



### **Team Members:**

Sarah Bonna (Team Lead),  
Brian Mahabir,  
Shivangi,  
Showndarya Madhavan





**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.**



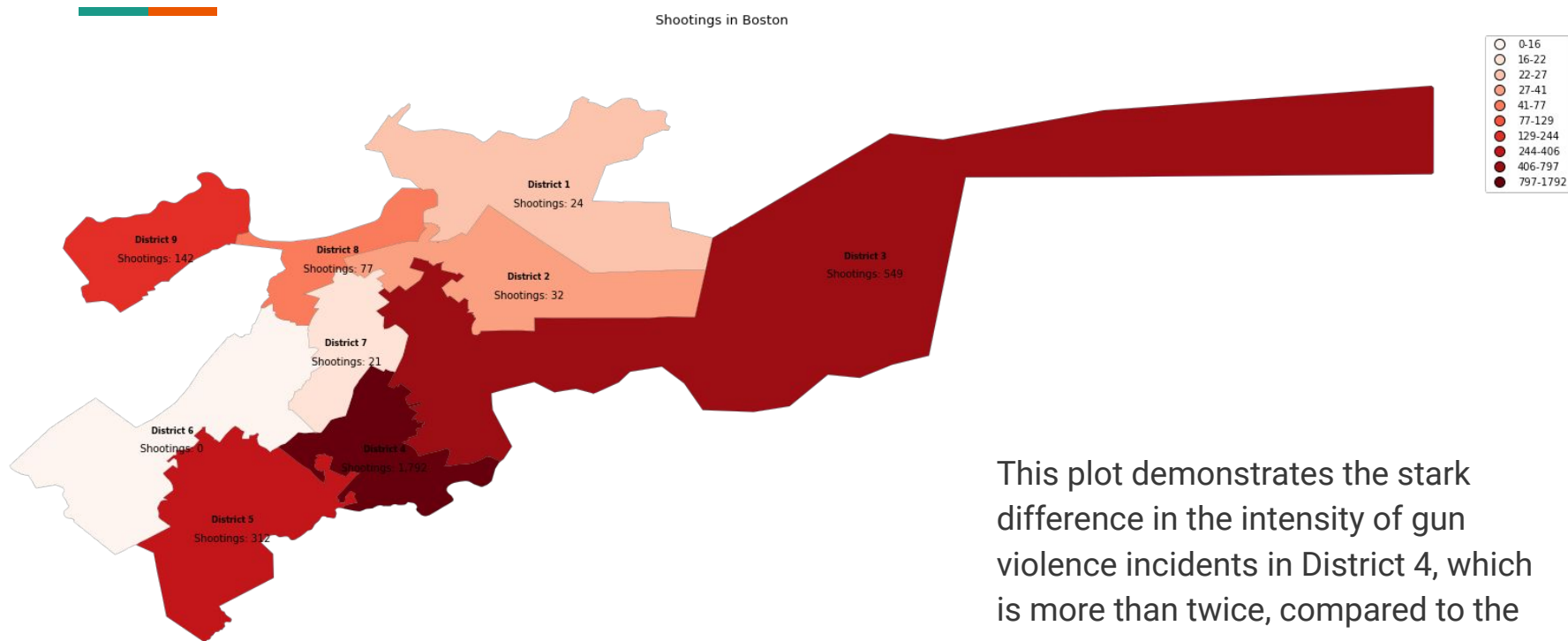
**To understand the drivers of gun violence in Boston's District 4 and the city as a whole, with a focus on identifying the variables associated with increases or decreases in gun violence.**



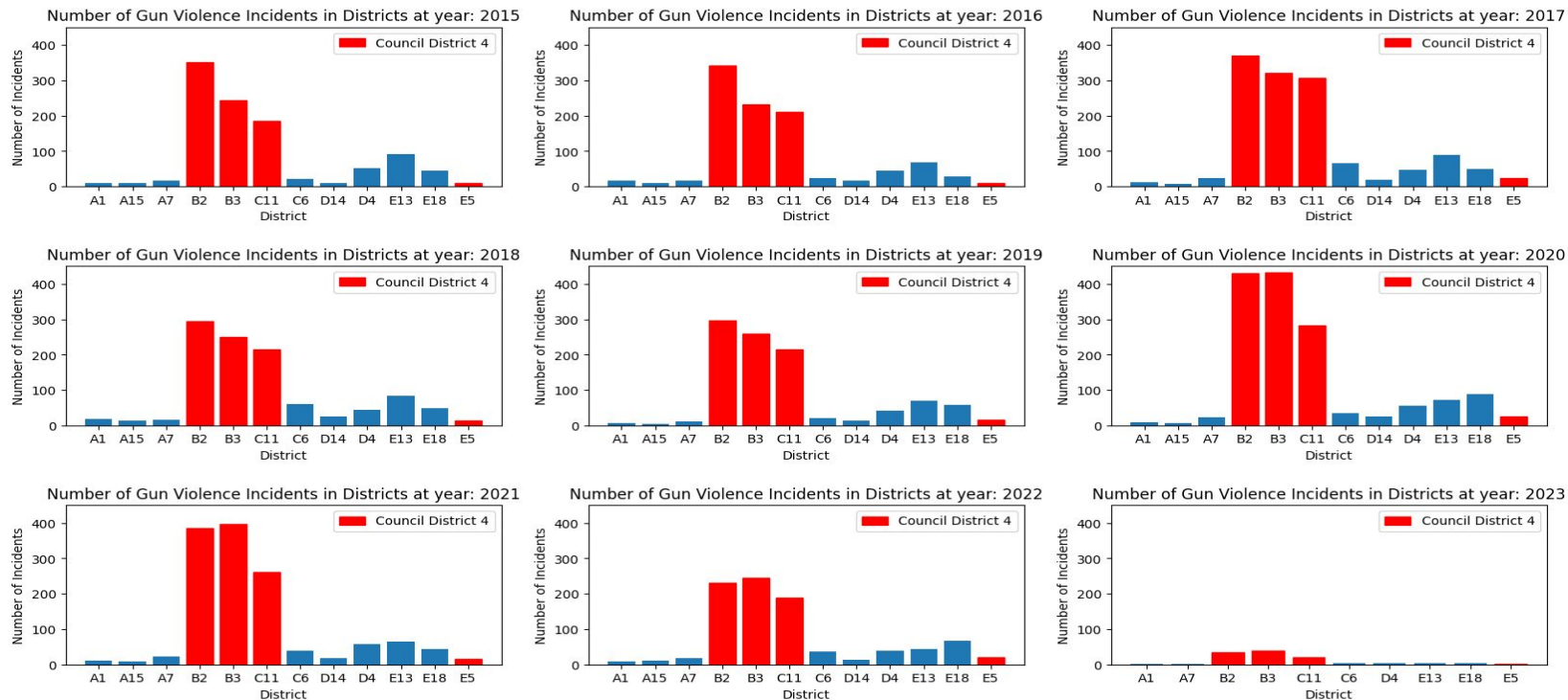
**To understand the project, it would be helpful to have knowledge of the factors that contribute to gun violence, such as poverty, access to firearms, mental health, and social dynamics.**

**Familiarity with the existing programs designed to address gun violence, their effectiveness, and their limitations would also be useful.**

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



# Rate of Gun Violence Incidents for Districts per Year



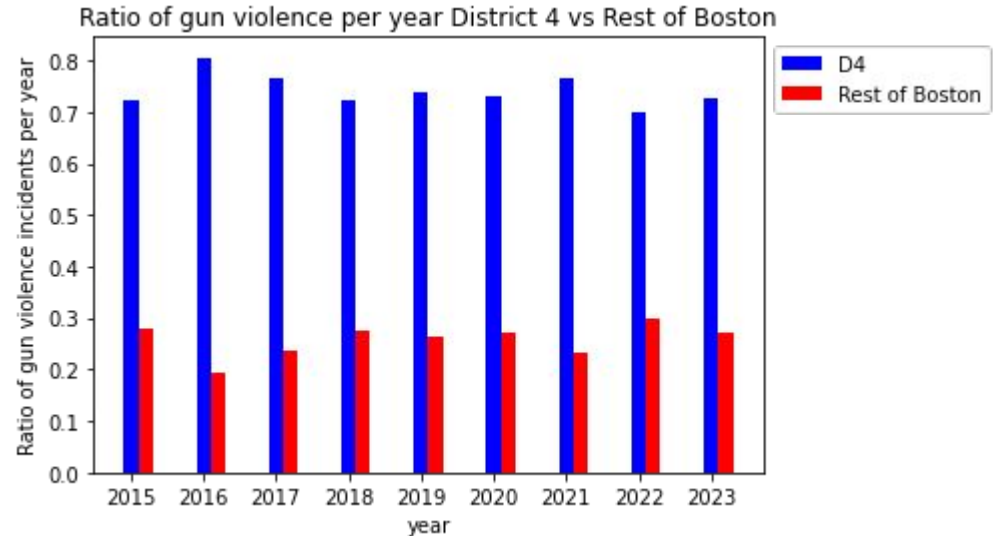
For every year the trend of gun violence for each police district is fairly unchanging. This showcases that gun violence is not inherently dependent on the timeframe

