ADVANCING SOCIAL WORK, PUBLIC HEALTH & SOCIAL POLICY

Washington University in St. Louis
Brown School

Cancer risk from air toxics : A spatial analysis of the St. Louis metropolitan area

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History of Environmental Justice in the United States

- Environmental Justice Origins:
  - Combination of Civil Rights Movement and Environmental Movement

- The **Civil Rights Act of 1964** (enacted July 2, 1964) is a landmark piece of civil rights and US labor law legislation in the United States that outlawed discrimination based on race, color, religion, sex, or national origin.
  - Ended unequal application of voter registration requirements and racial segregation in schools, at the workplace and by facilities that served the general public (known as "public accommodations")

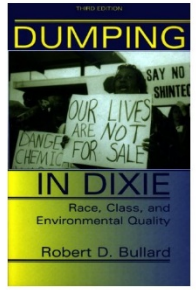
1960s and 1970s

1968: Memphis Sanitation Strike
Martin Luther King goes to Memphis to support occupational, environmental and economic rights of striking garbage workers

Photo credit: Richard L. Copley
Source: afscme.org

1979: Black residents of a middle-class suburb of Houston form the 'Northeast Community Action Group' to stop a proposed landfill. Their lawsuit, *Bean vs. Southwestern Waste Management, Inc.* is the first suit to challenge the citing of a waste facility under civil rights law.

Source: drrobertbullard.com

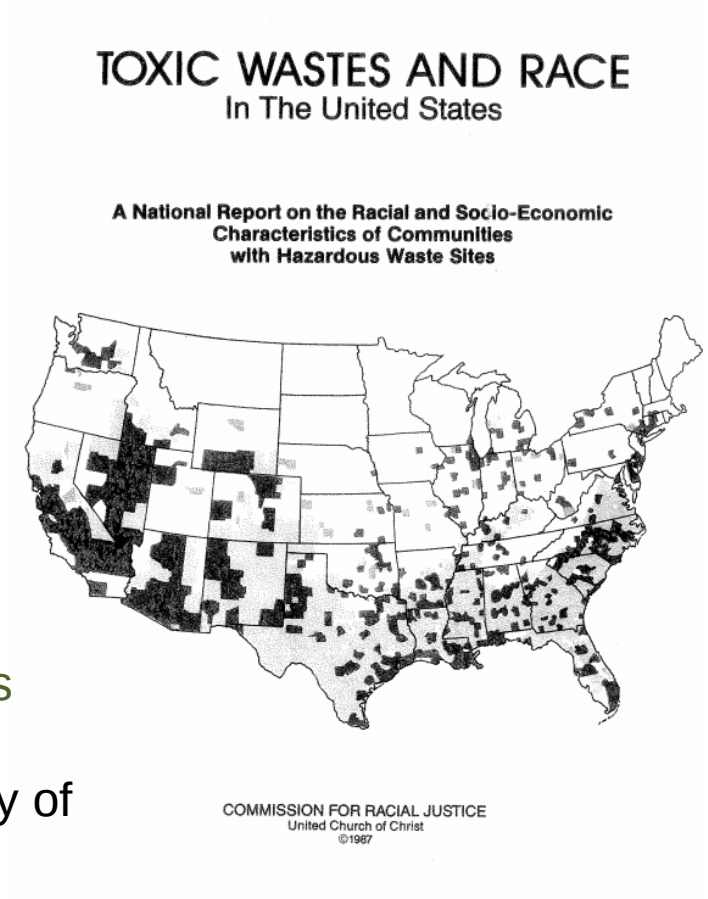


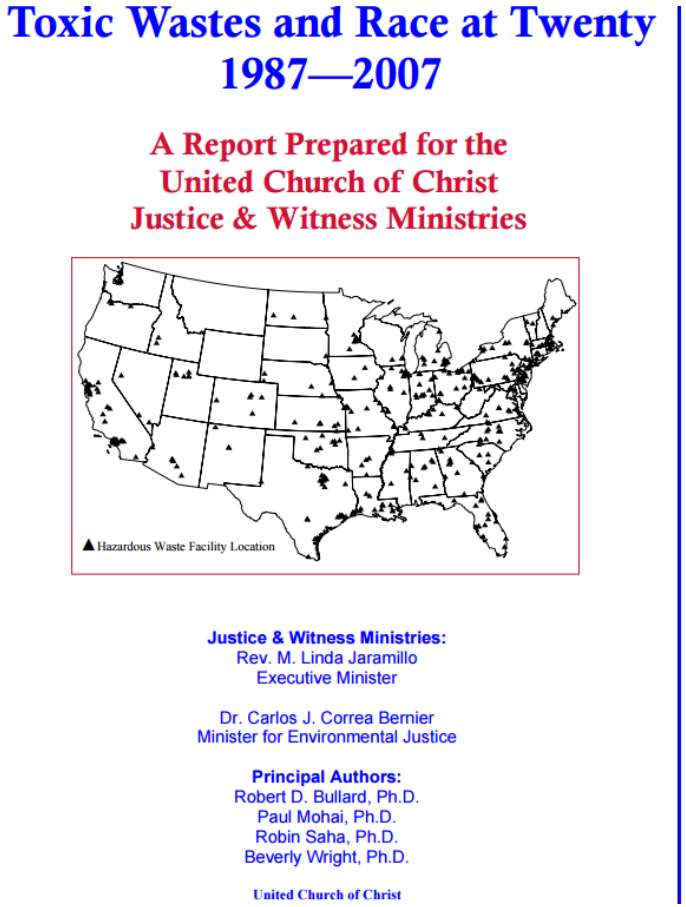
1983: U.S. General Accounting Office: "*Siting of Hazardous Waste Landfills and Their Correlation with Racial and Economic Status of Surrounding Communities*"

