

# A Link Between Environmental Injustice and COVID-19: A Case Study of Chicago and Milwaukee

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## Research focus:

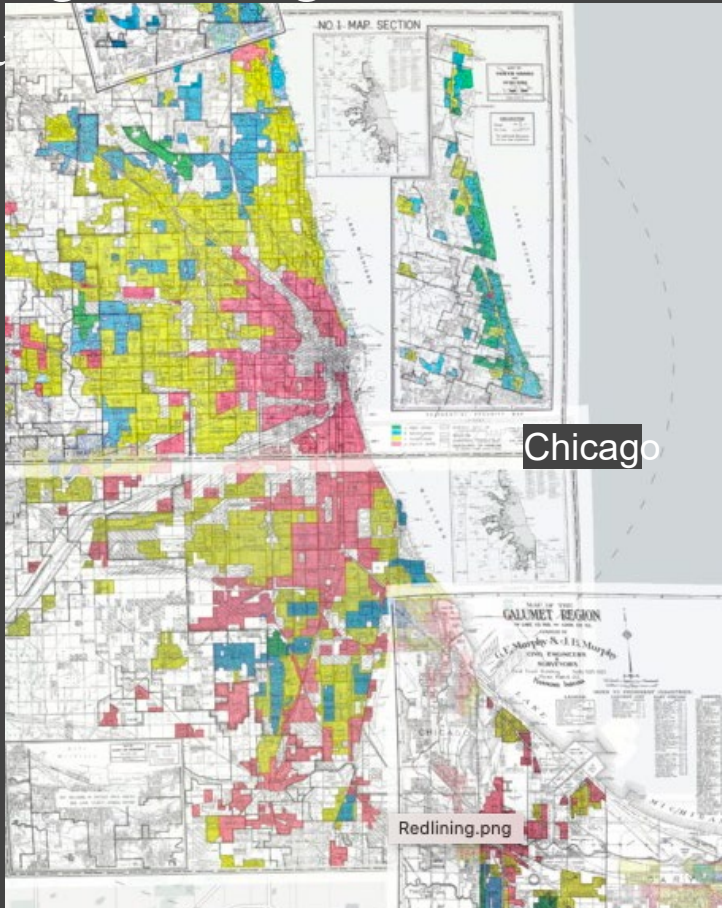
This study examines the correlation between environmental injustice and COVID-19 in Chicago and Milwaukee.



## Hypothesis

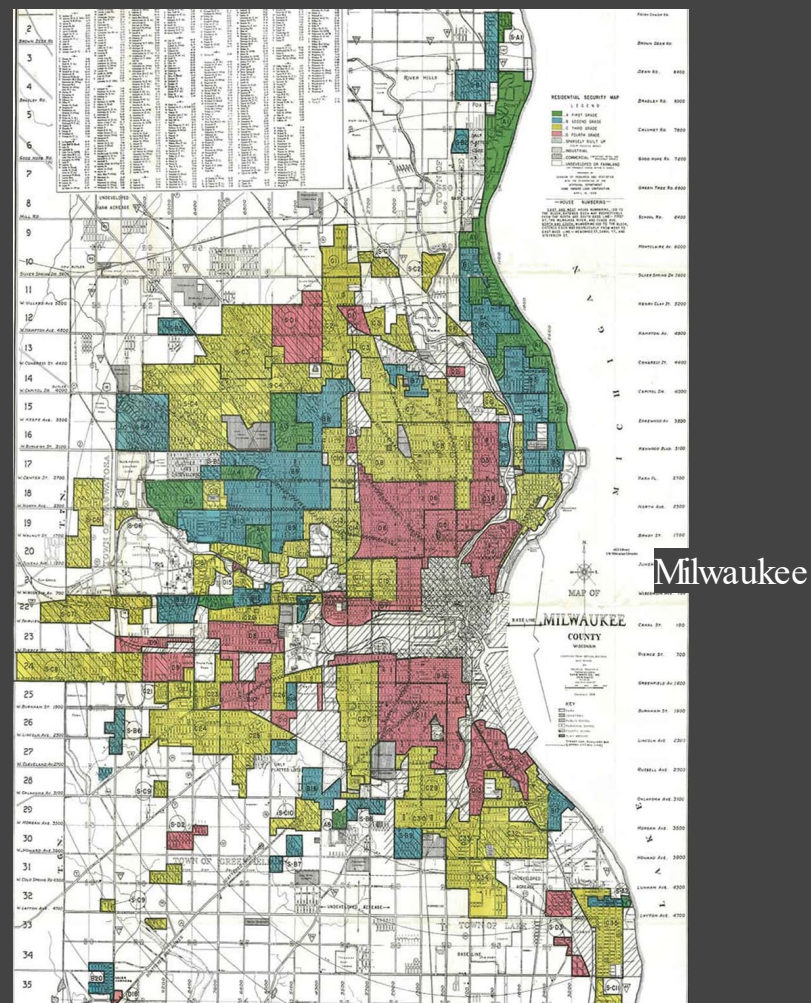
This study hypothesizes that segregated communities of color in both Chicago and Milwaukee will have disproportionate levels of particulate matter (PM) and higher rates of COVID-19.

