

Environmental Justice Data Exploration

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Introduction

This quarto document explores environmental justice issues in NorthEast Los Angeles (NELA), specifically Eagle Rock, Highland Park, Glassell Park, Cypress Park, Atwater Village, Montecito Heights, Lincoln Heights, El Sereno, and Mount Washington. There is some dispute about the official Los Angeles neighborhoods that make up NELA so Matsuoka & Urquiza's NELA definition was utilized for this analysis(2021). NELA is an interesting case study as it is ethnically diverse and can act as a representation for what may be occurring across the United States.

Adding the necessary libraries:

```
library(tidyverse)
```

```
-- Attaching core tidyverse packages ----- tidyverse 2.0.0.9000 --
v dplyr     1.1.4     v readr     2.1.5
v forcats   1.0.0     v stringr   1.5.1
v ggplot2   3.5.2     v tibble    3.3.0
v lubridate  1.9.4     v tidyr    1.3.1
v purrr     1.1.0
-- Conflicts -----
x dplyr::filter() masks stats::filter()
x dplyr::lag()    masks stats::lag()
i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to beco
```

```
library(sf)
```

```
Linking to GEOS 3.13.0, GDAL 3.8.5, PROJ 9.5.1; sf_use_s2() is TRUE
```

```
library(here)
```

here() starts at /Users/sofiarodas/Documents/MEDS/EDS-223/eds223-hw1

```
library(tmap)
```

Import data

```
# Read in geodatabase of EJScreen data at the Census Block Group level
ejscreen <- sf::st_read(here::here("data",
                                    "ejscreen",
                                    "EJSCREEN_2023_BG_StatePct_with_AS_CNMI_GU_VI.gdb"))
```

```
Reading layer `EJSCREEN_StatePctiles_with_AS_CNMI_GU_VI' from data source
  `/Users/sofiarodas/Documents/MEDS/EDS-223/eds223-hw1/data/ejscreen/EJSCREEN_2023_BG_StateP
  using driver `OpenFileGDB'
Simple feature collection with 243021 features and 223 fields
Geometry type: MULTIPOLYGON
Dimension:      XY
Bounding box:  xmin: -19951910 ymin: -1617130 xmax: 16259830 ymax: 11554350
Projected CRS: WGS 84 / Pseudo-Mercator
```

```
# Read in Los Angeles neighborhood shape file
la_neighborhood <- sf::st_read(here::here("LA_Times_Neighborhood_Boundaries-shp",
                                            "8494cd42-db48-4af1-a215-a2c8f61e96a22020328-1-621d00.x5yiu"))
```

```
Reading layer `8494cd42-db48-4af1-a215-a2c8f61e96a22020328-1-621d00.x5yiu' from data source
  using driver `ESRI Shapefile'
Simple feature collection with 114 features and 2 fields
Geometry type: MULTIPOLYGON
Dimension:      XY
Bounding box:  xmin: 6359592 ymin: 1715035 xmax: 6514633 ymax: 1945515
Projected CRS: NAD83 / California zone 5 (ftUS)
```

Subset Data

Changing column names to lower_snake

```
ejscreen <- janitor::clean_names(ejscreen)
```

Filter for Los Angeles County

```
los_angeles <- ejscreen |>  
  filter(cnty_name == "Los Angeles County")
```

Filter for NELA neighborhoods

```
la_neighborhood <- la_neighborhood |>  
  filter(name == "Eagle Rock" |  
         name == "Highland Park" |  
         name == "Mount Washington" |  
         name == "Glassell Park" |  
         name == "Cypress Park" |  
         name == "Montecito Heights" |  
         name == "Atwater Village" |  
         name == "Lincoln Heights" |  
         name == "El Sereno" )
```

Visualize Data

Map: People of Color Percentage in NorthEast Los Angeles

```
poc_percentiles <- tm_shape(los_angeles)+  
  tm_polygons(fill = "peopcolorpct",  
              fill.scale = tm_scale(values = "brewer.YlOrBr"),  
              fill.legend = tm_legend(title = "Percentile People of Color")) +  
  tm_shape(la_neighborhood, is.main = TRUE) + # is.main to set the size of map  
  tm_borders() + # Use tm_borders so the layer under is visible  
  tm_text("name", # Name helps distinguish what part of LA we're looking at  
         shadow = TRUE,  
         bgcol = "white") +  
  tm_title(text = "NorthEast Los Angeles: People of Color Percentiles",  
           frame = TRUE)+  
  tm_compass(position = c("right", "top"),  
             bg = TRUE,
```

```
        bg.color = "white",
        frame = TRUE)+
tm_scale_bar(position = c("left", "bottom"),
            bg = TRUE,
            bg.col = "white")
```