- 8 southeastern U.S. states studied
- 75% of commercial hazardous waste facilities were located in majority black neighborhoods
- The region was 20% black overall.

1987: UCC Commission for Racial Justice publishes *Toxic Waste and Race* Report

- Race more of a factor than class in the geography of hazardous waste disposal facilities.





Sources: www.ejnet.org/ej/twart.pdf
http://www.ucc.org/environmental-ministries_toxic-waste-20

Environmental Justice

.. is the **fair treatment** and **meaningful involvement** of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

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EXPOSURE TO CARCINOGENIC AIR TOXICS IN THE ST. LOUIS METROPOLITAN AREA

What is NATA?

- National scale air toxics assessment (NATA)
  - Characterization of air toxics across the nation
  - Nationwide assessment with census tract resolution with 180 hazardous air toxics
  - Emissions, modeled ambient concentrations from outdoor sources
  - Cancer risk estimates based on chronic exposures for 70 years

- Allows **public** to better understand the air toxics problem in the U.S. and in their **communities**

Exposure to Carcinogenic Air Toxics in the St. Louis Metropolitan Area

What's novel about this analysis?

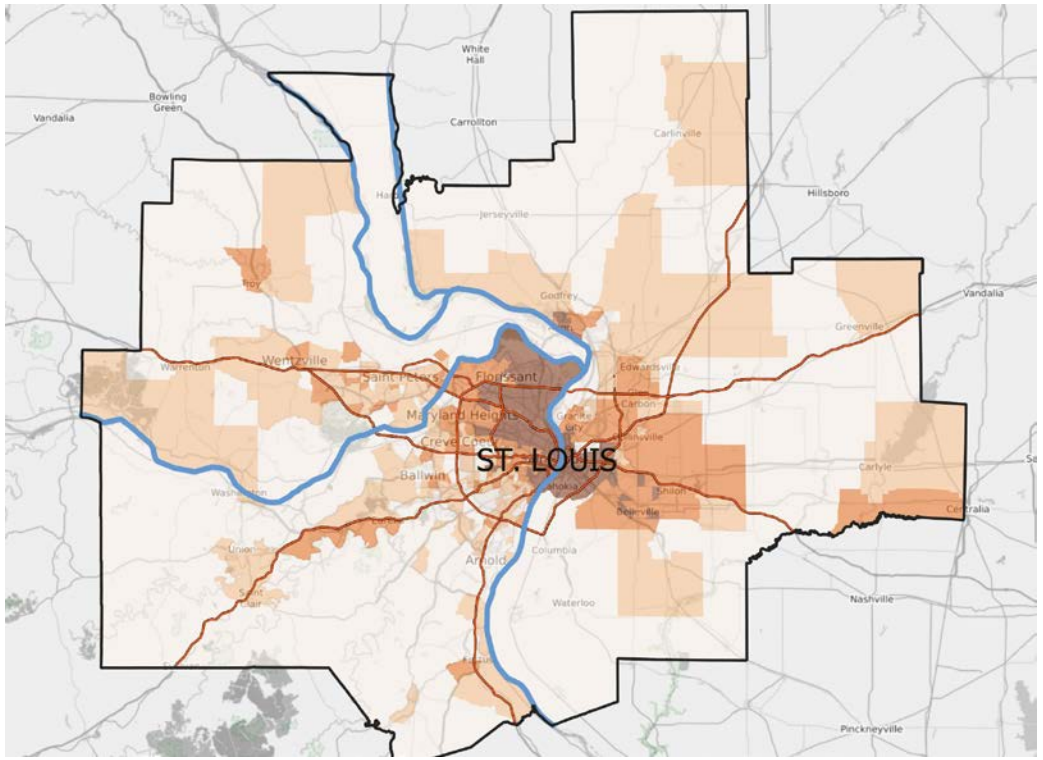
Modifiable areal unit problem

- Environmental research often fails to recognize the important variations of segregation levels across **local areas** or neighborhoods (census tracts)

