



Chicago Crime and Education Analytics Dashboard

POLICE LINE DO NOT CROSS POLICE LINE DO NOT CROSS POLICE LINE DO NOT CROSS



Welcome to Chicago's Analytics Page!

Here we are addressing the following Problem Statement,

"Identify strategies to reduce crime rates in Chicago by 30% in the next 1 Year by analyzing the correlation between education quality and crime rate to enable strategic actions"

Plan of Action

1) Building a Tableau Dashboard to address the problem statement.

Data Used for Analysis

Crime Data Summary:

This dataset reflects reported incidents of crime that occurred in the City of Chicago from 2012 to 2016.

Scope:

Time Period(s): 2012-2016

Description of Variables :

ID - Unique identifier for the record

Case_Number - The Chicago Police Department RD Number (Records Division Number), which is unique to the incident

Date - Date when the incident occurred; this is sometimes a best estimate

Block - The partially redacted address where the incident occurred, placing it on the same block as the actual address

IUCR - The Illinois Uniform Crime Reporting code. This is directly linked to the Primary Type and Description.

Primary_Type - The primary description of the IUCR code

Description - The secondary description of the IUCR code, a subcategory of the primary description

Location_Description - Description of the location where the incident occurred

Arrest - Indicates whether an arrest was made

Domestic - Indicates whether the incident was domestic-related as defined by the Illinois Domestic Violence Act.

Beat - Indicates the beat where the incident occurred. A beat is the smallest police geographic area - each beat has a dedicated police beat car. Three to five beats make up a police sector, and three sectors make up a police district. The Chicago Police Department has 22 police districts.

District - Indicates the police district where the incident occurred.

Ward - The ward (City Council district) where the incident occurred.

Community_Area - Indicates the community area where the incident occurred. Chicago has 77 community areas.

FBI_Code - Indicates the crime classification as outlined in the FBI's National Incident-Based Reporting System (NIBRS).

X_Coordinate - The x coordinate of the location where the incident occurred in State Plane Illinois East NAD 1983 projection. This location is shifted from the actual location for partial redaction but falls on the same block

Y_Coordinate - The y coordinate of the location where the incident occurred in State Plane Illinois East NAD 1983 projection. This location is shifted from the actual location for partial redaction but falls on the same block

Year - Year the incident occurred

Updated_On - Date and time the record was last updated

Latitude - The latitude of the location where the incident occurred. This location is shifted from the actual location for partial redaction but falls on the same block

Longitude - The longitude of the location where the incident occurred. This location is shifted from the actual location for partial redaction but falls on the same block

Location - The location where the incident occurred in a format that allows for creation of maps and other geographic operations on this data portal. This location is shifted from the actual location for partial redaction but falls on the same block

Education Data Summary

Chicago Public Schools (CPS) - Report Card Data This dataset shows all school-level performance data used to create CPS School Report Cards for the 2012-2016.

Metrics used are described as follows: for the entire list got to <https://data.cityofchicago.org/api/assets/AAD41A13-8E8A-4F67-B1F5-86F71FE09D5F?download=true>

5 Year Graduation Rate

The five-year cohort graduation rate follows a group of students who enter Chicago Public Schools (CPS) as freshmen and calculates the percent of these students who graduate within five years after their freshman year. For example, the 2016 rate tracks ninth grade students who started in CPS in the 2011-12 school year and graduated from CPS by August of the 2015-16 school year.

How is the rate calculated?

The rate is calculated by dividing the number of students from an adjusted ninth grade cohort who graduated over the five year time period by the total number of students in that cohort

Example Calculation

School A had 725 ninth grade students enrolled during the 2011-12 school year. Twenty of these were repeating the ninth grade. Twenty-five of them transferred out of CPS and were verified in a new school during the five years following the 2011-12 school year. The adjusted ninth grade cohort for this school was: Cohort9th adj. = $725 - 20 - 25 = 680$ students During the five years following the 2011-12 school year, 286 of these 680 students dropped out and 364 graduated. Of the remaining 45 students, 5 were unverified transfers as of August 2016, and twenty-five were still enrolled in CPS as of the end of the 2015-16 school year. School A's Five-Year Cohort Graduation Rate in 2016 was: Graduation Rate5-year cohort = $364 / 680 = 53.5\%$

5 Year DropOut Rate

What is the Five-Year Cohort Dropout Rate? The five-year cohort dropout rate follows a group of students who enter Chicago Public Schools (CPS) as freshmen and calculates the percent of these students who drop out within five years after their freshman year. For example, the 2016 rate tracks ninth grade students who started in CPS in the 2011-12 school year and dropped out of CPS by August of the 2015-16 school year.

How is the rate calculated?

The rate is calculated by dividing the number of students from an adjusted ninth grade cohort who dropped out over the five year time period by the total number of students in that cohort.

Example Calculation School A had 725 ninth grade students enrolled during the 2011-12 school year. Twenty of these were repeating the ninth grade. Twenty-five of them transferred out of CPS and were verified in a new school during the five years following the 2011-12 school year. The adjusted ninth grade cohort for this school was: Cohort9th adj. = $725 - 20 - 25 = 680$ students During the five years following the 2011-12 school year, 286 of these 680 students dropped out and 364 graduated. Of the remaining 45 students, 5 were unverified transfers as of August 2016, and twenty-five were still enrolled in CPS in the 2015-16 school year. School A's Five-Year Cohort Dropout Rate in 2016 was: Dropouts = $286 + 5$ (unverified transfer students) = 291 Dropout Rate5-year cohort = $291 / 680 = 42.8\%$

Student Growth Rating

Overall score of the school based on growth factors

Student Attainment Rating

Overall score of the school based on attainment of students

Racial Ethnicity of Students - Based on cast, religion and race

Population data of Chicago - for each zipcode

Avg annual income - For each zipcode

2015 Data for Poverty, Unemployment, GDP, No High School Diploma

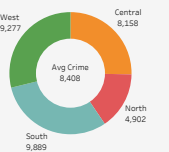
<https://data.cityofchicago.org/Health-Human-Services/below-poverty-level-by-community/b7zw-zvm2>



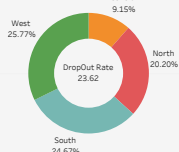
Exploratory Dashboard

Year
All

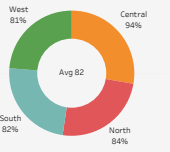
By Crime



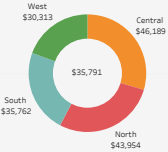
By Dropout



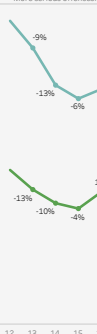
Freshman On-Track



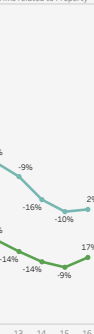
By Annual Income



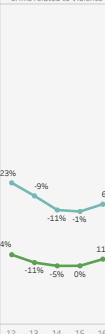
More serious offenses.



