Gun Violence - Team 3

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Project motivation:

Recent uptick in gun possession among youth in Boston's District 4

Need to understand the drivers of gun violence in the district and the city as a whole.

Inform policies that can improve the district and reduce the incidence of gun violence.

Project Goal

To understand the drivers of gun violence in Boston's District 4 and the city as a whole, with a focus on identifying the variables associated with increases or decreases in gun violence.

Project Background

To understand the project, it would be helpful to have knowledge of the factors that contribute to gun violence, such as poverty, access to firearms, mental health, and social dynamics.

Familiarity with the existing programs designed to address gun violence, their effectiveness, and their limitations would also be useful.
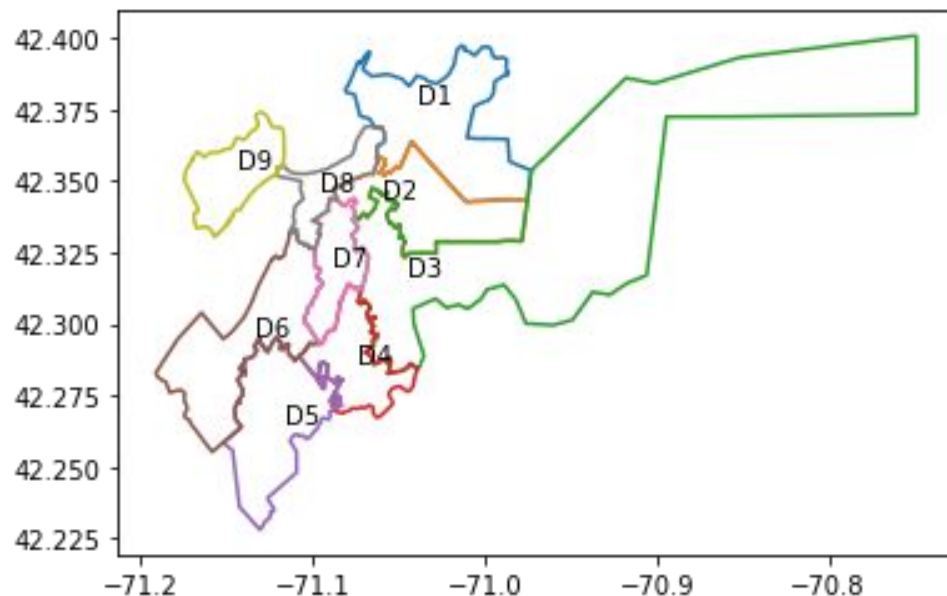
Progress so far:
Continued to look for trends by segmenting data with different parameters
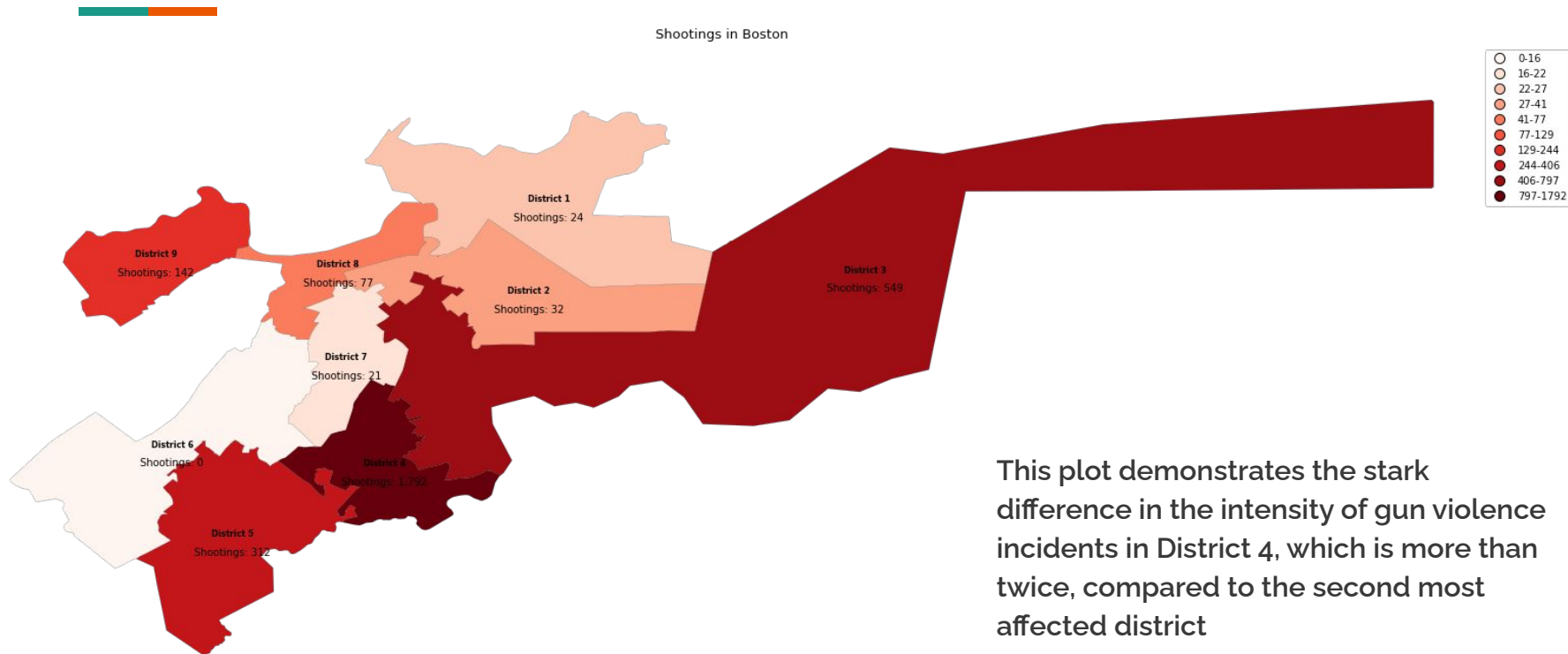
Datasets used:

- City Council Dataset
- Shots Fired
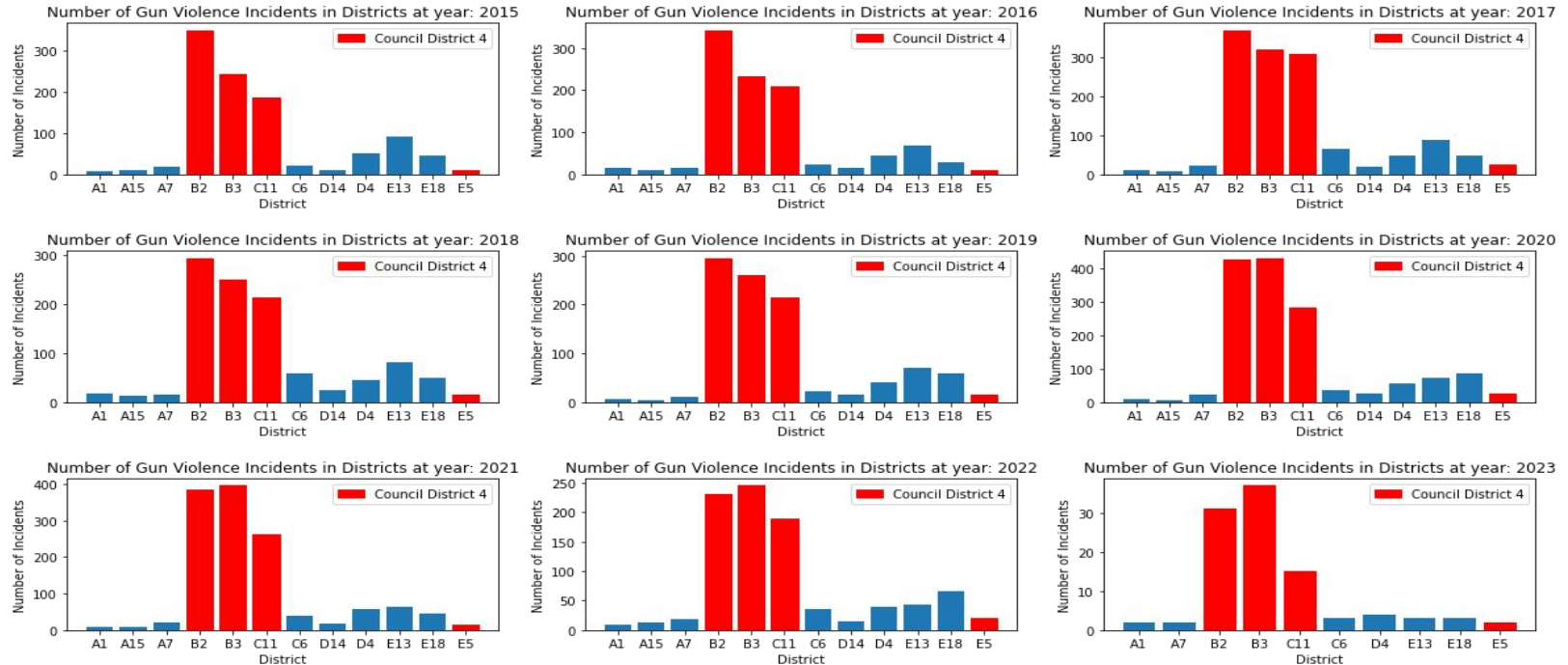- Shootings

City council Shapefile dataset validation

This plot ensures our group has the appropriate distinct bounded shapes, with the correct labels for checking the city council dataset shapefile

District wise intensity of gun violence w.r.t incidents count

Shootings in Boston

○	0-16
○	16-22
○	22-27
○	27-41
●	41-77
●	77-129
●	129-244
●	244-406
●	406-797
●	797-1792