Spatial segregation measures

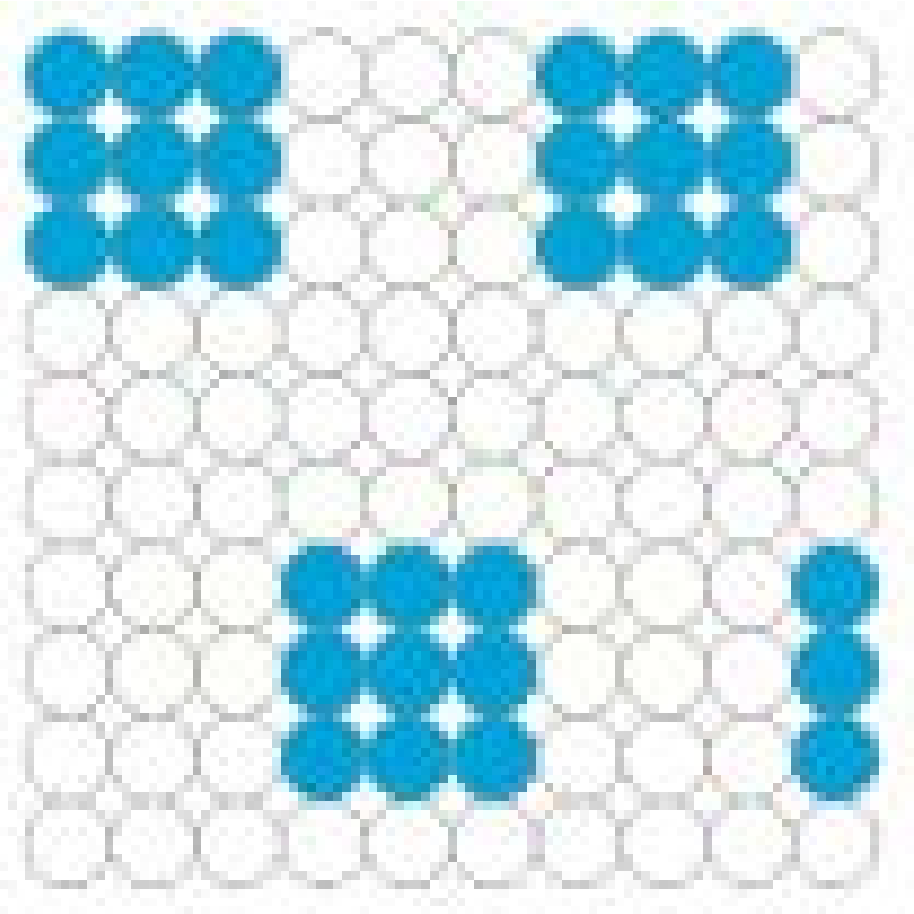
- Percentages as a "proxy" measure of segregation are not appropriate because they cannot quantify how different population groups are distributed across space
- Local spatial segregation indexes have rarely been incorporated into health research

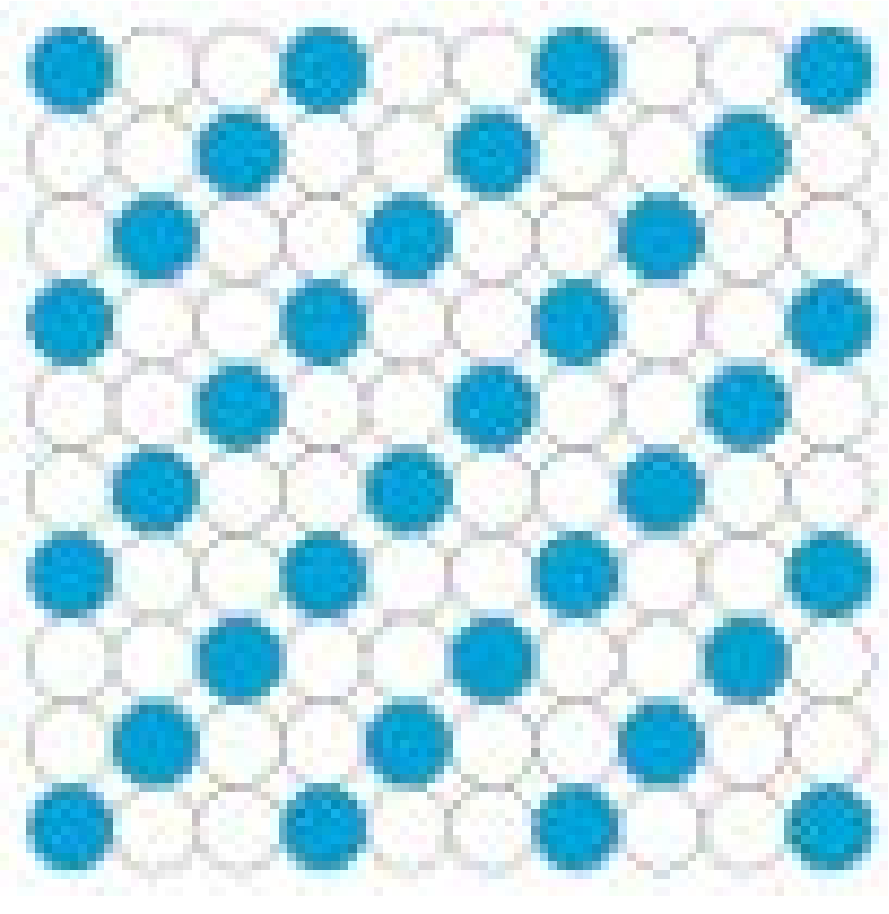
African American



Oka, M., & Wong, D. W. (2014). Capturing the two dimensions of residential segregation at the neighborhood level for health research. Frontiers in public health, 2, 118.

