The Geography of Neighborhood Incarceration in Chicago - Part 2

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4/13/2021

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Introduction

In the project lab “The Geography of Neighborhood Incarceration in Chicago- Part 1” we focused on cleaning, geocoding, validating and lightly analyzing the data on incarceration in Chicago from 2005- 2009. This lab notebook focuses on creating an analysis by mapping out the “Million Dollar Blocks” data to visualize any spatial trends.

Finalizing cost estimates

In the previous lab we calculated the cost estimates for all types of incarceration except life sentences. Life sentence costs are based on the average life expectancy which for Chicago is 77 years old. Since our database is focused on adult offenders, who had to be at least 18 when sentenced, we used an estimated age of 77-18 = *59 years*. To be more precise, we could try to use different estimates based upon the gender of the offender, or by looking for better information on the age distribution of offenders at conviction.

Assuming that each life sentence will incur 59 years of cost, we can just multiply out a cost for these sentences - 59 * $22,000 = $1,298,000. The following table shows the number of people who are serving life in prison (column N) and how much it costs (column cost). The total cost for 218 life in prison sentences costs a total of $282,964,000

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N	cost
<int>	<dbl>
218	282964000

1 row

Furthermore, the following table shows which are the crimes that result in a life in prison sentence. The following table shows it in numerical order from lowest to highest and the cost associated with each crime.

Code

Desc	Sentences	cost
<chr>	<int>	<dbl>
MURDER/INTENT TO KILL/INJ	69	89562000

Desc <chr>	Sentences <int>	cost <dbl>
MURDER/OTHER FORCIBLE FEL	29	37642000
MURDER/STRONG PROB KILL/I	24	31152000
MURDER/INTENT TO KILL/INJURE	17	22066000
PREDATORY CRIMINAL SEXUAL ASLT	9	11682000
AGG CRIM SEX ASLT/THREAT	6	7788000
AGG CRIM SEX ASSAULT/FELO	6	7788000
AGG KIDNAPING/INFLICT HAR	6	7788000
AGG CRIM SEX ASLT/BODILY	4	5192000
AGG DISCHARGE FIREARM/OCC	4	5192000

1-10 of 37 rows Previous **1** 2 3 4 Next

Prevelance of Sentencing

The following table summarizes each sentence description, the number of sentences per type, and the cost.

Code

Desc <chr>	Sentences <int>	cost <dbl>
POSS AMT CON SUB EXCEPT(A)/(D)	9556	2.736036e+08
OTHER AMT NARCOTIC SCHED I&II	9512	6.015163e+08
MFG/DEL 01-15 GR COCAINE/ANLG	5160	2.819528e+08
BURGLARY	5154	4.616758e+08
MFG/DEL 1-14 GR HEROIN/ANALOG	4410	2.642653e+08
RET THEFT/DISPLAY MERCH/>$150	4377	1.639175e+08
FELON POSS/USE FIREARM PRIOR	2996	2.282859e+08
AGG DUI/NO VALID DL	2920	8.811669e+07
AGG UNLAWFUL USE OF WEAPON/VEH	2484	1.022851e+08
RESIDENTIAL BURGLARY	2187	2.528851e+08

1-10 of 688 rows Previous **1** 2 3 4 5 6 … 69 Next

Based on the order of prevalence it is evident that the highest amount of sentences come from drug-related incidents.

Cost Total

Now that we have the data available for all sentencing including life in prison, we can determine the real cost of incarcerating individuals. The following table summarizes the total cost by crime type.

