Exploratory Data Analysis

(1) How can Baltimore police more efficiently and effectively deal with crime?

- **What innovative approaches can be used to increase public safety for both police officers and citizens?**

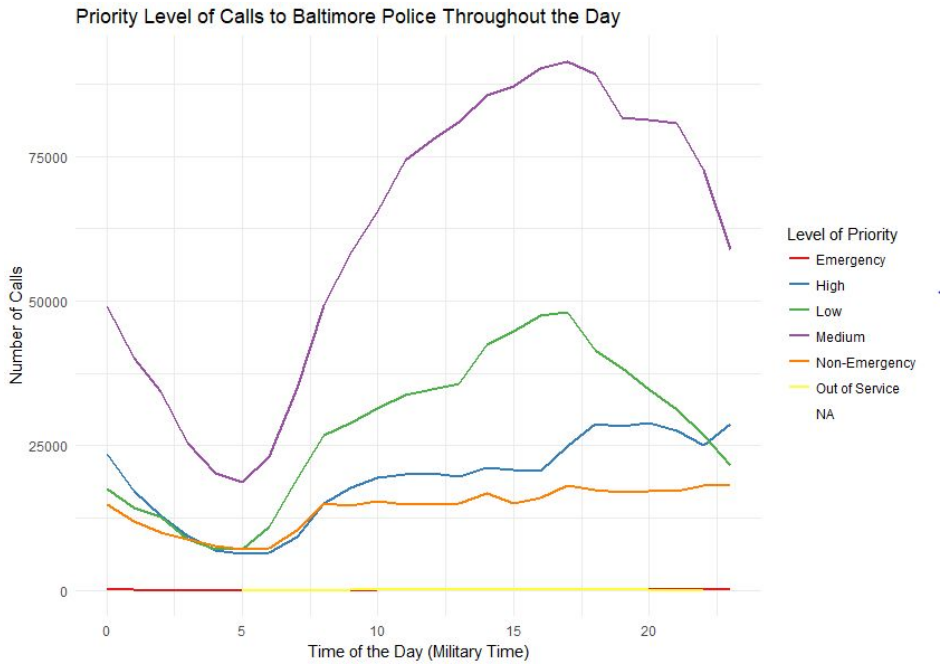


Figure 1.1: The Priority Level of Calls to the Baltimore Police Department throughout the Day

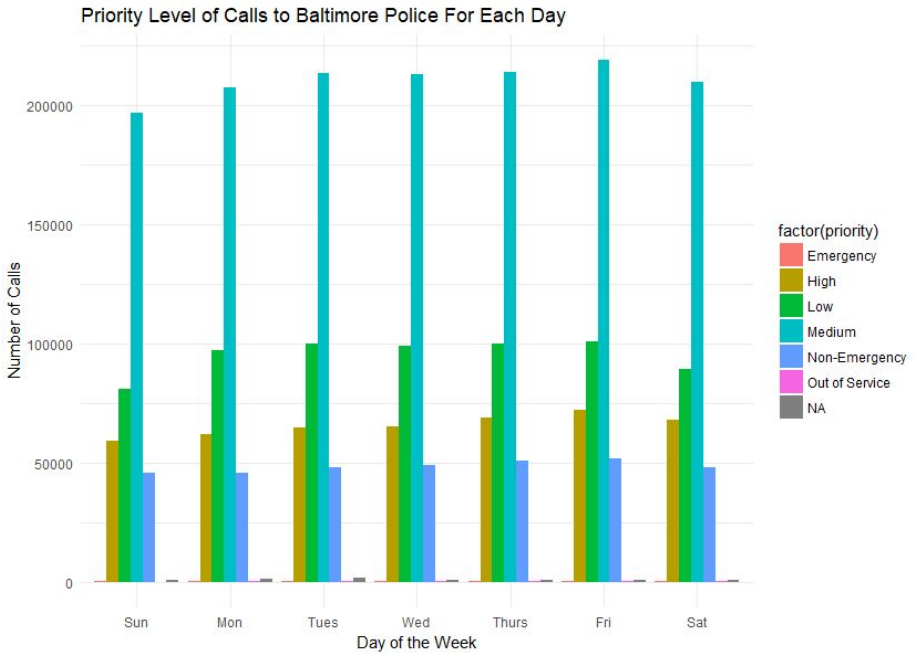


Figure 1.2: The Priority Level of Calls to the Baltimore Police Department throughout the Week