Spatial Isolation





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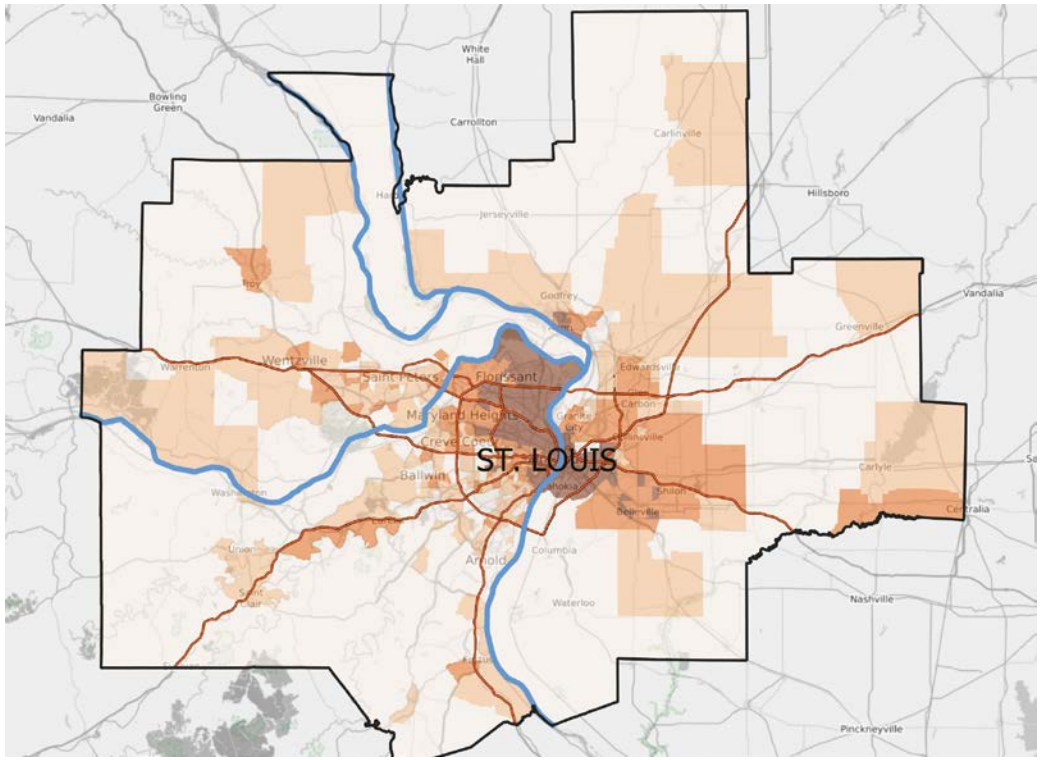
Exposure to Carcinogenic Air Toxics in the St. Louis Metropolitan Area

St. Louis Metropolitan Area

- St. Louis and 14 surrounding counties in the states of Missouri and Illinois
  - 615 census tracts
  - 75% reside in Missouri
  - 76% white; 18% African American; 2% Asian; 1% American Indian or Pacific Islander or some other race
  - 3% Hispanic or Latino