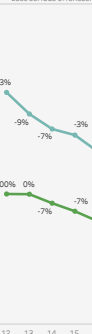
Crime related to Property



Crime related to Violence



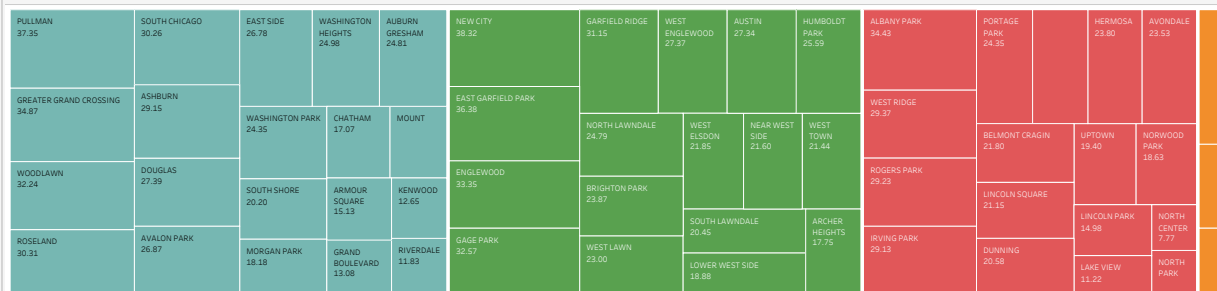
Less serious offenses.



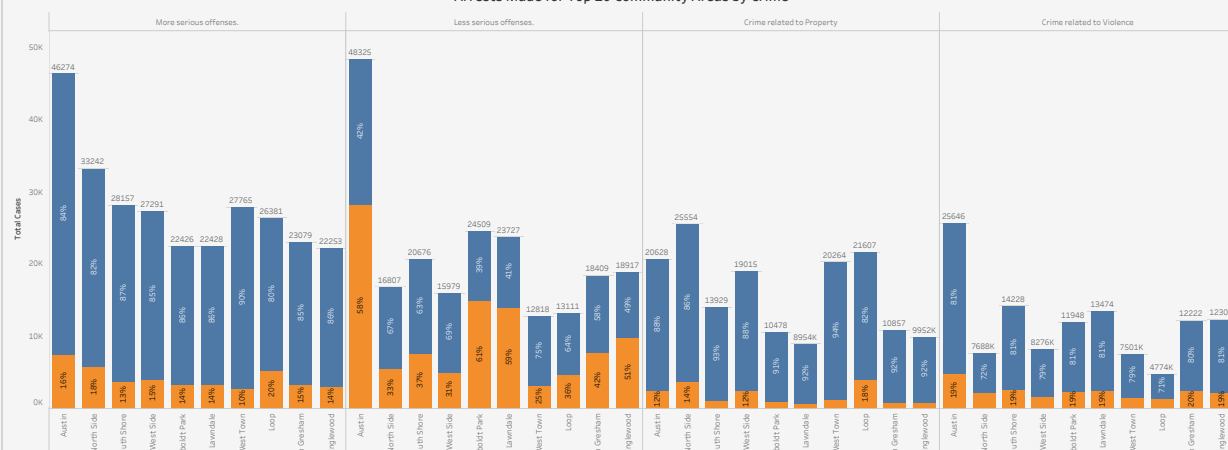
By Type and Month

Show By

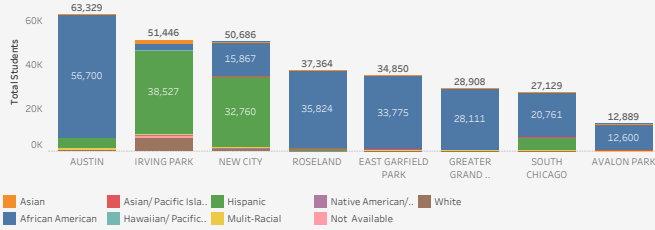
Primary Type	January	February	March	April	May	June	July	August	September	October	November	December
THEFT	24,518	20,681	24,727	25,710	27,967	29,576	31,939	31,725	29,490	29,043	26,253	25,885
BATTERY	18,836	17,040	22,038	21,665	25,467	25,517	25,270	24,377	22,306	21,635	19,078	18,571
CRIMINAL DAMAGE	11,248	9,412	12,625	13,085	14,158	13,924	14,744	14,275	13,365	13,403	12,354	11,605
NARCOTICS	11,918	12,041	13,422	12,180	12,164	11,299	12,141	11,287	10,588	10,531	9,865	8,546
ASSAULT	6,174	5,851	7,738	7,549	8,906	8,722	8,499	8,474	8,044	7,825	6,493	6,275
OTHER OFFENSE	7,390	6,736	7,608	7,438	7,996	7,524	7,720	7,709	6,854	7,178	6,627	6,541
DECEPTIVE PRACTICE	6,674	5,997	6,892	6,726	6,303	6,537	6,483	6,796	6,432	6,706	6,381	6,740
BURGLARY	6,725	4,963	5,834	6,003	6,874	6,994	7,746	7,998	7,478	7,700	7,199	7,263
MOTOR VEHICLE THEFT	5,536	4,543	4,919	4,445	4,830	5,254	5,305	5,238	4,962	5,079	5,032	5,204
ROBBERY	4,742	3,141	3,643	3,999	4,769	4,804	5,527	5,433	5,076	5,291	4,916	5,361

Show by
Dropout RateSouth West North Central

Arrests Made for Top 10 Community Areas by Crime



Relationship Between Race, DropOutRate and Crime in Community



To explore the relationship between Crime, Drop-out Rate and certain races, we have created sets for our analysis.