Code

Desc <chr>	Sentences <int>	cost <dbl>
OTHER AMT NARCOTIC SCHED I&II	9512	6.015163e+08
BURGLARY	5154	4.616758e+08
ARMED ROBBERY	1373	3.535971e+08
MFG/DEL 01-15 GR COCAINE/ANLG	5160	2.819528e+08
POSS AMT CON SUB EXCEPT(A)/(D)	9556	2.736036e+08
MFG/DEL 1-14 GR HEROIN/ANALOG	4410	2.642653e+08
RESIDENTIAL BURGLARY	2187	2.528851e+08
FELON POSS/USE FIREARM PRIOR	2996	2.282859e+08
ARMED ROBBERY/ARMED W/FIREARM	862	1.644250e+08
RET THEFT/DISPLAY MERCH/>$150	4377	1.639175e+08

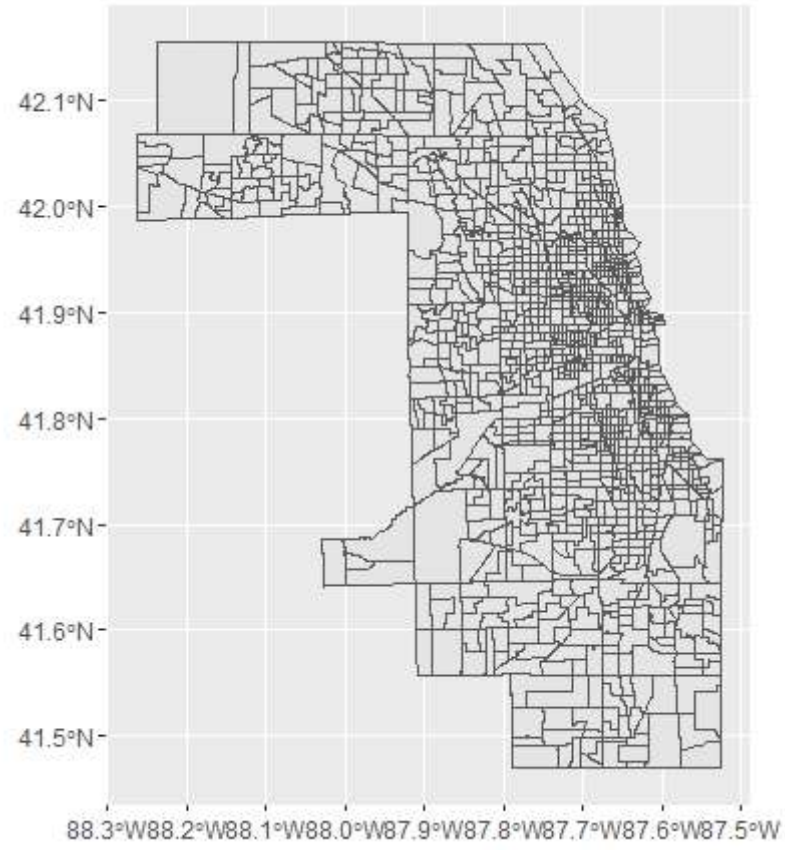
1-10 of 688 rows Previous **1** 2 3 4 5 6 … 69 Next