# Redlining in Chicago and Milwaukee



Chicago

Redlining.png



Milwaukee

Odugu, Desmond. *Racial Restriction and Housing Discrimination in the Chicago*. 2017, [digitalchicagohistory.org/exhibits/show/restricted-chicago/other/redlining](http://digitalchicagohistory.org/exhibits/show/restricted-chicago/other/redlining).  
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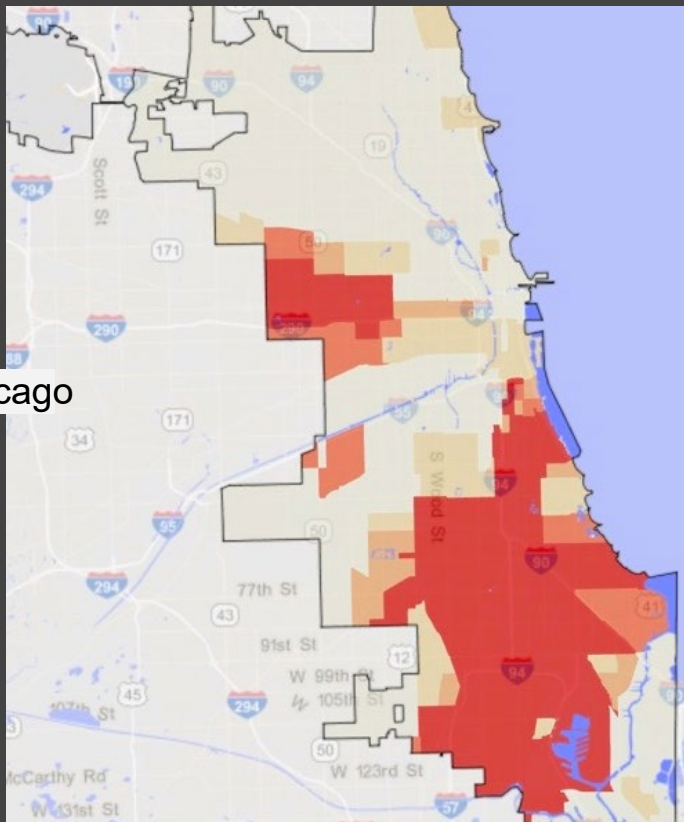
# Black population in Chicago and Milwaukee

**Black** Race and Ethnicity by Neighborhood

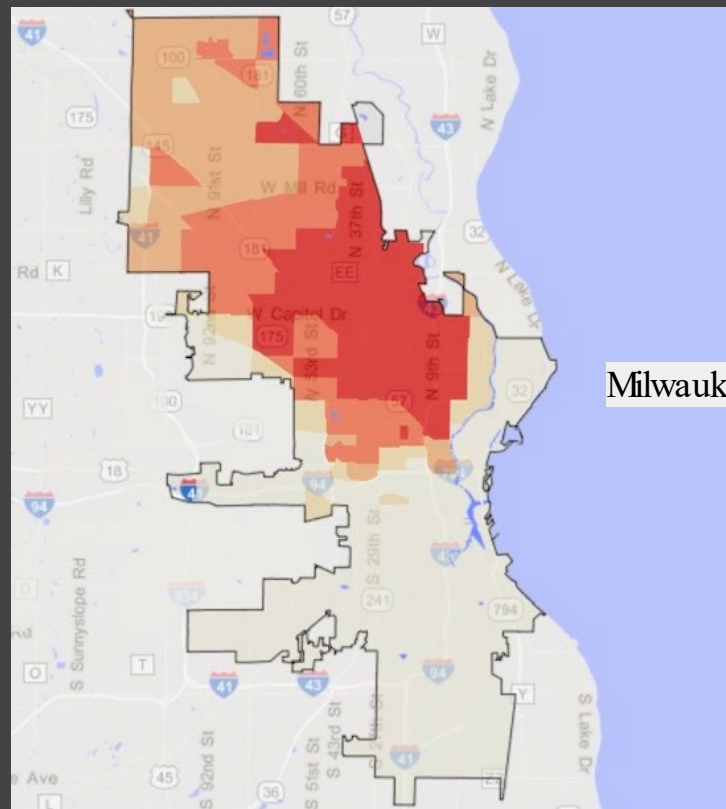
Blacks as a percentage of the population (%):