African American



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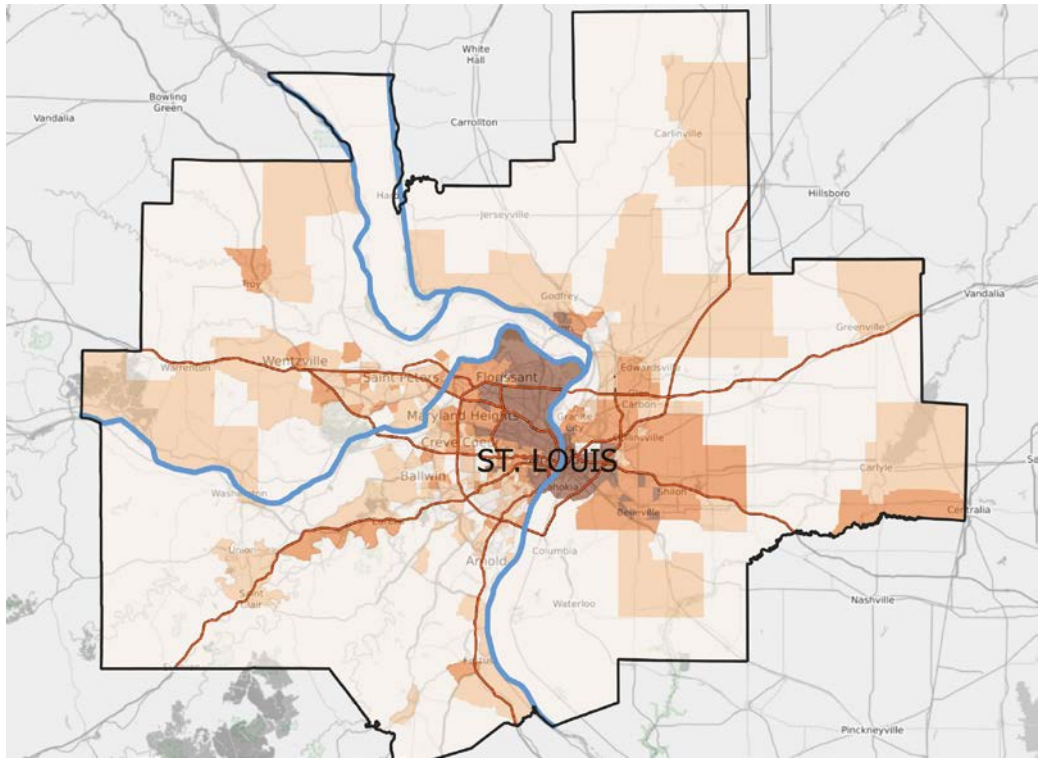
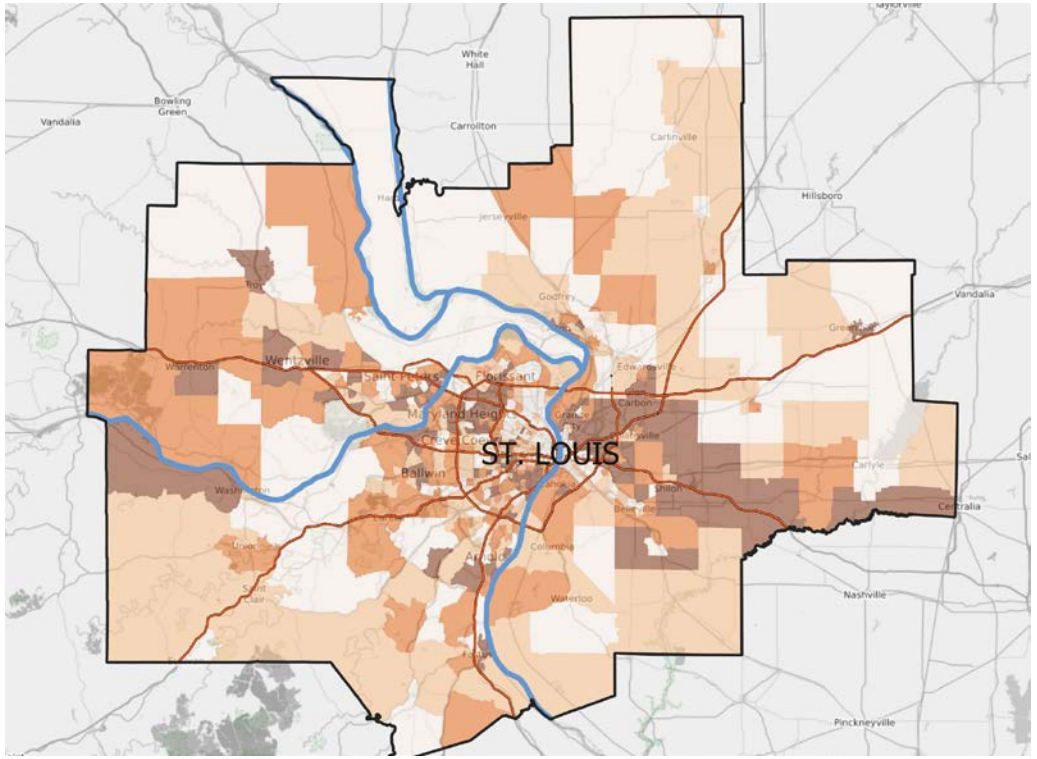
St. Louis Metropolitan Area