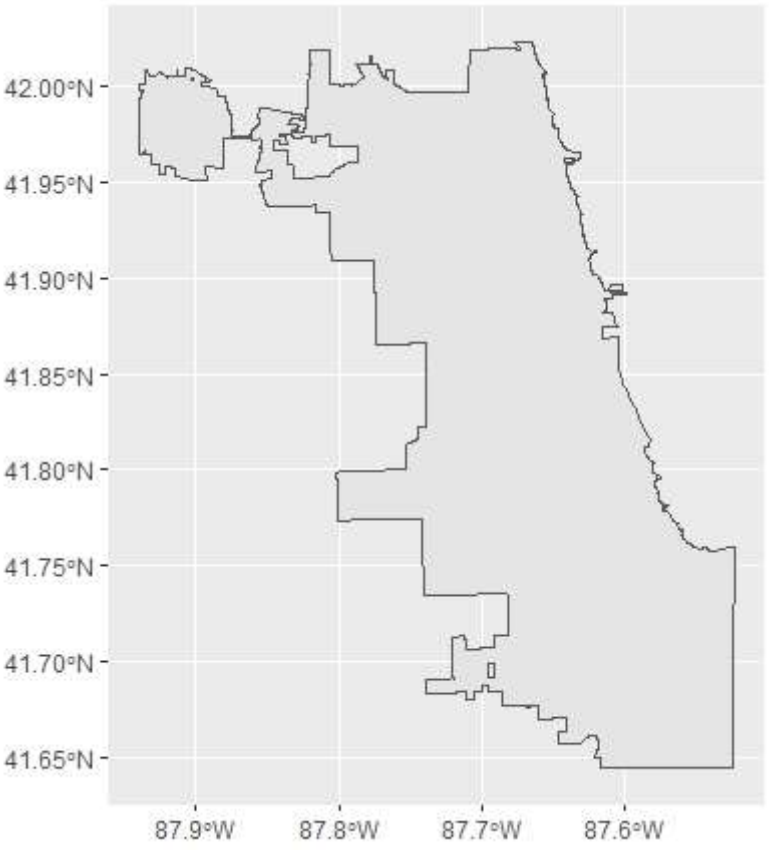
Code

When ordered this way, it is evident that the most costly crimes that led to incarceration are drug related, second is burglary, and third is armed robbery.

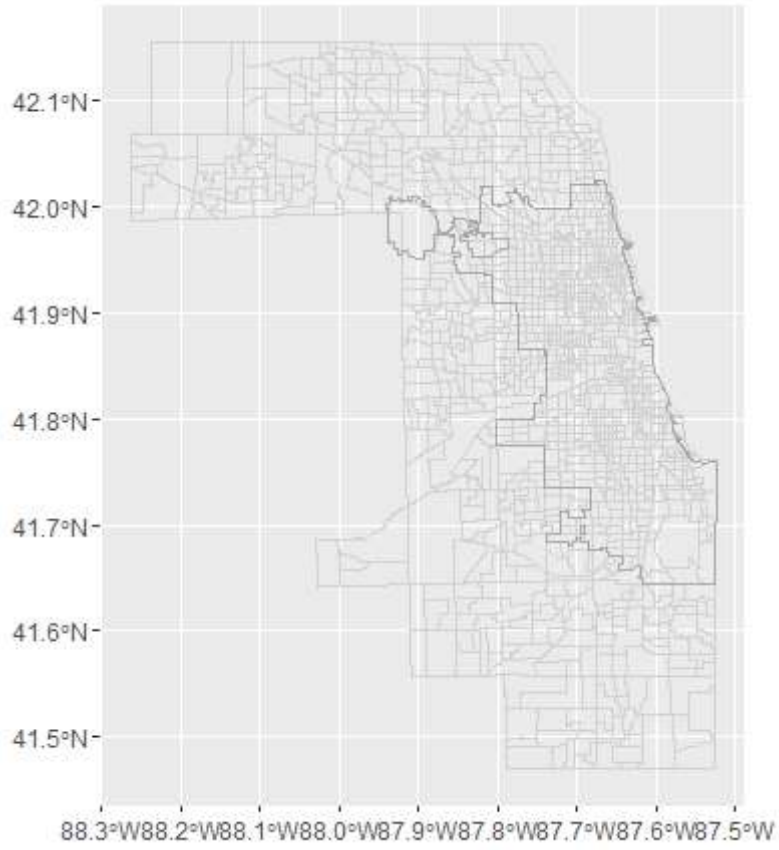
Spatial Analysis

The “Million Dollar Blocks” data groups data by street block throughout the city of Chicago. However, we can group this data to Million Dollar Blocks to represent larger portions of data. The following map shows all census tracts in Cook County which is the county in Chicago is. We will fill out this map with the data to visualize the way in which people are policed throughout the city of Chicago based on the data we cleaned.


42.1°N
42.0°N
41.9°N
41.8°N
41.7°N
41.6°N
41.5°N
88.3°W88.2°W88.1°W88.0°W87.9°W87.8°W87.7°W87.6°W87.5°W


42.00°N
41.95°N
41.90°N
41.85°N
41.80°N
41.75°N
41.70°N
41.65°N
87.9°W
87.8°W
87.7°W
87.6°W

Code



The following map is the clean version of the map we will be using for inputting out data.