District 1
Shootings: 24

District 9
Shootings: 142

District 8
Shootings: 77

District 2
Shootings: 32

District 3
Shootings: 549

District 7
Shootings: 21

District 6
Shootings: 0

District 4
Shootings: 1,792

District 5
Shootings: 312

This plot demonstrates the stark difference in the intensity of gun violence incidents in District 4, which is more than twice, compared to the second most affected district
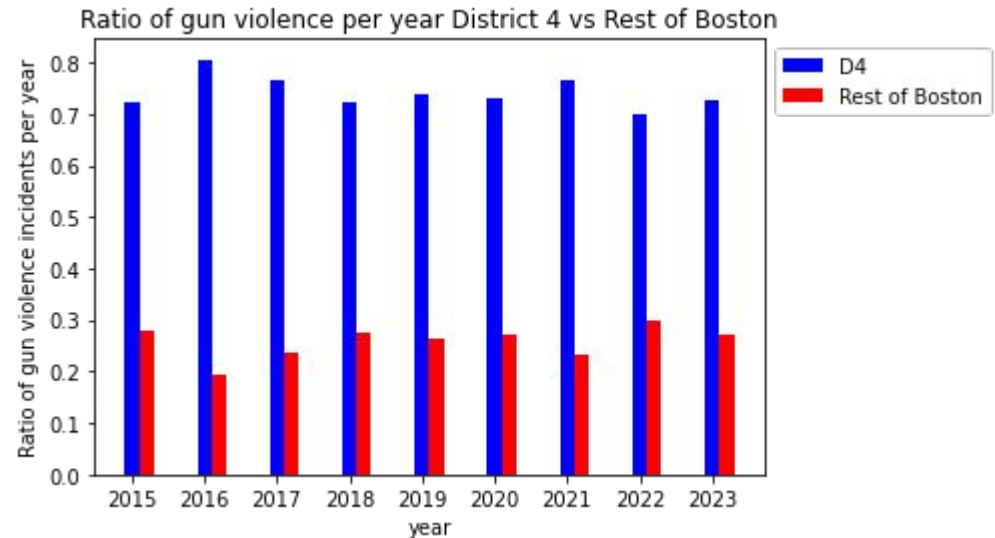
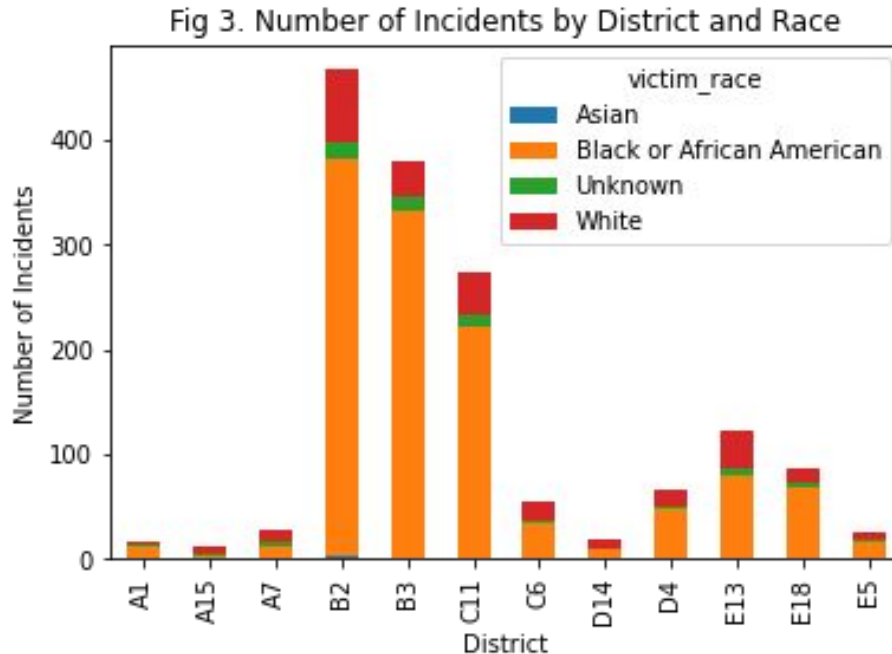# Rate of Gun Violence Incidents for Districts per Year

For every year the trend of gun violence for each police district is fairly unchanging. This showcases that gun violence is not inherently dependent on the timeframe