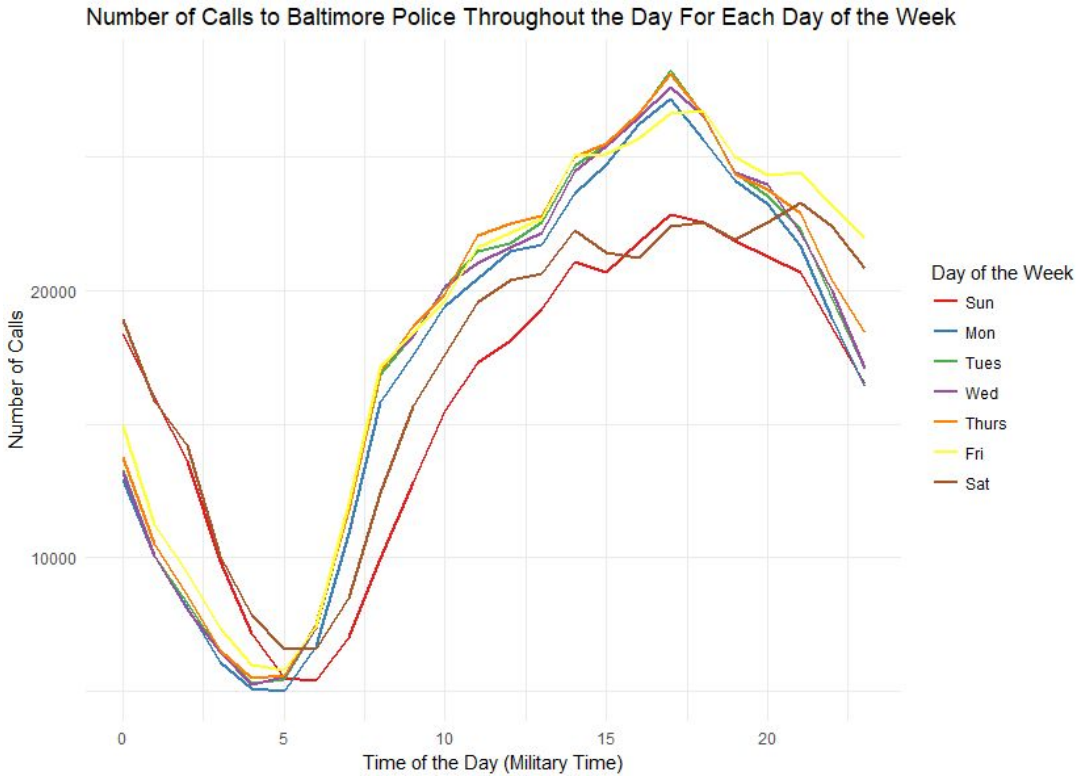


Figure 1.3: The Number of Calls to Baltimore Police Department Throughout the Day for Each Day of the Week

Figure 1.3.B confirms the observations seen in Figure 1.3.. Prevalence of the blue along with the highlight pink shows that the crimes are likely to be committed from 2PM to 8PM.