Code

```
although coordinates are longitude/latitude, st_contains assumes that they are planar
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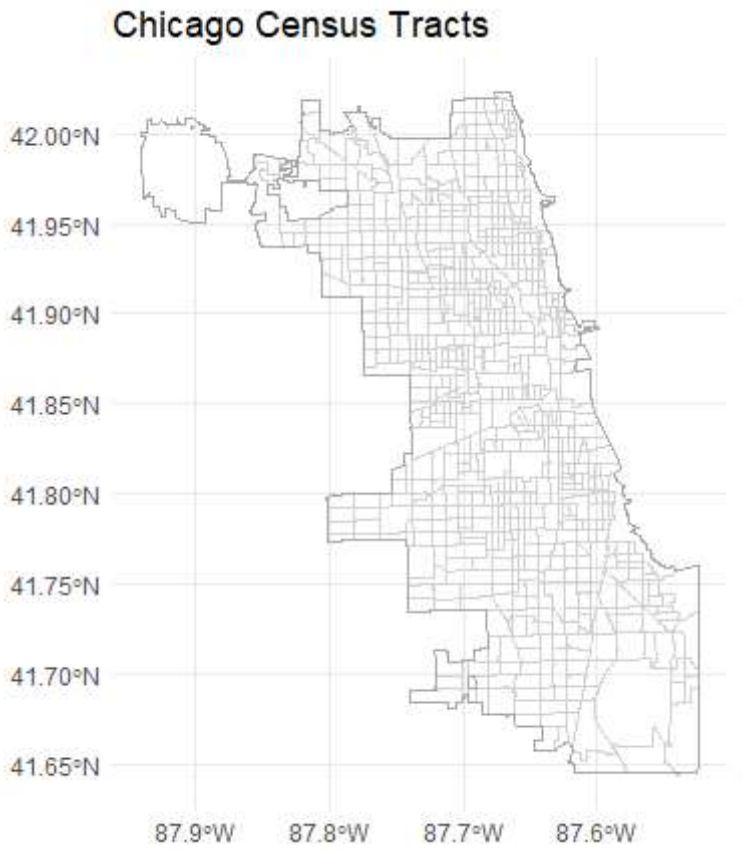
Code



The following table represents a dot density map which represents crime and incarceration throughout the city of Chicago. Higher density occurs in residential areas throughout the city of Chicago. Lower density areas indicate commercial areas, or parks.

Code