Ratio of Gun Violence in D4 vs Rest of Boston per year

- District 4 has the highest ratio of gun violence every single year from 2015 to 2023, slightly more than twice to rest of Boston
- Highest ratio of gun violence in 2016 - 80% of gun violence in District 4
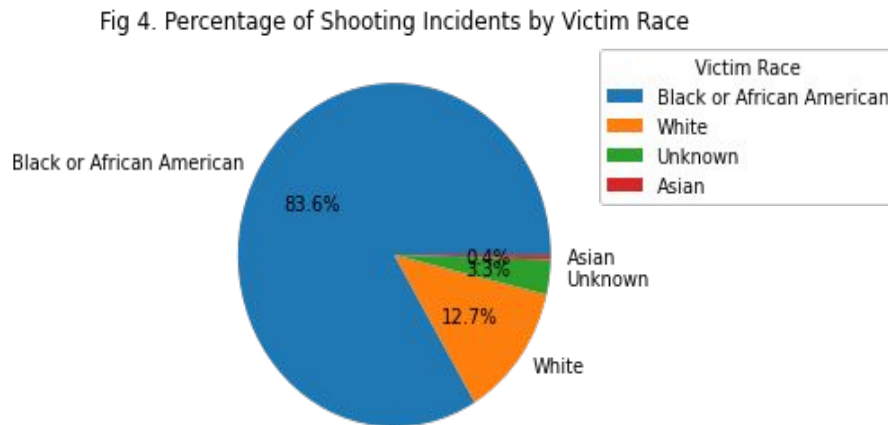- In 2023 - 70% of gun violence so far in District 4.

Ratio of gun violence per year District 4 vs Rest of Boston

Number of Incidents by District and Race

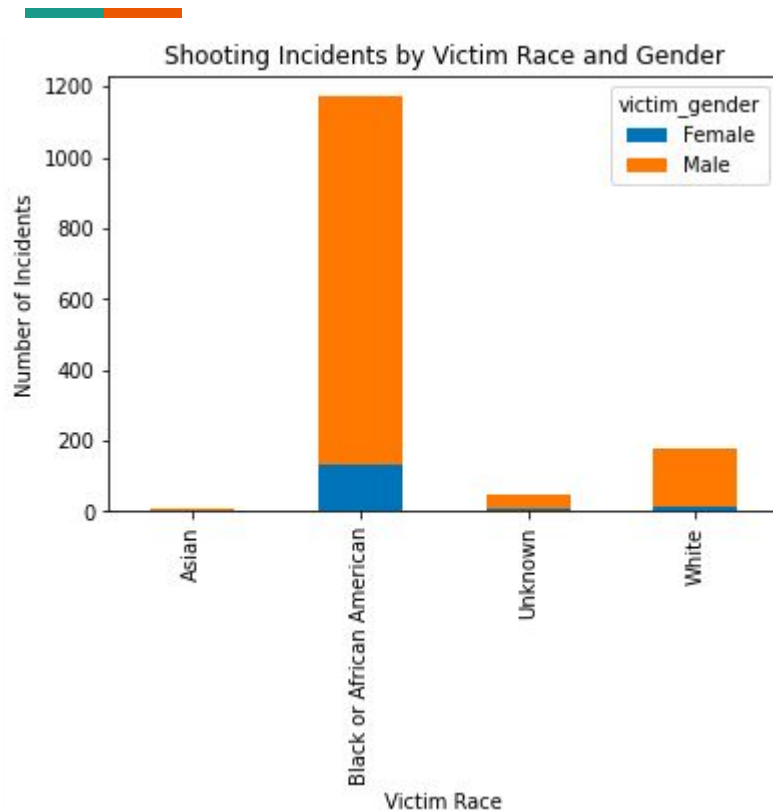Fig 3. Number of Incidents by District and Race

- Black or African American residents are disproportionately affected by shooting incidents.
- Unknown ethnicity victims are present in relatively high numbers - need improved reporting and data collection methods.
- Incidents involving Asian victims are almost negligible.

Percentage of Shooting Incidents by Victim Race

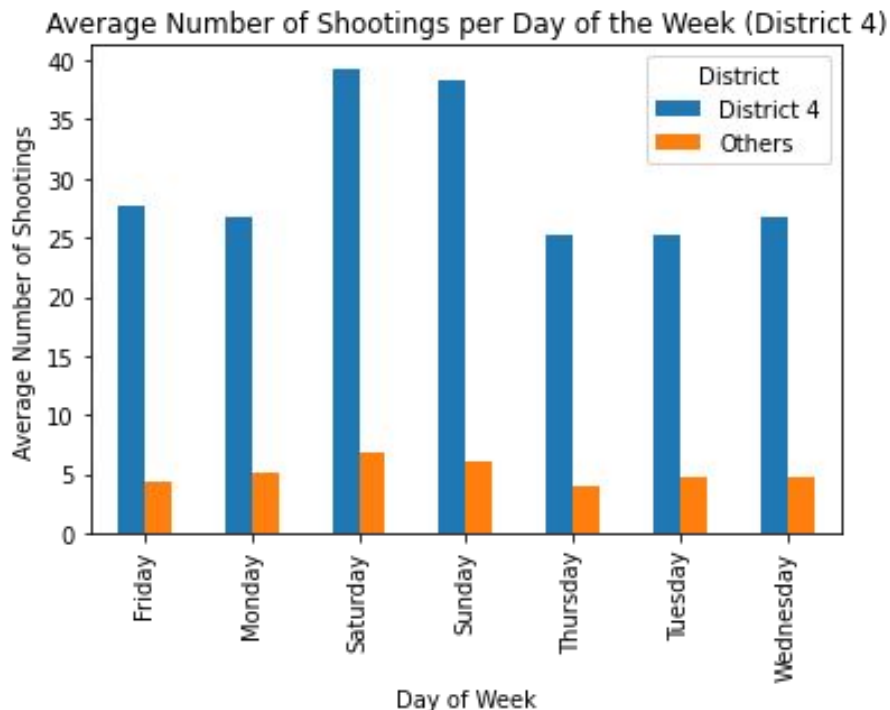Fig 4. Percentage of Shooting Incidents by Victim Race

