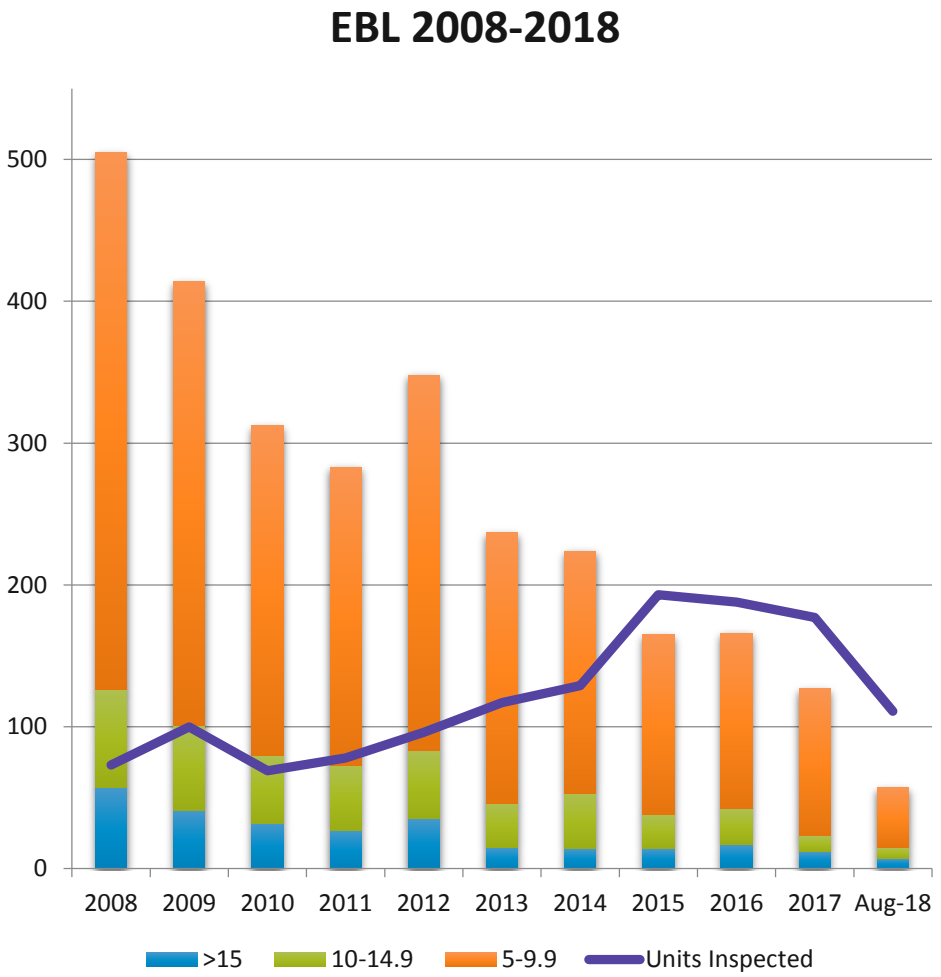
Going up stream

Every time you lower the threshold, 5 years later you cut the EBL rate – at whatever level you are investigating by roughly 50%

2008 -2013 went from 126 children with bll >10 ug/dl to 46, a 63% drop in 5 years

2015-2017 we experienced a 25% drop in the first 3 years, we are on track to see the 50% drop by the end of the 4th year