Chicago



Milwaukee



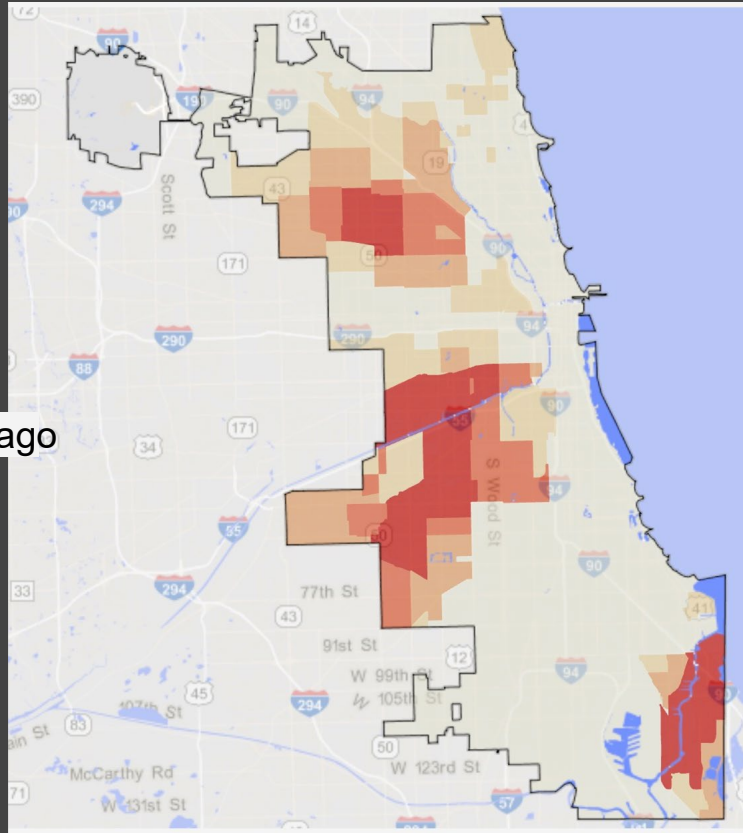
# Hispanic population in Chicago and Milwaukee

## Hispanic Race and Ethnicity by Neighborhood

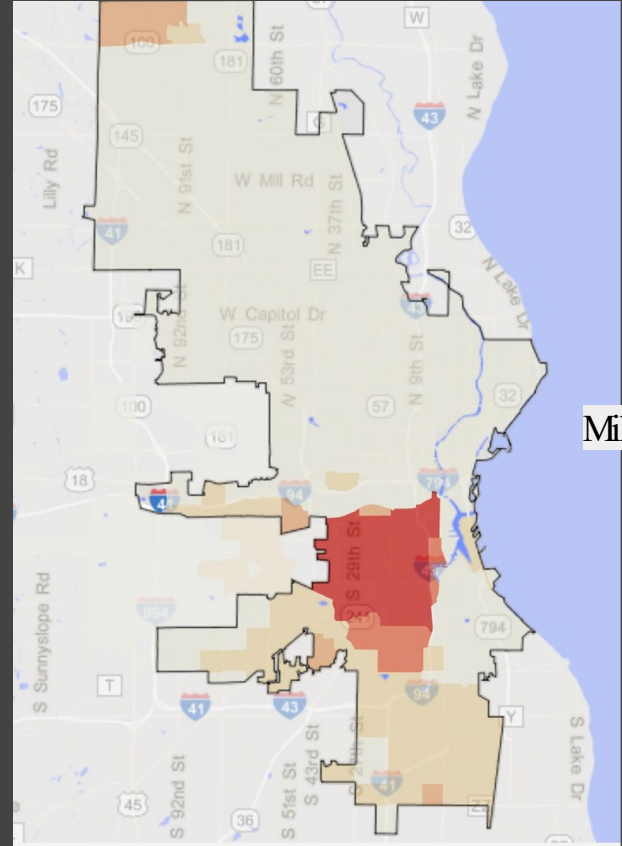
Hispanics (excluding black and Asian Hispanics) as a percentage of the population (%):