African American



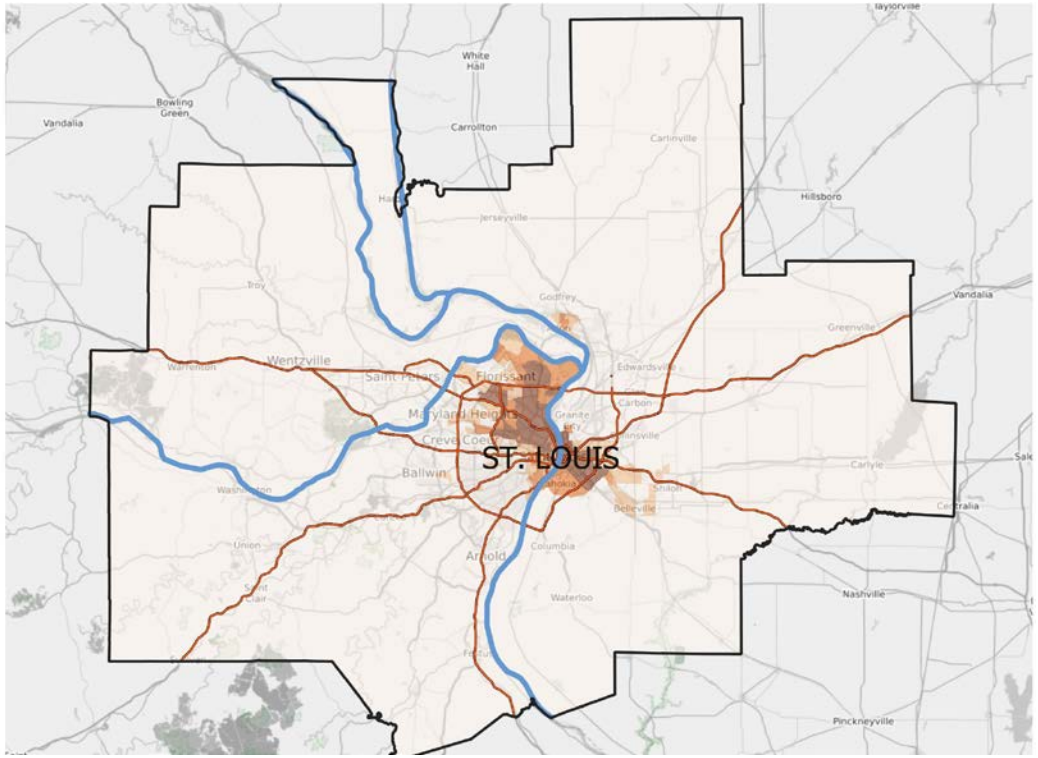
Hispanic or Latino



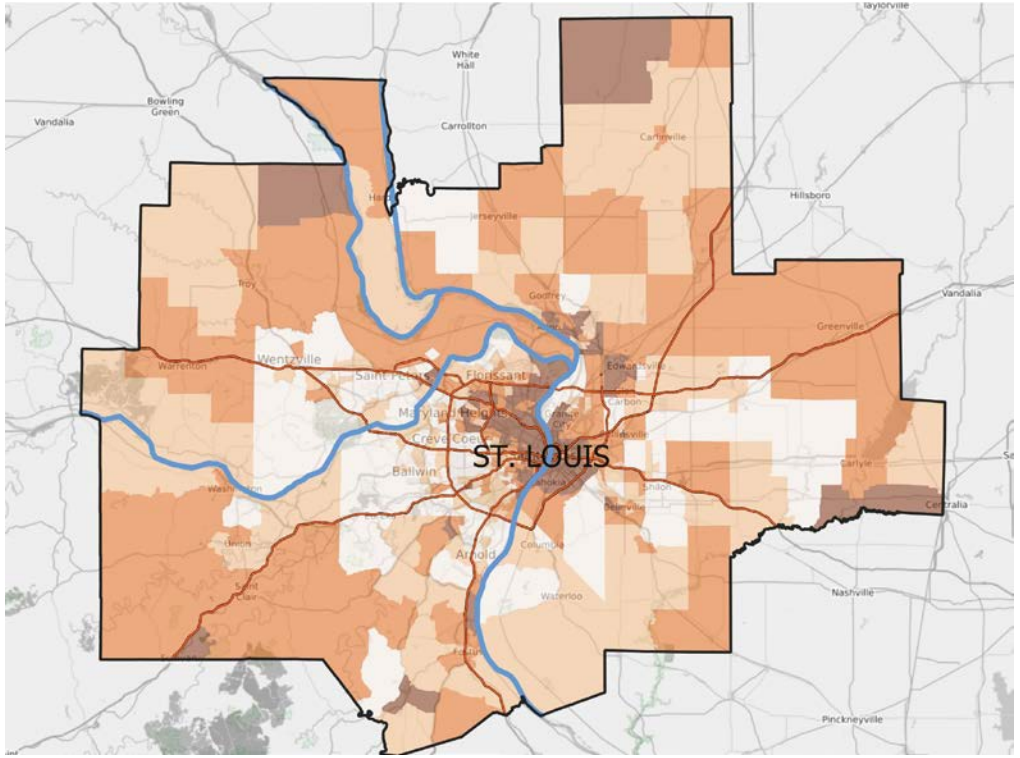
Ekenga, et al. (2019). Cancer risk from air toxics in relation to neighborhood isolation and sociodemographic characteristics: A spatial analysis of the St. Louis metropolitan area, USA. Environmental research, 179, 108844.

