



# Data Consolidation of Community-Based and Legislative Practices to Improve Health Outcomes in Lead-Exposed Areas

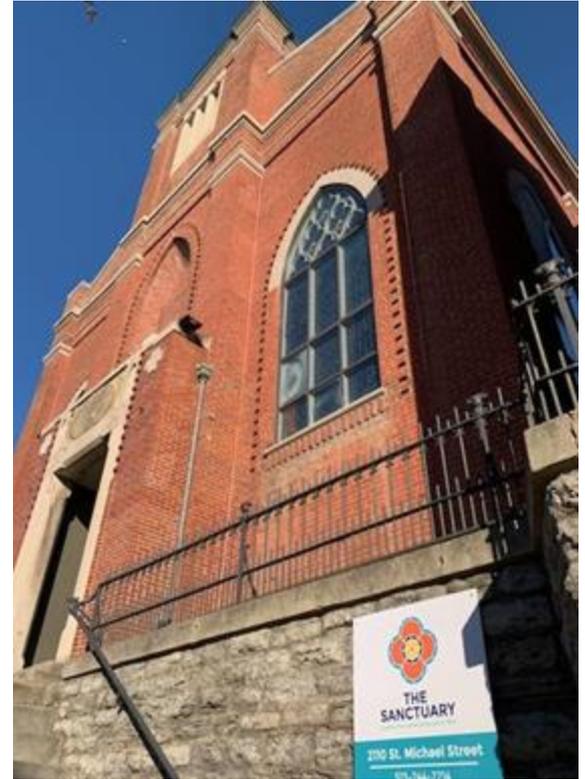
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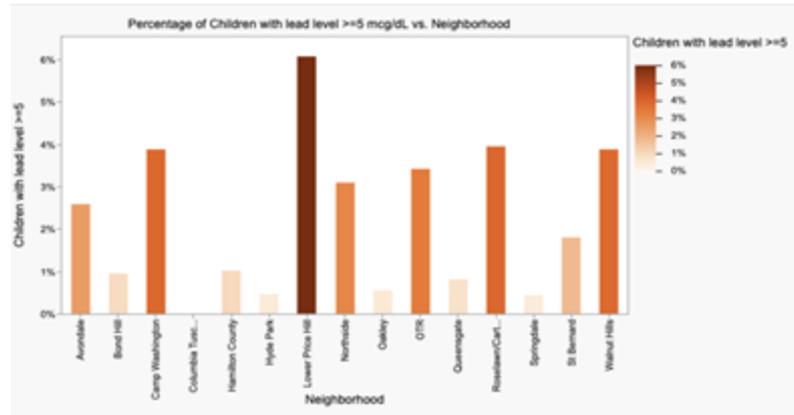
# Introduction

- Lower Price Hill (LPH) is a community that was established in the late-1800s on the west side of Cincinnati.
- Community Matters is focusing on lead abatement and reducing the harmful effects of lead on the community.



# Background

- Lead is bad for kids!
  - Cognitive defects, nervous system and kidney damage, poor coordination
  - Damage is often irreversible
- Lower Price Hill and Lead
  - 95.5% of homes in LPH built prior to 1970, well before the 1978 Lead Paint Law
  - Overpass coated in layers of lead paint was demolished in 2012
  - 66% of water sources in the only school in LPH had detectable amounts of lead



Newman, N., 2020. Environmental Justice And Childhood Lead Exposure In Hamilton County Ohio. [online] Available at: <[https://public.jmp.com/packages/Environmental-Justice-and-Childhood-Lead/jsp/4wwYC3jxt2g2wbhT\\_b0hZ](https://public.jmp.com/packages/Environmental-Justice-and-Childhood-Lead/jsp/4wwYC3jxt2g2wbhT_b0hZ)> [Accessed 18 November 2020].

# Project Objectives

## **Service Objective:** 2 Primary aims

- Compile data and information about reducing lead poisoning from comparable communities to Lower Price Hill for Community Matter to aid Community Matters in their lobbying efforts.
- Educate the community more about lead poisoning, where it is, what it is, how it affects children, and what they can do about it.

