

Process:

I created this map using GeoDa software and data from the Chicago Health Atlas and the Chicago Data Portal (Chicago Department of Public Health). The first dataset includes rates for inpatient Asthma hospitalization discharges per 10,000 people. I downloaded the CSV data at the zip code level and included the rates for the years 2017 (the latest) and 2010 (the earliest available data). Then I opened this data set in Excel and created a new column that computed the percent difference from 2010 to 2017. I did this by subtracting 2017 rates from 2010 rates and then dividing them by the 2010 rates. I multiplied the output by 100 to get the percentage. Moreover, I opened the Chicago Data Portal and downloaded the CDPH dataset that documents reported Environmental complaints received by the Department of Public Health (CDPH). I filtered the data by selecting only “Air Pollution Work Order” and “Asbestos Work Order” from the Complaint Type column. The understanding here was that individuals who reported more air pollution or asbestos complaints to the CDPH might experience increased exposure to Asthma-inducing air pollutants. Which includes open-air building demolitions, open-air sandblasting, unregulated dry cleaning byproducts, and higher rates of truck and car traffic smog. I also filtered this data by extracting complaints filed from 01/01/2017 - 12/31/2017. I did this so that the complaints correspond with the latest year reported in the Asthma dataset, which was 2017. The raw data was now ready to be utilized in GeoDa.

In GeoDa, I first opened the shapefile for Chicago's zip code boundaries. Then I merged the Asthma data set using the zipcode columns. This process allowed me to create the choropleth map; to include the data points for the air pollution complaints, I overlayed the air pollution data set by referring to the Longitude and Latitude column variables. From there I finalized the map's color, size, and elements.

Findings:

The map shows that the Northwest sides of Chicago and the immediate areas surrounding Chicago's Midway airport have the highest percent increases in Asthma hospitalization rates from 2010-2017. However, they do not have the highest counts of air pollution complaints. Contrastly, the Northeast side of Chicago (areas above the Loop - Lincoln Park, Lakeview, Ravenswood, Albany Park) has the highest counts of air pollution complaints even though they have had significant decreases in Asthma hospitalization rates from 2010-2017. This map potentially indicates that communities who were proactive in communicating their community's issues might experience lower rates of asthma hospitalization due to the following reasons. First, the city of Chicago might fine or halt any activities that might contribute to air-quality issues if these received a higher amount of resident complaints. In turn, this will improve the air quality in that area and likely reduce any Asthma-related pollutants. Second, communities that filed the air-pollution complaints might be better equipped through education, employment, or income thus they proactively send the complaints to ensure that zoning regulations and Chicago ward

policies restrict the development/ opening of any warehouses or buildings that cause heavy air-pollution byproducts. Initially, I thought the map would spatially demonstrate a correlation between communities that had high Asthma rates with high counts of air pollution complaints. Instead, the map showed the opposite - where areas with decreased Asthma rates had the highest concentrations of air pollution complaints. This was a form of both descriptive and Diagnostic analytics, where we learned why certain communities had higher or lower Asthma rates.

Challenges/Additional Work:

Some of the challenges that I faced while creating this map. First, the shapefile for Chicago's zip code boundaries had duplicate values (more than one of the same zip code), which conflicted with the merge process. I had to manually check and fix the data within GeoDo itself. The second major challenge I faced was deciding which complaint types to include from the Chicago Data Portal. The CDPH had many code violation numbers, so I had to find and select the violation codes that corresponded with issues related specifically to air quality. Lastly, GeoDa did not have a scale bar function, so I had to create a scale bar on a same-sized Chicago map through QGIS - which I copied and pasted later on the GeoDa image. I aimed my best to use colorblind-friendly patterns and point sizes that were visually appealing - therefore, I am not entirely sure what additional steps I could have taken to make the map better. However, I am open to suggestions. Thank you

<https://chicagohealthatlas.org/indicators/HDEDR?topic=asthma-ed-visit-rate>

<https://data.cityofchicago.org/browse?category=Environment+%26+Sustainable+Development>

***Chicago's
Northwest Side
Experienced
Largest Percent
Increase in Asthma
Hospitalization
from 2010 - 2017
While Northeast
Side Filed the
Highest Counts of
Air Pollution
Complaints***

Legend

% Change

- < -22.01 (11)
- [-22.01, -10.46) (13)
- [-10.46, 6.32) (15)
- [6.32, 26.53) (8)
- >= 26.53 (7)
- undefined (7)
- Air Pollution Complaint

Scalebar

0 500 1,000 1,500 2,000 m



Sources: Chicago Health
Atlas & Chicago Public
Health Department Data
Portal

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