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

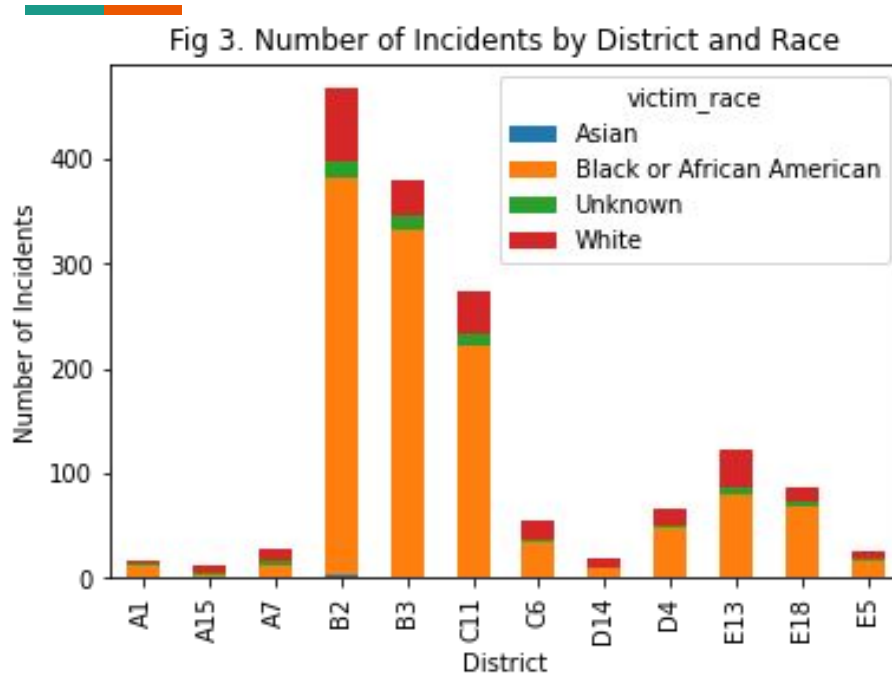


## Key Findings:

- 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.



# Number of Incidents by District and Race (All Districts)



## Key Findings:

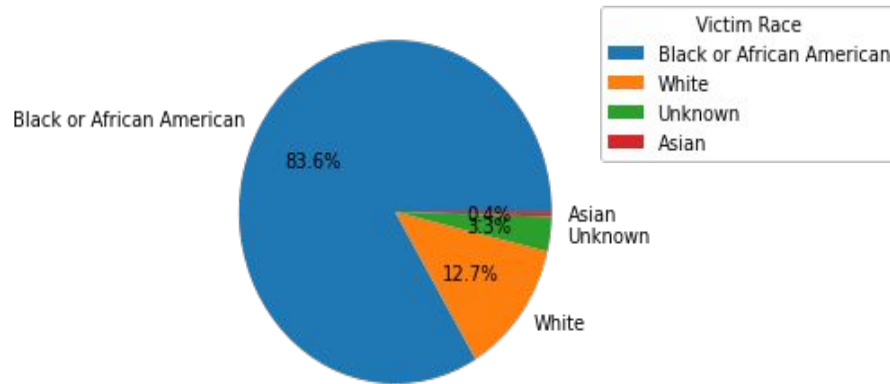
- Black residents are disproportionately affected by shooting incidents.
- Unknown ethnicity victims are present in relatively high numbers - need improved reporting and data collection methods.
- Incidents involving Asian victims are almost negligible.



# Percentage of Shooting Incidents by Victim Race in D4



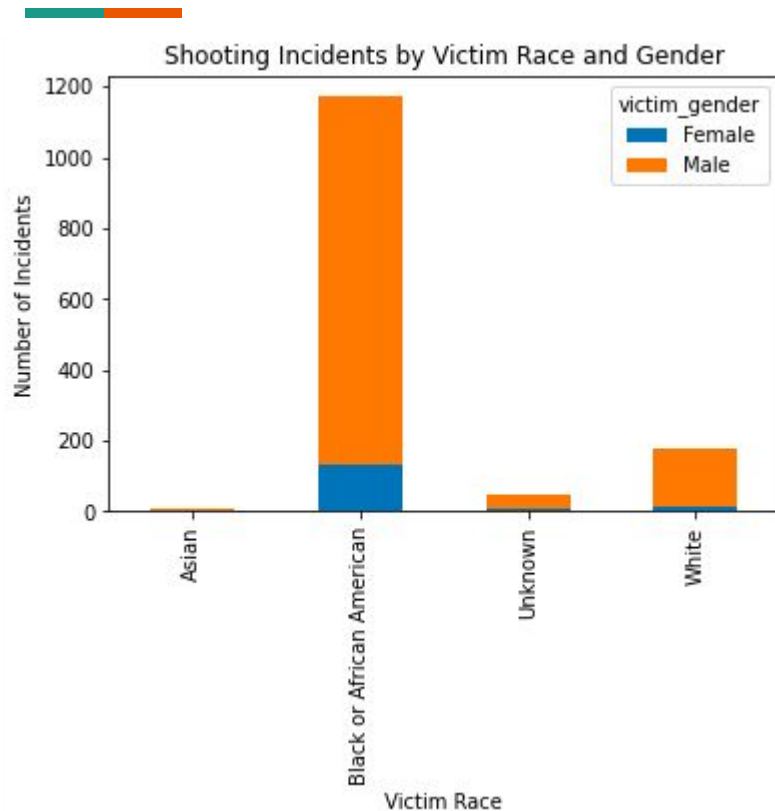
Fig 4. Percentage of Shooting Incidents by Victim Race



## Key Findings:

- Black 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.

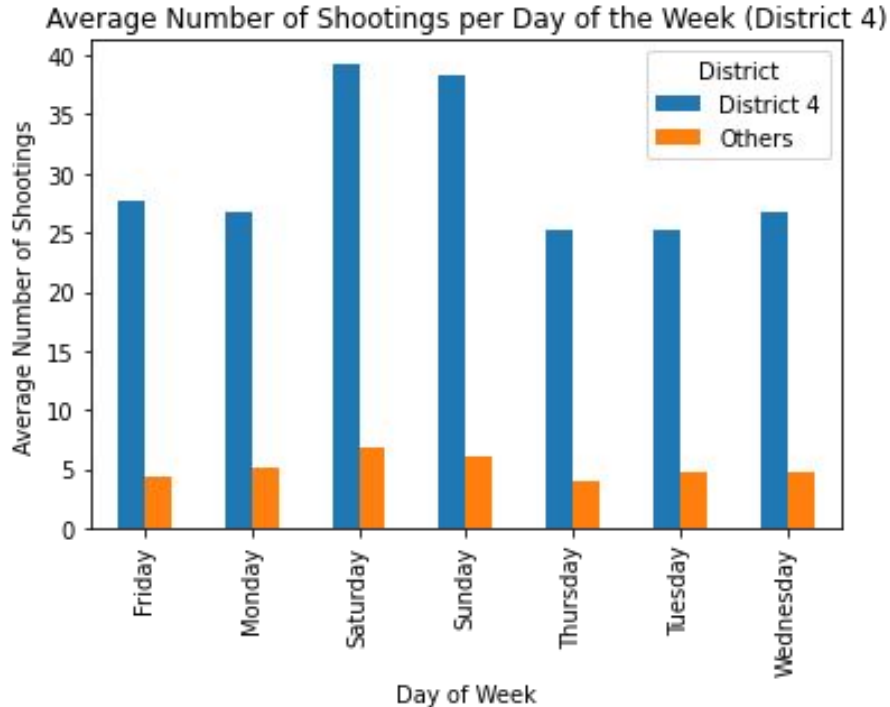
# Shooting Incidents by Victim's Race and Gender



## Key Findings:

- 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)