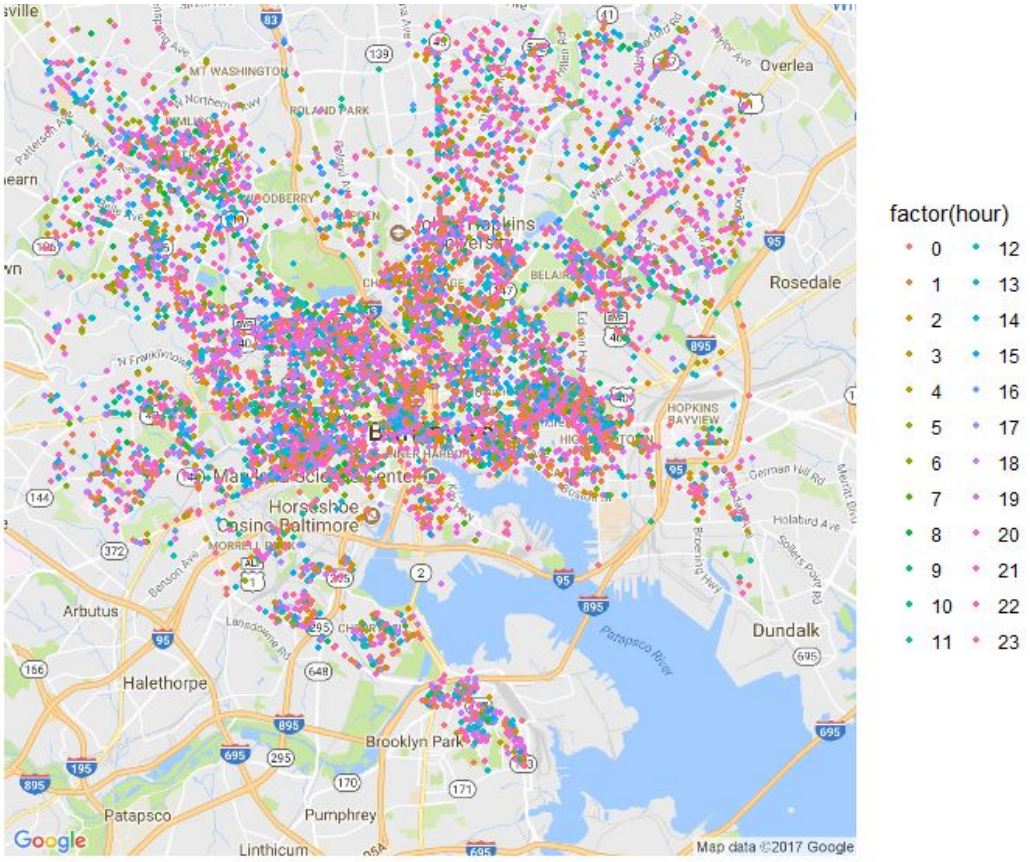


Figure 1.3: Type of Crimes Observed By Time of Day

From Figure 1.1, it can be seen that the majority of calls to the Baltimore Police Department (BPD) are classified as medium priority, followed by low then high priorities. There is an obvious increase around 5 to 15 military time, with the biggest increase (slope) for the medium priority. A similar trend is indicated by Figure 1.2 minus the sharp increase. There is only a slight increase in call number throughout the days of the week for medium priority and Saturday and Sunday calls seem to dip for low priority calls. Interestingly enough, when the numbers of calls were plotted for each day of the week on a time series graph, there is a clear distinction between the trend of the weekend (Saturday and Sunday) and the weekdays (Monday through Friday). Although the overall trend is similar between the weekdays and the weekend, the number of calls are higher for the weekends than the weekdays from midnight to 5AM EST (0 to 5 in military time) and lower from 5AM to midnight EST (5 to 0 in military time).

With this information, police can better delegate assignments to officers. Further analysis should be conducted to determine the correlation of the increase in call volume and location.

Figure 1.4 indicates the location of the police stations for Baltimore along with the reported crimes from 2015 onwards. While most stations are located strategically to cover the outskirts, the high frequency of crimes in the central areas suggest that crimes can be dealt more effectively if HQ was relocated to a more central area or a new station was built.