Chicago

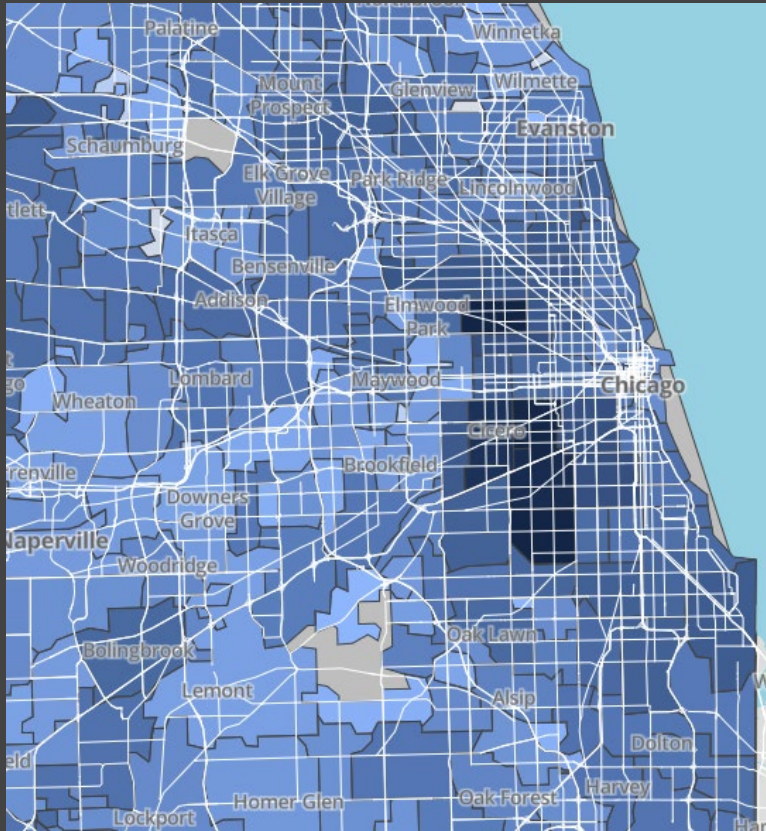


Milwaukee



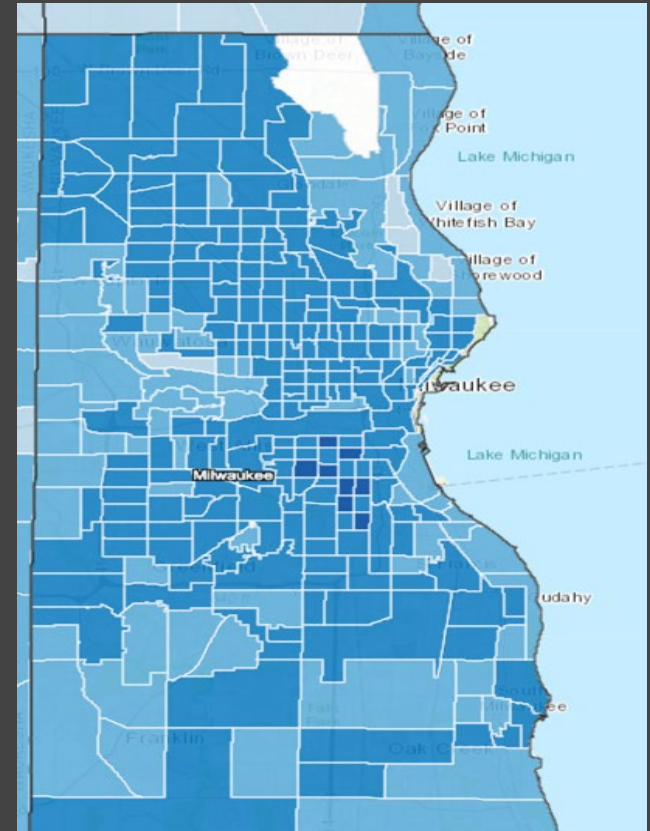
# COVID-19 Positive Cases

## Chicago



Illinois Department of Public Health. "COVID-19 Statistics | IDPH" July 2020, [www.dph.illinois.gov/covid19/covid19-statistics](http://www.dph.illinois.gov/covid19/covid19-statistics).

