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The link between housing conditions, elevated lead exposure, and kindergarten readiness

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Agenda

- Report highlights of a recent study that examined the link between housing, lead exposure and kindergarten readiness.

Coulton, C.J., Richter, F.C.G., Kim, S.J., Cho, Y. & Fischer, R. (2016). Temporal effects of distressed housing on early childhood risk factors and kindergarten readiness. *Children and Youth Services Review,* 68, 59-72.

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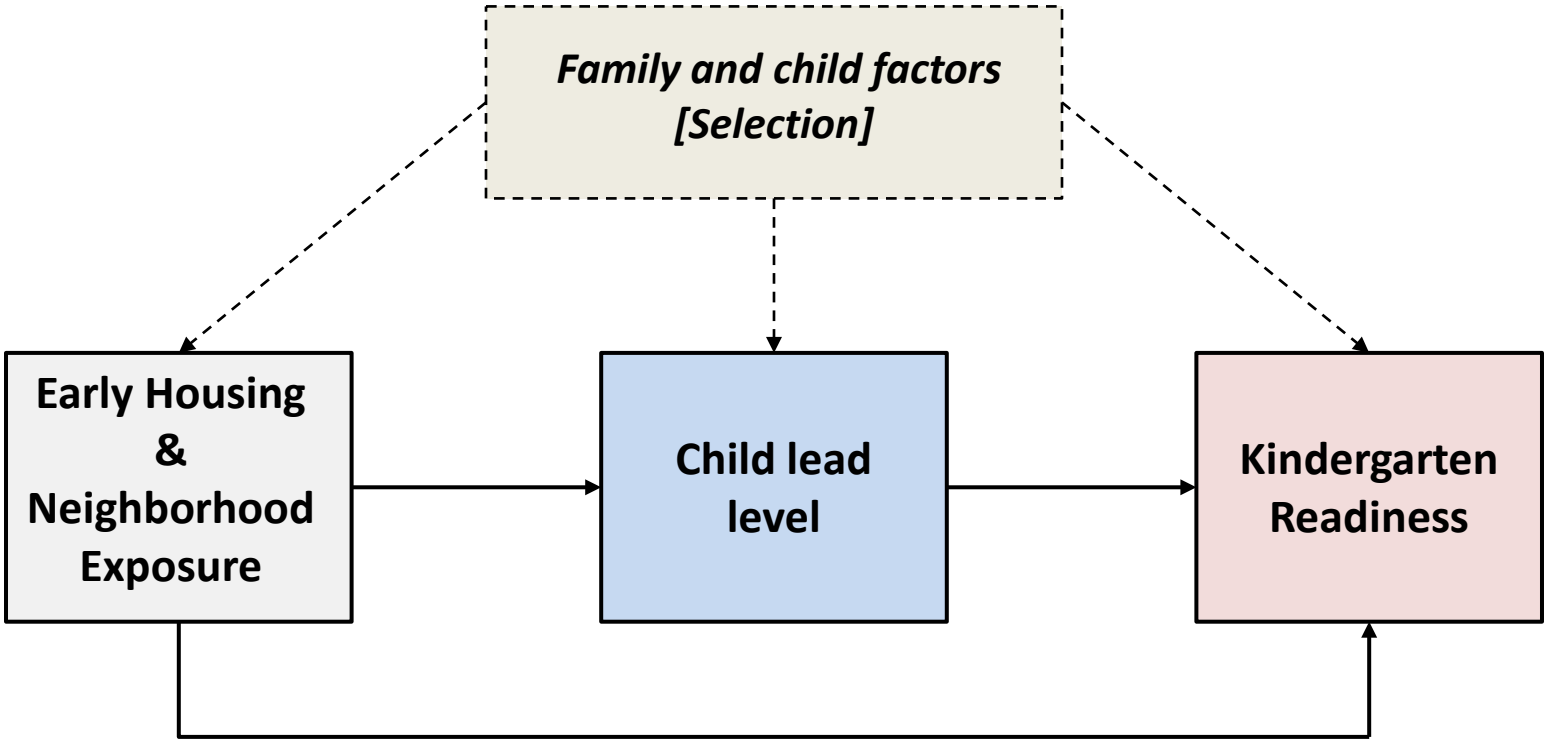
- Map the clusters of children testing positive for lead and along with historical forces affecting housing

Motivation for the study

- In many big cities, substantial numbers of children enter kindergarten already well behind in their cognitive and social development.
- Accumulating evidence suggests that elevated lead levels are an important factor in cognitive development.
- However, little is known specifically about how housing conditions in children's own homes and the immediately surrounding areas factor into their lead exposure and school readiness.

