ENVIRONMENTAL INEQUALITIES, SOCIAL DISADVANTAGES AND LEAD CONTAMINATION

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Introduction

The persistence of lead poisoning as a public health problem in the United States demonstrated the prevalence of lead hazards in the environment and the high risks that are associated with lead exposure and its vital health problems in the most vulnerable population, children. Children's lead poisoning problem varies among the population whose communities have experienced this health problem unevenly. The findings highlight the wide gap of disproportionate lead poisoning across and within the U.S. states. Environmental health inequalities of uneven distribution of toxic hazards are mostly clustered within communities that tend to be located in concentrated minorities and low-income neighborhoods. Together, the socio-economic, socio-spatial and socio-racial predictors are constitutive factors of the disproportionate geographic distribution of lead, indicating the production and reproduction processes of environmental injustice.

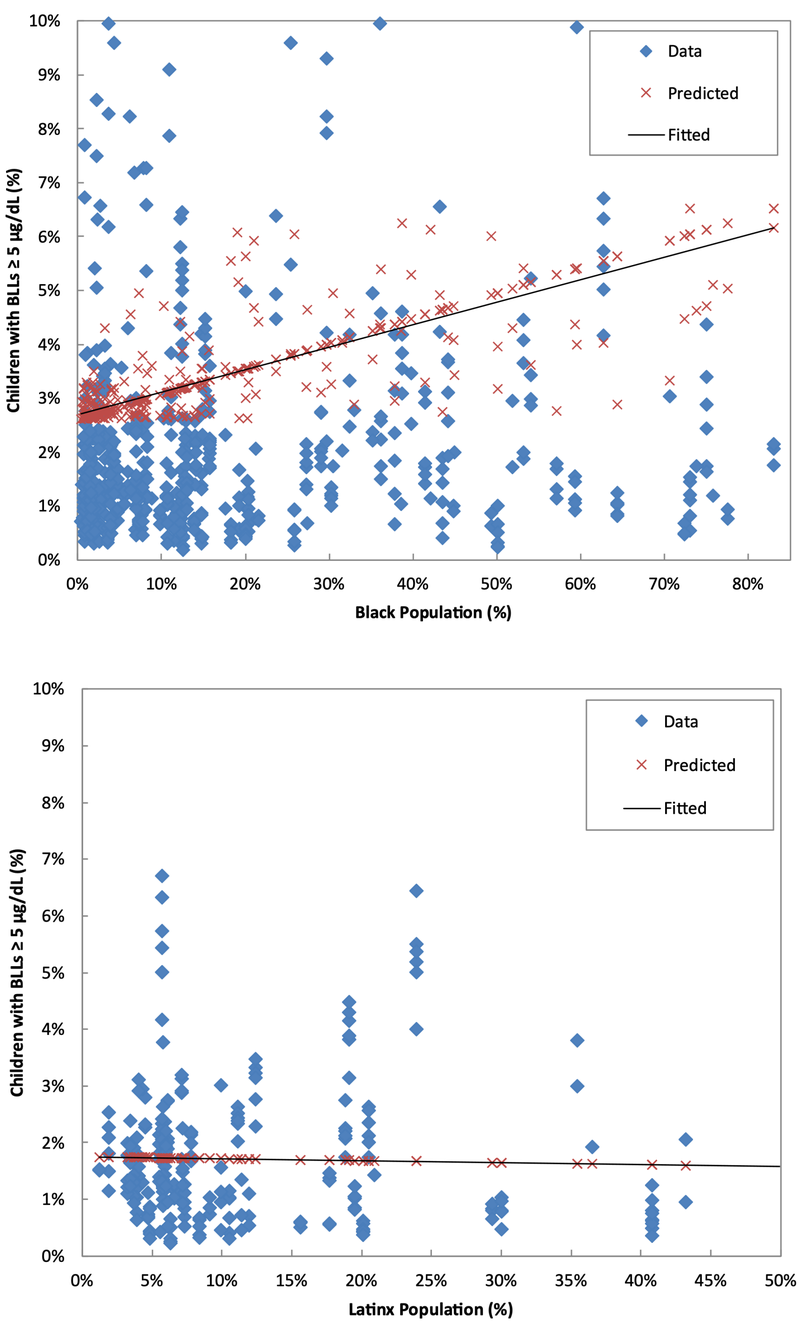
Materials and Methods

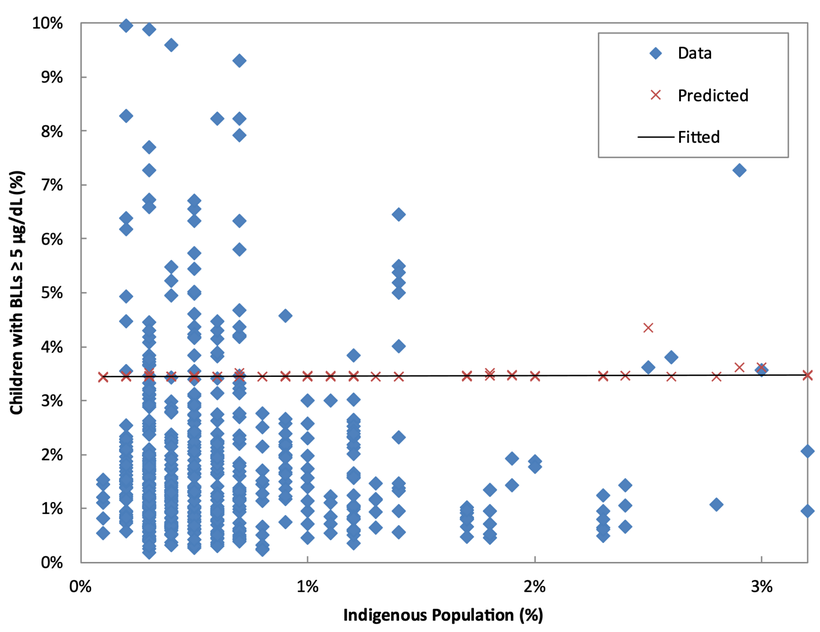
Variables	1	2	3	4	5
1. Income Index	1.00				
2. Children with BLLs ≥ 5 µg/dL	-0.25*	1.00			
3. Black Population (%)	-0.36*	0.14*	1.00		
4. Latinx Population (%)	0.21*	-0.15*	-0.25*	1.00	
5. Indigenous Population (%)	-0.14*	0.01	-0.16*	0.17*	1.00

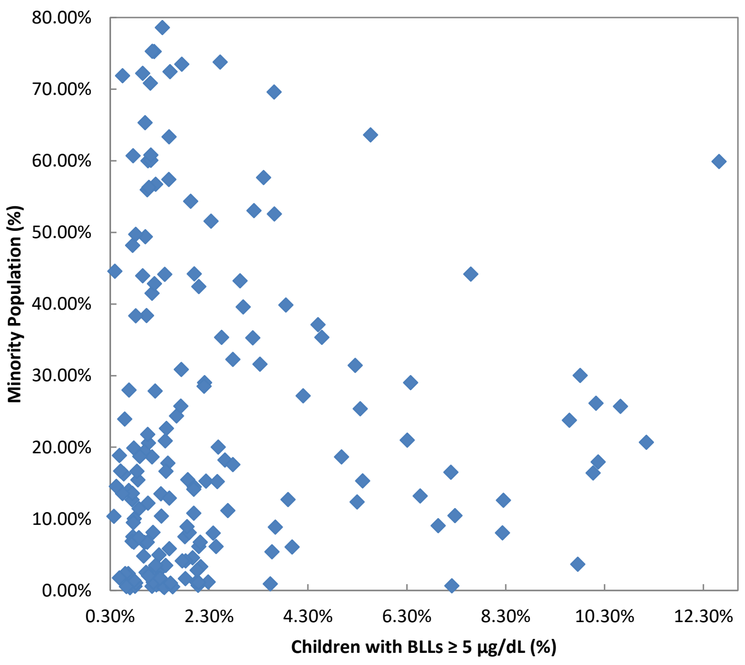
*$p \leq 0.05$. All States, $N = 644$.