We estimate an 80% drop from where we started in 2008 by the end of the year

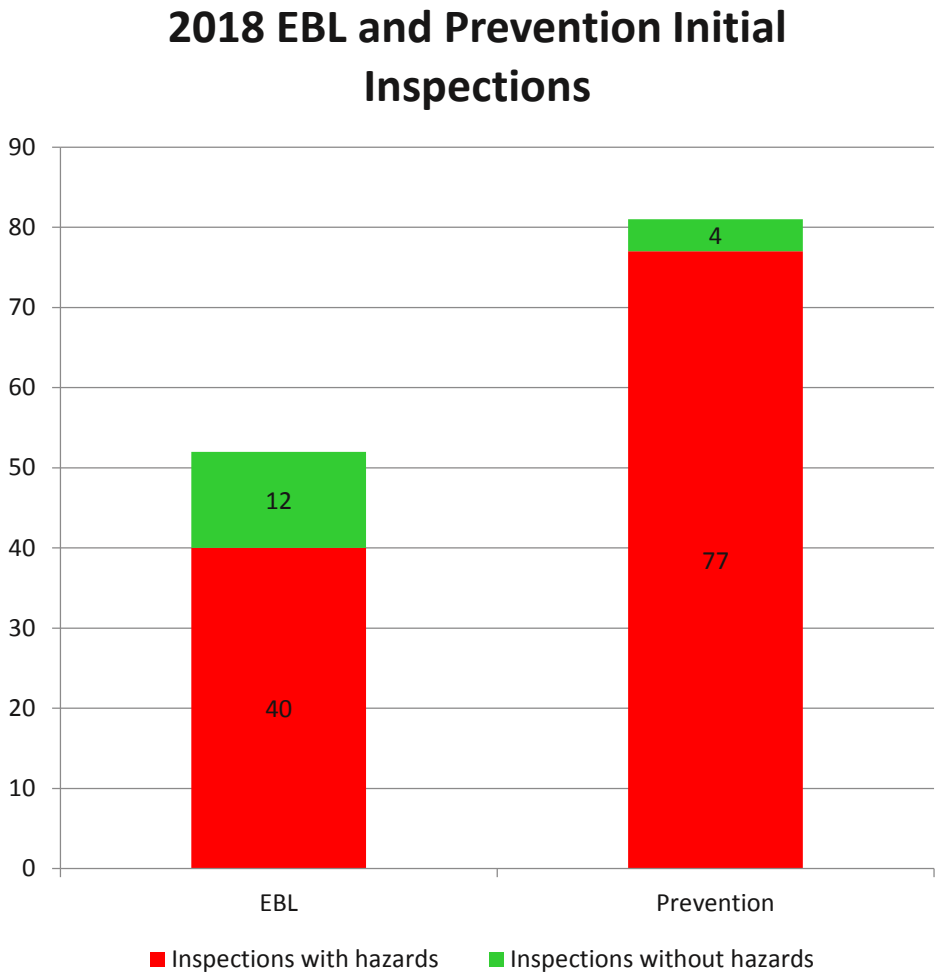


Cut off EBLs before they happen

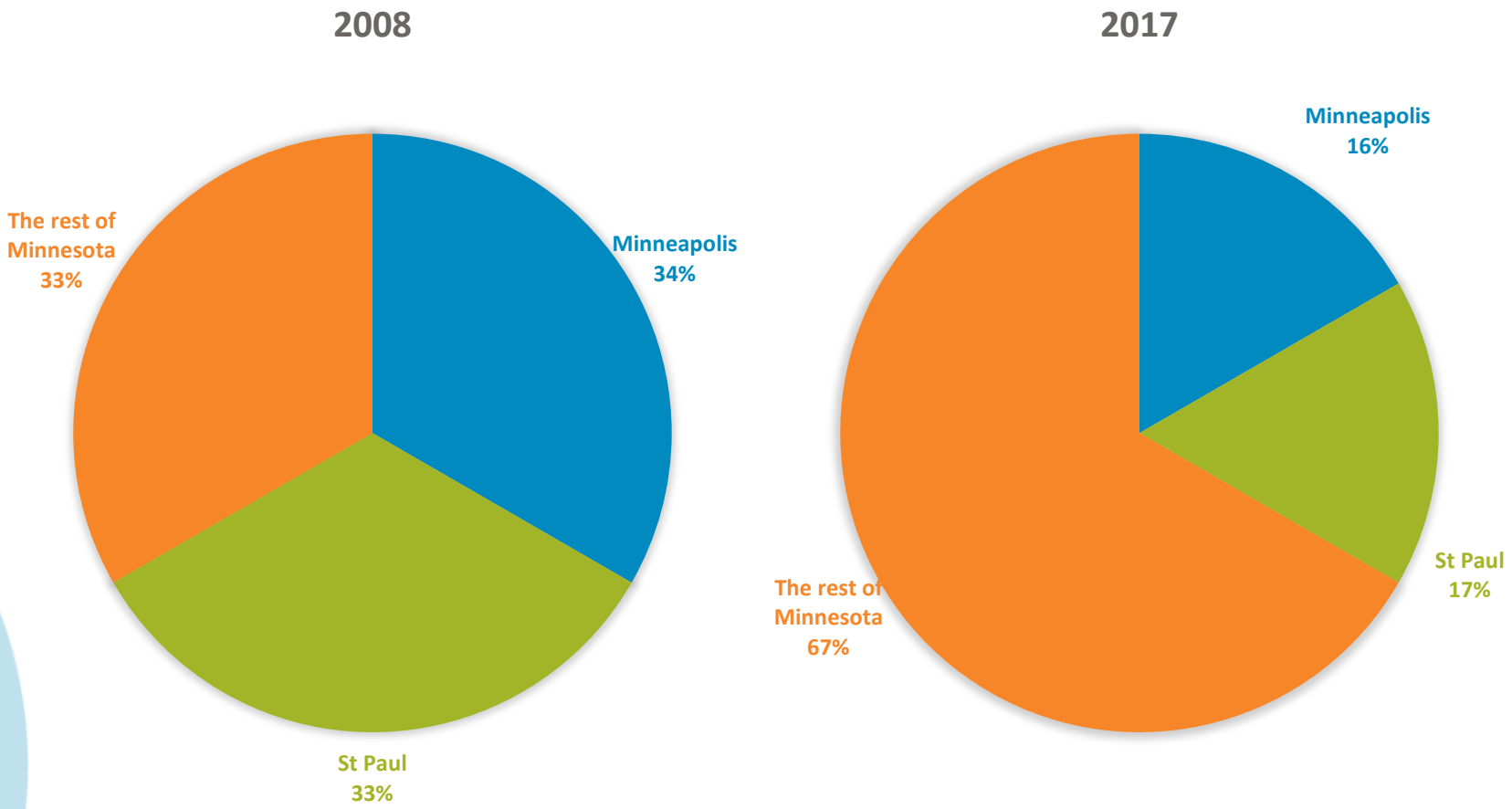
A prevention inspection is done because there is capillary with some lead present or as part of rental licensing.