## **Learning Objective:**

- Understand the prevalence and impact of lead and lead poisoning from LPH community members
- Discern how to work through Community Matters to effect change in LPH
- Interpret results from public databases and how to effectively find relevant information

# Methods

**Household Group:** background research on socioeconomic statistics of LPH, phone and zoom interviews with community members, creation of complex pamphlet and simple flyer for community education

**Policy Group:** Two Databases, Scopus and Web of Science, were used to search for articles analyzing evidence based lead abatement interventions and policies. The search terms used included the following: ("Lead poisoning" OR "lead exposure") AND (legislation OR polic\* OR regulation OR abatement OR intervent\* OR remediat\*) AND ("united states" OR USA OR "North America" OR America). In order, papers were screened by title, abstract, and full-length text. References were scoped for relevant papers. Recommendations were also taken from papers that did not meet criteria but had useful information. The most pertinent papers will be discussed in this presentation.

**Best Practices:** direct meetings with Community Matters with efficient and clear communication via Zoom and email, as well as interviewing residents of LPH over the phone.

# Simple Flyer

## COULD LEAD BE POISONING YOUR CHILDREN?

Lead poisoning is 100% preventable

### WHAT CAN YOU DO?



#### CLEAN YOUR HOUSE FREQUENTLY

Use a damp cloth to dust and  
wipe away any chipping paint



#### WASH YOUR HANDS

After coming in from outdoors  
and before eating



#### EAT FOODS WITH IRON & CALCIUM

Like meat, dark green leafy  
vegetables, and dairy



#### TALK TO YOUR DOCTOR

If you have concerns



SCAN ME

#### CHECK OUT MORE INFORMATION HERE!

Source: Centers for Disease Control



COMMUNITY  
MATTERS





# Results



**Community Outreach Group:** Simple fliers on lead poisoning were distributed electronically (Facebook under the Lower Price Hill Community Council page as well as the Community Matters Staff page). Simple and complex pamphlets were distributed to the Lower Price Hill community.

**Policy Group:** 681 manuscripts related to lead abatement were retrieved from online databases based on specific search terms and screened by title, abstract, and content to isolate 5 papers for in depth analysis and presentation to Community Matters.

# Discussion



# The Commonwealth of Kentucky, USA

Paper: An economic impact assessment of lead exposure in the Commonwealth of Kentucky, USA, making the case for statewide remediation

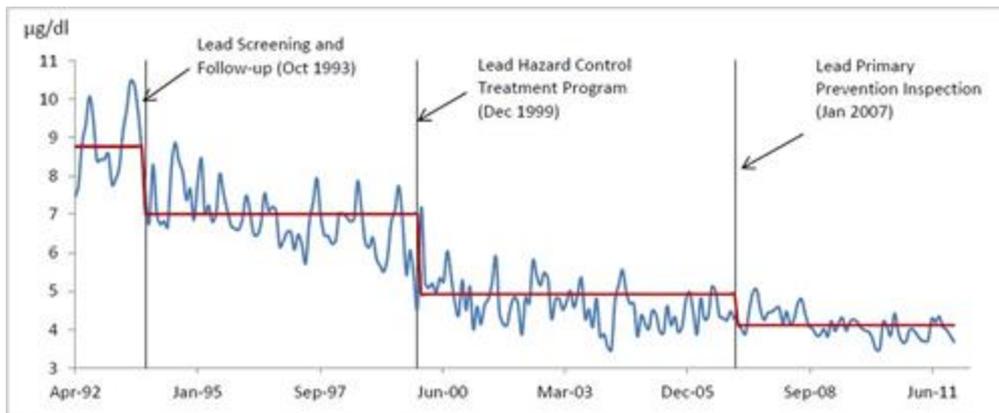
- This paper assesses the economic impact of lead exposure in high-risk housing among children residing in the Commonwealth of Kentucky as measured by productivity and tax revenues lost
- It examines the relationships between IQ and earnings potential, lost earnings and tax revenue generation, remediation costs and the cost of exposure, and it evaluates these costs against exposure reduction and suggests a strategy for comprehensive remediation activities that pays for itself over time.
- The results of this analysis determine that **the long-term benefits of reducing the outcomes associated with lost productivity among young children per year due to lead exposure would generate sufficient tax revenue to pay for complete remediation of all high-risk low-quality housing units** in Kentucky.