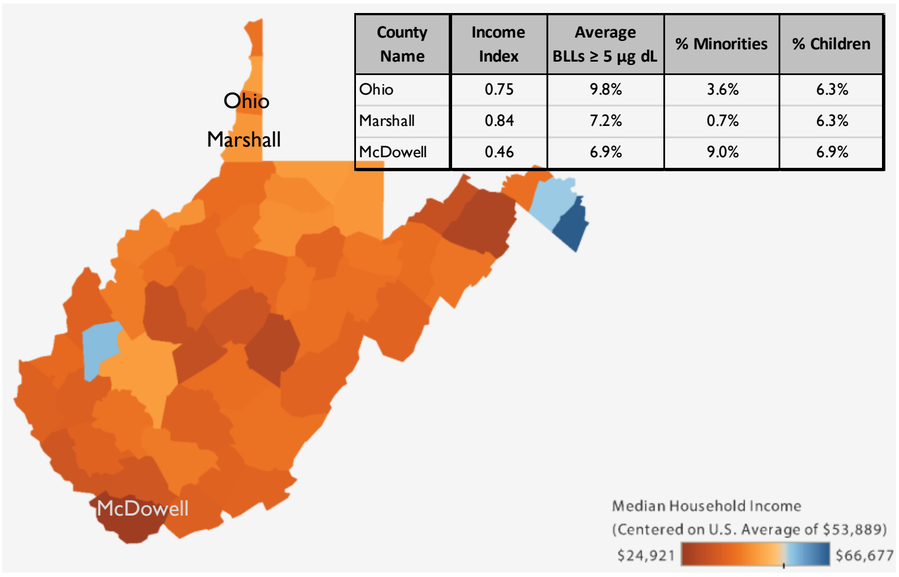
Location	Variables used in this study											
	Income Index		Children with BLLs ≥ 5 µg/dL		Black Population (%)		Latinx Population (%)		Indigenous Population (%)		Child Population (%)	
Poor States	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**
Alabama	0.79	0.17	6.9%	0.15	27.2%	0.19	4.7%	0.03	0.6%	0.00	6.1%	0.01
Michigan	0.91	0.15	1.3%	0.01	6.0%	0.08	4.8%	0.03	1.1%	0.02	5.4%	0.01
Mississippi	0.65	0.14	7.9%	0.11	43.6%	0.20	2.8%	0.02	0.6%	0.01	6.3%	0.01
New Mexico	0.81	0.19	1.1%	0.01	2.0%	0.01	46.8%	0.19	17.3%	0.27	6.1%	0.01
Oklahoma	0.78	0.09	6.7%	0.04	5.3%	0.04	8.5%	0.06	12.6%	0.06	6.4%	0.01
West Virginia	0.76	0.13	3.3%	0.03	4.1%	0.03	1.5%	0.01	0.2%	0.00	5.2%	0.00
Richer States	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**
Colorado	1.11	0.30	1.3%	0.01	3.7%	0.04	24.9%	0.12	1.7%	0.01	5.9%	0.01
Connecticut	1.32	0.17	2.4%	0.01	8.3%	0.06	12.7%	0.06	0.6%	0.00	4.8%	0.01
Maryland	1.26	0.39	1.5%	0.01	21.7%	0.18	6.7%	0.05	0.5%	0.00	5.5%	0.01
Rhode Island	1.22	0.18	2.5%	0.02	4.5%	0.05	8.4%	0.09	0.7%	0.00	4.5%	0.01
Washington	1.07	0.25	1.2%	0.00	4.6%	0.03	19.4%	0.21	2.8%	0.03	6.5%	0.01

Results



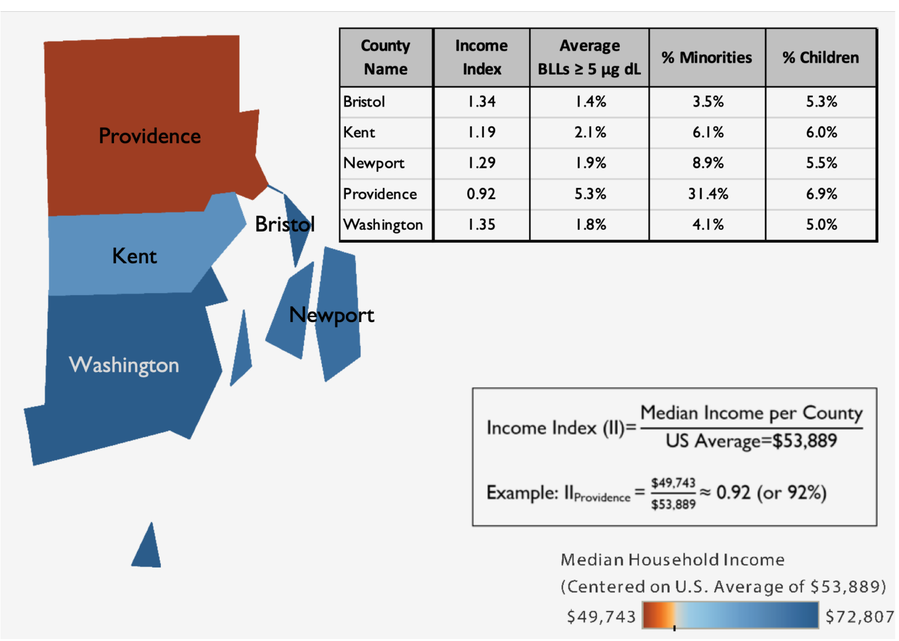






County Name	Income Index	Average BLLs ≥ 5 µg dL	% Minorities	% Children
Ohio	0.75	9.8%	3.6%	6.3%
Marshall	0.84	7.2%	0.7%	6.3%
McDowell	0.46	6.9%	9.0%	6.9%

Map of West Virginia, focusing on 3 counties. McDowell County is the poorest in the state (II = 0.46), has the highest percentage of minority population and an elevated level of the percentage of BLL.