When we start inspecting based on the age of housing and economic status of the neighborhood we find an extreme likely hood of lead paint hazards.

This is how we plan on using what we know about lead paint to target the housing instead of using children as lead detectors.



Ratios of Lead Poisoning- change over 20 years



City of Minneapolis actions

- Cross-training staff toincrease inspections
- Training housing inspectors to detect suspect conditions
- Accompanying construction and licensing inspection staff at key transformation points
- ***Address nutritional deficiencies from health disparities that expose children to increased lead absorption***

Lead in children

- Adults typically absorb up to 20% of ingested inorganic lead after a meal and up to 60-80% on an empty stomach [ATSDR 2010].
- Children absorb about 50% of ingested lead after a meal [ATSDR 2010] and up to 100% on an empty stomach.
- Adults about 94% of lead in bones (Barry, 1975)
- Children about 73% in bones (Barry 1975)
- Exposure 1 to 5 years, effects seen at 6 years

Nutritional deficiencies

- CDC recommendations for lead prevention
  - Calcium
    - milk, yogurt, cheese, and green leafy vegetables like spinach
  - Iron
    - lean red meats, spinach, beans, peanut butter, and cereals
  - Vitamin C
    - oranges, green and red peppers, and juice

Calcium

- Calcium reduces lead uptake
- Also reduces iron uptake
- Lead mimics (replaces) calcium (toxicity)
- Bone health
- Calcium supplements for pregnant and nursing women can reduce transfer of lead to fetus (Ettinger et al, 2007)
- No CDC supplement recommendations

Iron

- Recommended Dietary Allowance (RDA)
  - Premenopausal women 18 mg/day
  - Pregnant women 27 mg/day
  - Men and postmenopausal women 8 mg/day
  - Children 6 months to 11 years 11 mg/day
- Average western diet 6 to 7 mg Fe per 1,000 calories
- Heme iron (meats) and non-heme iron (plants)
- Non-heme eaten with **Vitamin C** (Ferric to Ferrous)
- Iron deficiency linked to higher EBLs in children

24th Street Urban Farming Coalition

- Vacant CPED lot in south Minneapolis

Layout

Planting

Results

EBL Families really appreciate receiving fresh veggies and a recipe.

Community Lead Awareness Day

Ongoing

- Vegetable baskets for families with affected children
- Recipes
- Awareness education

Conclusions

- Not a panacea or replacement for enforcement
- Additional tool – nutrition alone will not lower EBL
- Regular nutritious meals provide best defense
- Strongest evidence for iron deficiency and EBL
- Vitamin C combined with plant-iron sources
- Cooking methods can reduce nutritional value
- 5-second rule not in effect
- Keep lead paint intact!

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