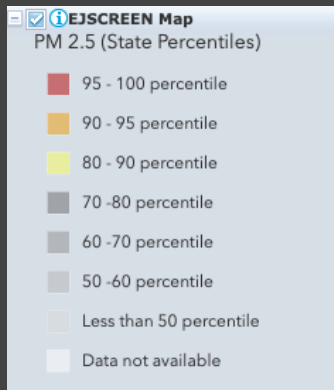
## Milwaukee



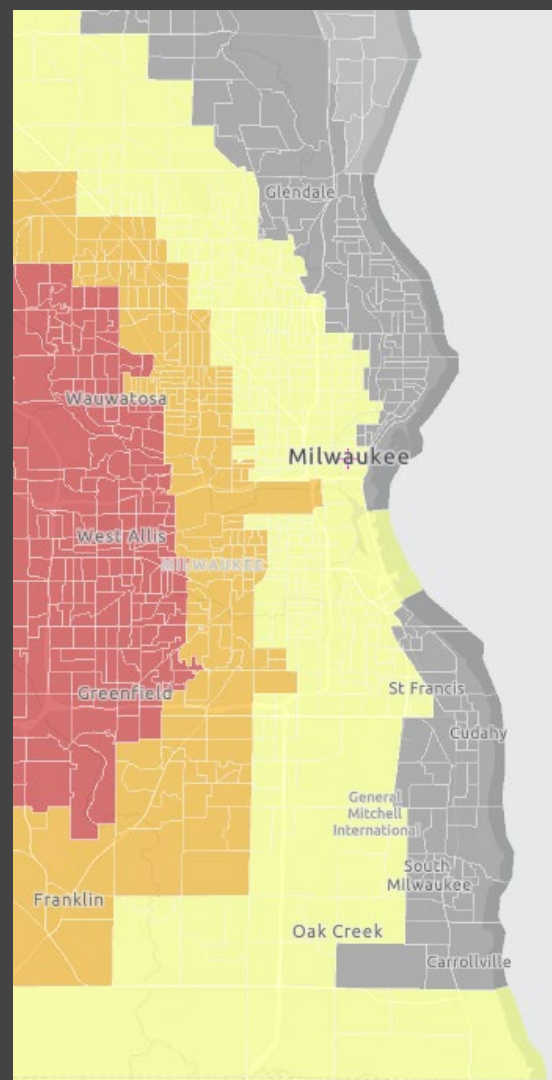
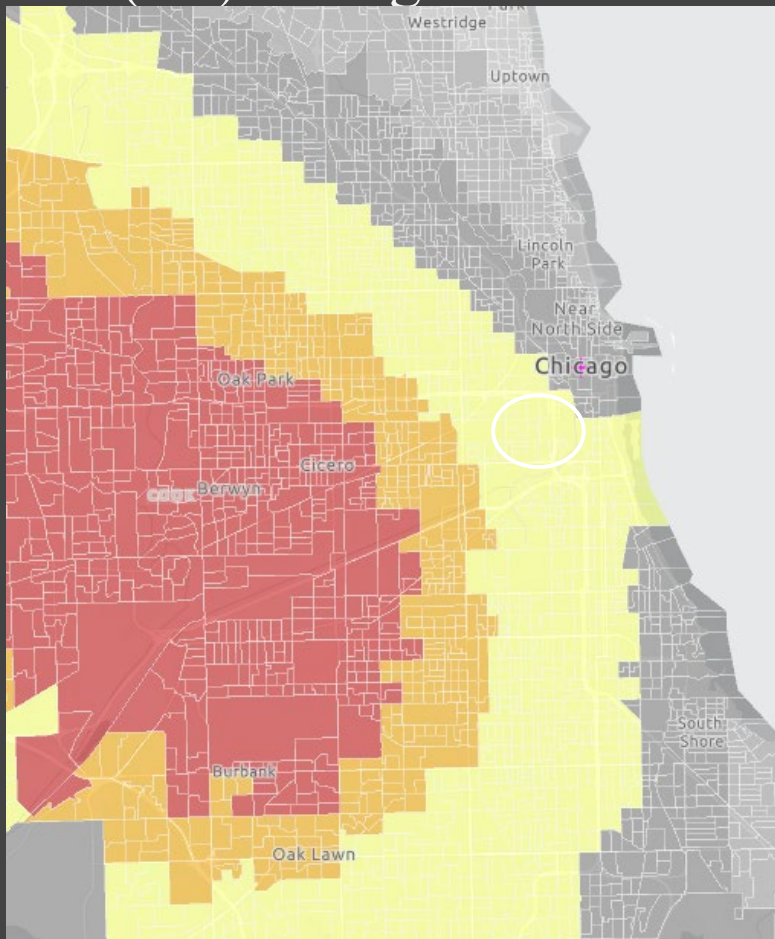
Wisconsin Department of Health Services. "COVID-19: County Data." *COVID-19 / Mapped Cases* July 2020, [www.dhs.wisconsin.gov/covid-19/county.htm](http://www.dhs.wisconsin.gov/covid-19/county.htm).

