Environmental Justice Data and Indices

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Environmental Justice Overview

Allegheny County Health Department

"Environmental justice (EJ) 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."

Definition from EPA

Environmental justice health risks are created!

Environmental Justice is Important

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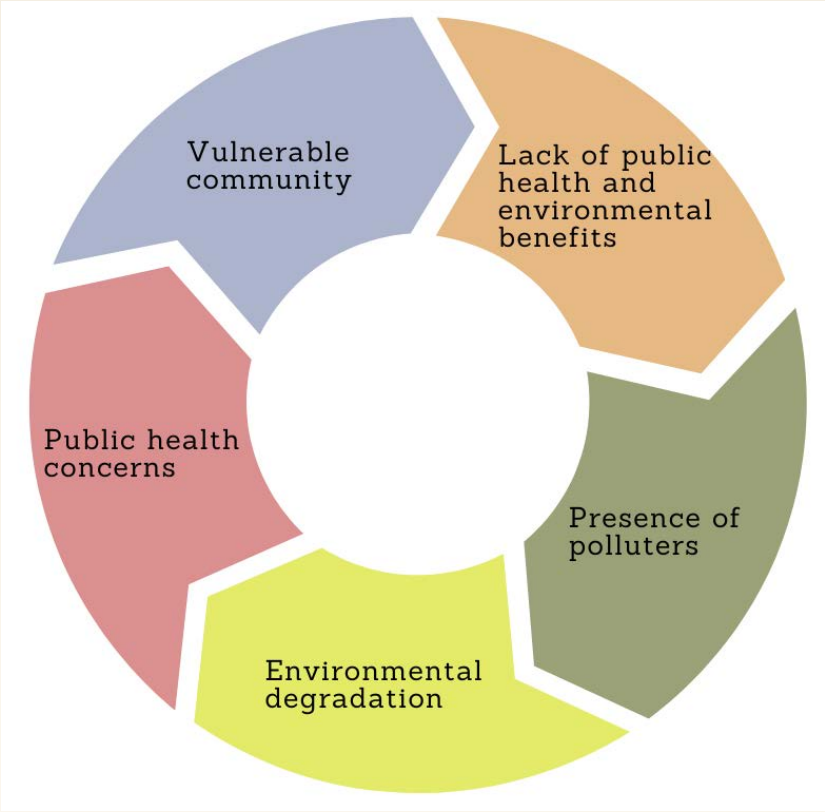
- EJ allows for equity driven work
- Consideration of EJ is becoming increasingly important for grant applications
- Discussions of EJ are necessary for prioritizing climate resilience efforts



ACHD EJ Index: History

Allegheny County Health Department

- According to the Pennsylvania Department of Environmental Protection, EJ is defined by race and poverty
- ACHD expanded definition by creating an index tailored to local environmental and social risk factors
- In 2017, ACHD worked with community members to selected indicators for a dynamic EJ index
- In 2019 and 2022, index updated and indicators changed slightly to account for a larger range of environmental and social issues
  - Highest need areas remained similar in all iterations

ACHD EJ Index: Background

Allegheny County Health Department

- ACHD EJ Index 2022 indicators include:
  - Race
  - Income
  - Educational Attainment
  - Greenness
  - Flood Risk
  - Housing Vacancy
  - Lead Paint Risk
  - Particulate Matter
- All data were from publicly available sources

ACHD EJ Index: Methods

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- Indicators obtained at municipality/neighborhood geographic level
- Categorized into deciles based on the numeric value
- Each community was given a score between 1 and 10 for each indicator
- Values of the 8 indicators were averaged to achieve a final EJ score
- A higher-level score corresponds with a higher need area
- Some measures indicated above were reversed to reflect this scale (ex. Income – higher income = lower EJ Score)

ACHD EJ Index: Particulate Matter

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- Quantifying air quality at the community level is difficult
- $PM_{2.5}$ values assigned to communities from 8 air quality monitors
- Considered both daily and annual $PM_{2.5}$ averages from 2019-2021
- Because there are only 8 unique values, equal values were assigned a similar score
  - The highest value was much greater than the others and was assigned a score of 10 while the rest were assigned 1-7, in order