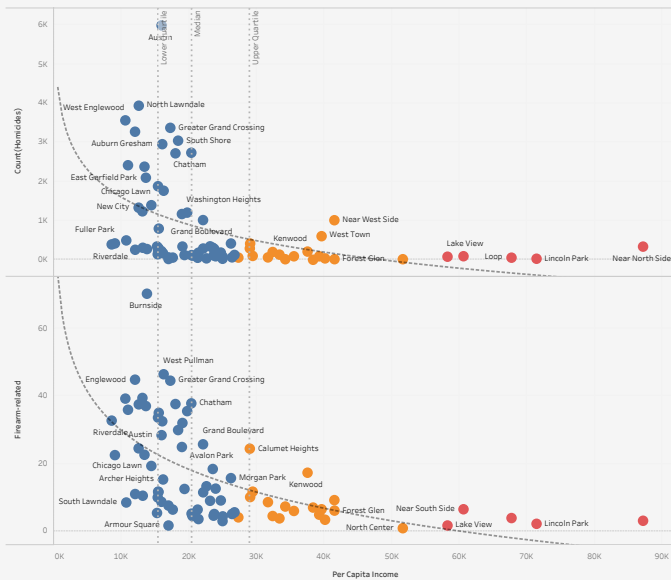
Set 1) Top 20 communities by Crime
Set 2) Top 10 communities by Dropout Rate

Intersection area of the above 2 sets gives us the top communities with high crime and high dropout rate.

The community areas with higher crime rates and dropout rates are mostly dominated by **African Americans** followed by **Hispanic** race of Students.
To conclude, there is a definite strong relationship between Crime and education for some races and the reason for the high crime rate could be the high Drop-out rate.

Show By Homicide/Firearm vs PerCapitaIncome

Explanatory Analysis using Scatterplots with Various variables



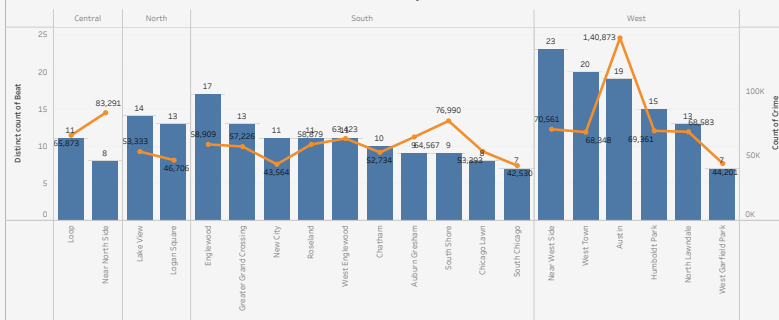
Poverty
The scatter plot shows the plot between Percentage of people lying below BPL and the Count of Crimes (homicides/ firearms). We can conclude that there are certain Community Areas which has high poverty level, are also more prone to offences such as Homicides.
The insights drawn is that
* The Community Areas with poverty gr than Median Poverty Line commits Weapons And Firearms related crimes which leads to increase in homicides in certain area.
* The reason of more offenders committing crimes could be higher rate of Mental Illness in poor than rich, other reason could be personal revenge grudges etc.
* The another reason could be financial problems or eager to earn money shortcuts (by Committing crimes or by any other illegal means.)
Low/No money leads to poverty which in turn leads to low living standards resulting in inequality in society and fear of getting cornered leads to commit crimes.

No High School Diploma
In Chicago it is mandatory that a person requires a minimum of 14 years of education to enter any line of work, so people with no high school diploma mostly struggle to be getting themselves employed, this struggle in unemployment often leads in getting involved in criminal activities
From the graphs we can observe that community area with students who do not attend high school diploma has higher chance of getting involved in crimes. From the plot we can see community area with 14% to 33% of people do not have high school diploma certificate and has higher chance of committing crime.

Unemployment
Poverty is a by-product of unemployment
Higher unemployment certainly increases poverty and at the same time leads to more crime due to depression associated with being unemployed.
From the scatter plot show we can see that the unemployment rates in a certain community areas and with Firearms and homicides rates are in intelligible.
The relationship between crimes and Unemployment concerns the direct causation but unemployment has a small role in crimes. Unemployment supported by racial discrimination is one of the major concern especially for the people of African-American race has to face inferiority complex in jobs which leads to depression, and crimes.

Per capita Income
The scatter plot shows the plot between Per capita Income of a community area the Count of Crimes (homicides/ firearms). We can say that Community Area with per capita income ranging between 10K to 25K has maximum chances of committing crimes and also more prone to areas with high crime rates.
The possible reason could be, The income inequality in society is one of the main reason for increase in crimes. Per capita income is proportional to the growth in society, Poverty, Unemployment, Excess homicides imposes a greater economic cost which we can see that the government could not effectively invest on development on certain community areas where violent crimes are high because the money which is for development is put on for economic cost. Also homicides are related to firearms so those community areas with high homicides also experiences highest level of firearm related lethal crime. Compensates also fear from the certain people belonging to certain areas where crimes are high and don't hire them which results in unemployment and thus increase crime rates.

Beat Analysis



Beat Analysis

Analysing Beats in the top 20 Community areas by crime, we found that ratio of beats and crime in certain areas are disproportionate.
e.g **Austin** in West and **Near North Side** in Central has high crime rate but has lower beats in the area.
Based on the trends, the Mayor can take a decision to increase/decrease the number of beats in the area to fight crime effectively.

Hovering on "**Near West Side Community**" area shows that even though the number of beats are high, the arrests are being made for only **20%** of the crimes.



Chicago Crime and Education Analytics Dashboard

POLICE LINE DO NOT CROSS POLICE LINE DO NOT CROSS POLICE LINE DO NOT CROSS

Welcome to Chicago's Analytics Page!

Here we are addressing the following Problem Statement.

"Identify strategies to reduce crime rates in Chicago by 30% in the next 1 Year by analyzing the correlation between education quality and crime rate to enable strategic actions"

Plan of Action

1) Building a Tableau Dashboard to address the problem statement.

Crime Data Summary:

This dataset reflects reported incidents of crime that occurred in the City of Chicago from 2012 to 2016.

Scope:

Time Period(s): 2012-2016

Description of Variables :

ID - Unique identifier for the record

Case_Number - The Chicago Police Department RD Number (Records Division Number), which is unique to the incident

Date - Date when the incident occurred; this is sometimes a best estimate

Block - The partially redacted address where the incident occurred, placing it on the same block as the actual address

IUCR - The Illinois Uniform Crime Reporting code. This is directly linked to the Primary Type and Description.

Primary_Type - The primary description of the IUCR code

Description - The secondary description of the IUCR code, a subcategory of the primary description

Location_Description - Description of the location where the incident occurred

Arrest - Indicates whether an arrest was made

Domestic - Indicates whether the incident was domestic-related as defined by the Illinois Domestic Violence Act

Beat - Indicates the beat where the incident occurred. A beat is the smallest police geographic area - each beat has a dedicated police beat car. Three to five beats make up a police sector, and three s

District - Indicates the police district where the incident occurred.