## Key Findings:

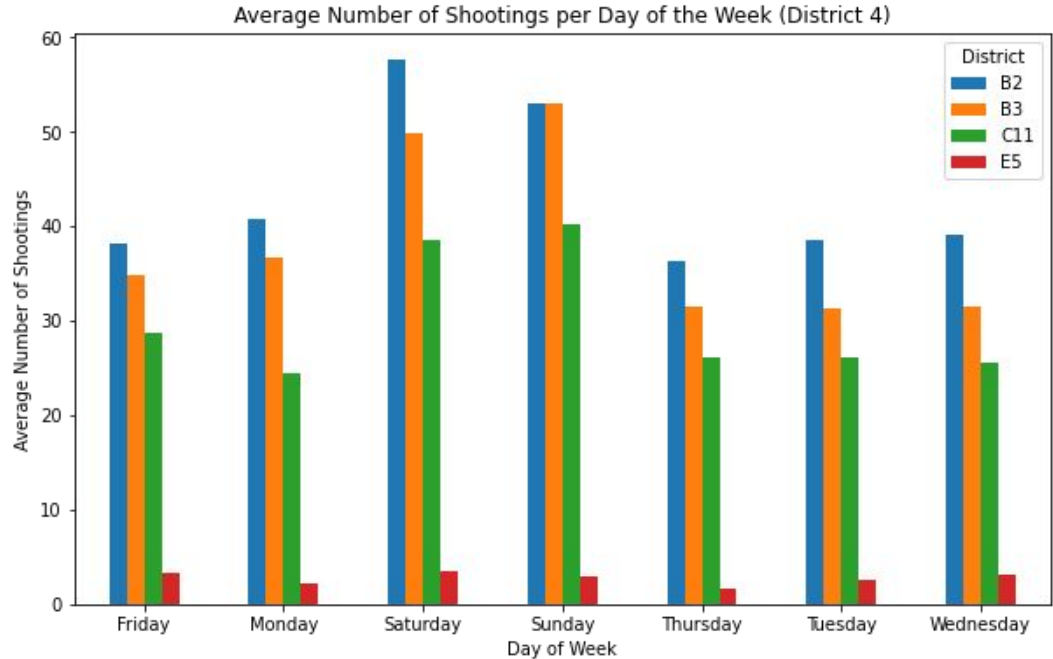
- Avg # of shootings in District 4 is remarkably higher than all other districts combined
- Higher avg # of shootings over the weekend (Saturday, Sundays)

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



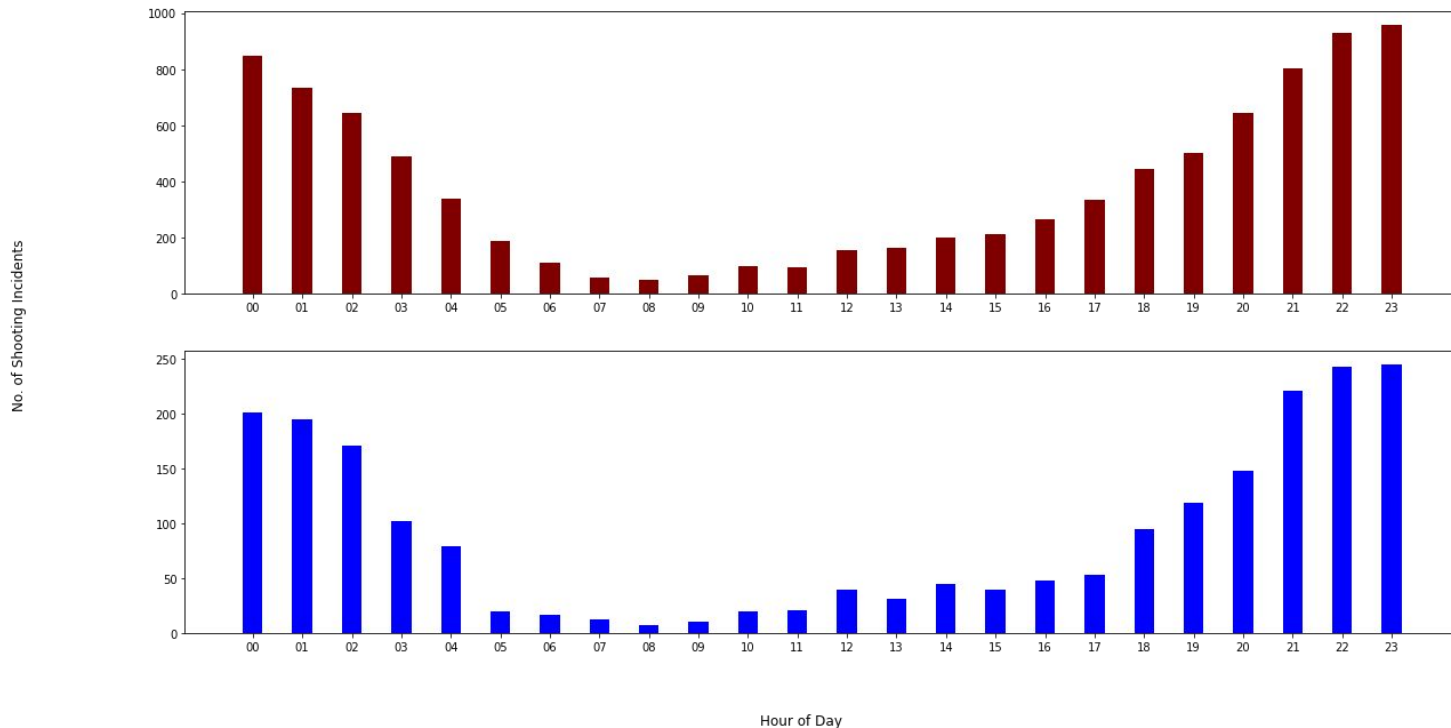
## Key Findings:

- 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)



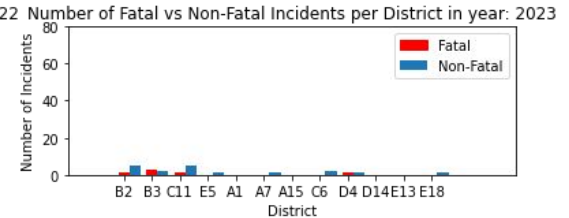
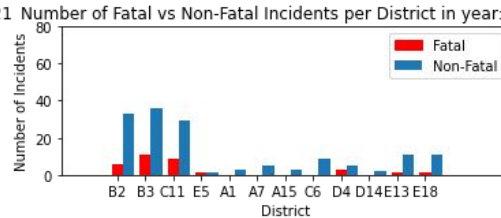
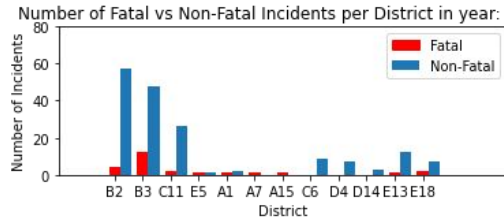
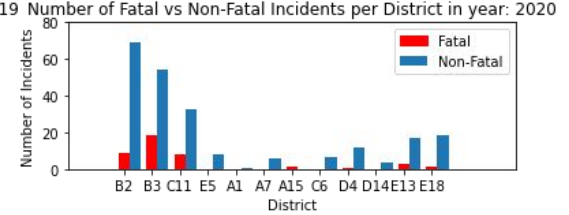
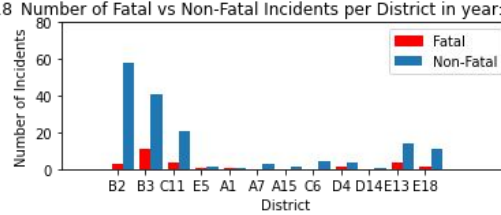
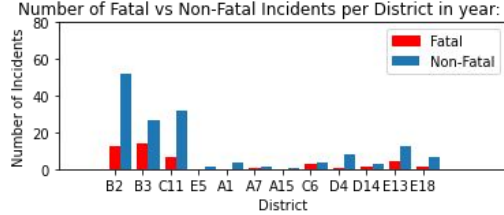
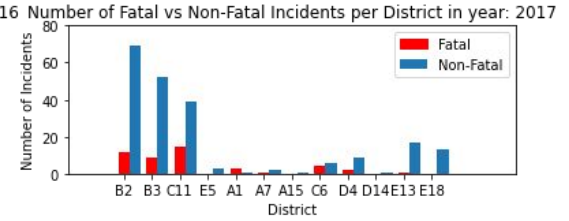
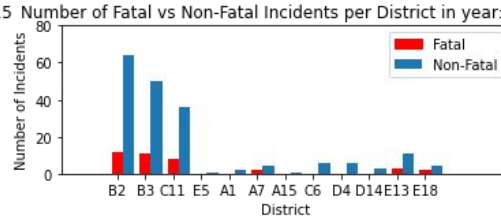
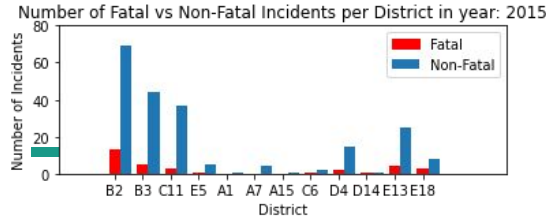
# Shooting incidents Segmented by Hours

