

## TITLE

The Relationship between Demolition Activity and Children's Blood Lead Levels

(NOTE: Tulane University and Missouri Department of Health and Senior Services Joint Presentation; two Abstracts are included below.)

## THEME

Foster Collaborations Among Health and the Environment

## KEYWORDS

childhood lead poisoning, blood lead level, children's health, demolitions

## BACKGROUND

Research has shown that demolition of old structures may be a source of lead exposure for children residing near demolition activities. The Missouri Department of Health and Senior Services conducted a project to determine the prevalence of demolition activity and the blood lead levels of children in St. Louis City. Data from the Missouri Childhood Lead Poisoning Prevention Program were merged with data from the City of St. Louis Department of Health, Building Division, to compare the geographic distribution of demolition density to the density of elevated blood lead levels. Based on the results of this preliminary study, Tulane University Center of Excellence joined with the Missouri Department of Health and Senior Services and the St. Louis Health Department to further investigate the relationship between demolition activity and childhood blood lead levels in the City of St. Louis.

## OBJECTIVE(S)

The study objective was to examine whether children exposed to demolition(s) are more likely to have higher blood lead (BPb) levels than children not exposed to demolition activity, controlling for other known risk factors. The specific aims of the study were: 1) To determine if demolition activity has any effect on the blood lead levels of children living on the block where the demolition occurred; and 2) To determine if the magnitude of the effect, if any, differs by the number of demolitions on the block.

## METHOD(S)

Childhood lead data, building permit demolition data, and tax assessor data was used to conduct a retrospective cohort study in the city of St. Louis. A child's lead test was included in the study if it was drawn between January 1, 2002, and December 31, 2002 and if the child lived on a block with at least one demolition. Children who had a BPb test within 45 days of a demolition were considered "exposed". Children who did not have a BPb test within 45 days of the demolition were considered "unexposed". The dependent variable was the child's blood lead level. Covariates included date of birth, sex, race and age of the house where the child resided at the time of the blood draw. We conducted multivariate regression analysis of blood lead level and demolition, controlling for relevant covariates, to determine whether living in the vicinity of a demolition was associated with an increased BPb, and whether the number of demolitions on the child's block was associated with an increased in BPb.

## RESULT(S)

When controlling for known risk factors, being exposed to a demolition is not related to an increase in BPb level. However, being exposed to multiple demolitions, after controlling relevant covariates, is related to an increase in BPb level.

## DISCUSSION/RECOMMENDATION(S)

Although being exposed to multiple demolitions was related to an increase in BPb, the most important predictors in our model were age of housing and race. Further, the increase seen in blood lead level was not clinically significant. Therefore, recommendations made to the buildings division include continuation of current lead containment efforts with increased attention to areas where multiple demolitions are scheduled to occur.

## AUTHOR(S)

Felicia Rabito, Ph.D., M.P.H.  
Clinical Assistant Professor  
Department of Epidemiology  
Tulane School of Public Health & Tropical Medicine  
Center for Applied Environmental Public Health  
504-988-2331  
[rabito@tulane.edu](mailto:rabito@tulane.edu)

Charles Shorter: [shorter@tulane.edu](mailto:shorter@tulane.edu)  
Shahed Iqbal: [siqbal@tulane.edu](mailto:siqbal@tulane.edu)



## **TITLE**

The Relationship between Demolition Activity and Children's Blood Lead Levels

## **THEME**

Foster Collaborations Among Health and the Environment

## **KEYWORDS**

lead, demolitions, childhood lead poisoning, blood lead level, children's health, Missouri Department of Health and Senior Services, Missouri, environmental public health tracking

## **BACKGROUND**

Research has shown that demolition of old structures may be a source of lead exposure for children residing near demolition activities. The Missouri Department of Health and Senior Services conducted a project to determine the prevalence of demolition activity and the blood lead levels of children in St. Louis City. Data from the Missouri Childhood Lead Poisoning Prevention Program were merged with data from the City of St. Louis Department of Health and Building Division to compare the geographic distribution of demolition density to the density of elevated blood lead levels. Based on the results of this preliminary study, Tulane University Center of Excellence joined with the Missouri Department of Health and Senior Services and the St. Louis Health Department to further investigate the relationship between demolition activity and childhood blood lead levels in the City of St. Louis.

## **OBJECTIVE(S)**

- 1) To foster and advance working relationships with the St. Louis City Department of Health and Building Division by working with them to obtain current quality data;
- 2) To develop adequate data to conduct GIS Spatial Analysis;
- 3) To provide appropriate quality data to Tulane University Center of Excellence for Tulane to conduct advanced data analysis;
- 4) To conduct a data analysis study project.

The study objective was to examine whether children exposed to demolition(s) are more likely to have higher blood lead (BPb) levels than children not exposed to demolition activity, controlling for other known risk factors. The specific aims of the study were: 1) To determine if demolition activity has any effect on the blood lead levels of children living on the block where the demolition occurred; 2) To determine if the magnitude of the effect, if any, differs by the number of demolitions on the block.

## **METHOD(S)**

- Previous GIS mapping of blood lead levels and demolition/rehabilitation permit locations suggested some correlation between elevated blood lead levels and demolition/rehabilitation work.
- Used Year 2002 data for both blood lead levels and building demolition/rehabilitation permits.
- Geocoded home of residence for children with blood lead test results and building demolition/rehabilitation permits.
- Compared lead test results prior to demolition/rehabilitation to lead test results afterwards; all test results were within one quarter-mile of demolition/rehabilitation site.



## RESULT(S)

- Lead test results after demolition/rehabilitation averaged about 0.5 microgram per deciliter of whole blood higher (statistically significant). However, this finding was not clinically important when analyzed by a multi-regression test of risk factors (race of child was the most important factor in higher blood lead level).
- There have been operational and policy changes in St. Louis City dealing with demolitions.

## DISCUSSION/RECOMMENDATION(S)

- The study was retrospective and not all risk factors were known or able to be controlled for in analysis; i.e., air lead concentrations, presence/condition of lead paint in child's home, meteorological factors, child's nutritional status, child's household hobbies or occupations, etc.).
- Results demonstrate the usefulness of GIS utility and capability in environmental public health activities.
- A prospective study is a possibility; however, studies of this nature are expensive, involving years of research and measuring, documenting, and modeling of various potential factors.

## AUTHOR(S)

Patty Osman, Epidemiology Specialist  
Missouri Department of Health and Senior Services  
Division of Environmental Health and Communicable Disease Prevention  
Office of Surveillance  
P.O. Box 570  
Jefferson City, Missouri 65102-0570  
573-751-9071  
[osman@dhss.mo.gov](mailto:osman@dhss.mo.gov)

Jeff Patridge: [patrij1@dhss.mo.gov](mailto:patrij1@dhss.mo.gov)  
Roger Gibson: [gibsor@dhss.mo.gov](mailto:gibsor@dhss.mo.gov)  
Pat Phillips: [phillip@dhss.mo.gov](mailto:phillip@dhss.mo.gov)