Conceptual model

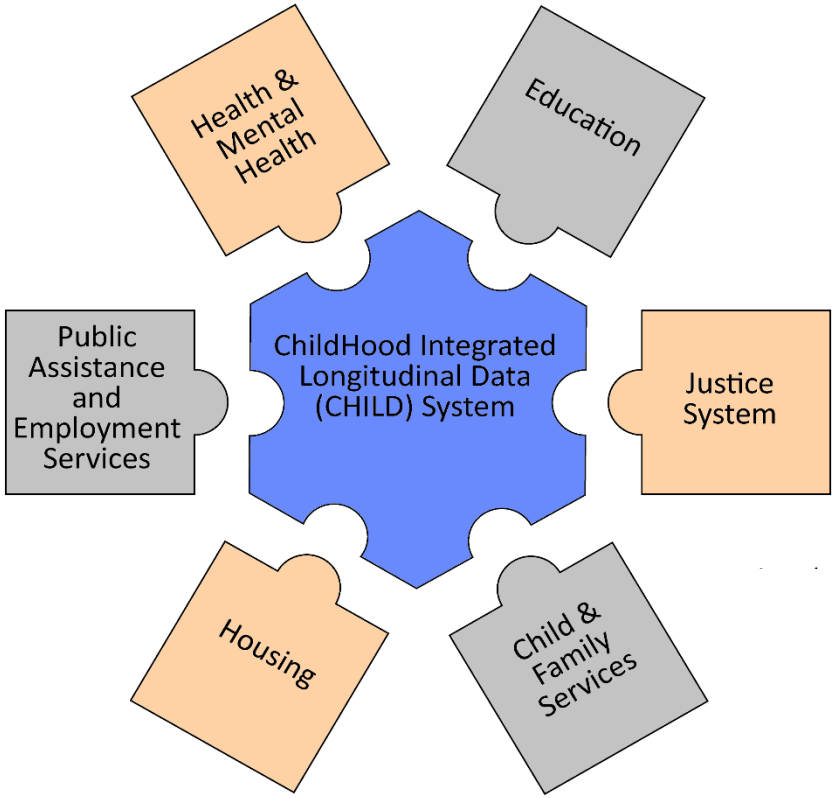


Housing, Lead and Kg. Readiness: Birth to 6 study of children in Cleveland

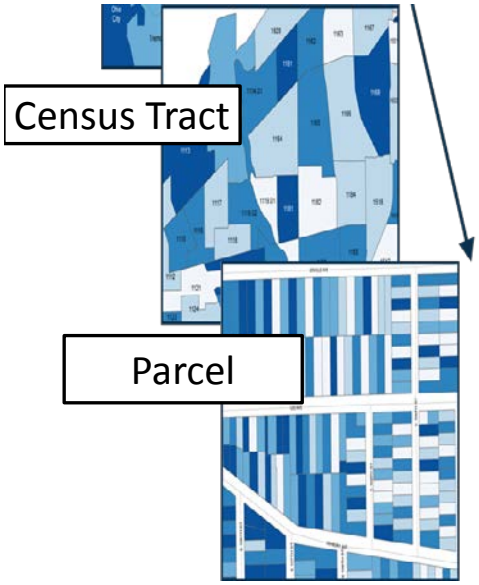
- Sampling criteria
  - Children who entered CMSD kindergarten for the first time in AY 2007-2010 (**N=13,762**)
- Research design
  - Retrospective longitudinal study of family/child risk factors, housing and neighborhood exposures, elevated lead and KRA-L
  - Monthly data on housing and risk factors from birth to Kg.
  - Statistical models examine cumulative effects of these exposures on KRA-L, controlling for family/child characteristics and dynamic housing and neighborhood selection

Study Data: Linked records from CHILD with neighborhood and housing information via address/parcel history

CHILD system



NEO CANDO system



Selected sample characteristics

Variables	
Race/ethnicity	
African American	69%
Non-Hispanic White	18%
Hispanic	12%
Low birth weight (<2,500 g)	12%
English as a second language	8%
Teen mother (<18)	16%
Mother w/ high school degree	57%
Percent of months below poverty	0.75

Lead exposure and kindergarten readiness outcomes

Variables		
Lead exposure	Lead level in blood >5 µg/dL	
	- Tested positive	**39%**
	- Tested negative	47%
	- Not tested	15%
Kg readiness	Average KRA-L score	15.8
	- Band 1 (score 0-13)	**41%**
	- Band 2 (score 14-23)	**41%**
	- Band 3 (score 24-29)	18%