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



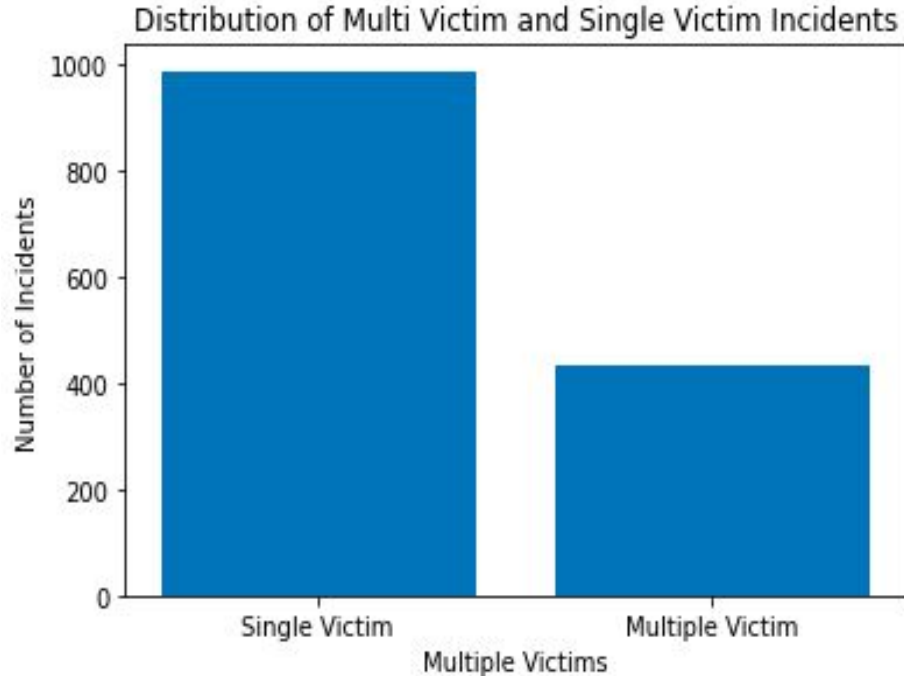
More gun incidents happen at night rather than during the day, parabolic trend of gun violence incidents, gun violence incidents in council district 4 have the same trend as the rest of Boston, indicating nothing abnormal about gun violence incident times in District 4.

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



2023: other districts have more non-fatal shooting incidents than fatal ones (except B3). Some districts (A15 in 2016, 2019, etc.): no fatal shootings and even negligible non-fatal shootings. B2: highest number of non-fatal shooting incidents yearly, except in 2022 (B3 had the highest number). B3: highest number of fatal shooting incidents every year from 2018 to 2023.

# Multiple Victims vs Single Victims

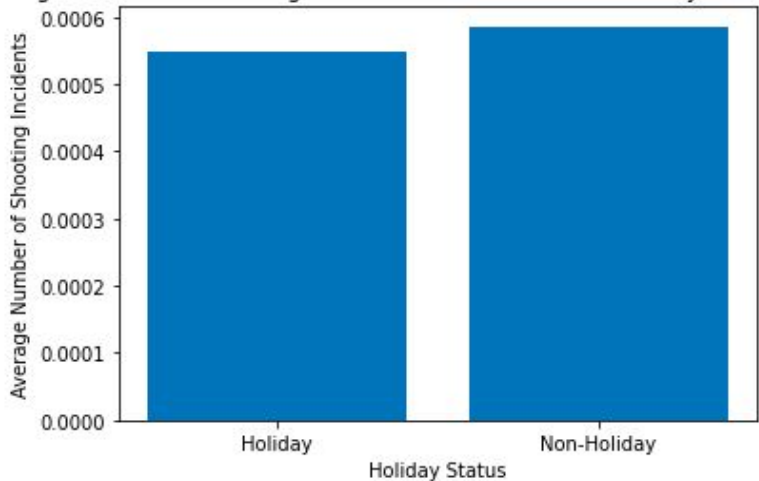


## Key Findings:

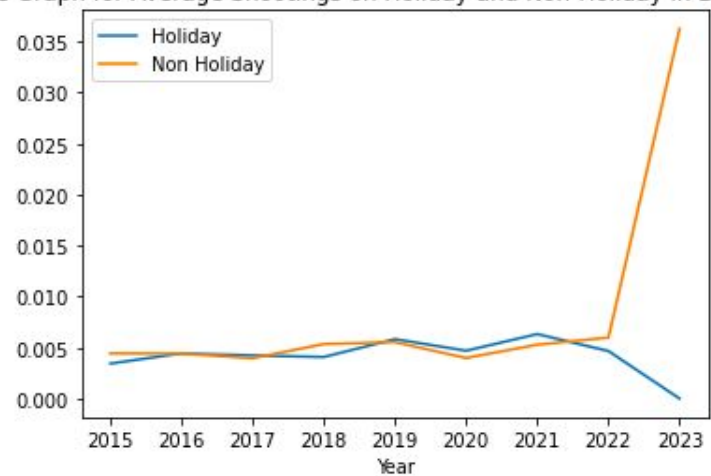
- The number of single victims is almost double that of multiple victims
- Targeted attacks outnumber mass shootings / family related attacks

