

# Exploring the relationship between demolitions and children's blood lead levels

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# Research Question

- Are children exposed to demolition(s) more likely to have higher blood lead levels than children not exposed to demolition activity?
- Time frame: 2002

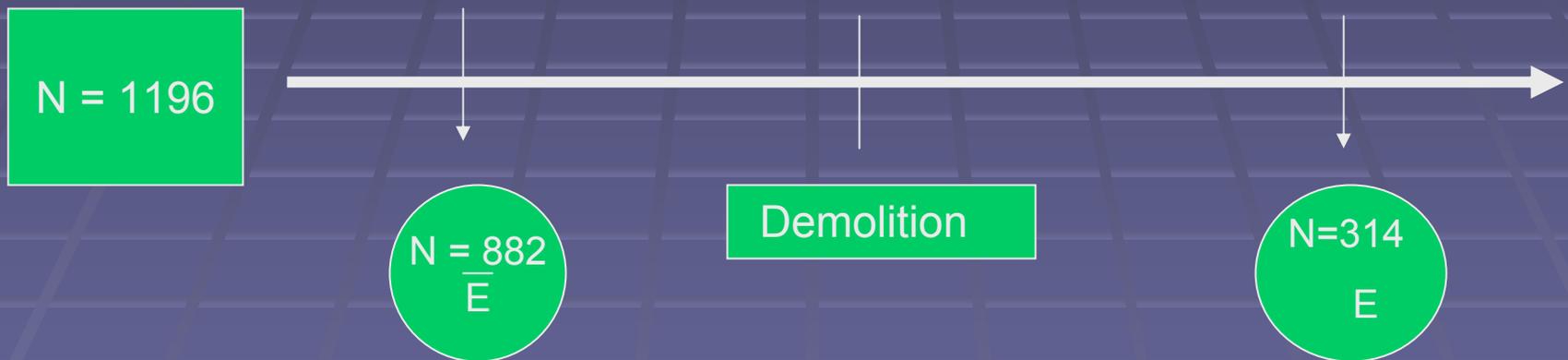
# Approach

- Multivariate regression analysis of blood lead levels and demolitions, controlling for other known risk factors for an elevated lead level.
- Unit of analysis: individual level using census block information
- Study variables:
  - Outcome = blood lead level
  - Exposure = demolition (yes/no and number)
  - Covariates = age, sex, race, age of the house in which the child resides

# Approach (cont'd)

- Study Population
  - Sampling frame
    - 2002 CLPPP childhood blood lead surveillance dataset
    - 2002 demolition dataset
  - Inclusion criteria
    - Children 6 months to 6 years of age screened for a BPb in 2002 (n=1272) who lived on a block with at least one demolition
    - Data available on age of house in which the child resided when the lead test was conducted (n=1196)
  - Exposed group
    - Children who had a BPb test within 45 days of a demolition (n = 314)
  - Unexposed group
    - Children who did not have a PbB test at any time after a demolition (n=882)

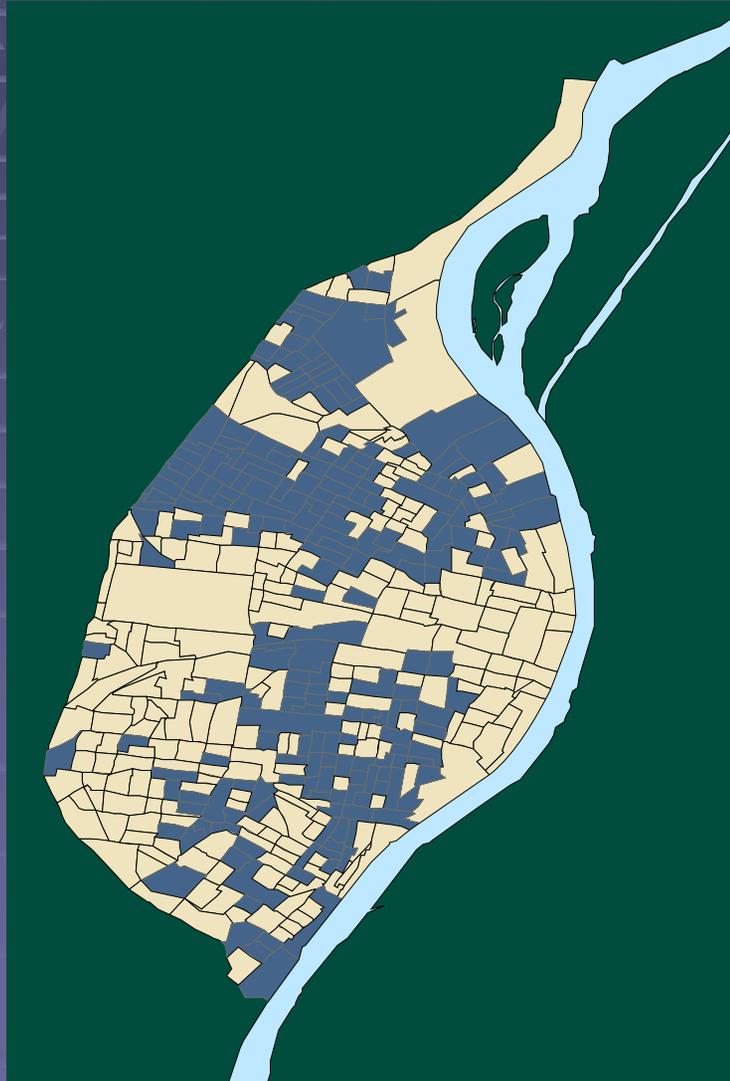
# Definition of Study Groups



# Results: Descriptive

- St. Louis Blood Lead Data 2002
  - 9,756 children tested
  - 113 total census tracts
  - 111 with blood lead data
  - 444 block groups with blood lead data
  - 2,618 blocks with blood lead data
- Study dataset
  - 1196 children included
  - 82 census tracts
  - 219 block groups
  - 395 blocks