-- tmap v3 code detected -----

```
[v3->v4] `tm_text()`: migrate the layer options 'shadow' to 'options =
opt_tm_text(<HERE>)'
! `tm_scale_bar()` is deprecated. Please use `tm_scalebar()` instead.
```

```
# Save map and define the size
tmap_save(poc_percentiles,
           here::here("maps", "poc_percentiles.png"),
           height = 8,
           width = 14)
```

```
[cols4all] color palettes: use palettes from the R package cols4all. Run
`cols4all::c4a_gui()` to explore them. The old palette name "brewer.YlOrBr" is
named "yl_or_br" (in long format "brewer.yl_or_br")
Map saved to /Users/sofiarodas/Documents/MEDS/EDS-223/eds223-hw1/maps/poc_percentiles.png
```

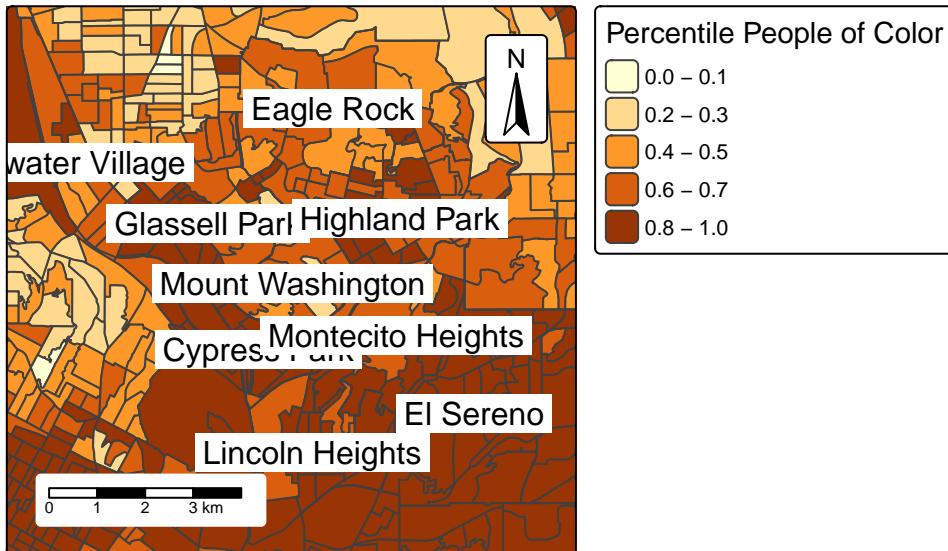
Resolution: 4200 by 2400 pixels

Size: 14 by 8 inches (300 dpi)

```
# Show map in the quarto doc
print(poc_percentiles)
```

```
[cols4all] color palettes: use palettes from the R package cols4all. Run
`cols4all::c4a_gui()` to explore them. The old palette name "brewer.YlOrBr" is
named "yl_or_br" (in long format "brewer.yl_or_br")
[plot mode] fit legend/component: Some legend items or map components do not
fit well, and are therefore rescaled.
i Set the tmap option `component.autoscale = FALSE` to disable rescaling.
```

NorthEast Los Angeles: People of Color Percentiles



Map: Air toxics cancer risk, an Environmental Justice (EJ) Index in NorthEast Los Angeles

```
air_cancer_risk <- tm_shape(los_angeles)+  
  tm_polygons(fill = "d2_cancer",  
              fill.scale = tm_scale(values = "brewer.YlOrBr"),  
              fill.legend = tm_legend(title = "Air Toxins Cancer Risk EJ Index Percentile"))  
tm_shape(la_neighborhood, is.main = TRUE) + #is.main to set the size of the map  
  tm_borders() + # Use tm_borders so the layer under is visible  
  tm_text("name", # Name helps distinguish what part of LA we're looking at  
         shadow = TRUE,  
         bgcol = "white") +  
  tm_title(text = "NorthEast Los Angeles: Air Toxins Cancer Risk EJ Index",  
           frame = TRUE)+  
  tm_compass(position = c("right", "top"),  
             bg = TRUE,  
             bg.color = "white",  
             frame = TRUE) +  
  tm_scale_bar(position = c("left", "bottom"),  
               bg = TRUE,  
               bg.col = "white")
```

```
-- tmap v3 code detected -----
```

```
[v3->v4] `tm_text()`: migrate the layer options 'shadow' to 'options =  
opt_tm_text(<HERE>)'  
! `tm_scale_bar()` is deprecated. Please use `tm_scalebar()` instead.
```

```
# Save map and define the size  
tmap_save(air_cancer_risk,  
          here::here("maps", "air_cancer_risk.png"),  
          height = 8,  
          width = 14)
```

```
[cols4all] color palettes: use palettes from the R package cols4all. Run  
`cols4all::c4a_gui()` to explore them. The old palette name "brewer.YlOrBr" is  
named "yl_or_br" (in long format "brewer.yl_or_br")  
Map saved to /Users/sofiarodas/Documents/MEDS/EDS-223/eds223-hw1/maps/air_cancer_risk.png
```