Ward - The ward (City Council district) where the incident occurred.

Community_Area - Indicates the community area where the incident occurred. Chicago has 77 community areas.

FBI_Code - Indicates the crime classification as outlined in the FBI's National Incident-Based Reporting System (NIBRS).

X_Coordinate - The x coordinate of the location where the incident occurred in State Plane Illinois East NAD 1983 projection. This location is shifted from the actual location for partial redaction but fa

Y_Coordinate - The y coordinate of the location where the incident occurred in State Plane Illinois East NAD 1983 projection. This location is shifted from the actual location for partial redaction but fa

Year - Year the incident occurred

Updated_On - Date and time the record was last updated

Latitude - The latitude of the location where the incident occurred. This location is shifted from the actual location for partial redaction but falls on the same block

Longitude - The longitude of the location where the incident occurred. This location is shifted from the actual location for partial redaction but falls on the same block

Location - The location where the incident occurred in a format that allows for creation of maps and other geographic operations on this data portal. This location is shifted from the actual location for

2015 Data for unemployment, GDP, Poverty, No high school Diploma

<https://data.cityofchicago.org/Health-Human-Services/below-poverty-level-by-community/b7zw-zvm2>

Education Data Summary

Chicago Public Schools (CPS) – Report Card Data This dataset shows all school-level performance data used to create CPS School Report Cards for the 2012-2016.

Metrics used are described as follows: for the entire list got to <https://data.cityofchicago.org/api/assets/AAD41A13-BE8A-4E67-B1F5-86F711E09D5F?download=true>

5 Year Graduation Rate

The five-year cohort graduation rate follows a group of students who enter Chicago Public Schools (CPS) as freshmen and calculates the percent of these students who graduate within five years after in the 2011-12 school year and graduated from CPS by August of the 2015-16 school year.

How is the rate calculated?

The rate is calculated by dividing the number of students from an adjusted ninth grade cohort who graduated over the five year time period by the total number of students in that cohort

Example Calculation

School A had 725 ninth grade students enrolled during the 2011-12 school year. Twenty of these were repeating the ninth grade. Twenty-five of them transferred out of CPS and were verified in a new this school was: Cohort9th adj. = 725 – 20 – 25 = 680 students During the five years following the 2011-12 school year, 286 of these 680 students dropped out and 364 graduated. Of the remaining 40 CPS as of the end of the 2015-16 school year. School A's Five-Year Cohort Graduation Rate in 2016 was: Graduation Rate5-year cohort = 364 / 680 = 53.5%

5 Year DropOut Rate

What is the Five-Year Cohort Dropout Rate? The five-year cohort dropout rate follows a group of students who enter Chicago Public Schools (CPS) as freshmen and calculates the percent of these sth ninth grade students who started in CPS in the 2011-12 school year and dropped out of CPS by August of the 2015-16 school year.

How is the rate calculated?

The rate is calculated by dividing the number of students from an adjusted ninth grade cohort who dropped out over the five year time period by the total number of students in that cohort.

Example Calculation School A had 725 ninth grade students enrolled during the 2011-12 school year. Twenty of these were repeating the ninth grade. Twenty-five of them transferred out of CPS and v ninth grade cohort for this school was: Cohort9th adj. = 725 – 20 – 25 = 680 students During the five years following the 2011-12 school year, 286 of these 680 students dropped out and 364 graduat were still enrolled in CPS in the 2015-16 school year. School A's Five-Year Cohort Dropout Rate in 2016 was: Dropouts = 286 ("true" dropouts) + 5 (unverified transfer students) = 291 Dropout Rate5-

Student Growth Rating

Overall score of the school based on growth factors

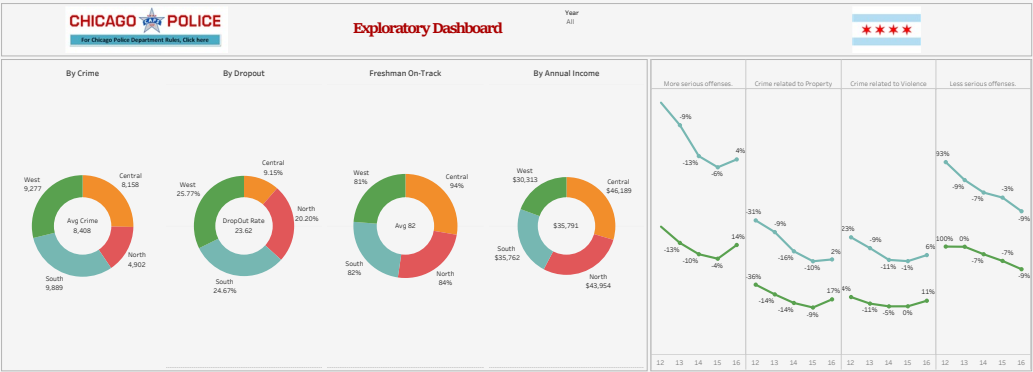
Student Attainment Rating

Overall score of the school based on attainment of students

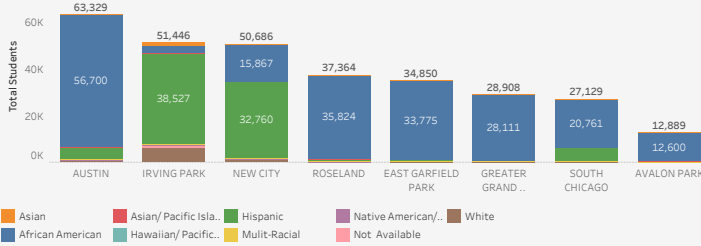
Racial Ethnicity of Students - Based on cast, religion and race

Population data of Chicago - for each zipcode

Avg annual income - For each zipcode



Relationship Between Race, DropOutRate and Crime in Community



To explore the relationship between Crime, Drop-out Rate and certain races, we have created sets for our analysis.