- Black or African American residents in the D4 district are disproportionately affected by shooting incidents.
- Further analysis and investigation needed to understand the underlying reasons for this disparity to develop effective strategies for reducing gun violence in the area.

Shooting Incidents by Victim's Race and Gender

Shooting Incidents by Victim Race and Gender

- **Black Men** are targeted the most.
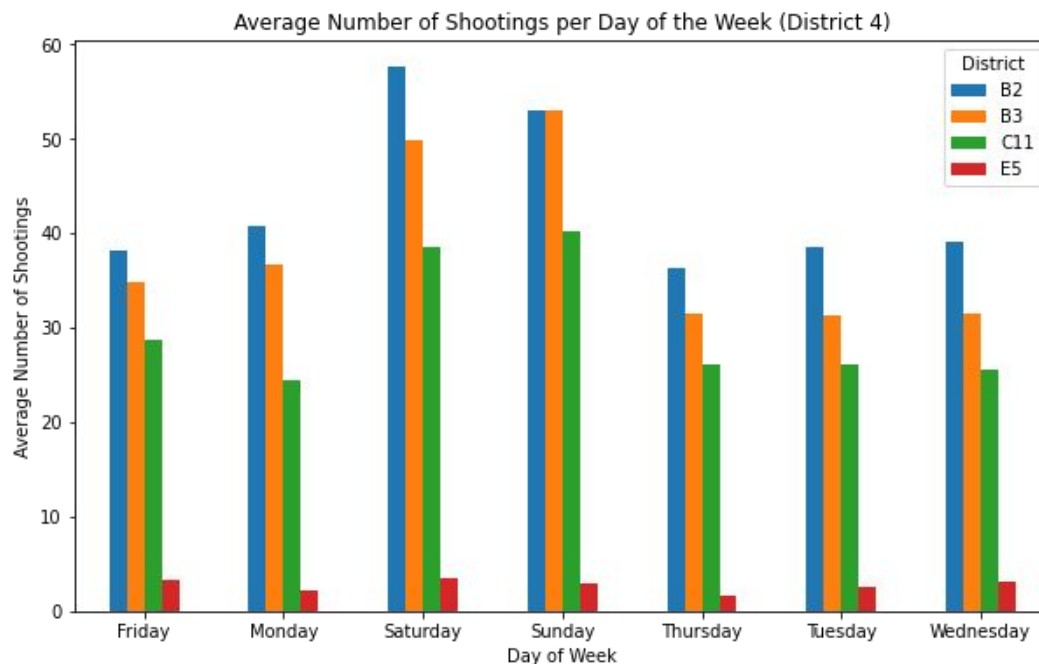- Victim count of **White Men** are low compared to **Black Men**.

Average number of shootings per day of the week vs district (across the years)

Average Number of Shootings per Day of the Week (District 4)

- Avg # of shootings in District 4 is remarkably higher than all other districts combined
- Higher avg # of shootings over the weekend (Saturday, Sundays)