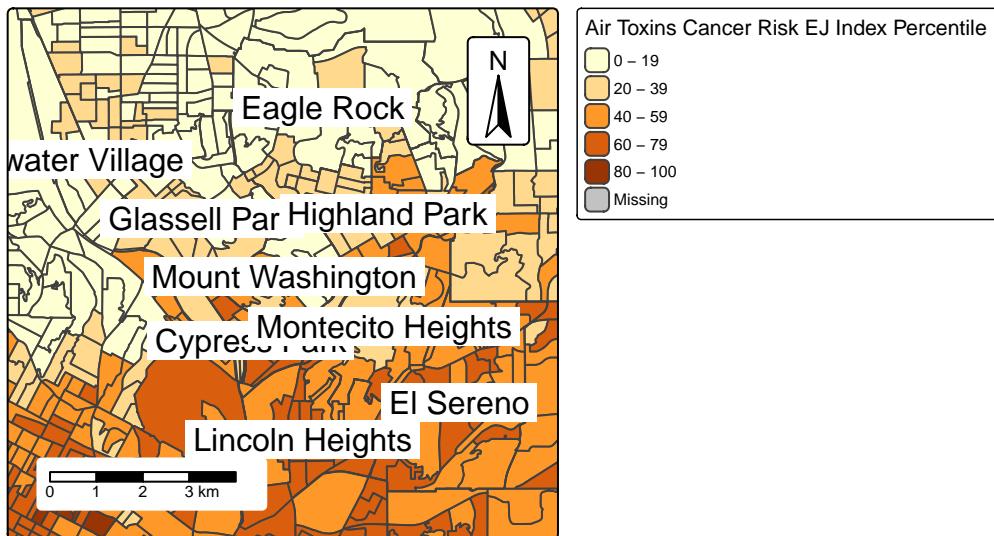
Resolution: 4200 by 2400 pixels

Size: 14 by 8 inches (300 dpi)

```
# Show map in the quarto doc  
print(air_cancer_risk)
```

```
[cols4all] color palettes: use palettes from the R package cols4all. Run  
`cols4all::c4a_gui()` to explore them. The old palette name "brewer.YlOrBr" is  
named "yl_or_br" (in long format "brewer.yl_or_br")  
[plot mode] fit legend/component: Some legend items or map components do not  
fit well, and are therefore rescaled.  
i Set the tmap option `component.autoscale = FALSE` to disable rescaling.
```

NorthEast Los Angeles: Air Toxins Cancer Risk EJ Index



Map Interpretation

The first graph above shows people of color percentage for each Census block. The opacity of the orange darkens as the percentage of people of color increases. The second graph shows air toxics cancer risk environmental justice index. The air toxics cancer risk environmental justice index is based on the estimated risk of inhaling carcinogens in the air. There is an obvious correlation showing that the more people of color live in an area, the more likely they are to have a high score for air toxics cancer risk environmental justice risk index.

Though disheartening, the finding that people of color live where environmental pollution risks to health are higher is the first step to making policy change that can help offset injust risks. Air toxics is one of the few environmental justice indices. Further analysis of the distribution of risk ranging from toxic wastewater discharge to lead paint in homes can help show accumulated environmental risk of people of color and show the immediate need for intervention to reduce negative outcomes for marginalized communities.

References

- LA Times. (2016). LA Times Neighborhood Boundaries. Retrieved from [URL](#)
- Matsuoka, Martha & Urquiza, John. (2021). Building community knowledge, resilience and resistance through research. *GeoJournal*. 87. 10.1007/s10708-021-10422-5.

- U.S. Environmental Protection Agency (EPA), 2023. EJSscreen Technical Documentation.