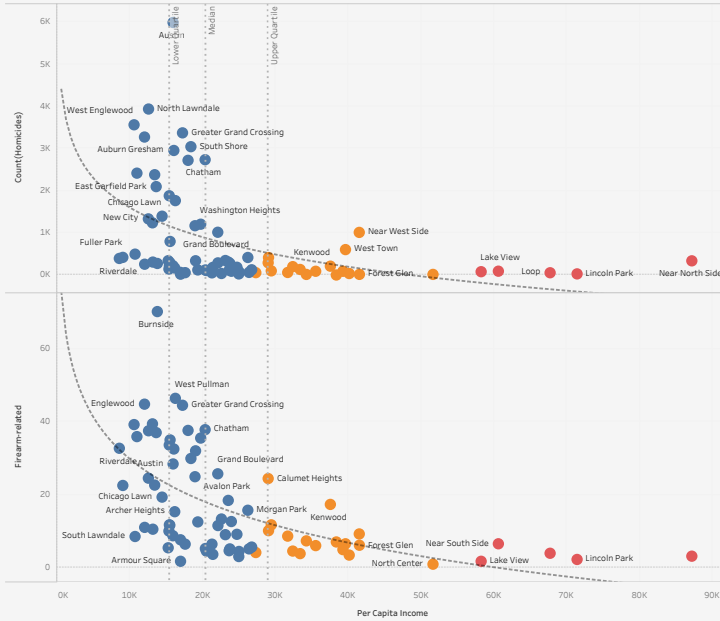
Set 1) Top 20 communities by Crime
Set 2) Top 10 communities by Dropout Rate

Intersection area of the above 2 sets gives us the top communities with high crime and high dropout rate.

The community areas with higher crime rates and dropout rates are mostly dominated by **African Americans** followed by **Hispanic** race of Students. To conclude, there is a definite strong relationship between Crime and education for some races and the reason for the high crime rate could be the high Drop-out rate.

Show By Homicide/Firearm vs PerCapitaIncome

Explanatory Analysis using Scatterplots with Various variables



Poverty

The scatter plot shows the plot between Percentage of people lying below BPL and the Count of Crimes (homicides/ firearms). We can conclude that there are certain Community Areas which has high poverty level, are also more prone to offences such as Homicides. The insights drawn is that
* The Community Areas with poverty gr than Median Poverty Line commits Weapons And Firearms related crimes which leads to increase in homicides in certain area.
* The reason of more offenders committing crimes could be higher rate of Mental illness in poor than rich, other reason could be personal revenge grudges etc.
* The another reason could be financial problems or eager to earn money shortcuts (by Committing crimes or by any other illegal means.)
Low/No money leads to poverty which in turn leads to low living standards resulting in inequality in society and fear of getting cornered leads to commit crimes.

No High School Diploma

In Chicago it is mandatory that a person requires a minimum of 14 years of education to enter any line of work, so people with no high school diploma mostly struggle to be getting themselves employed, this struggle in unemployment often leads in getting involved in criminal activities. From the graphs we can observe that community area with students who do not attend high school diploma has higher chance of getting involved in crimes. From the plot we can see community area with 14% to 33% of people do not have high school diploma certificate and has higher chance of committing crime.

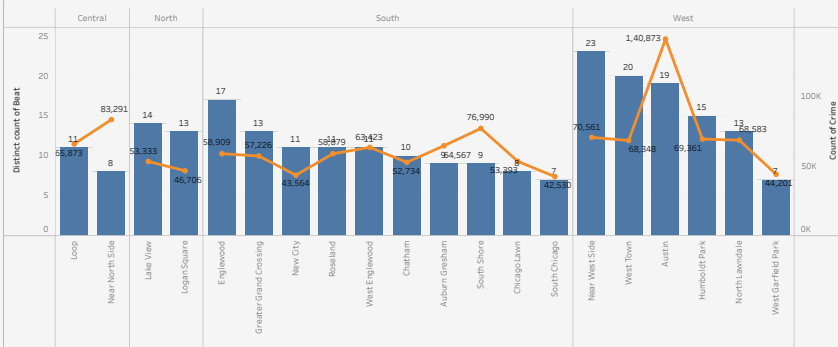
Unemployment

Poverty is a bi-product of unemployment. Higher unemployment certainly increases poverty and at the same time leads to more crime due to depression associated with being unemployed. From the scatter plot show we can see that the unemployment rates in a certain community areas and with Firearms and homicides rates are interligible. The relationship between crimes and Unemployment concerns the direct causation but unemployment has a small role in crimes. Unemployment supported by racial discrimination is one of the major concern especially for the people of African-American race has to face inferiority complex in jobs which leads to depression, and crimes.

Per capita Income

The scatter plot shows the plot between Per capita Income of a community area the Count of Crimes (homicides/ firearms). We can say that Community Area with per capita income ranging between 10K to 25K has maximum chances of committing crimes and also more prone to areas with high crime rates. The possible reason could be. The income inequality in society is one of the main reason for increase in crimes. Per capita income is proportional to the growth in society. Poverty, Unemployment, Excess homicides imposes a greater economic cost which we can see that the government could not effectively invest on development on certain community areas where violent crimes are high because the money which is for development is put on for economic cost. Also homicides are related to firearms so those community areas with high homicides also experiences highest level of firearm related lethal crime. Companies also fear from the certain people belonging to certain areas where crimes are high and don't hire them which results in unemployment and thus increase crime rates.