ACHD EJ Index: Particulate Matter

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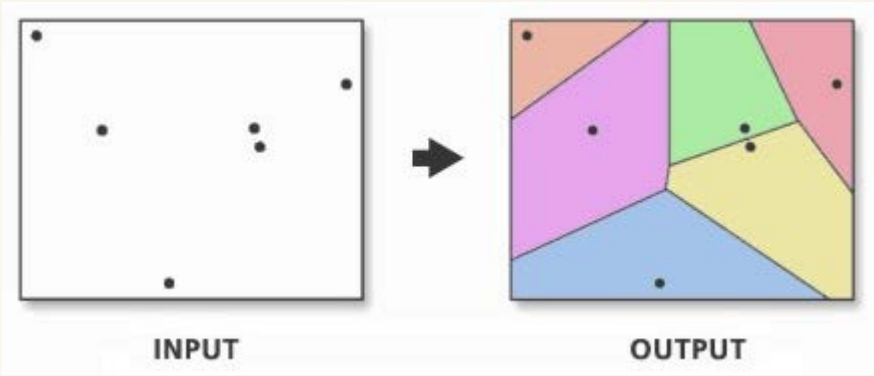
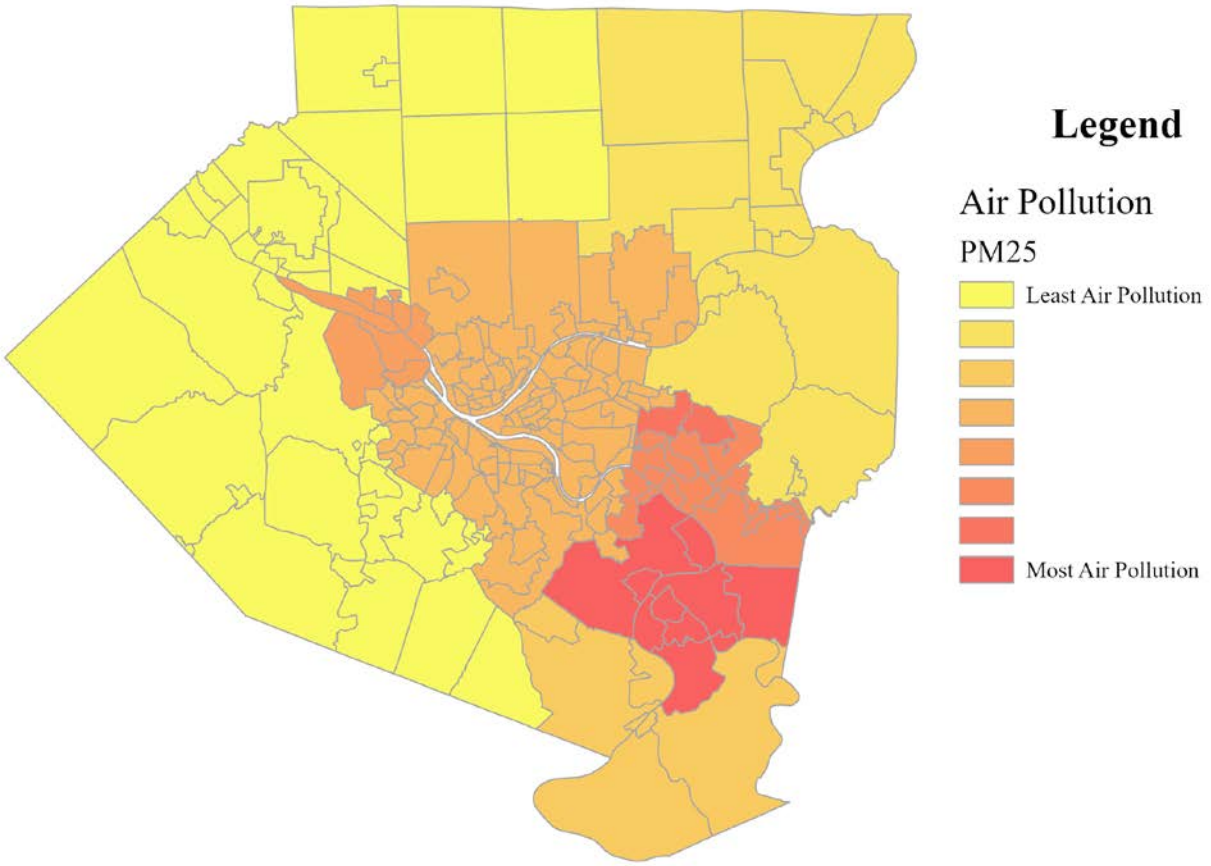
- $PM_{2.5}$ values were assigned to each community based on:
  - $PM_{2.5}$ monitored concentrations at current and former sites
  - Monitor site characteristics, including exposure scales and site objectives (ex. near road monitoring site)
  - Voronoi polygons of the potential spatial areas served by each monitor site*
  - Locations of the largest $PM_{2.5}$ sources (industrial, roadways, etc.)
  - Extent of modeled $PM_{2.5}$ impacts (both short-term and long-term)
  - Topography and known meteorological patterns
  - Municipal borders