St. Louis Metropolitan Area

Non-White



Poverty



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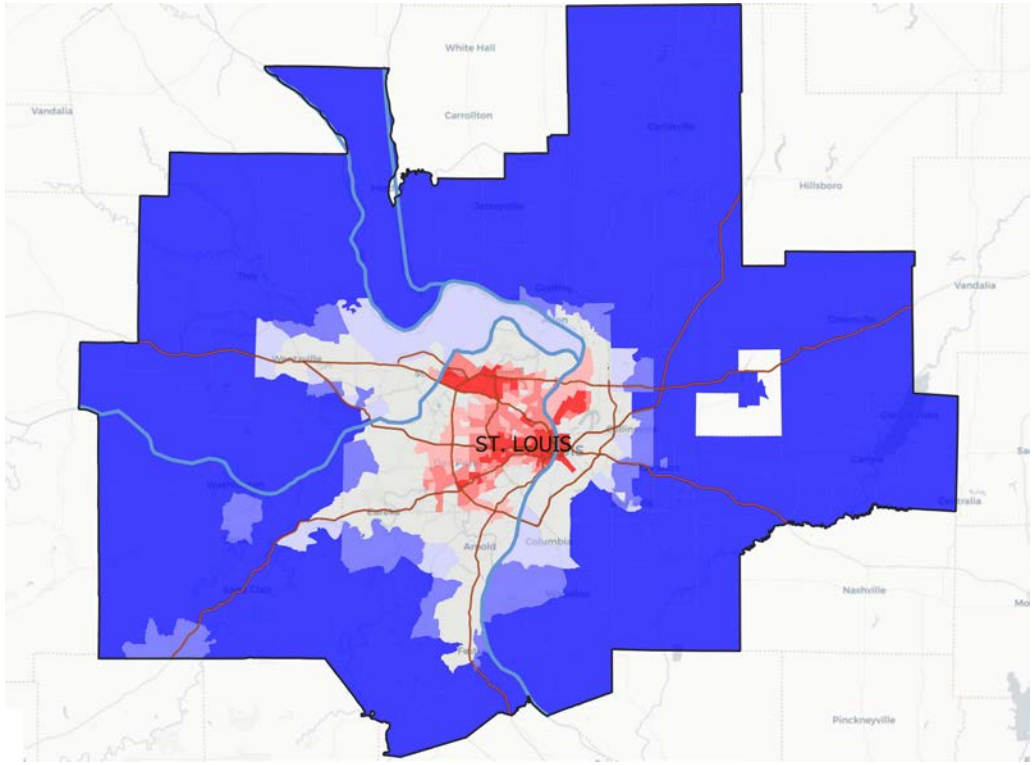
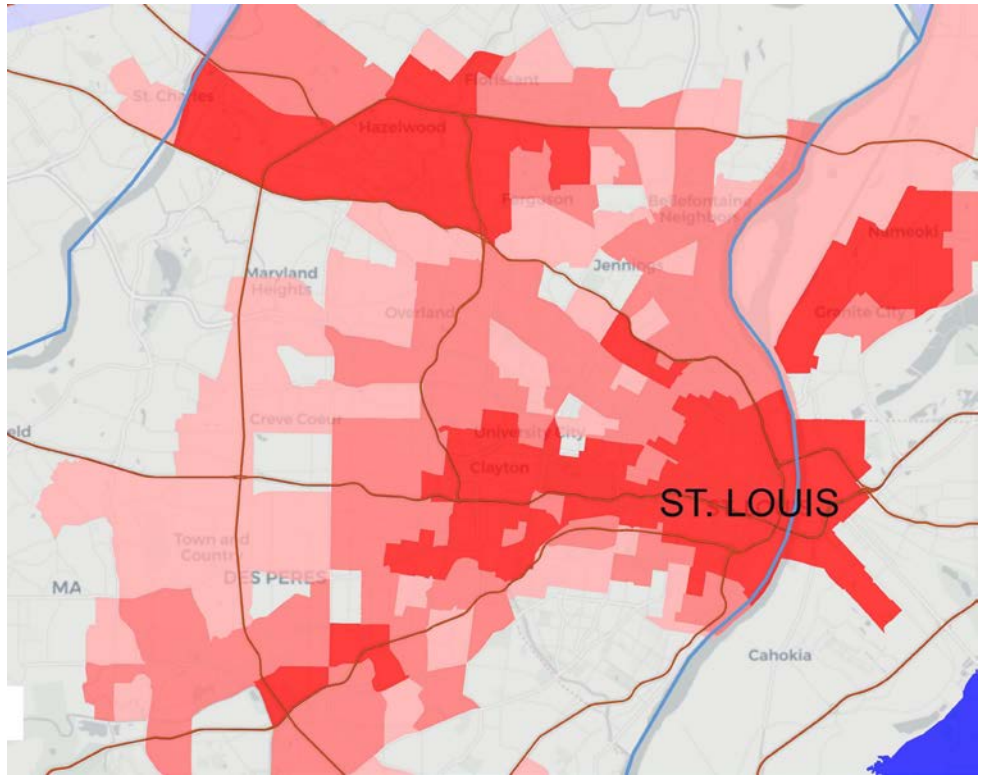
Air Toxics Hotspots & Coldspots