# Block Groups Contributing Children to the Demolition Study



## Included Block Groups

-  Not Represented
-  Represented by at least one child

# Results: Descriptive, cont'd

- St. Louis Blood Lead Data 2002

- Sex

- 47.3% female
    - 50.5% male

- Study dataset

- Sex

- 47.7 % female\*
    - 50.5% male\*

\* After imputing values for 21 records with missing data

# Results: Descriptive, cont'd

- St. Louis Blood Lead Data 2002

- Race

- 62.5 % African-American
    - 11.0% All others combined
    - 26.5 % unknown

- Study dataset

- Race

- 84.4% African American
    - 11.3% All others combined
    - 4.3% missing\*

\* Records with missing data were excluded in the regression analysis

# Results: Descriptive, cont'd

- St. Louis Blood Lead Data 2002
  - Age Group
    - 4.0% 6-11 months
    - 46.8% 12-35 months
    - 49.1 % 36-72 months
- Study dataset
  - Age Group
    - 10.9% 6-11 months
    - 40.1% 12-35 months
    - 49.1% 36-72 months

# Results: Descriptive, cont'd

- St. Louis Demolition Data 2002 (n=1,017)
  - 113 Total census tracts
  - 106 census tracts with demolition data
  - 450 block groups
  - 314 block groups with demolition data
  - 696 blocks with demolition data
- Study dataset
  - Matched 314 demolitions

# Results: Descriptive, cont'd

- St. Louis Blood Lead Data 2002

- Blood lead ( $\mu\text{g}/\text{dL}$ )
  - 82.5% < 10
  - 10.6% 10 to 15
  - 4.1% 15 – 20
  - 2.8%  $\geq 20$

- Study dataset

- Blood lead ( $\mu\text{g}/\text{dL}$ )
  - 79.6% < 10
  - 12.4 % 10 to 15
  - 4.9 % 15 to 20
  - 3.1%  $\geq 20$

## Descriptive Results (summary)

Characteristic	E*	$\bar{E}$ *
	n=314	n=882
PBb level (mean)	7.35 µg/dL	6.87 µg/dL
Mean Age in months	35.7	35.38
Sex		
female	149 (25.6%)	432 (74.4%)
male	165 (26.8%)	450 (73.2%)
Mean Age House Built	1913	1913
Race <sup>+</sup>		
African American (n=1010)	279 (27.6%)	731 (72.4%)
All others combined (n=135)	25 (18.5%)	110 (81.5%)

\* E = demolition, yes;  $\bar{E}$  = demolition, no

+ Final dataset (n=1145) reflects records excluded due to missing race data

# Results: Regression Analysis

- Question 1: Is blood lead level related to residing on a block with at least one demolition?
  - In a model with only demolition as an exposure variable, demolition is weakly associated with an increase in blood lead level ( $p = .051$ ).

# Results: Regression Analysis

- Question 1: Is blood lead level related to residing on a block with at least one demolition?
  - In a model controlling for other known risk factors (age, sex, housing age and race) demolition is not associated with an increase in blood lead level ( $p = .106$ ).
  - In this model, race and house built prior to 1950 were significant predictors of higher BPb levels. The  $p$ -values are .000 and .001 respectively.

# Results: Regression Analysis

- Question 2: Is blood lead level related to the number of demolitions a child is exposed to?
  - Exposure definition
    - None
    - One
    - > One (multiple)
  - In a model containing only the variable number of demolitions, being exposed to multiple demolitions is associated with an increase in blood lead level ( $p = .010$ ) compared to children not exposed to any demolitions.

# Results: Regression Analysis

- Question 2: Is blood lead level related to the number of demolitions a child is exposed to?
  - In a model controlling for other known risk factors (age, sex, housing age and race) being exposed to multiple demolitions was associated with an increase in blood lead level ( $p = .010$ ).
  - In this model, race and house built prior to 1950 were also significant predictors of higher BPb levels. The p-values are .000 and .001 respectively.

# Conclusions

- When controlling for known risk factors for elevated blood lead levels\*, being exposed to a demolition, defined as living on a block where a demolition occurred, is not related to an increase in blood lead level.

\* age, sex, race, age of housing

# Conclusions

- When controlling for known risk factors for elevated blood lead levels\*, being exposed to multiple demolitions, defined as more than one demolition, is related to an increase in blood lead level.

\* age, sex, race, age of housing

# Limitations

- Data on direct measures of home lead exposure were unavailable.
- Data on condition of housing was unavailable.
- Data on neighborhood characteristics was limited.
- Dispersion data for lead particles after demolition were not available.

# Discussion

- Being exposed to multiple demolitions contributes to the risk of increasing blood lead levels.
- The age of housing and race remains the most important predictors.
- However, we are unsure why race is a strong predictor in this model, suggesting the occurrence of residual confounding .

# Geographic Distribution of Study Sample by Race