*

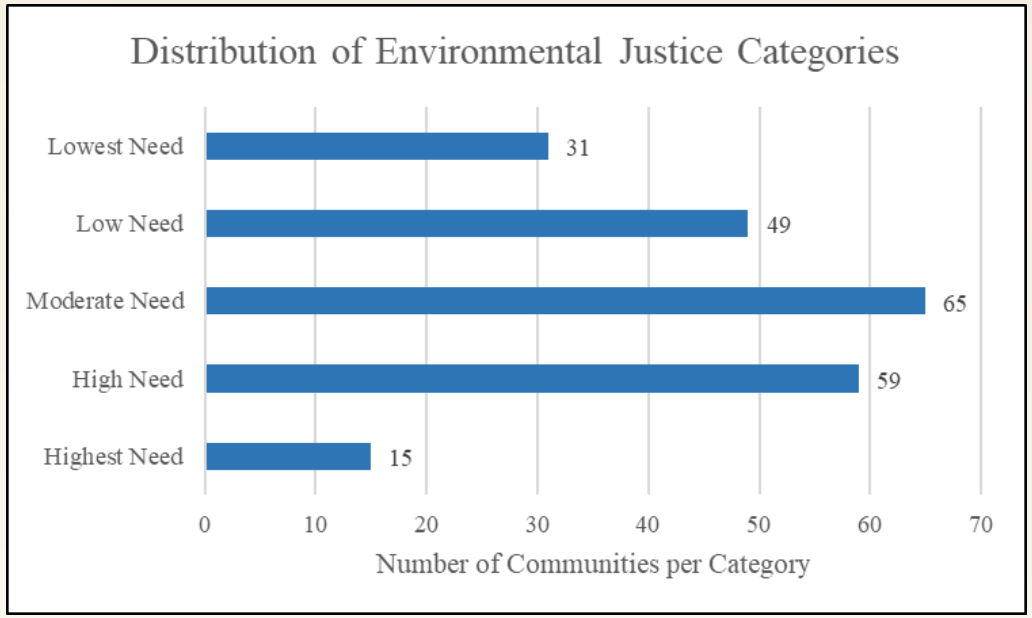


Particulate Matter Score for EJ Index



Identifying EJ Communities

- Areas were defined into 5 categories based on equal interval quantification (range of 1.5)
  - Assured that similarly scored areas were categorized together
  - Normal distribution
- Highest and high need areas are defined as EJ communities
  - However, the index allows for a scale compared to traditional dichotomous selection (EJ/not EJ)