```
although coordinates are longitude/latitude, st_within assumes that they are planar
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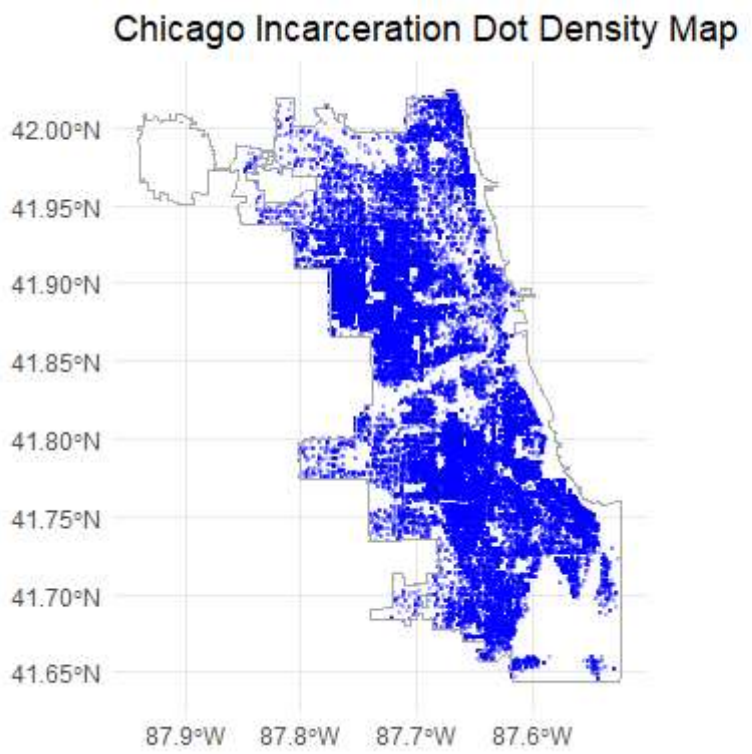
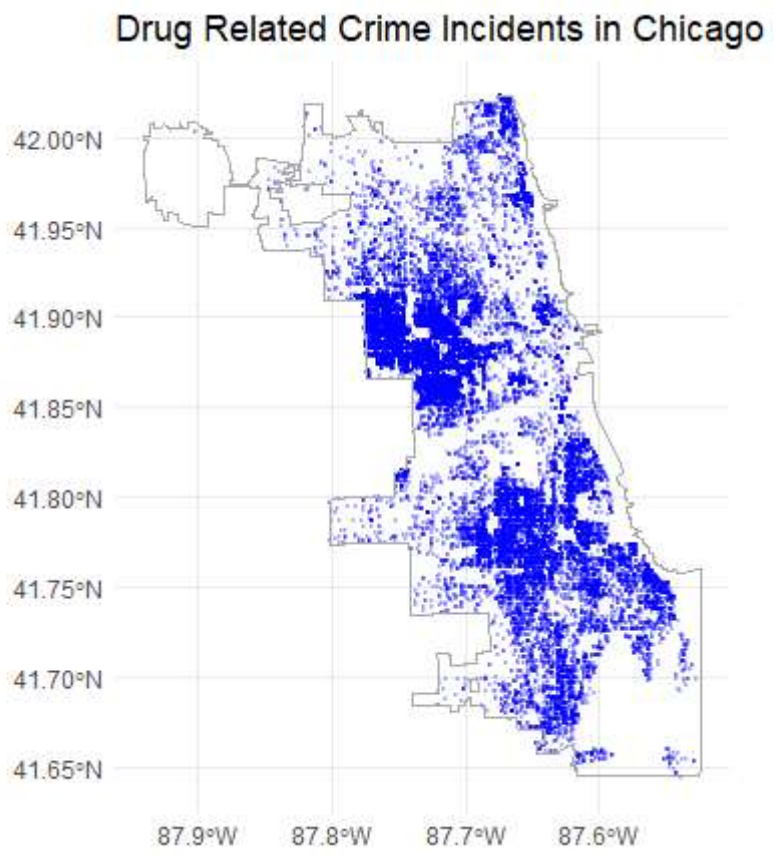
Code