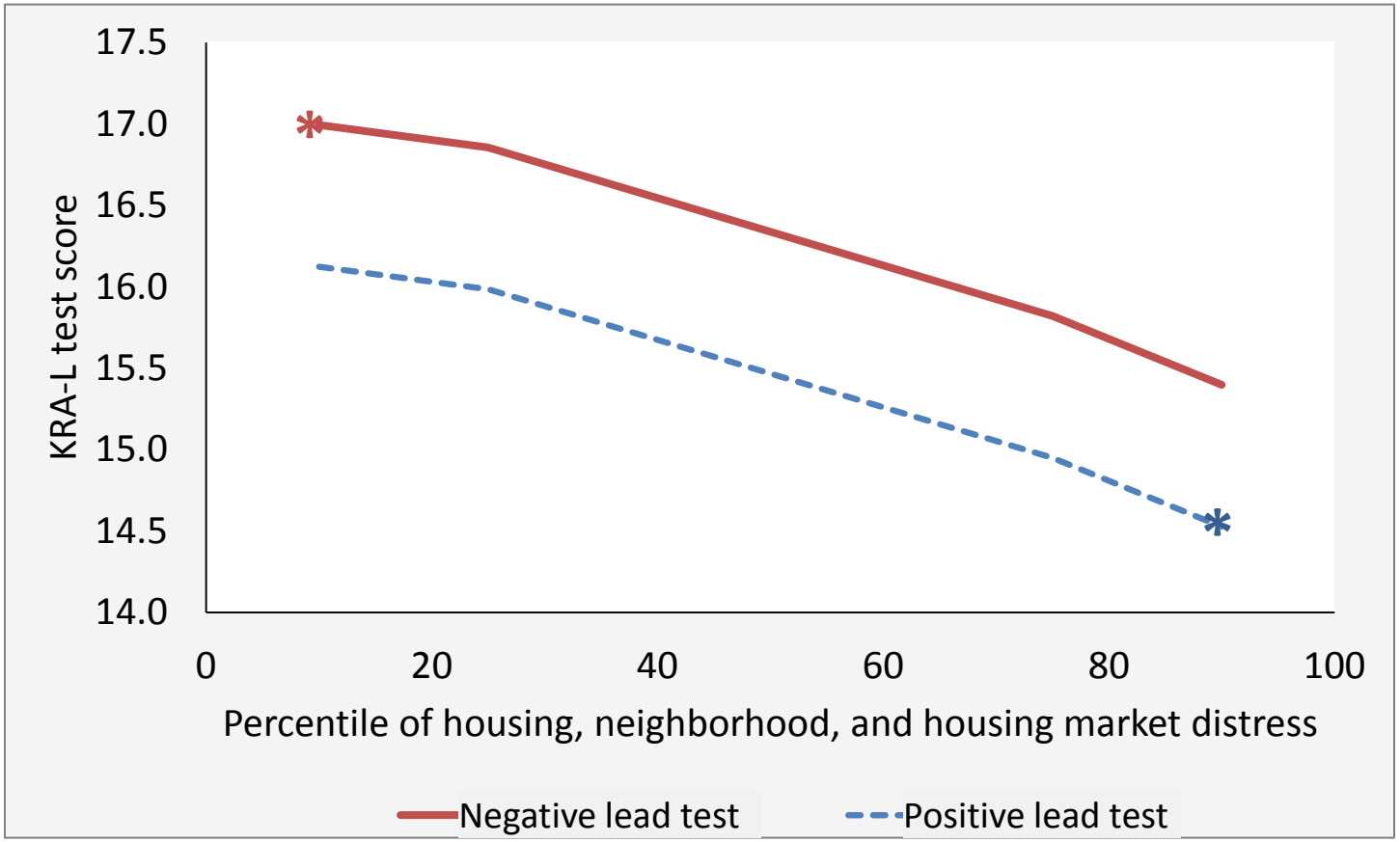
Housing and neighborhood exposure

Variables		
Housing characteristics		
Poor condition[a]	Percent ever	36%
	Mean share of time	0.31
Low value[a,b]	Percent ever	59%
	Mean share of time	0.18
Public/subsidized	Percent ever	18%
	Mean share of time	0.10
Housing mkt distress[a]	Percent ever	50%
Tax delinquency	Mean share of time	0.16
Foreclosure	Mean share of time	0.07
Owned by speculator	Mean share of time	0.07
Housing mobility	Percent ever	78%
	Average # of moves	3.33
Neighborhood distress		
Concentrated	Percent ever	80%
disadvantage (>70p)[a]	Mean share of time	.66

Key findings from analysis of cumulative model of KRA-L

- Longer exposure to poor neighborhood or housing conditions lowers KRA-L
- Living in or near housing touched by foreclosure or other signs of disinvestment (tax delinquent, speculator) lowers KRA-L
- Having an elevated lead level lower KRA-L