Beat Analysis

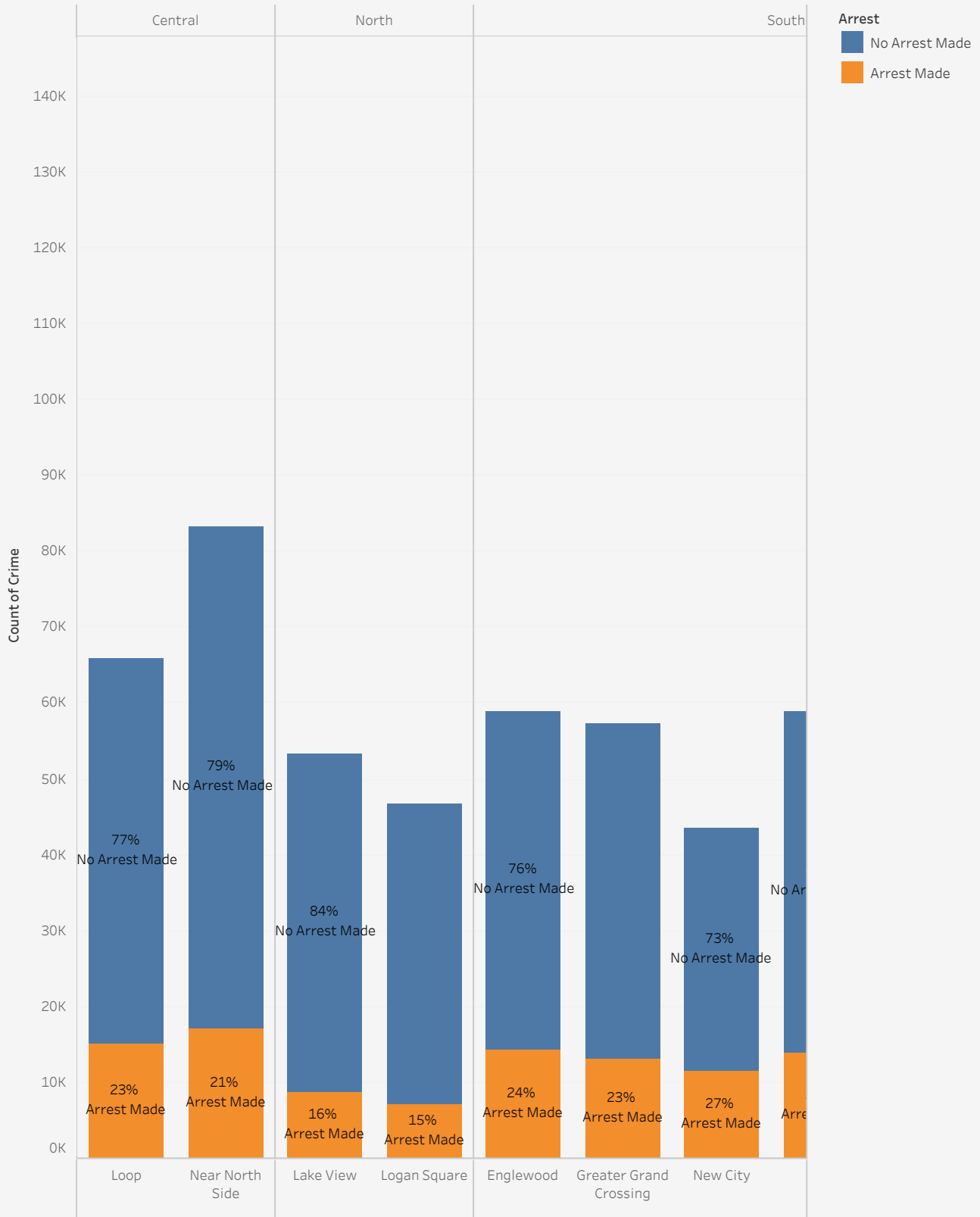


Beat Analysis

Analysing Beats in the top 20 Community areas by crime, we found that ratio of beats and crime in certain areas are disproportionate. e.g **Austin** in West and **Near North Side** in Central has high crime rate but has lower beats in the area. Based on the trends, the Mayor can take a decision to increase/decrease the number of beats in the area to fight crime effectively.

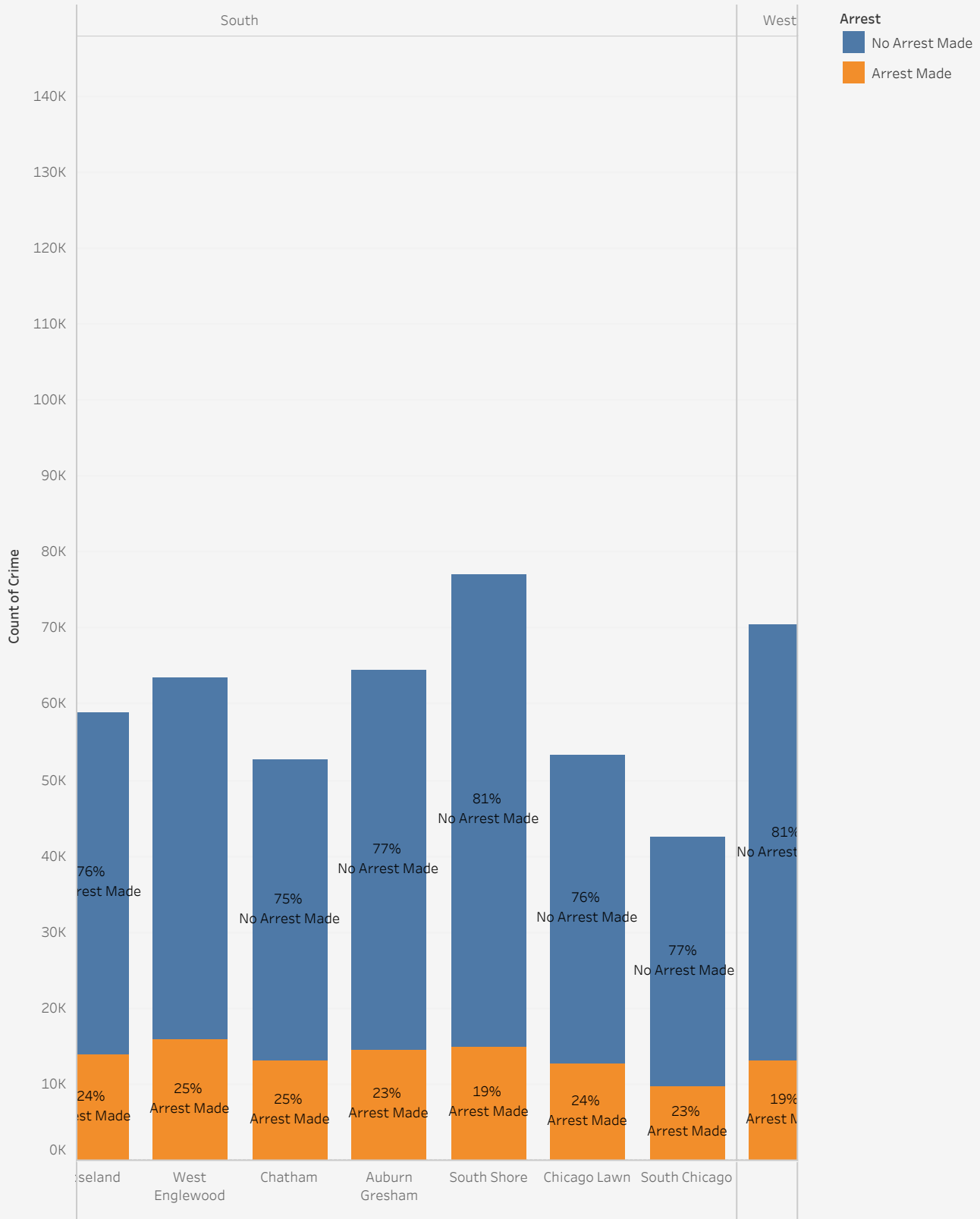
Hovering on "**Near West Side Community**" area shows that even though the number of beats are high, the arrests are being made for only **20%** of the crimes.