- The darker the area, the more positive, COVID-19 cases are present.
- Timeframe of maps v. current trends

# Particulate Matter (2.5) Chicago and Milwaukee



<https://www.epa.gov/ejscre>

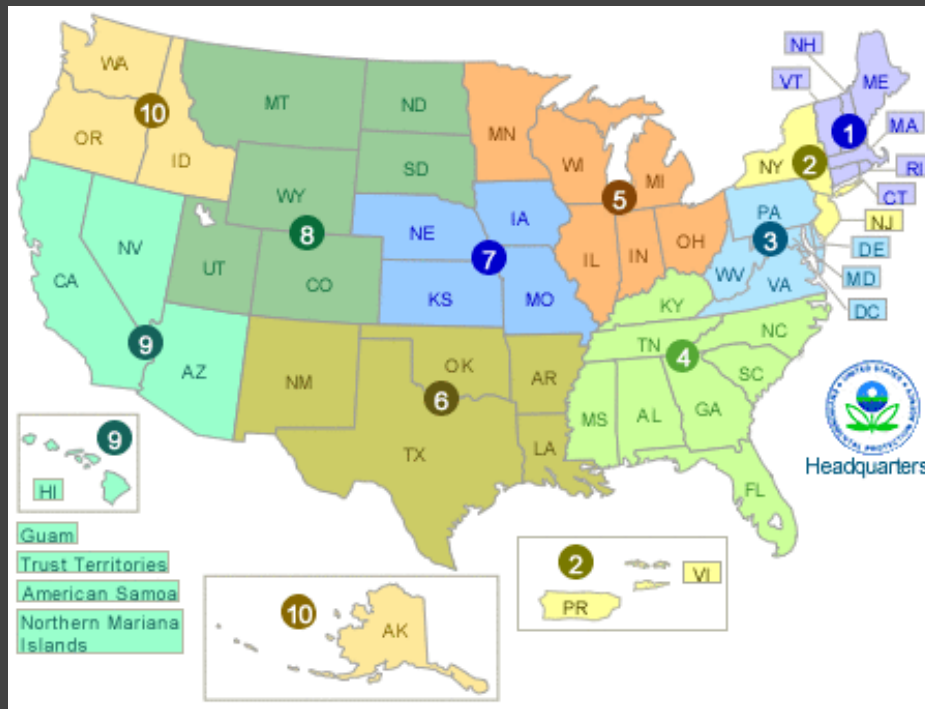






# Methods- EJ Screen Mapping Process of larger block groups

Map of EPA Regional Locations



Chicago and Milwaukee reside in Region 5

PM Region 5 average= 8.63  $\mu\text{g}/\text{m}^3$



# Results: Non-white exposure to PM within block groups

Measurements of Particulate Matter (PM) within block groups of Chicago and Milwaukee

Chicago City Limits, Block groups	Percentile of PM 2.5 above regional average	Percentile of <b>Non-white exposure</b> to PM 2.5		Milwaukee City Limits, Block groups	Percentile of PM 2.5 above regional average	Percentile of <b>Non-white exposure</b> to PM 2.5
Central	92nd	42nd		Central	53rd	85th
West	96th	96th		Central North	56th	87th
North West	95th	83rd		Central South	54th	93rd
North	84th	76th		North	53rd	93rd
South	93rd	91st		North East	52nd	82nd
South East	92nd	93rd		South		66th
South West	97th	95th				