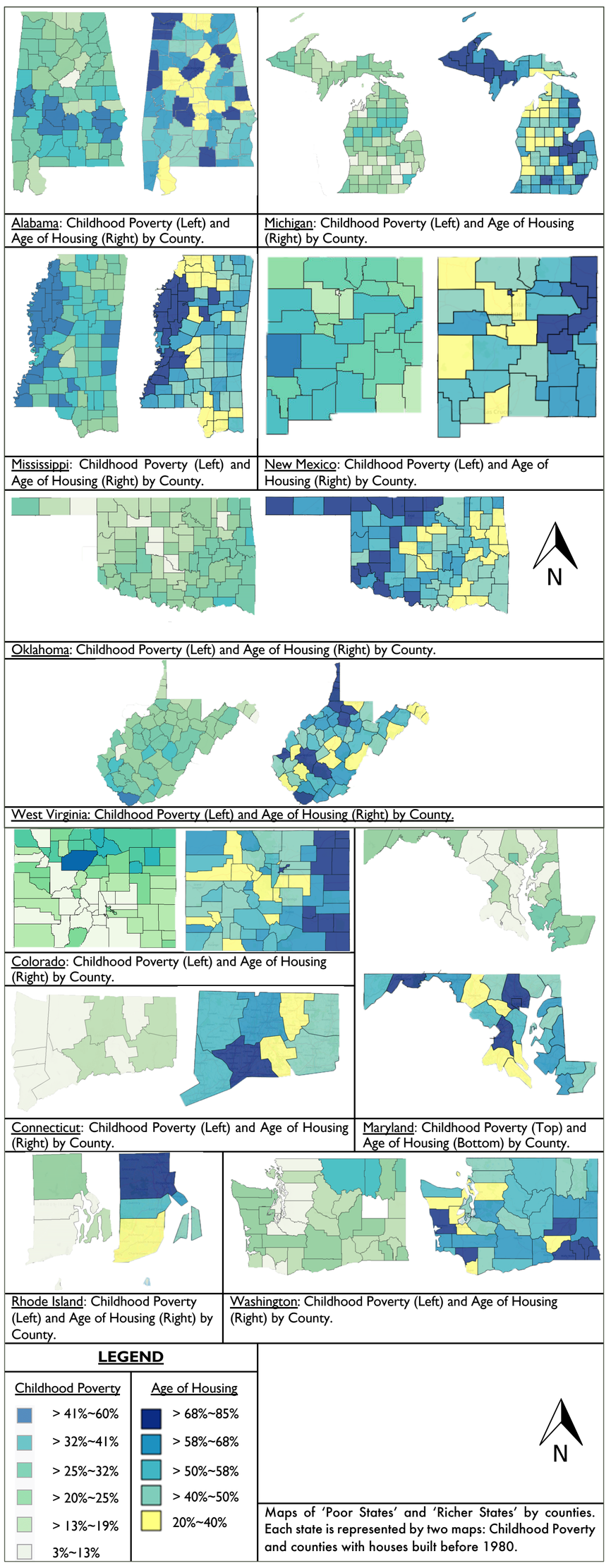


County Name	Income Index	Average BLLs ≥ 5 µg dL	% Minorities	% Children
Bristol	1.34	1.4%	3.5%	5.3%
Kent	1.19	2.1%	6.1%	6.0%
Newport	1.29	1.9%	8.9%	5.5%
Providence	0.92	5.3%	31.4%	6.9%
Washington	1.35	1.8%	4.1%	5.0%

$$\text{Income Index (II)} = \frac{\text{Median Income per County}}{\text{US Average}=\$53,889}$$

$$\text{Example: } II_{\text{Providence}} = \frac{\$49,743}{\$53,889} \approx 0.92 \text{ (or 92\%)}$$

Map of Rhode Island showing ALL counties. Providence is the poorest county in the state (II = 0.92), has the highest percentage of BLL and has the highest percentage of minority population.



Alabama: Childhood Poverty (Left) and Age of Housing (Right) by County.

Michigan: Childhood Poverty (Left) and Age of Housing (Right) by County.

Mississippi: Childhood Poverty (Left) and Age of Housing (Right) by County.

New Mexico: Childhood Poverty (Left) and Age of Housing (Right) by County.

Oklahoma: Childhood Poverty (Left) and Age of Housing (Right) by County.

West Virginia: Childhood Poverty (Left) and Age of Housing (Right) by County.

Colorado: Childhood Poverty (Left) and Age of Housing (Right) by County.

Connecticut: Childhood Poverty (Left) and Age of Housing (Right) by County.

Maryland: Childhood Poverty (Top) and Age of Housing (Bottom) by County.

Rhode Island: Childhood Poverty (Left) and Age of Housing (Right) by County.

Washington: Childhood Poverty (Left) and Age of Housing (Right) by County.

Maps of 'Poor States' and 'Richer States' by counties. Each state is represented by two maps: Childhood Poverty and counties with houses built before 1980.