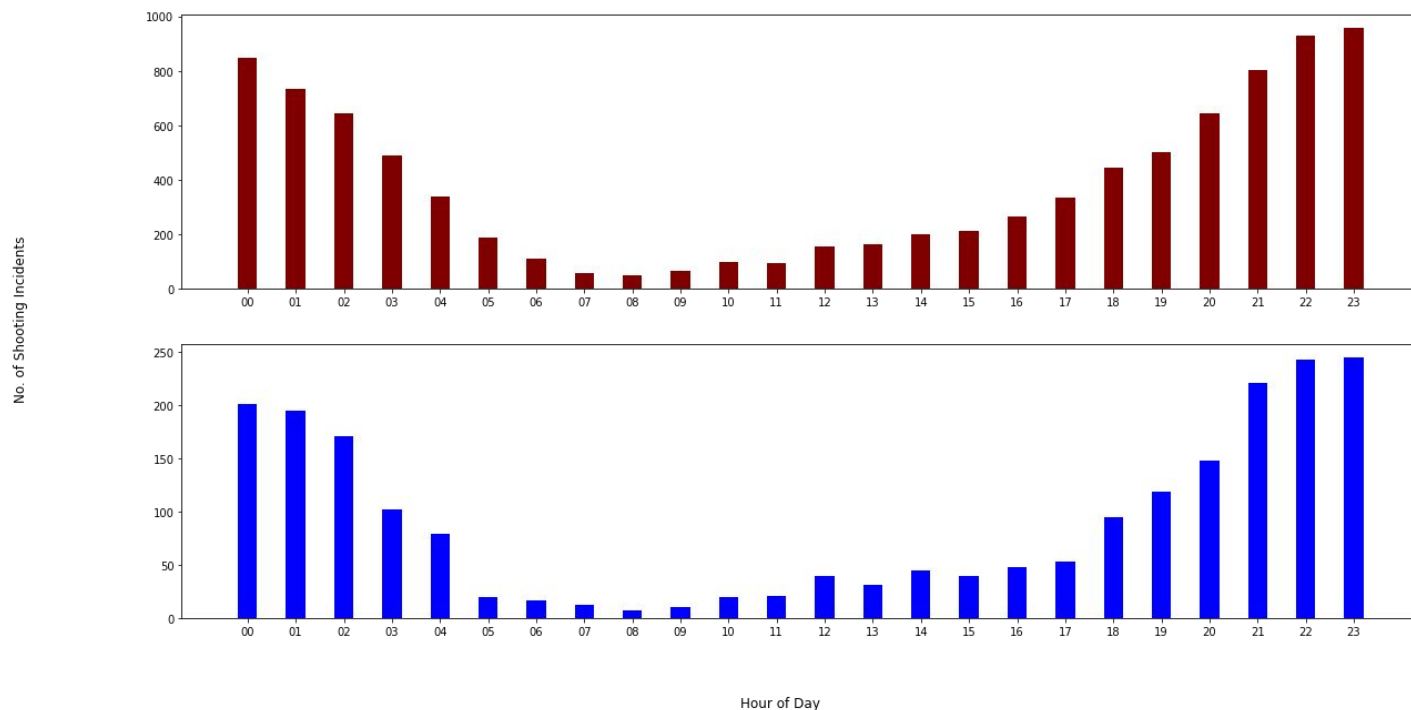## Average number of shootings per day of the week vs district (across the years)

- Out of the 4 police districts constituting District 4, the avg # of shootings in District B2 is the highest
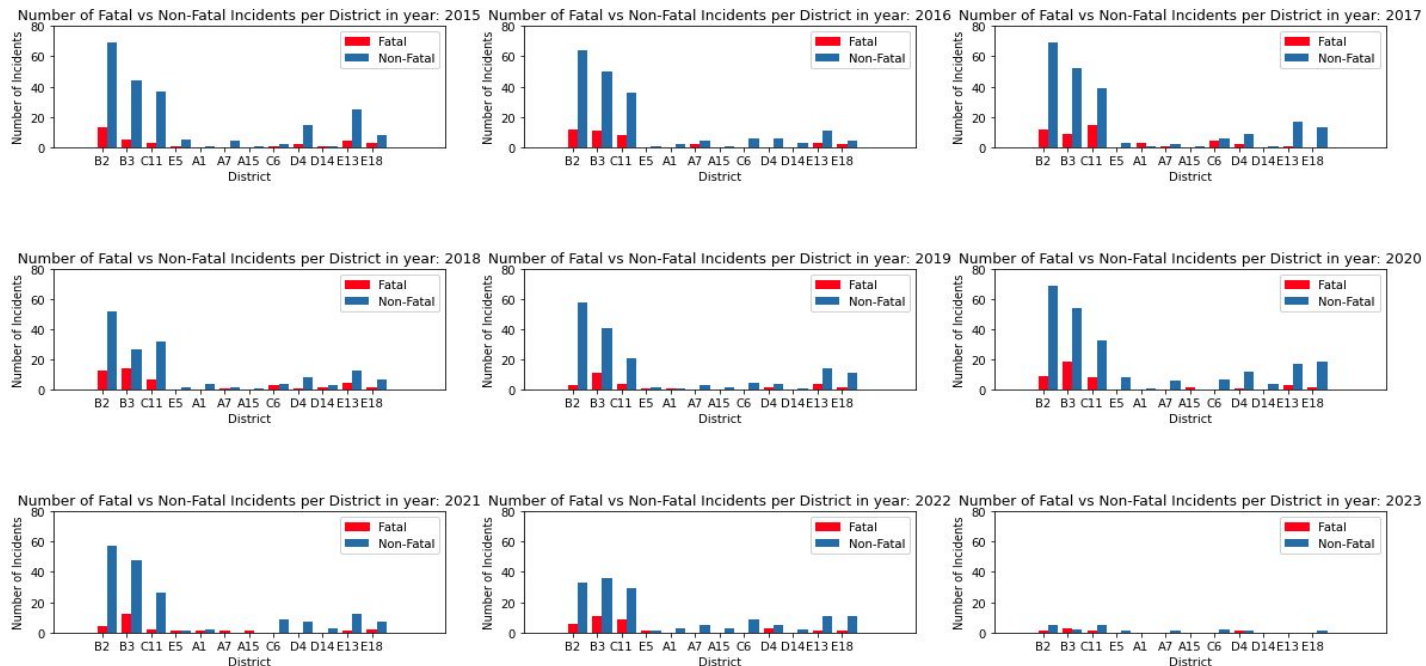- Higher avg # of shootings over the weekend (Saturday, Sundays)