# Rochester, NY



- Coalition to Prevent Lead Poisoning advocacy organization.
  - Lead-Based Paint Poisoning Prevention Ordinance (July 2006).
  - All rental houses required to receive visual inspection for deteriorating paint.
- Lead hazards added to move-in/move-out policies for public housing.
- Rates of lead poisoning decreased 2.4x faster in Monroe County than other counties.
- 2000-2015, number of children with blood lead level +10 ug/dl reduced by 84 percent.

# Syracuse, NY



From 1992-2011, a 3-stage program in Syracuse reduced the average blood lead level (BLL) of local children under six years old by 55% ( $8.77\mu\text{g/dL}$  to  $3.94\mu\text{g/dL}$ ). (6)

- **Stage 1 (Oct 1993):** New York State implements regulations for children's BLL reporting, lead screening, environmental assessment, abatement regulation, and follow-up.
- **Stage 2 (Dec 1999):** The Syracuse Lead Program begins lead-abatement of "high risk" homes (ie low-income housing where resident children have  $\text{BLL} \geq 10\mu\text{g/dL}$ ).
- **Stage 3 (Jan 2007):** The City of Syracuse starts conducting proactive inspections to identify potential hazards in lower-risk properties (ie children with  $\text{BLL} < 10\mu\text{g/dL}$ ).

# Additional Articles

- **Effectiveness in Types of Lead Abatement.**

- Complete repainting of homes in addition to window abatement led to reductions in window and floor lead dust levels after 36 months. (8)

- **New Jersey (Community Reinvestment Act).**

- One-on-one counseling of homeowners about funding was associated with more than 50 percent success in completing abatement. The CRA loans accounted for about one-third of the abated units. (10)

- **Window Replacement.**

- A total of 189 homes were evaluated in 4 locations across the U.S. as part of a HUD Lead Hazard Control Grant Program. Houses either had all, some, or no windows replaced. This study showed that complete window replacement resulted in significant reduction in house dust lead levels when compared to houses that did not undergo window replacement. While partial window replacement showed a decrease in house dust lead levels, it was not statistically significant. (11)

- **St. Louis, MO.**

- Screening and remediation of houses of pregnant women is effective to reduce the average blood-lead level and number of children that exceed the federal level of concern for lead poisoning in a high-risk population.

# Supplemental Findings

- **Urban Gardening.** Raised urban gardening beds initially showed reduced lead levels compared to the neighboring soil, but the measured soil lead level increased each year, indicating that wind-transported lead likely contaminates the raised beds. Therefore, recommended maintenance includes removing the top layer of soil in the raised beds (about 3-5 cm) and replacing it with compost every year. (1)
- **Soil.** Lead soil abatement procedures combined with interior dust abatement and loose paint removal led to significant decreases in blood lead levels of children with elevated blood lead levels for a period of at least one year. While test groups specifically given only dust abatement and loose paint removal experienced similar drops in blood lead levels, those levels were shown to increase significantly more at the one year mark compared to the soil group. (2)
- **Nutrition.** While there has not been an evidence-based intervention observing the effect of nutrition and lead absorption in children, it has been suggested that adequate iron, calcium, and vitamin C in children's diets may improve outcomes after lead exposure. We could consider increasing and promoting foods with these nutrients in the community food bank. (3)
- **Lead Cleaning in Jersey City.** "A year long cleaning protocol can significantly decrease lead levels in rugs and on other exposed surfaces." (4)
- **A Case-Control Study to Determine Risk Factors for Elevated Blood Lead Levels in Children.** Idaho demonstrated yard soil remediation showed the strongest association with changes in blood lead levels. The results suggest that removal of lead-contaminated soil from residential yards was effective in reducing blood lead levels in children. (5)

# Conclusions

Not only is removal of lead beneficial for the health and safety of the residents of Lower Price Hill, but it is also financially beneficial in the long term. There are a multitude of possible lead abatement strategies that have been successful in environments similar to Lower Price Hill or Cincinnati at large. Therefore, if Cincinnati officials wish to invest resources into future lead abatement projects, then there exists evidence-based, scientifically reviewed abatement strategies which officials may use to guide future policies.