# Average Number of Shooting Incidents on Holidays vs Non-Holidays

Average Number of Shooting Incidents in D4 District on Holidays vs Non-Holidays



Line Graph for Average Shootings on Holiday and Non-Holiday in D4 districts

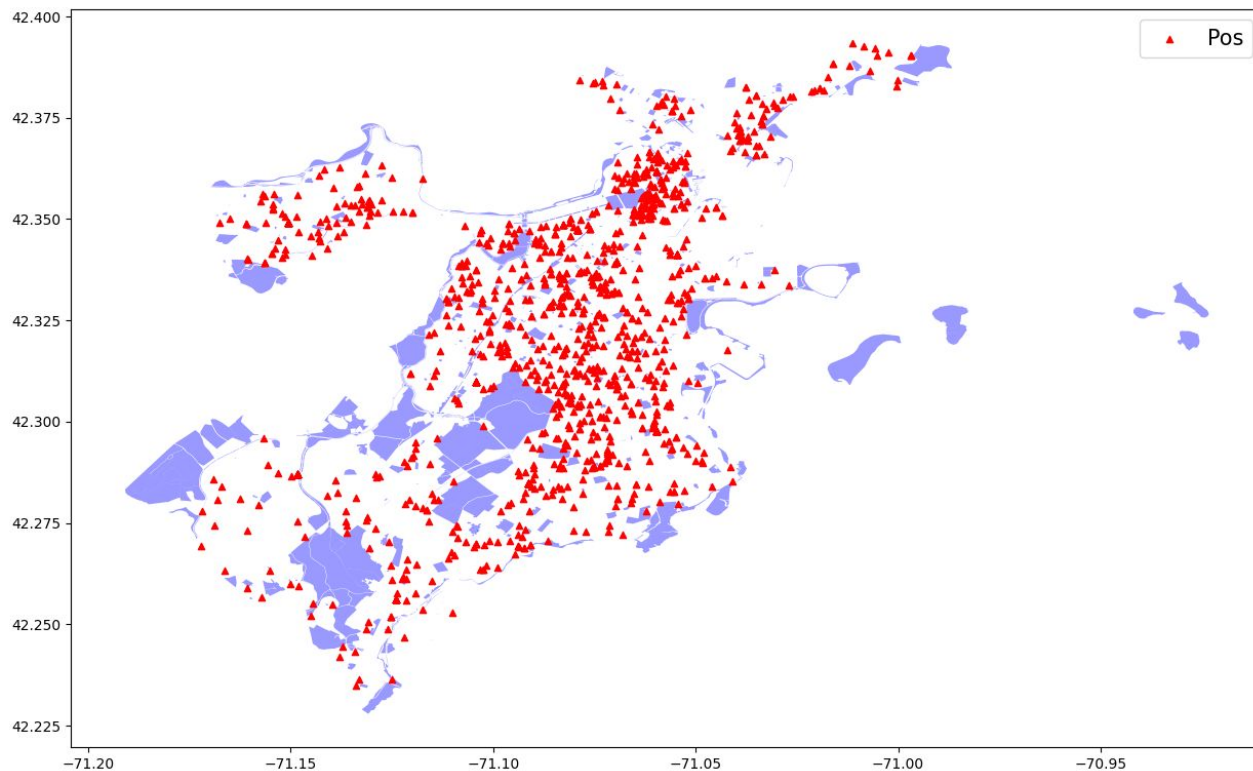


## Key Findings:

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



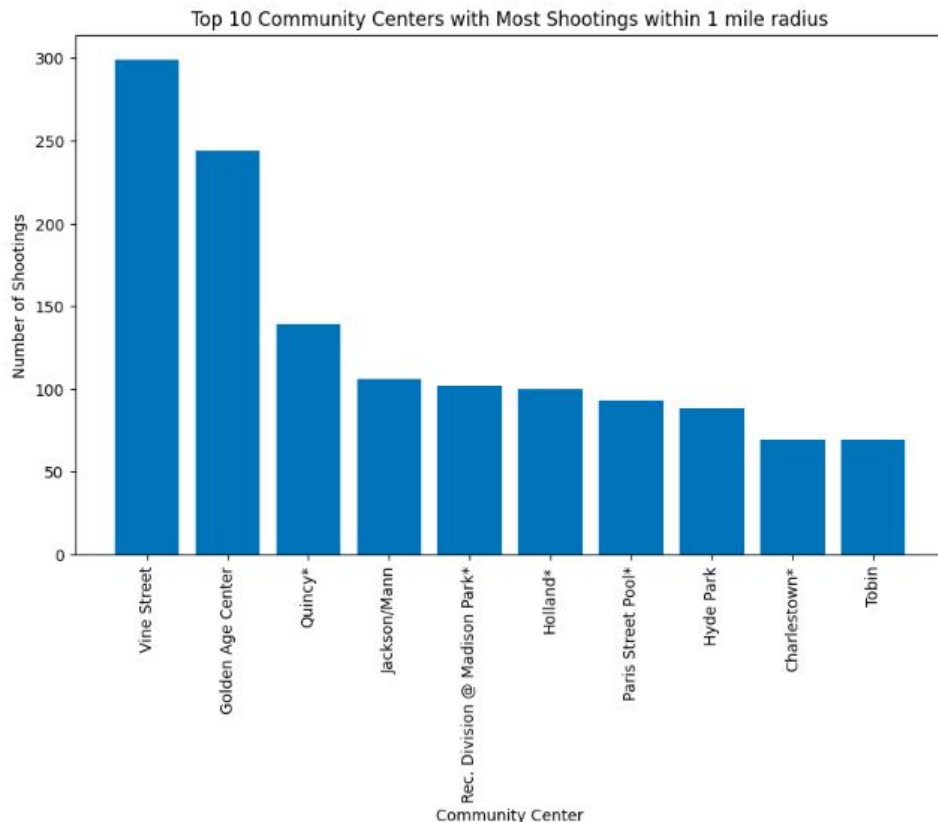
# Parks Gun Violence Map



## Key Findings:

- Most gun violence does not happen in parks
- Boston has a high park area ratio to city its hard to say if shootings happen near parks with this bias

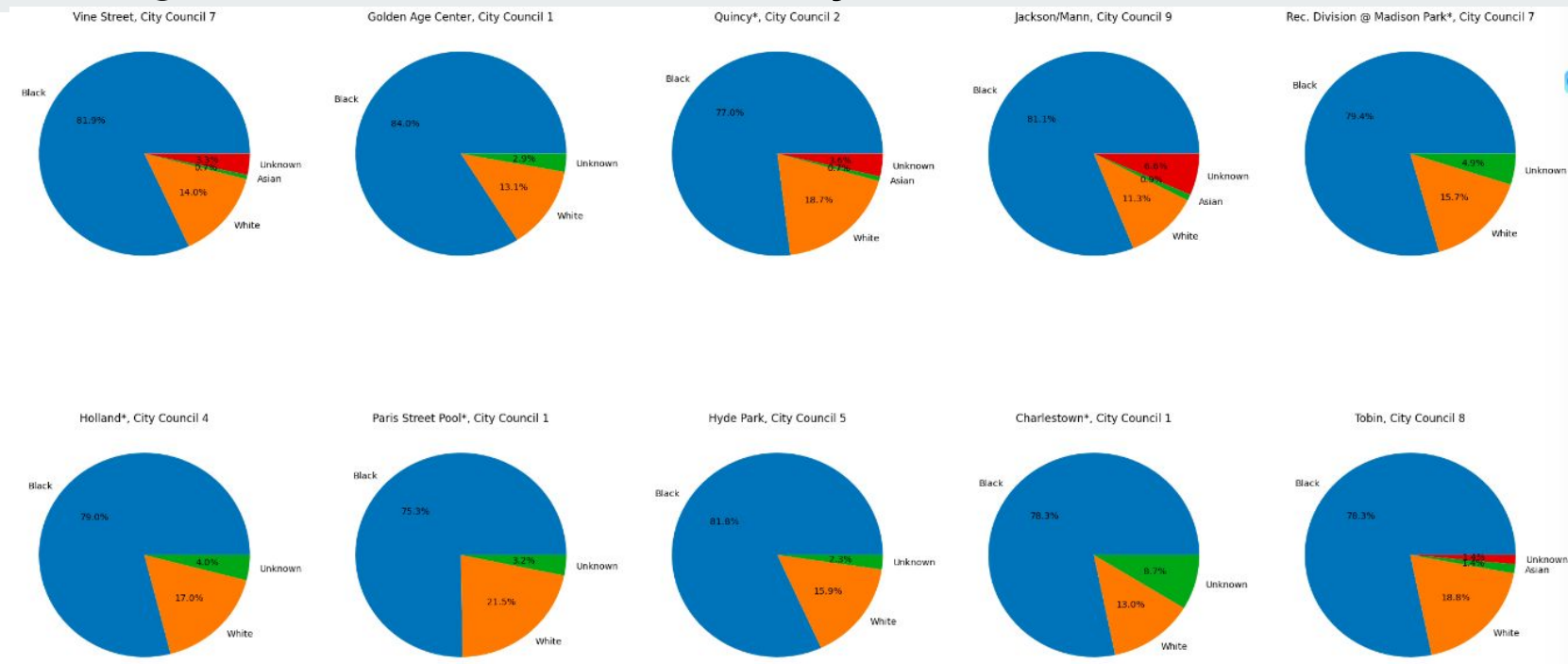
# Top 10 Community Centers with Most Shootings



## Key Findings:

- More shootings near Community Centers seem to happen in City Council 1, with 3 Community Centers each in the top 10 list.
- There is only 1 Community Center from City Council 4 (Holland) in the top 10 list.
- There is only one Community Center from City Councils 2, 4, 5, 8 and 9 in the top 10 list.

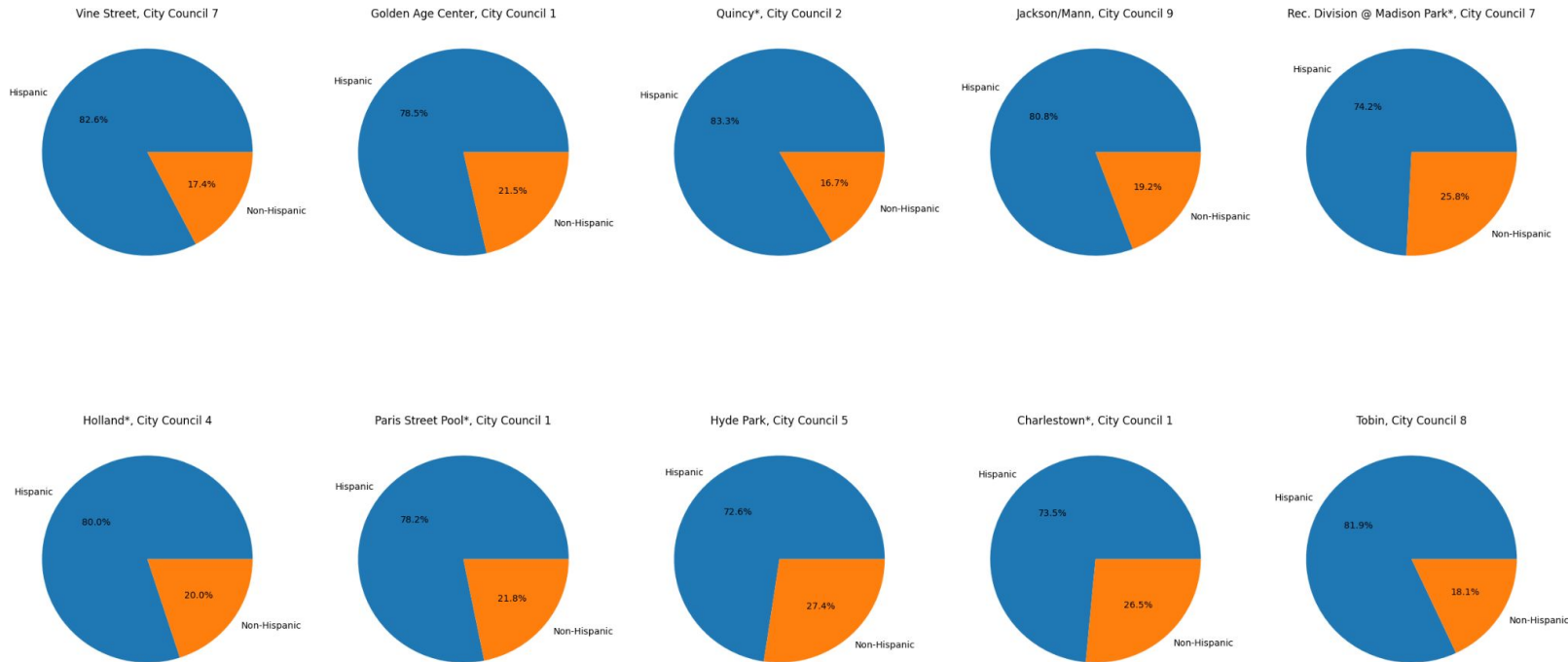
# Race Segmentation for Community Centers



## Key Findings:

- More than 75% of the victims are Black.
- The Community Center at Paris Street Pool has the highest number of White victims
- The Community Center at Jackson/Mann has the highest number of victims of unknown race with 6.6%.