Model based average test scores by levels of housing and neighborhood distress

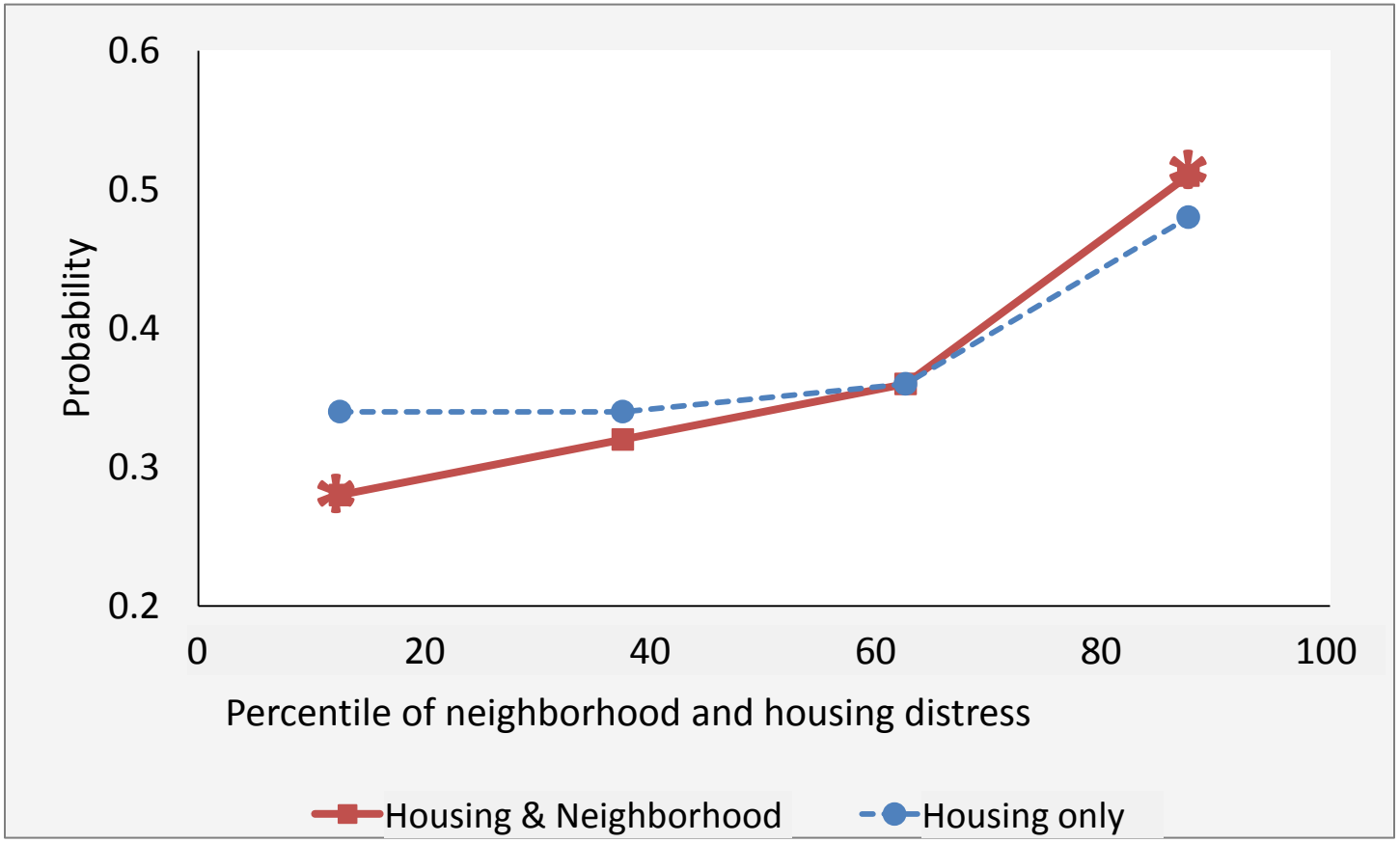


Key findings from analysis of cumulative model of elevated lead

- Longer exposure to poor neighborhood or housing conditions increase chance of elevated lead

- Living in or nearby housing touched by foreclosure or other signs of disinvestment (tax delinquent, speculator) increases chances of elevated lead

Probabilities of a positive lead test for levels of housing and neighborhood distress