Exp_Arrests



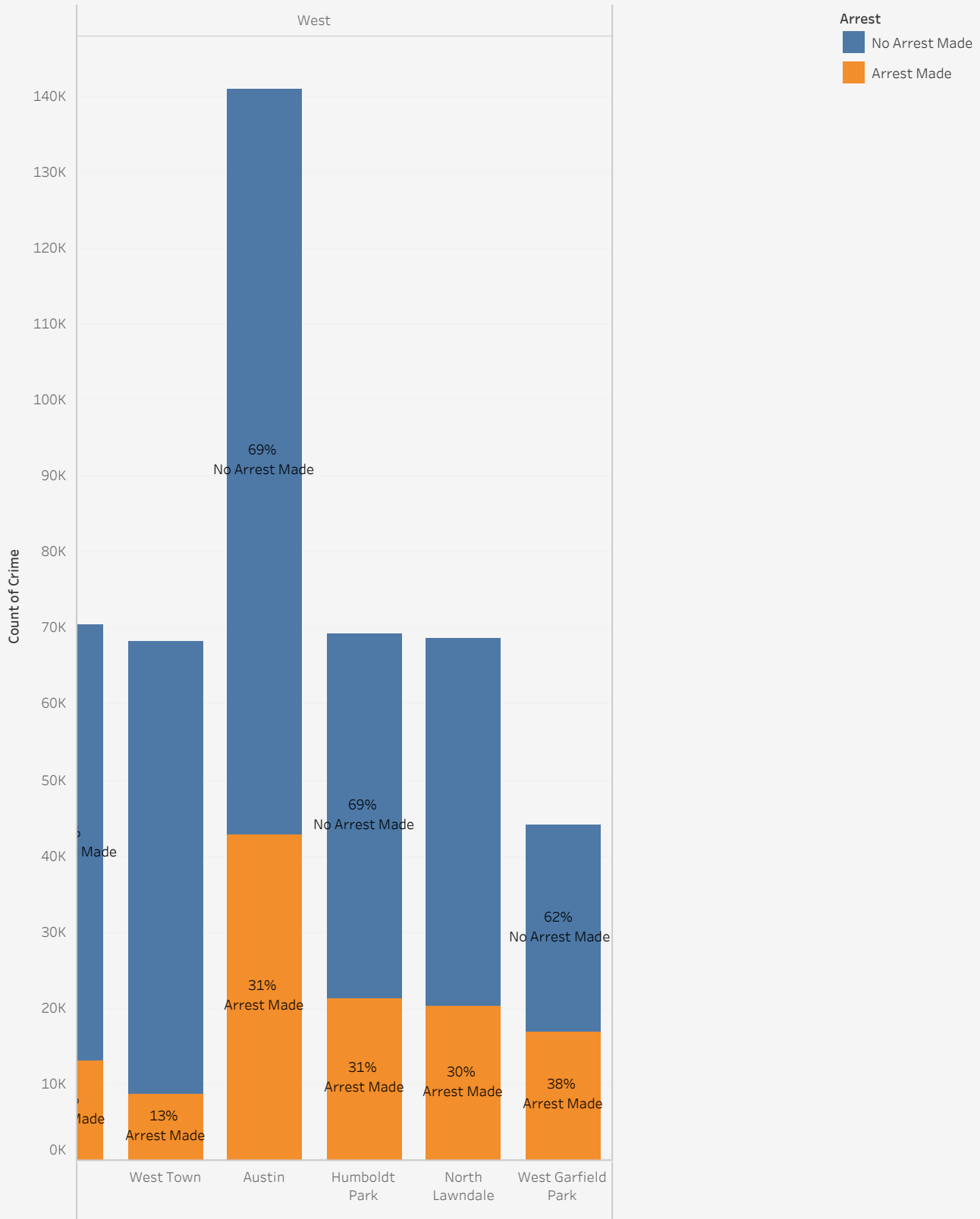
Count of ID for each Community area broken down by Region (group). Color shows details about Arrest. The marks are labeled by % of Total Count of ID and Arrest. Details are shown for Community area. The data is filtered on Year Year, Crime Severeness and Tooltip (Community area,Region (group)). The Year Year filter keeps multiple members. The Crime Severeness filter keeps Crime related to Property, Crime related to Violence, Less serious offenses. and More serious offenses.. The Tooltip (Community area,Region (group)) filter keeps 78 members. The view is filtered on Community area, which keeps 20 of 78 members.

Exp_Arrests



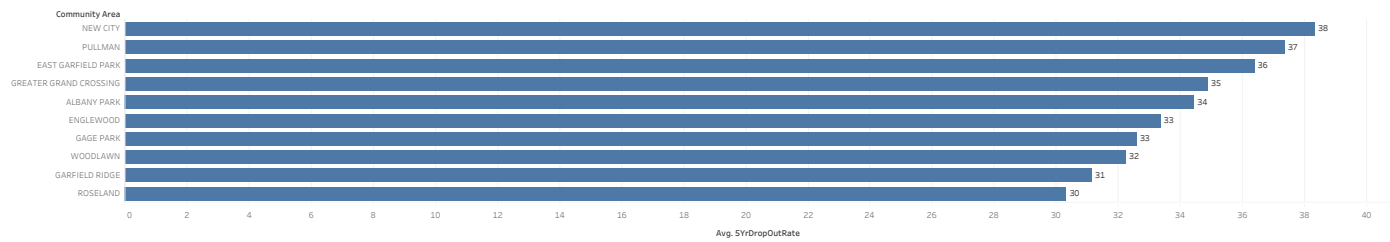
Count of ID for each Community area broken down by Region (group). Color shows details about Arrest. The marks are labeled by % of Total Count of ID and Arrest. Details are shown for Community area. The data is filtered on Year Year, Crime Severeness and Tooltip (Community area,Region (group)). The Year Year filter keeps multiple members. The Crime Severeness filter keeps Crime related to Property, Crime related to Violence, Less serious offenses. and More serious offenses.. The Tooltip (Community area,Region (group)) filter keeps 78 members. The view is filtered on Community area, which keeps 20 of 78 members.