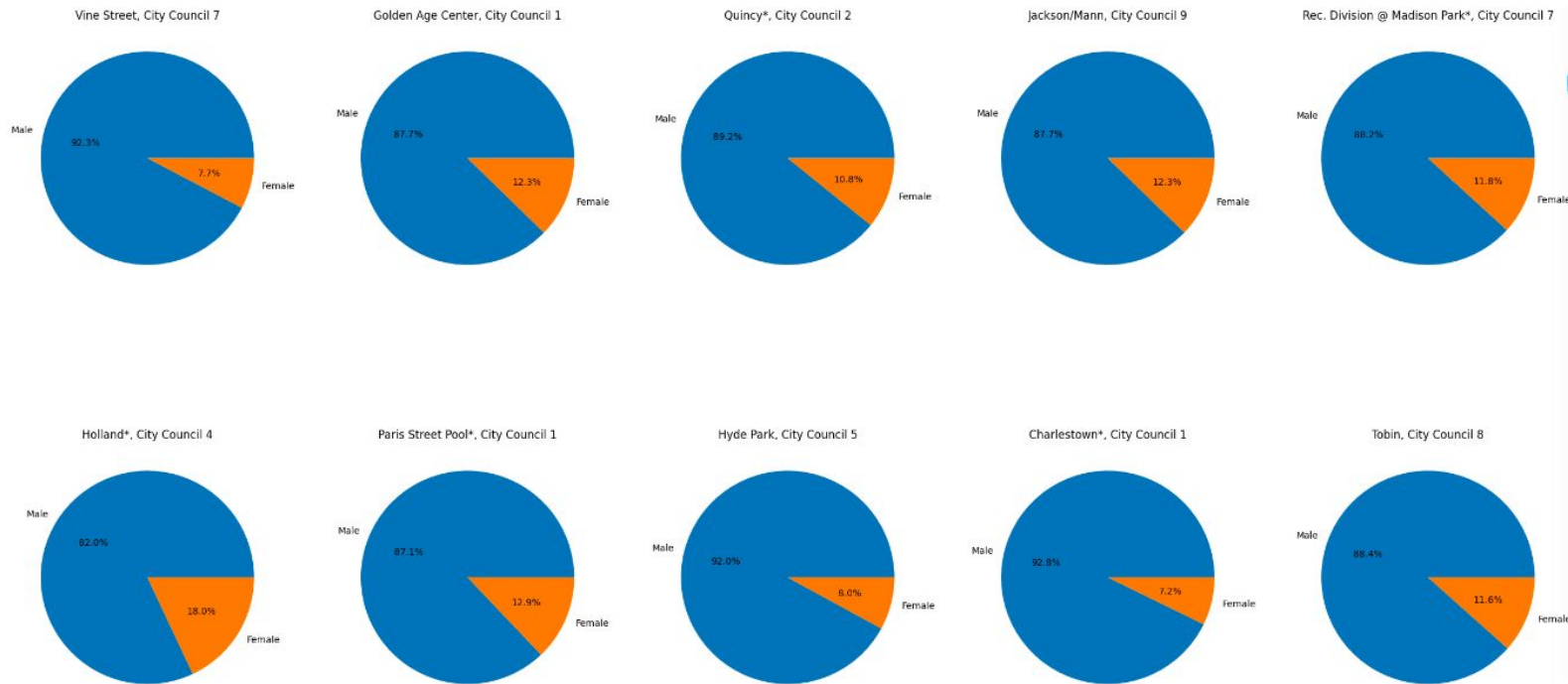
# Hispanic Segmentation for Community Centers



## Key Findings:

- In the top 10 community centers most affected by gun violence the majority of people identify as Hispanic

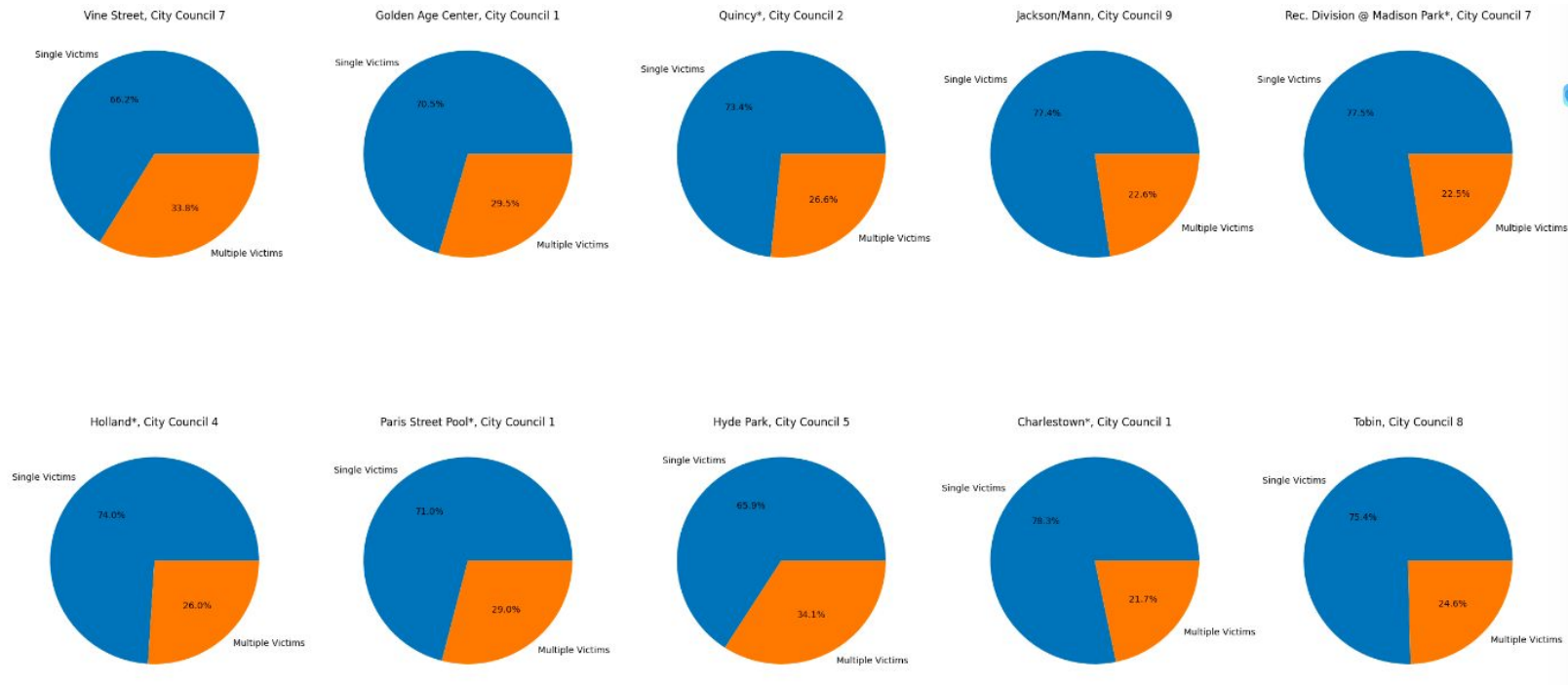
# Gender Segmentation for Community Centers



## Key Findings:

- There are always more male victims than female victims (more than 80% of the victims are males in every case vs more than 7% for females).
- Charlestown in City Council 1 has the highest percentage of male victims at 92.8%
- Holland in City Council 4 has the highest percentage of female incidents with 18%