Non-white exposure column utilizes the **EJ Index** formula.

$$\text{EJ Index} = (\text{The Environmental Indicator}) \times (\text{Demographic Index for Block Group} - \text{Demographic Index for EPA Region 5}) \times (\text{Population count for Block Group})$$

# Comparing Zip codes across Chicago and Milwaukee

## Chicago

Zip Code	Demographics, % of the majority	PM 2.5 Index, %tile	COVID-19 (Positive cases/Amount tested)	Positive Covid %
60608, Pilsen	56.73% <b>Hispanic</b>	95th	1942/ 14,451	13.44%
60620, Auburn Gresham	98.1% <b>African American</b>	96th	1371/ 14456	9.48%
60631, Edison Park	92.6% <b>White</b>	91st	432/ 7349	5.88%

## Milwaukee

Milwaukee Zip Code	Demographics % of the majority	PM 2.5 Index, %tile	COVID-19 (Positive cases/Amount tested)	Positive Covid %
53206, Arlington Heights	95.1% <b>African American</b>	52nd	389/ 3765	10.33%
53215, South Gate	66% <b>Hispanic</b>	93rd	2252/ 11040	20.4%
53207, Bay View	76.95% <b>White</b>	63rd	878/ 9059	9.69%



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Conclusion:

The data supports my hypothesis that there are higher levels of PM and COVID-19 cases in segregated communities of both cities.

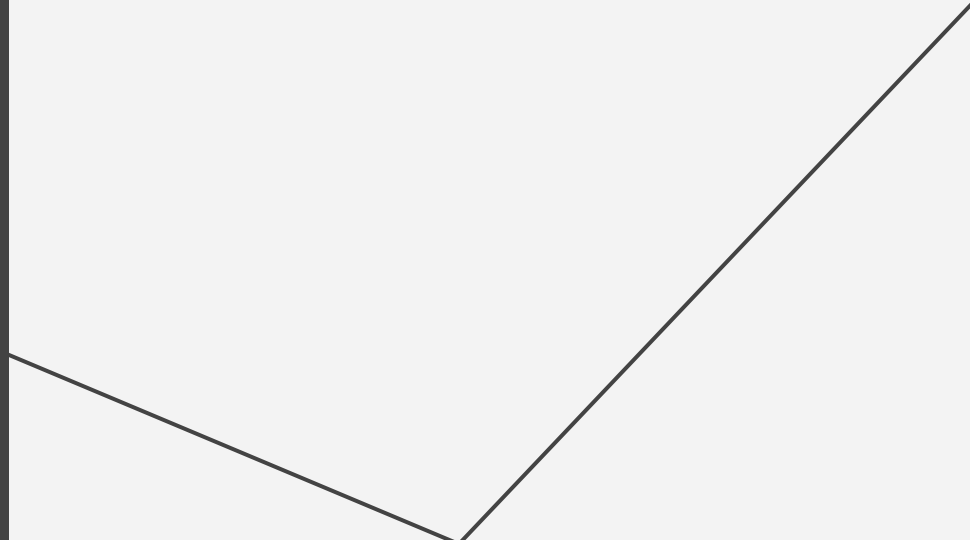
Limitations:

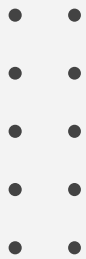
GIS inexperience, COVID-19 data variations per state, possible human error

Discussion:

The future health of our cities demands us to address our racist past of segregation and environmental injustice.

# Conclusion and Discussion





# Future research

- Expand on this work with an Honors 495 credit
  - Utilize future data that COVID-19 will bring- health stats, economic recovery, recycling, etc.
- Complete a full research paper
- Apply to outside conferences

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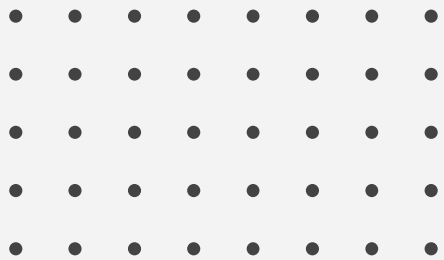
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# Thank you!

Questions?

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