Average Number of Shootings per Day of the Week (District 4)

Shooting incidents Segmented by Hours

Number of Shootings per Hour in the Day from 2015 - 2023

- It's more dangerous in the night than the day
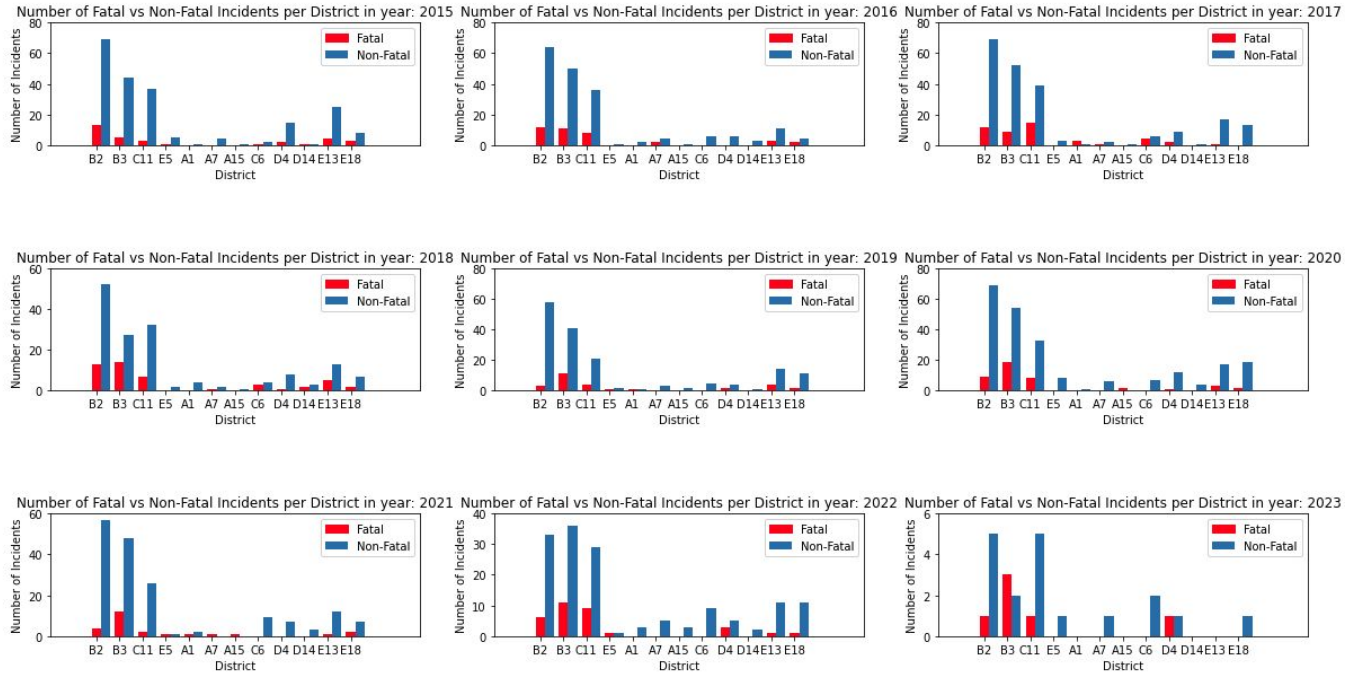- Council District 4 trend mimic the rest of Boston