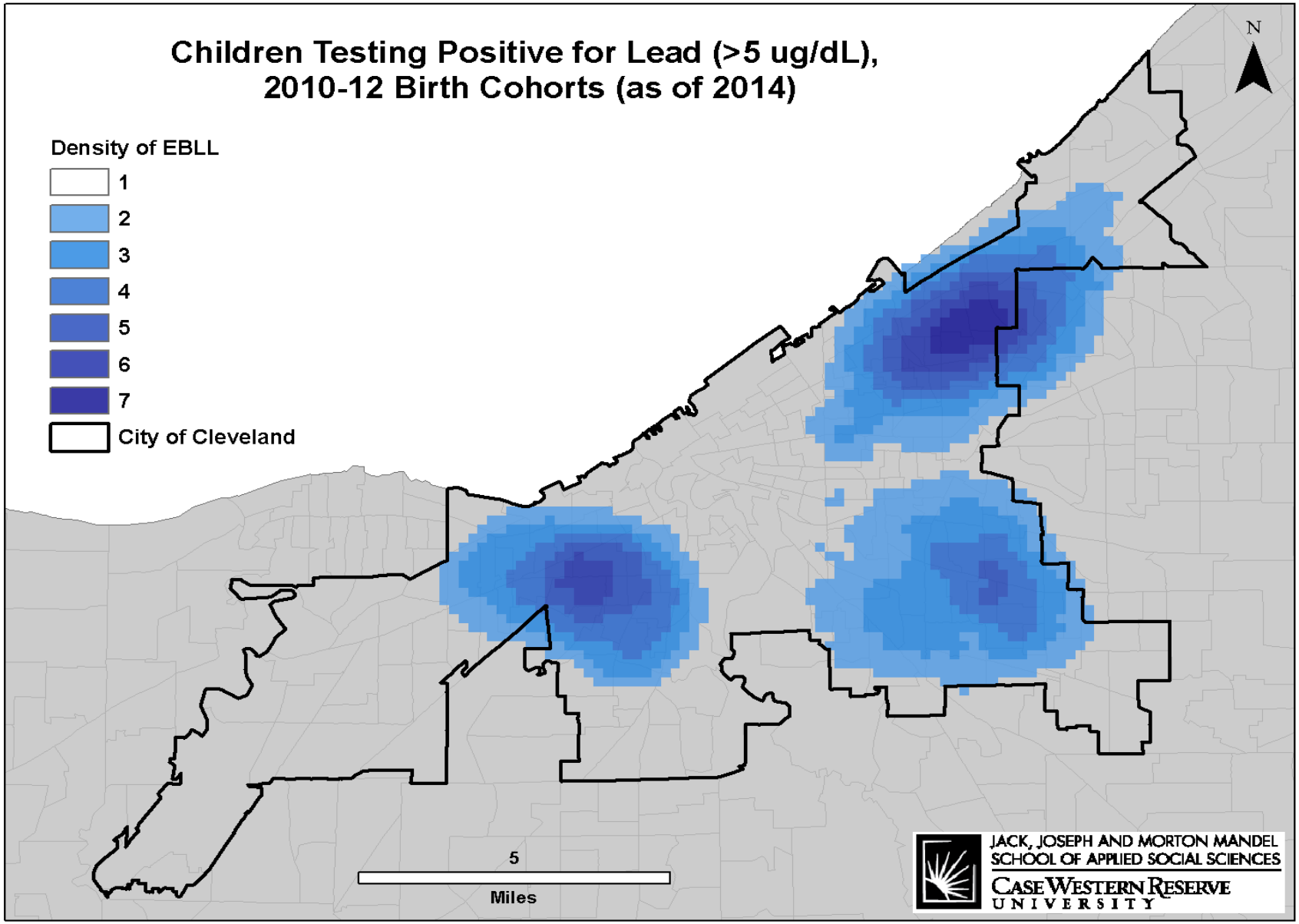


Limitations of study

- Focused on the population of kindergartners in 2007-2010, and the results cannot be readily generalized to other times/places
- Reliance on administrative records limited study variables.
- Key variables have some limitations (e.g., KRA-L test, Lead test, housing quality).
- Despite methods to control for selection bias and confounding, we could not rule out all other factors.

Conclusions and implications

- **Lead exposure** is a major contributor to low KRA-L scores.
- The **state of repair** of families' housing has direct effects on KRA-L and indirect effects through elevated lead levels.
- **Housing market forces** exacerbate housing problems and their effects on children.
- **Interventions** that reduce chance of living in or near problematic **housing** could **prevent lead exposure** and **improve kindergarten readiness**.
- Focus prevention on **chronically hard hit areas** of city