Exp_Arrests



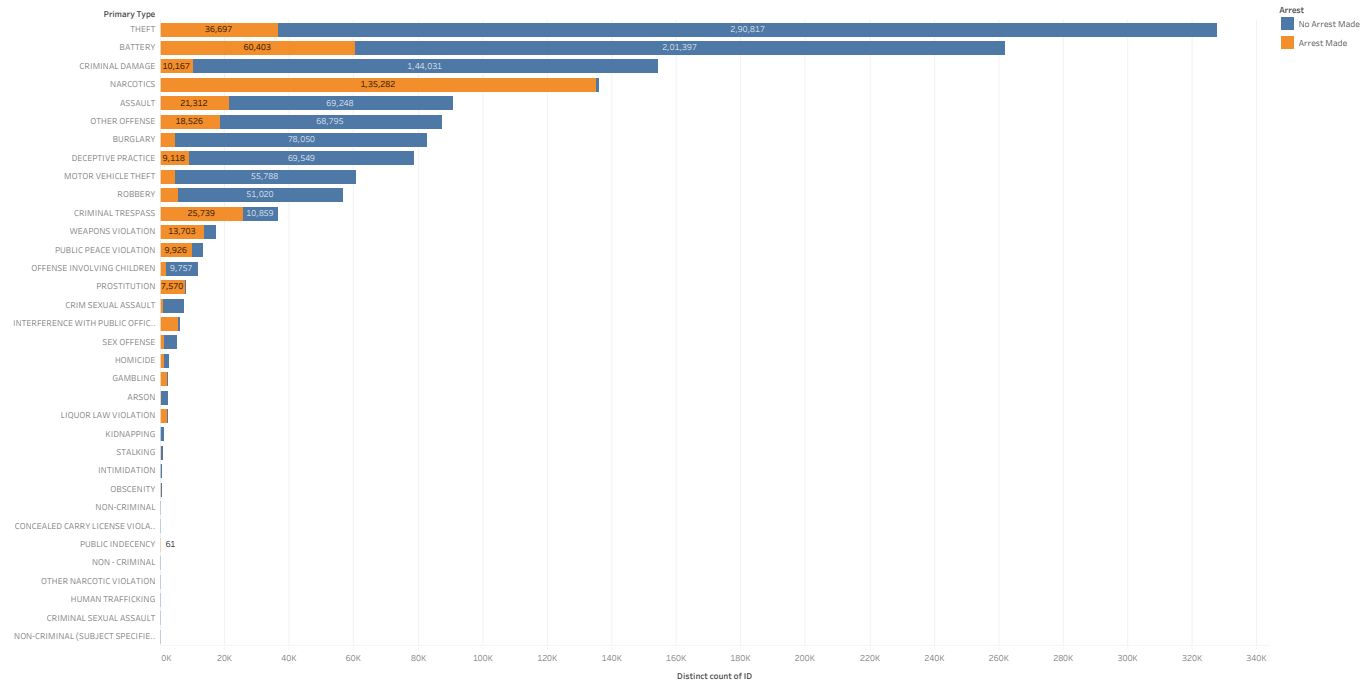
Count of ID for each Community area broken down by Region (group). Color shows details about Arrest. The marks are labeled by % of Total Count of ID and Arrest. Details are shown for Community area. The data is filtered on Year Year, Crime Severeness and Tooltip (Community area,Region (group)). The Year Year filter keeps multiple members. The Crime Severeness filter keeps Crime related to Property, Crime related to Violence, Less serious offenses. and More serious offenses.. The Tooltip (Community area,Region (group)) filter keeps 78 members. The view is filtered on Community area, which keeps 20 of 78 members.

DropOutCommArea



Average of 5YrDropOutRate for each Community Area. The marks are labeled by average of 5YrDropOutRate. The data is filtered on Region (group) and Tooltip (Region (group)). The Region (group) filter keeps Central, North, South and West. The Tooltip (Region (group)) filter keeps 5 members. The view is filtered on Community Area, which keeps 10 of 78 members.

Primary Type

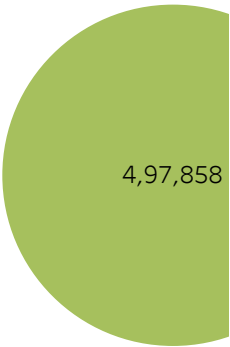
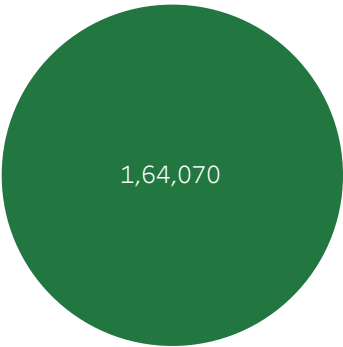
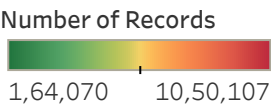


Distinct count of ID for each Primary Type. Color shows details about Arrest. The marks are labeled by distinct count of ID. The data is filtered on Crime Severeness, Region (group), Tooltip (Region (group)) and Tooltip (Arrest, Crime Severeness). The Crime Severeness filter keeps Crime related to Property, Crime related to Violence, Less serious offenses, and More serious offenses. The Region (group) filter keeps Null, Central, North, South and West. The Tooltip (Region (group)) filter keeps 5 members. The Tooltip (Arrest, Crime Severeness) filter keeps 8 members. The view is filtered on Arrest, which keeps No Arrest Made and Arrest Made.

Crime Dashboard

Central

North



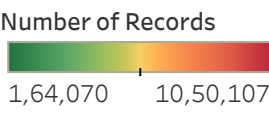
Count of Number of Records broken down by Region (group). Color shows sum of Number of Records. The marks are labeled by count of Number of Records. The view is filtered on Region (group), which keeps Central, North, South and West.

Crime Dashboard

North

South

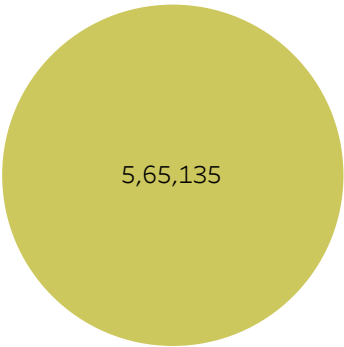
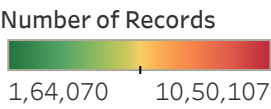
West



Count of Number of Records broken down by Region (group). Color shows sum of Number of Records. The marks are labeled by count of Number of Records. The view is filtered on Region (group), which keeps Central, North, South and West.

Crime Dashboard

West



Count of Number of Records broken down by Region (group). Color shows sum of Number of Records. The marks are labeled by count of Number of Records. The view is filtered on Region (group), which keeps Central, North, South and West.