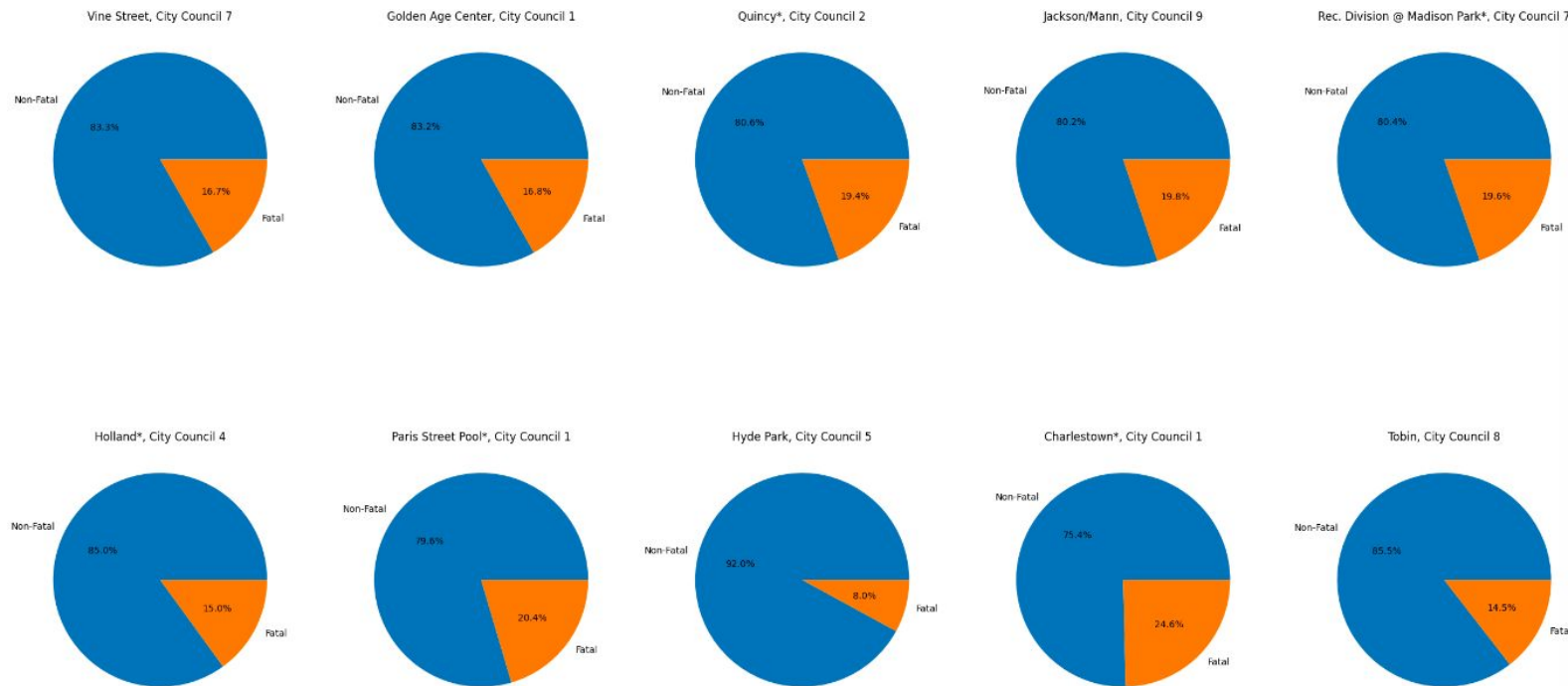
# Single Victim vs Multiple Victims for Community Centers



## Key Findings:

- There are always more incidents with single victims than multiple victims (more than 60% of the incidents have a single victim in every case vs more than 21% for multiple victims).
- Charlestown in City Council 1 has the highest percentage of incidents with a single victim at 78.3%, whereas for multiple victims, it is at Vine Street in City Council 7, with 33.8%.

# Fatal vs Nonfatal Shootings for Community Centers

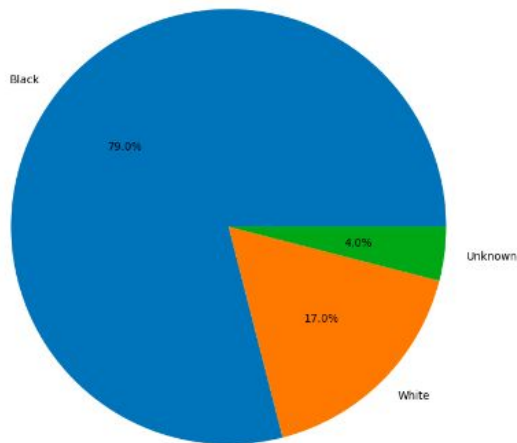


## Key Findings:

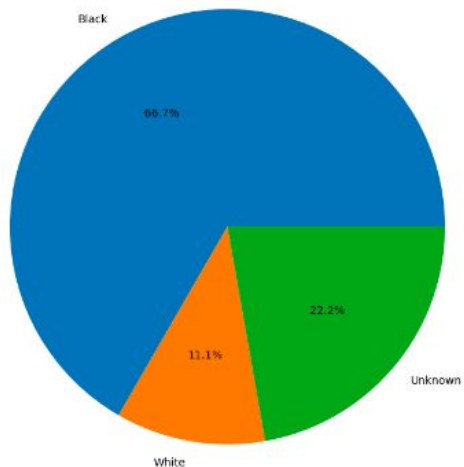
- In all the Community Centers in the top 10 list, there are always more non-fatal than fatal incidents (more than 75% of the incidents are non-fatal in every case vs more than 14% for fatal ones).
- Hyde Park in City Council 5 has the highest percentage of non-fatal at 92%, whereas for fatal ones, it is at Charlestown in City Council 1, with 24.6%.

# Race Segmentation for D4 Community Centers

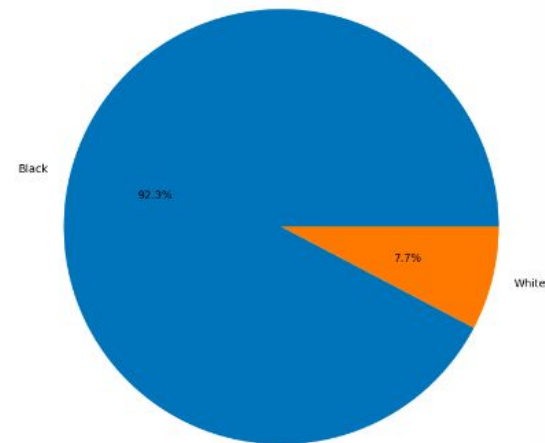
Holland\*, City Council 4



Perkins\*, City Council 4



Gallivan, City Council 4



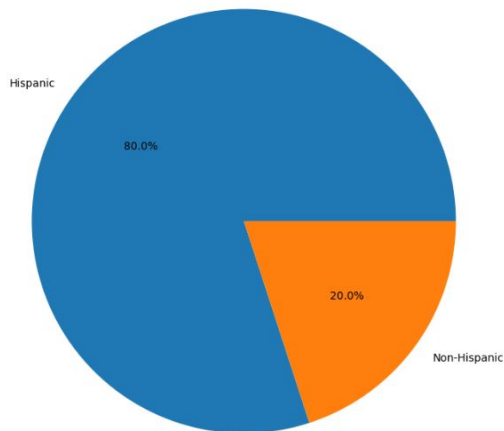
## Key Findings

- For the top 3 community centers in D4 We see that the majority race that is affected are black
- White and the rest of unknown races combined at most have 1/3 the amount of gun violence incidents while the rest is black
- These community centers are located in predominantly black neighborhoods so our graphs represent those biases