Children Testing Positive for Lead (>5 ug/dL),
2010-12 Birth Cohorts (as of 2014)
Density of EBLL
1
2
3
4
5
6
7
City of Cleveland
N
5
Miles
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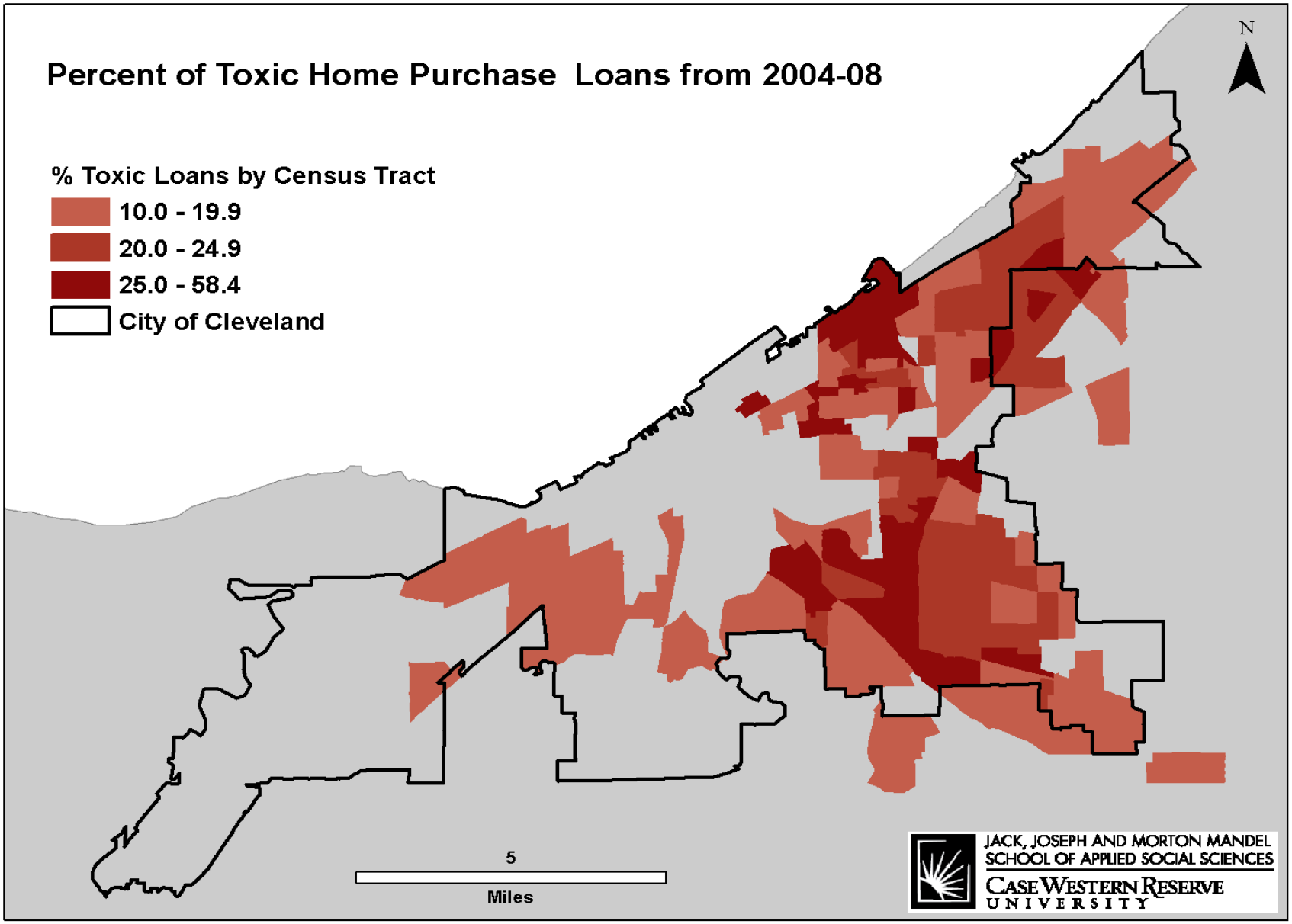
Percent of Toxic Home Purchase Loans from 2004-08
% Toxic Loans by Census Tract
10.0 - 19.9
20.0 - 24.9
25.0 - 58.4
City of Cleveland
N
5
Miles
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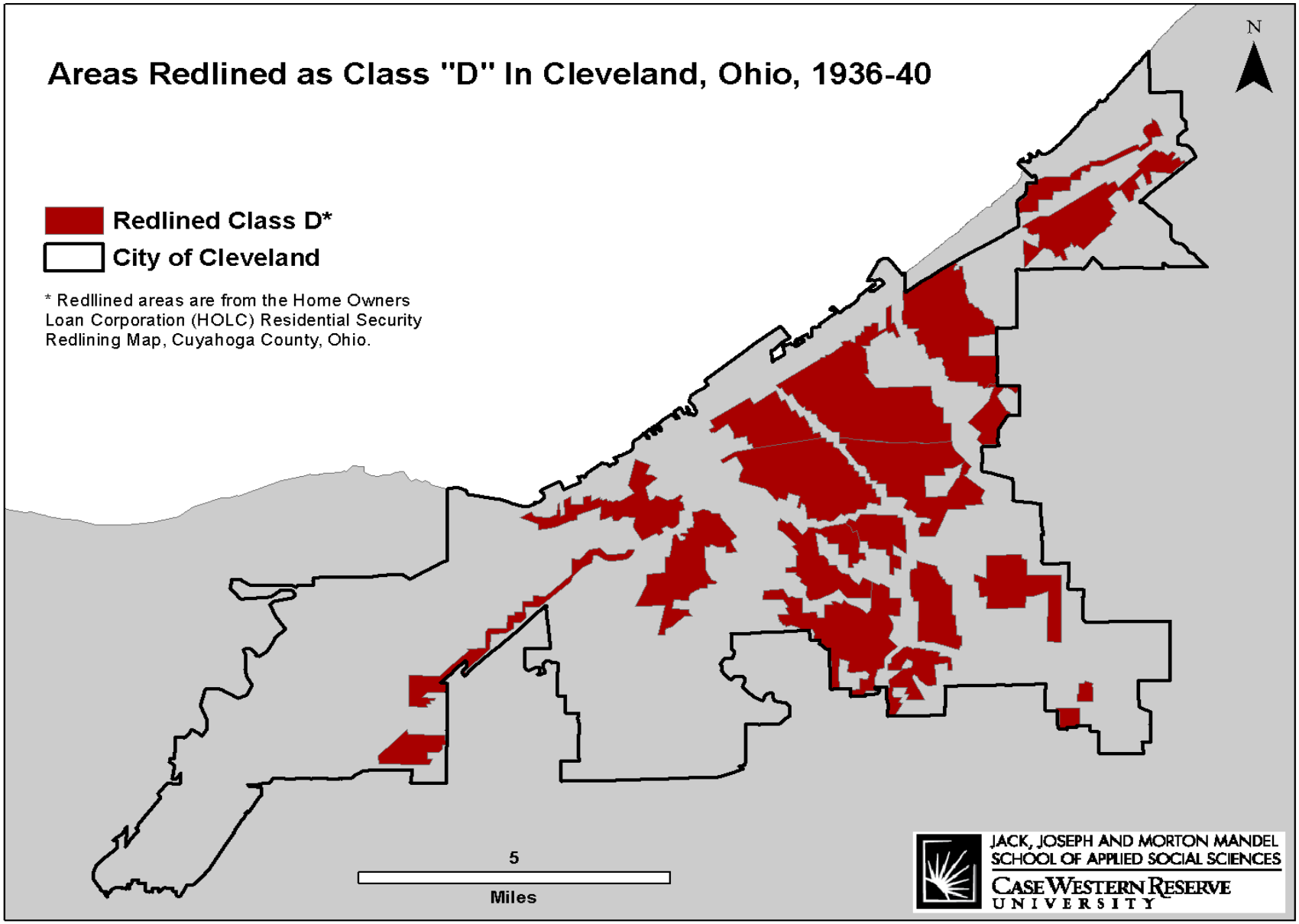