Drug Related Crime

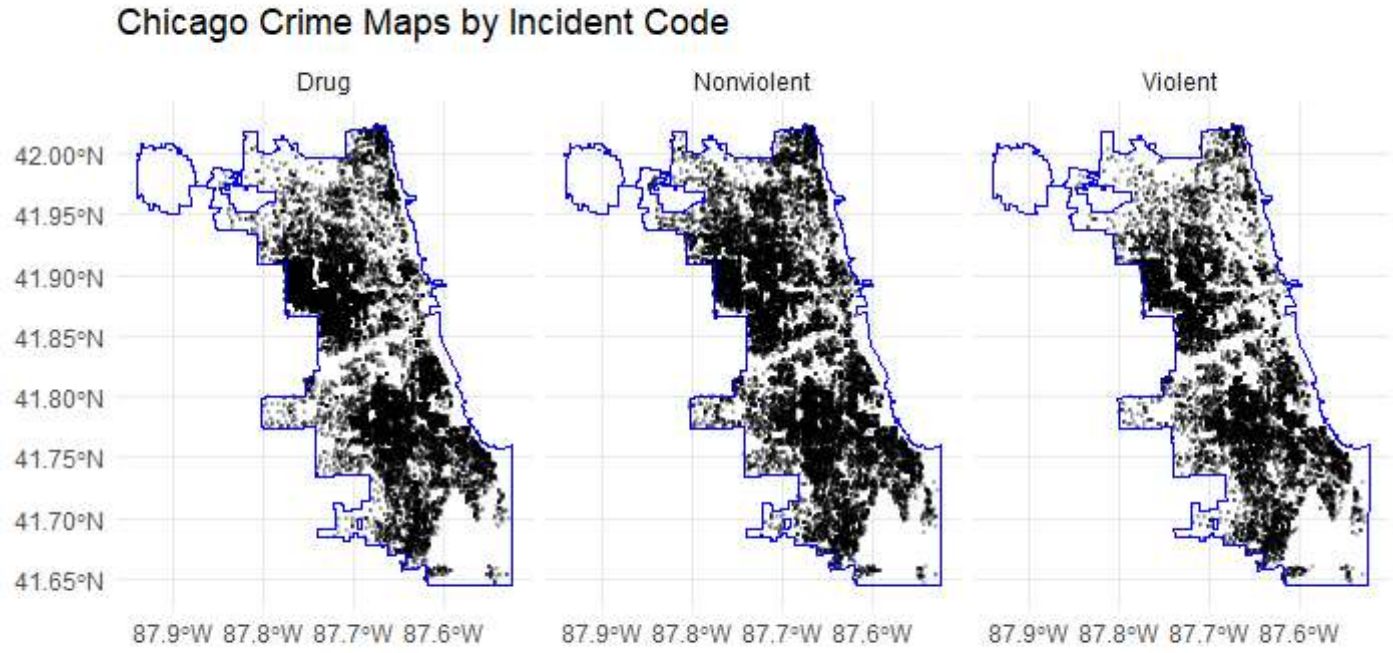
The following map shows only the incarcerations associated with drug related incidents through a dot density map. From this map we can see that the majority of incarceration were drug related. We can also see that spatially there are clusters where these incidents are much more prevalent. These clusters are located generally in the southside of Chicago, and the west side of the city.

Code



We can compare this map to other maps to get a general idea of the spatial distribution of crimes. The following set of maps can be used to compare drug, violent, and non violent crime.

Code



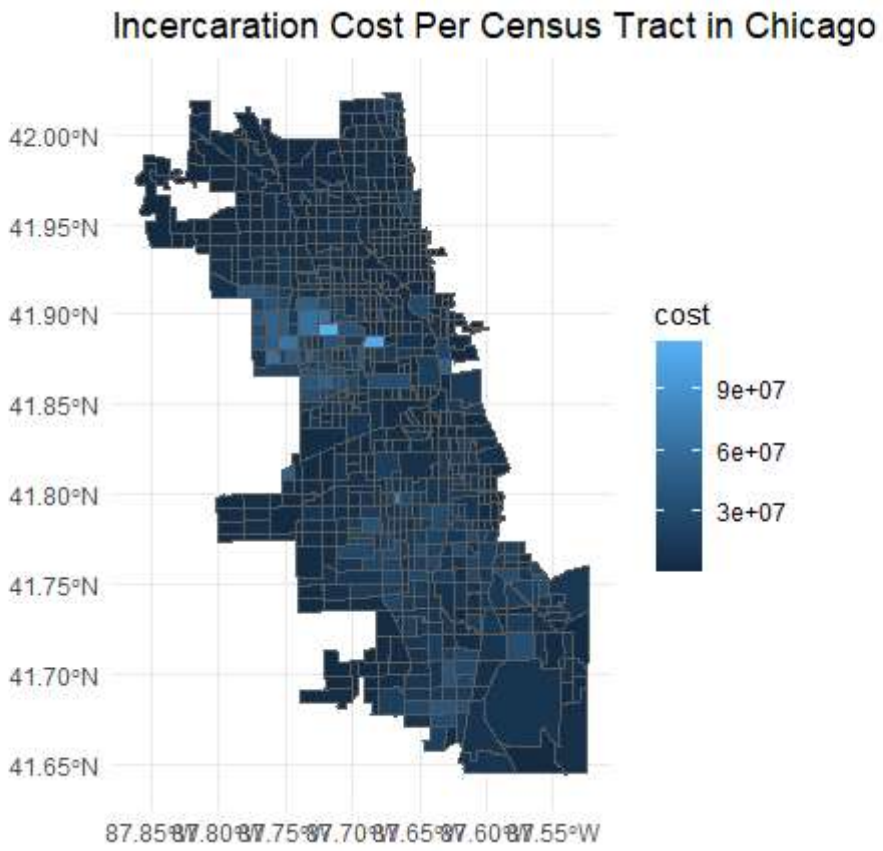
By comparing these maps we can see that there are areas with higher concentrations of crime. Violent crimes are generally more scattered throughout the city, however still have a higher prevalence in the south and west side of the city. For nonviolent crimes we can see they are prevalent in a scattered manner almost evenly throughout the city.