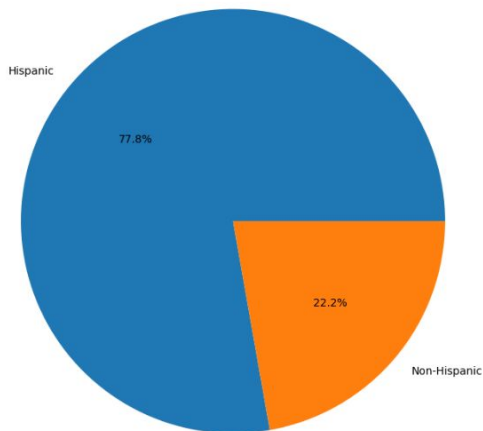


# Hispanic Segmentation for D4 Community Centers

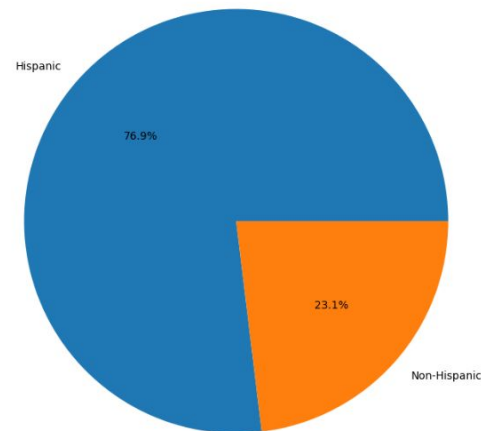
Holland\*, City Council 4



Perkins\*, City Council 4



Gallivan, City Council 4

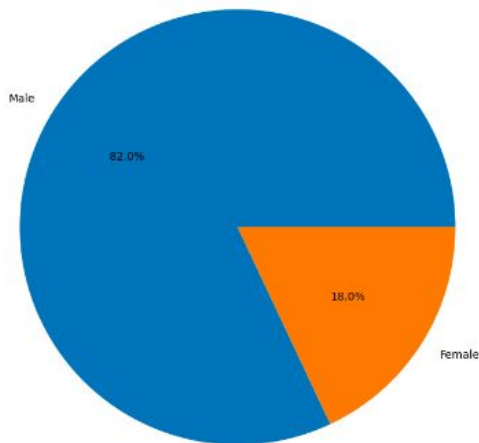


## Key Findings:

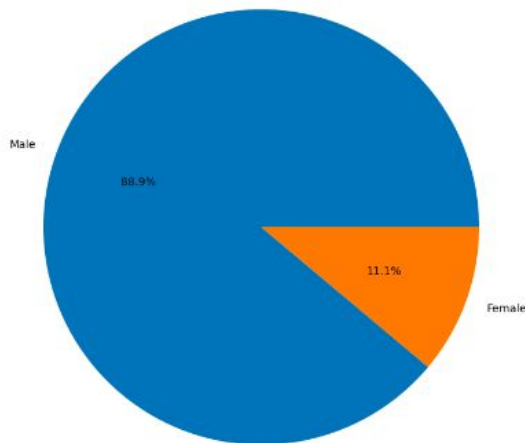
- D4 has the same trend as the rest of Boston
- More people who are affected by gun violence identify as hispanic

# Gender Segmentation for D4 Community Centers

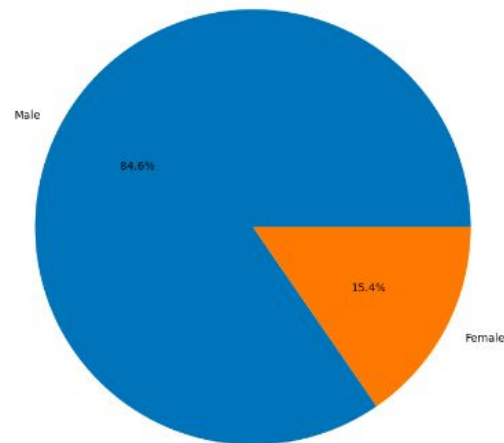
Holland\*, City Council 4



Perkins\*, City Council 4



Gallivan, City Council 4

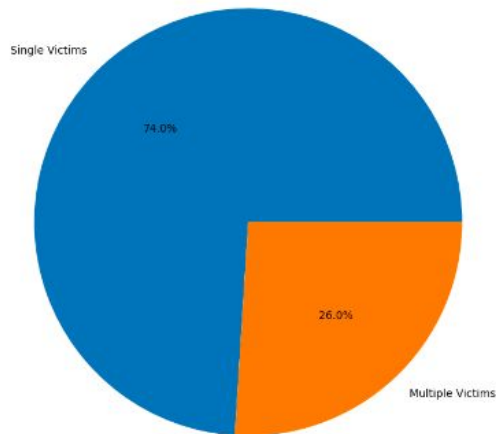


## Key Findings

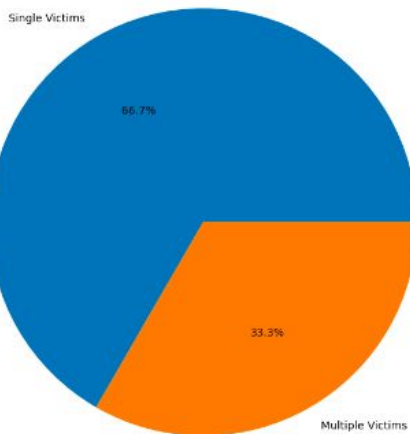
- For the top 3 community centers in D4, we see that male victims outnumber female victims by 4 to 1.
- Generally, it's considered that men perpetrate more gun violence than women (due to sociological properties) so seeing men victims also high is interesting

# Single vs Multiple Victims for D4 Community Centers

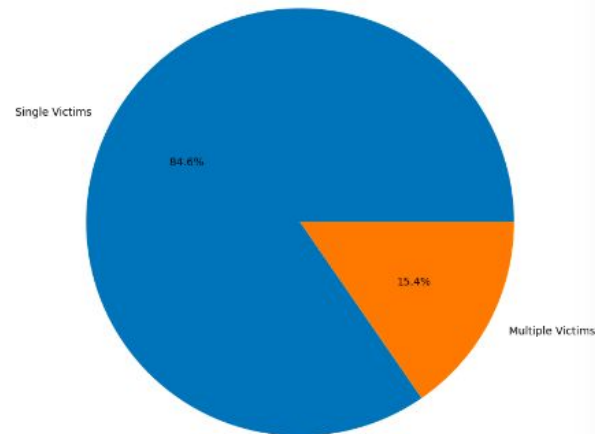
Holland\*, City Council 4



Perkins\*, City Council 4



Gallivan, City Council 4

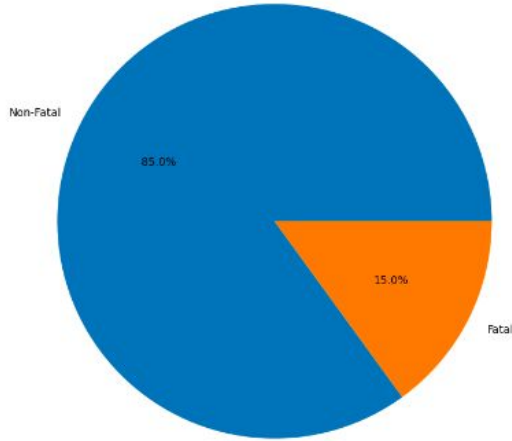


## Key Findings

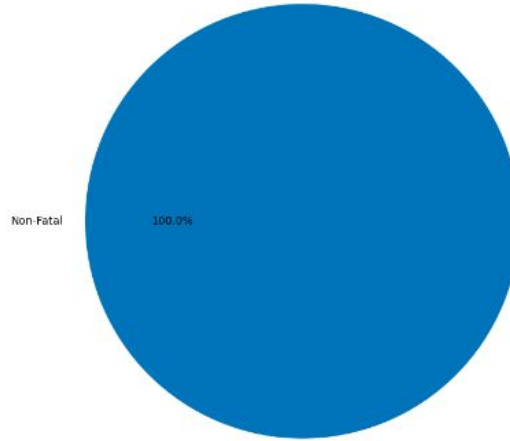
- For the top 3 community centers in D4 Single Victims outnumber Multiple Victims almost 4 to 1
- Community centers are a public place with lots of people so it is interesting that multiple victims are less than single. This could highlight a bias in our data where we get a range of incidents near the community center within one mile

# Fatal vs Non-fatal Shootings for D4 Community Centers

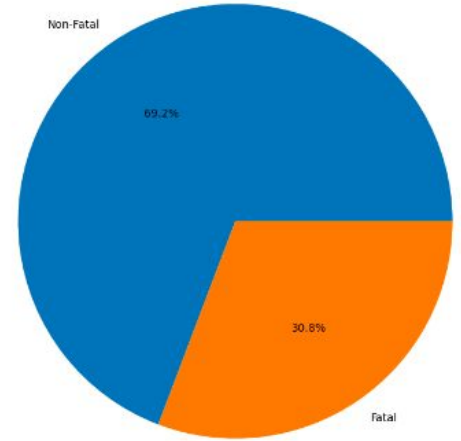
Holland\*, City Council 4



Perkins\*, City Council 4



Gallivan, City Council 4



## Key Findings

- For the top 3 community centers in D4 Non fatal incidents happen on average 85% and fatal incidents happen 15%
- On average most shootings have more non-fatal vs fatal but its still interesting to note the same trend happening on a local level



## Summary

Gun violence is a complex issue with multiple drivers, including demographic, socioeconomic, geographic, criminal justice, and gun law factors.

Analysis suggests that prevention efforts should address the root causes of gun violence, such as poverty and lack of education and employment opportunities, rather than relying solely on criminal justice interventions. Additionally, enforcing strong gun laws and reducing access to firearms can reduce gun violence.



**Questions?**