Areas Redlined as Class "D" In Cleveland, Ohio, 1936-40
N
Redlined Class D*
City of Cleveland
* Redllined areas are from the Home Owners Loan Corporation (HOLC) Residential Security Redlining Map, Cuyahoga County, Ohio.
5
Miles
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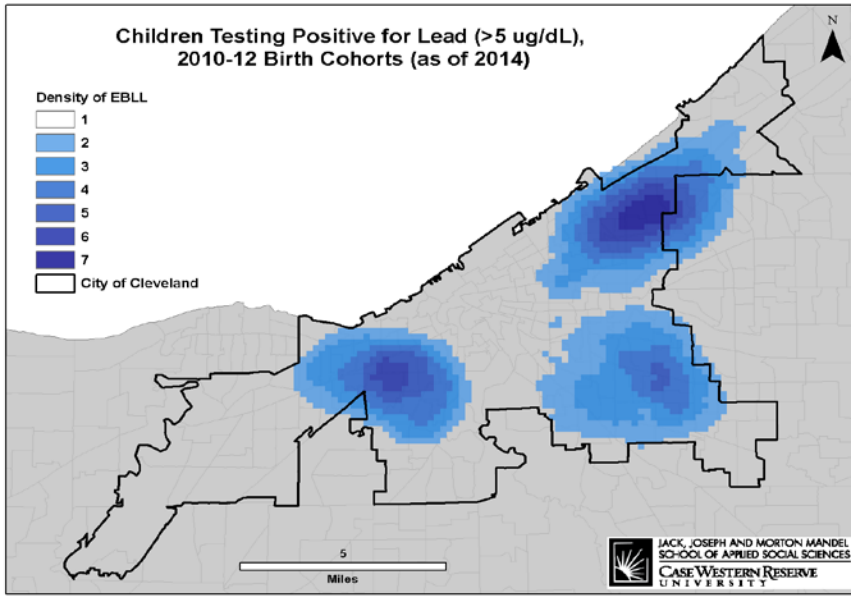
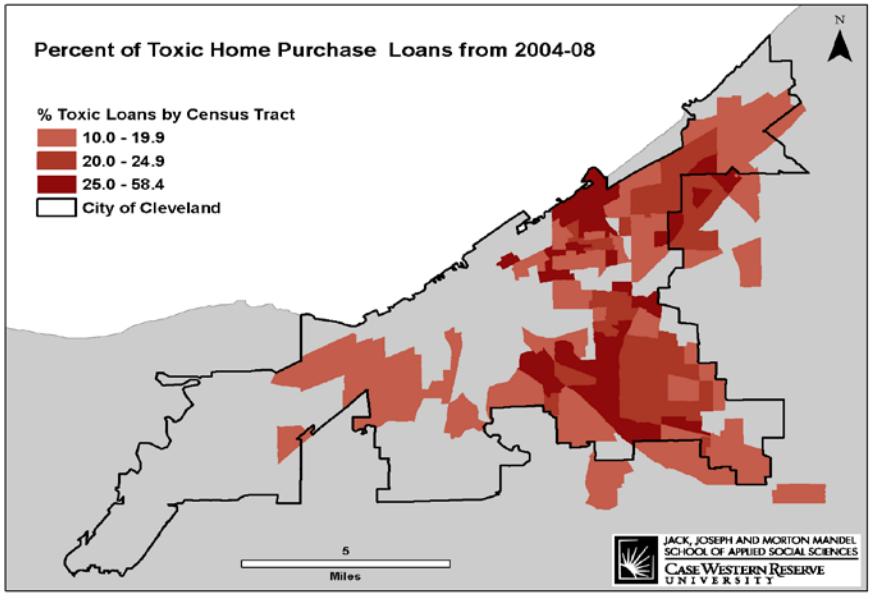
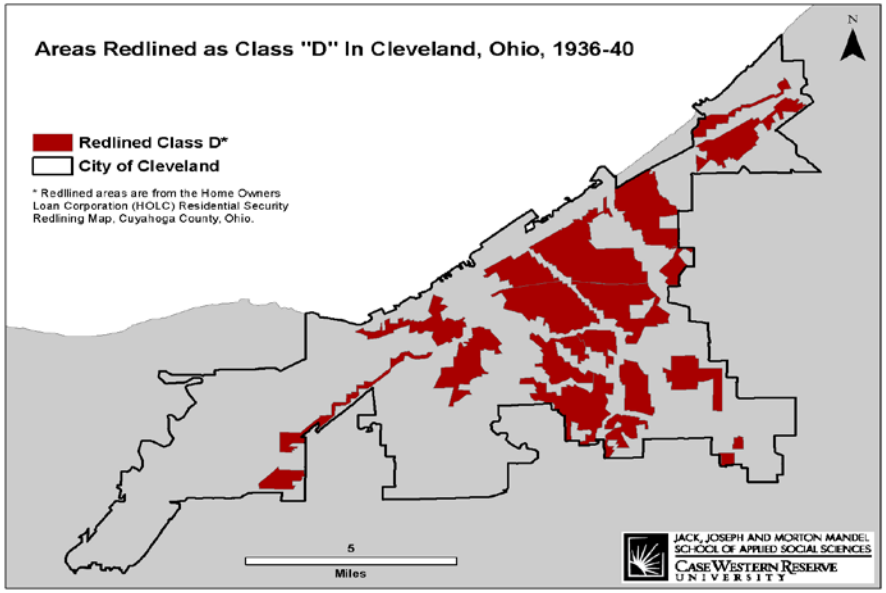




How can we overcome the durable geography of racial inequity?



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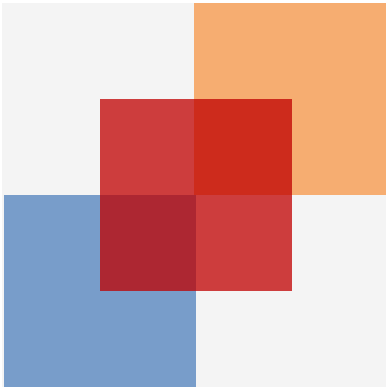
Link to summary of study

http://povertycenter.case.edu/wp-content/uploads/2016/04/Briefly_Stated_No_16-02_Housing_Deterioration_Contributes_to_Elevated_Lead.pdf



Contact Information

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Resources

- Center on Urban Poverty & Community Development: http://povertycenter.case.edu/
- NEO CANDO: http://neocando.case.edu/