Tract Level Summaries

While the above maps provide a general overview of the data, it can still be quite hard to interpret. We can use census tracts to compare different areas in a more efficient manner.

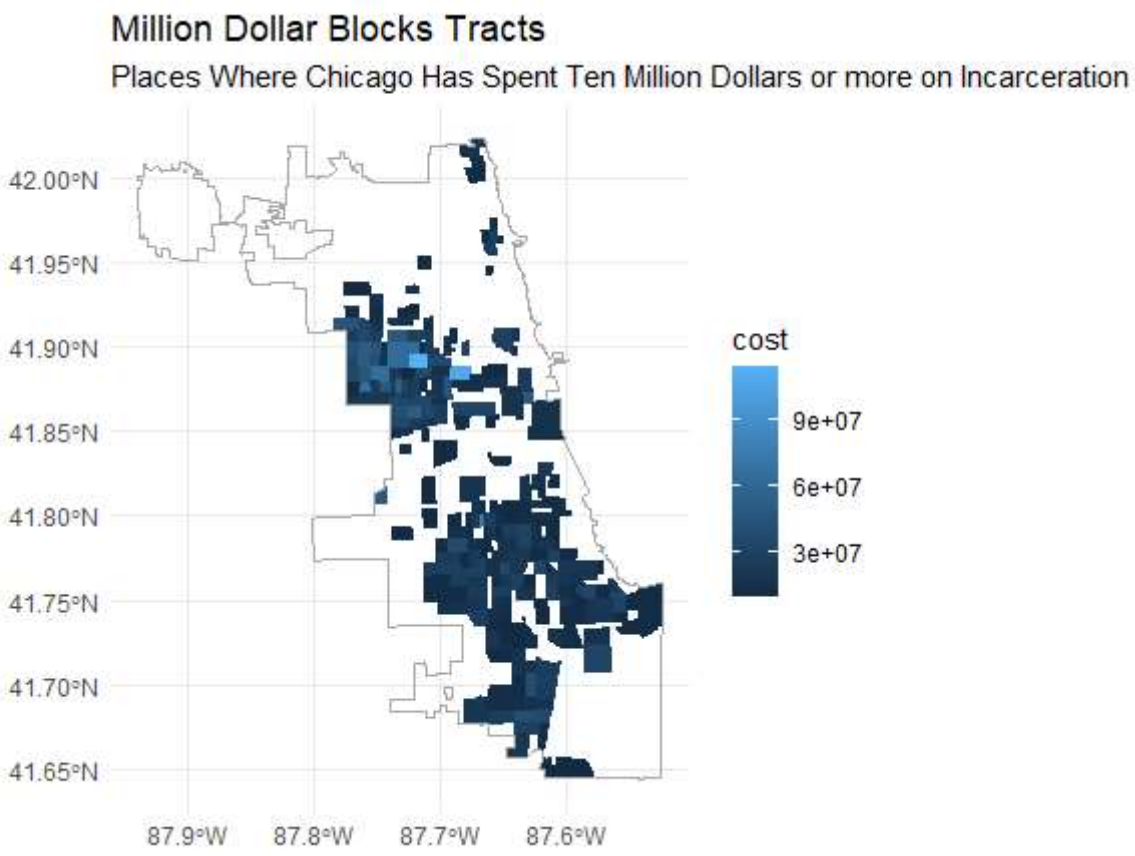
The following map displays the cost of incarceration per census tract throughout the city of Chicago.