ACHD EJ Index: Mapping

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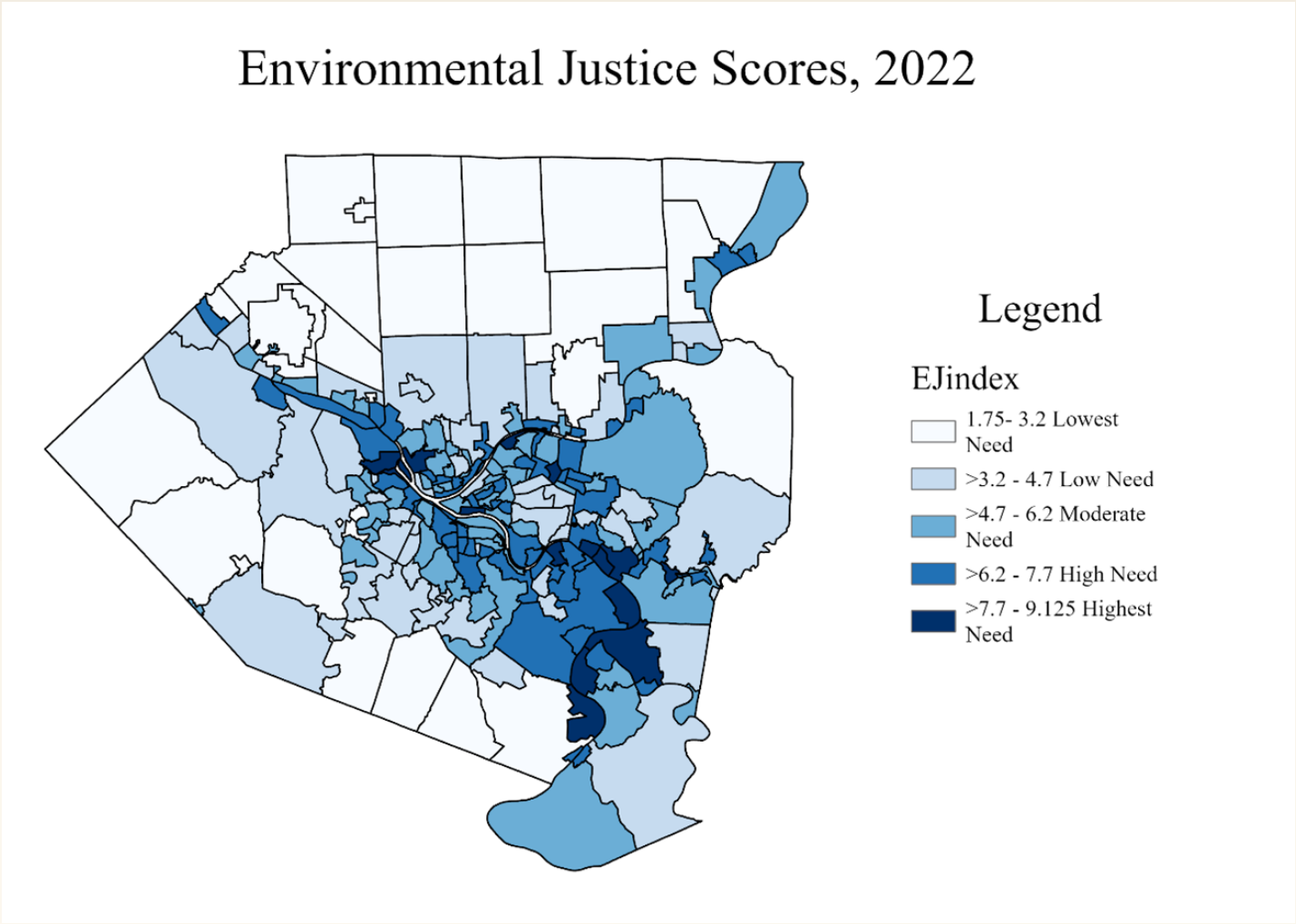

ACHD EJ StoryMap

How to create your own EJ index

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- What indicators affect someone's health or social wellbeing based on where they live?
  - Community engaged
  - May look different for different places
- Where is the geographic range for an environmental or social risk?
- How can these measures be quantified?
  - Weighting each indictor
  - Collinearity issues
- How can this affect policy and decision making?

Thank you!

Questions?