St. Louis Metro Area



Zoomed-In View



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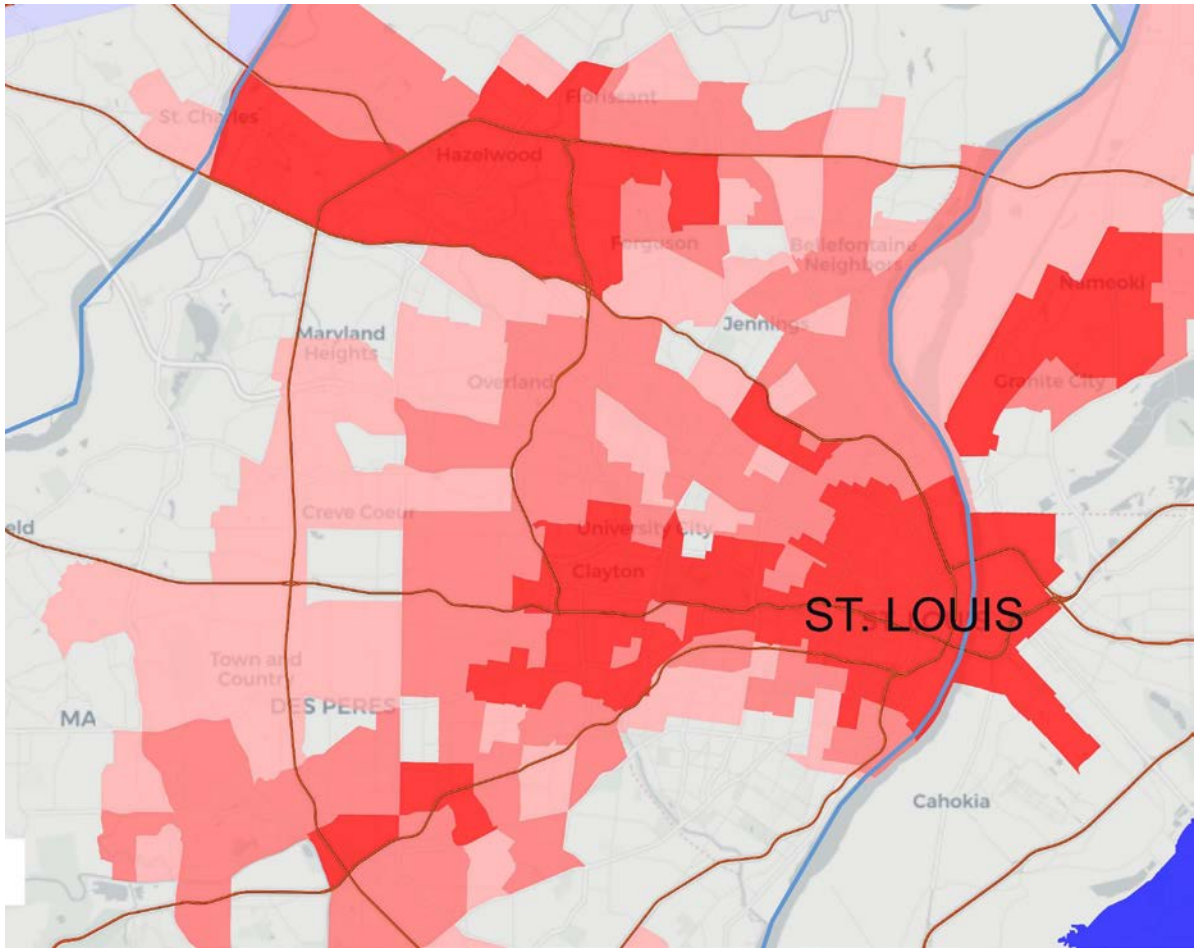
Air Toxic Hotspots

- African American ⬆
- Poverty ⬆
- Hispanic ⟷
- Unemployment ⬆
- Education ⬇

- Five times higher for census tracts with high level of black residents and high levels of poverty than for areas with white middle-class residents.



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What is the relationship between segregation and pollution?

Polluting industries are more often located in disenfranchised communities with:

- Minority residents
- Poor residents
- Residents with limited social capital
- Residents with limited power to affect the decision-making processes that determine where such industries are placed

Decreased property values leads to cycle of vulnerability

Differential enforcement of environmental regulations that facilitate the entry of polluting industries:

- Racialized zoning policies,
- Racialized property laws, or practices of credit rationing in
  - Poor neighborhoods,
  - Minority neighborhoods, and
  - Politically underrepresented communities

Decreased property values leads to cycle of vulnerability

Thanks

- Masayoshi Oka
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