## **Reflections:**

- Childhood lead poisoning is a serious health concern facing many children in Lower Price Hill and nationwide.
- The health of the community extends well beyond hospitals and clinics.
- The key to improving community health is knowing and understanding your community and the people you are serving and using their strengths, like their strong community ties and pride, to build an even better place.

## **Next steps for Community Matters and Future LCs:**

- Distribute our educational materials to the community.
- Use our research on policy interventions to advocate for legal changes on local, state, and national governmental levels.
- Follow up on the impact of our educational materials in the community.
- Partner with neighborhood schools to continue increasing awareness in the community.

# Affiliations and Acknowledgements

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# References

- (1) Clark HF, Hausladen DM, Brabander DJ. Urban gardens: lead exposure, recontamination mechanisms, and implications for remediation design. *Environ Res.* 2008;107(3):312-319. doi:10.1016/j.envres.2008.03.003
- (2) Weitzman M, Aschengrau A, Bellinger D, Jones R, Hamlin JS, Beiser A. Lead-contaminated soil abatement and urban children's blood lead levels. *JAMA.* 1993 Apr 7;269(13):1647-54. PMID: 8455298.
- (3) Cunningham E. What role does nutrition play in the prevention or treatment of childhood lead poisoning?. *J Acad Nutr Diet.* 2012;112(11):1916. doi:10.1016/j.jand.2012.09.003
- (4) Liou PJ, Yiin LM, Adgate J, Weisel C, Rhoads GG. The effectiveness of a home cleaning intervention strategy in reducing potential dust and lead exposures. *J Expo Anal Environ Epidemiol.* 1998;8(1):17-35.
- (5) Maisonet M, Bove FJ, Kaye WE. A Case-Control Study to Determine Risk Factors for Elevated Blood Lead Levels in Children, Idaho. *Toxicology and Industrial Health.* 1997;13(1):67-72. doi:10.1177/074823379701300106
- (6) Shao L, Zhang L, Zhen Z. Interrupted time series analysis of children's blood lead levels: A case study of lead hazard control program in Syracuse, New York. *Plos One.* 2017;12(2). doi:10.1371/journal.pone.0171778
- (7) Kennedy, Byron S., MD, PhD, MPH, Doniger, Andrew S., MD, MPH, Painting S, BS, et al. Decline in Elevated Blood Lead Levels Among Children, 1997–2011. *American journal of preventive medicine.* 2014;46:259-264
- (8) Dixon SL, Wilson JW, Scott Clark C, Galke WA, Succop PA, Chen M. Effectiveness of lead-hazard control interventions on dust lead loadings: Findings from the evaluation of the HUD Lead-Based Paint Hazard Control Grant Program. *Environmental research.* 2005;98:303-314.
- (9) An economic impact assessment of lead exposure in the Commonwealth of Kentucky, USA: making the case for statewide remediation <https://doi.org/10.1504/IJEP.2007.014821>
- (10) Yiin LM, Weber J, Sannoh S, Rhoads G. Efficacy of the Community Reinvestment Act in promoting lead abatement. *J Environ Health.* 2005;67(8):44-48.
- (11) Dixon SL, Jacobs DE, Wilson JW, Akoto JY, Nevin R, Scott Clark C. Window replacement and residential lead paint hazard control 12 years later. *Environ Res.* 2012;113:14-20. doi:10.1016/j.envres.2012.01.005
- (12) Berg DR, Eckstein ET, Steiner MS, Gavard JA, Gross GA. Childhood lead poisoning prevention through prenatal housing inspection and remediation in St. Louis, MO. *Am J Obstet Gynecol.* 2012;206(3):199.e1-199.e1994. doi:10.1016/j.ajog.2012.01.001