Code



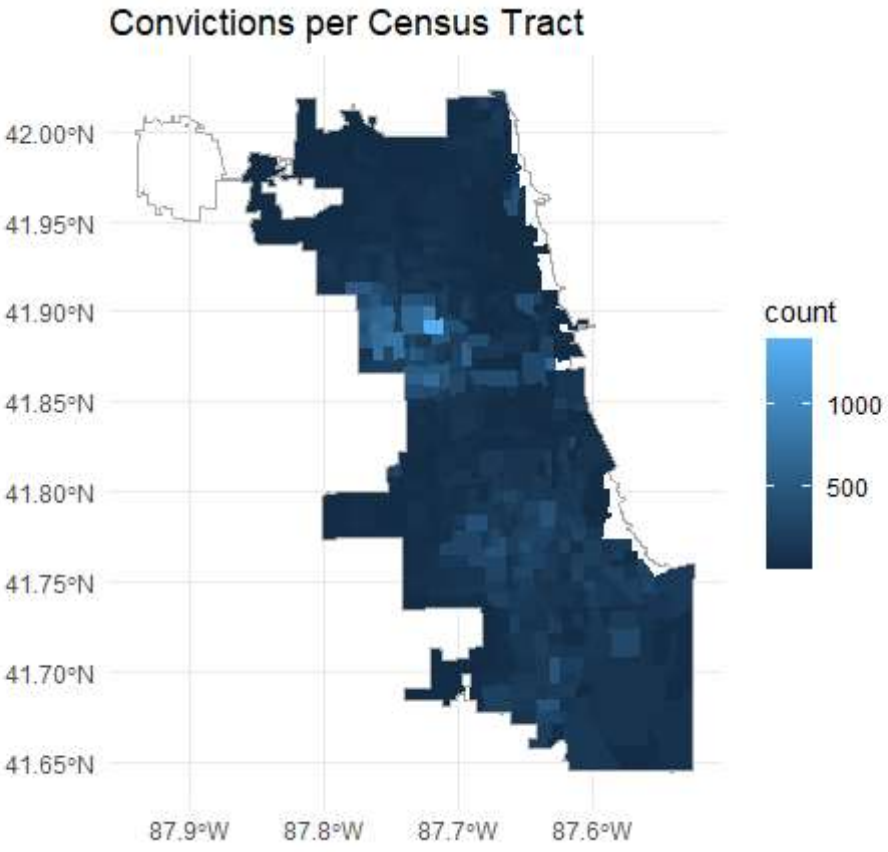
The following map displays the “million dollar blocks” tracts. These tracts specifically calculate where ten million dollar tracts are located. More specifically they indicate where the city of Chicago has spent 10 million dollars on incarceration.

Code



Furthermore, the following map shows the number of convictions per census tract. In this map we can see that there is one cluster in particular the has a high number of convictions. This map indicates that the area with the highest number of convictions is located in the West side of the City.

Code



Conclusion

Mapping the Million Dollar Blocks data allowed us to see the distribution of crime convictions throughout the city of Chicago, It is evident that there are areas with high convictions. Convictions were especially relevant in the South and west side of the city. These maps can provide some indications of where crime occurs, or where incarcerated people live. this data can also be an indication of where people are more heavily policed throughout the city of Chicago. Conversely, this data can be used by government administration to identify high crime areas and provide funds for organizations to mitigate crime. If this data is used properly, this data can be used to inform the city of of vulnerable places that they will be able to help.