Number of Fatal vs Non-Fatal Incidents per District per Year

The graph above shows a comparison of how fatal vs non-fatal shooting incidents in the various districts have changed over the years, given the y-axis is the same (max. 80).
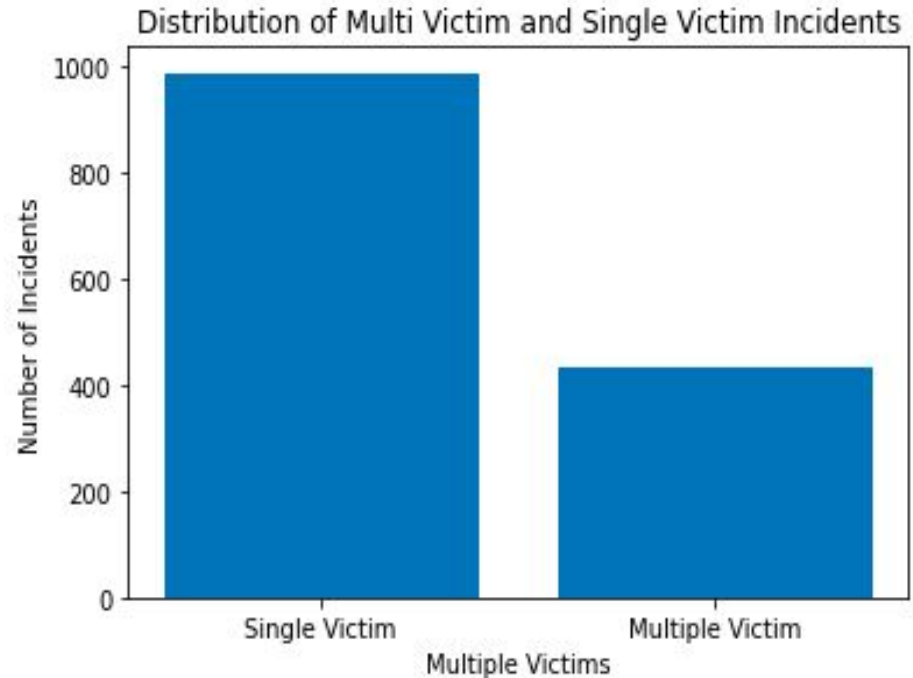
Number of Fatal vs Non-Fatal Incidents per District per Year

- B2 has the highest number of non-fatal shooting incidents every year, except in 2022 and 2023.
- Police district B3, has the highest number of fatal shooting incidents every year from 2018 to 2023.
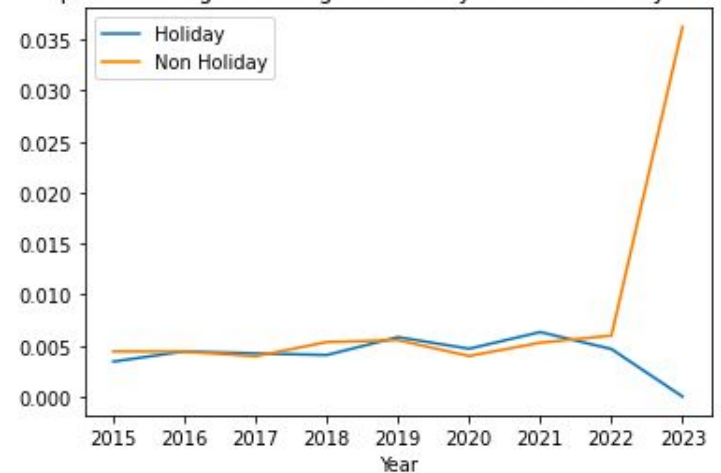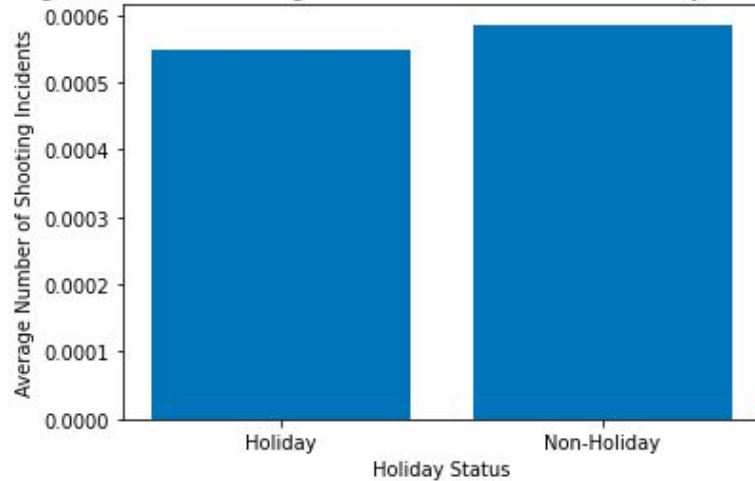
Multiple Victims vs Single Victims

- The number of single victims is almost double that of multiple victims
- Targeted attacks outnumber mass shootings / family related attacks

Distribution of Multi Victim and Single Victim Incidents

Average Number of Shooting Incidents on Holidays vs Non-Holidays

We can see that number of incidents on Holidays and Non-Holidays are almost similar.

Summary

- Challenges
  - Preprocessing the data was hard
  - Lack of data regarding the motive of each crime
- Limitations & Assumptions
  - Wish we had better shape files to map boston city council districts to police districts
  - We had to assume slightly about D4's location
- Next steps
  - Use different datasets that were not given to give better insights to the trends we discovered
- Steps to goal
  - Planning to use data on green spaces to see if there is any relationship between gun violence and the amount of green spaces in the various districts

Questions?