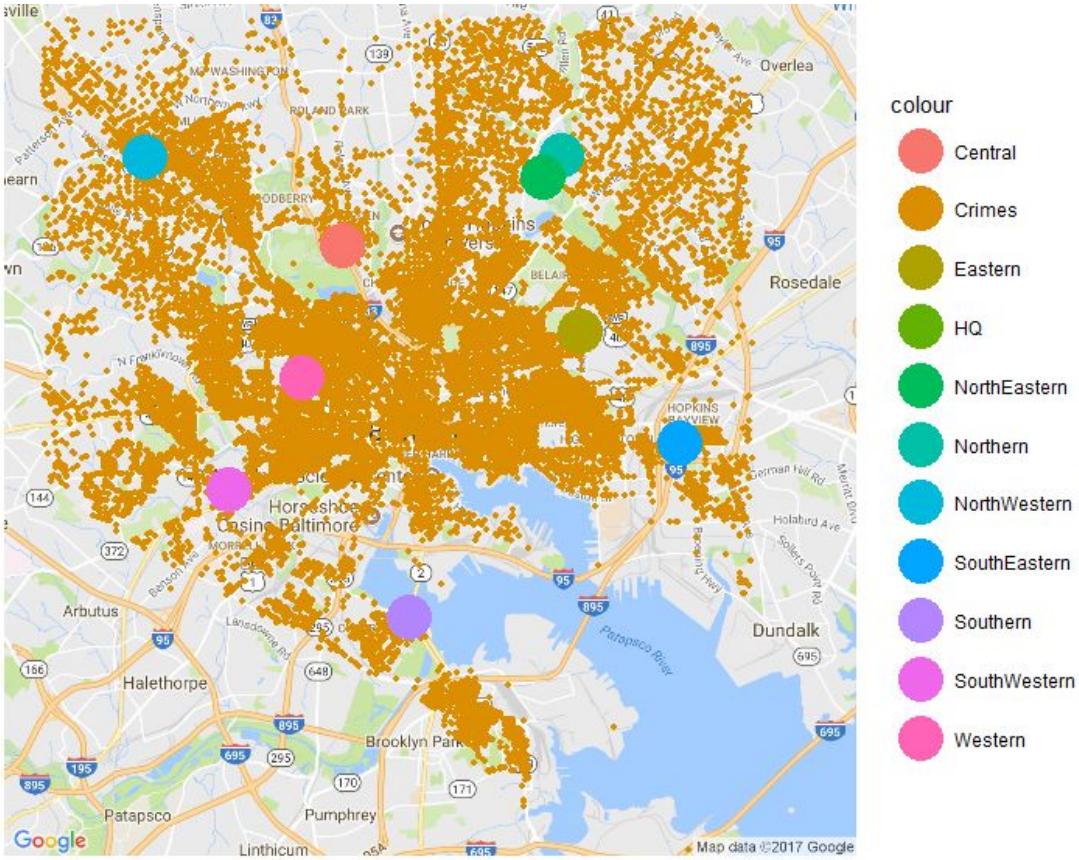


Figure 1.4 Map of Police Stations Over Crime

>Note on the Graph: As it stands, Crimes and Police Stations are both considered equivalent data points by R, Crimes data should be converted into some other type of aesthetic that separates the crimes from Police Station location and better marks frequency of crime. The legend also needs to be better title for more clarification.

Figure 1.5 displays the crimes that were observed categorized into the type of weapon used in the crime. The crimes appear to be rather evenly distributed, and behaves intuitively -scaling along with the concentration of population. One particular point of interest is how crimes involving firearm do not scale with the population, but rather appear to be consistent throughout the map.

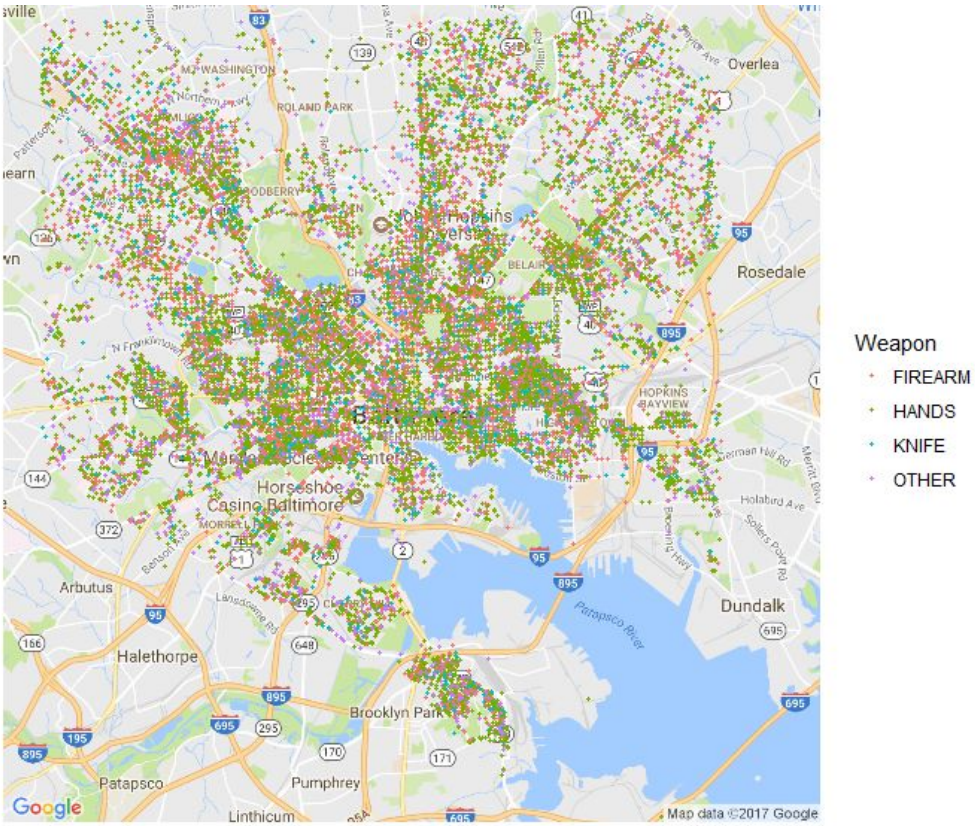


Figure 1.5: Crimes Categorized into Type of Weapon Used

(2) Are there specific locations that need increased police activity and/or implementation of specific preventative measures?

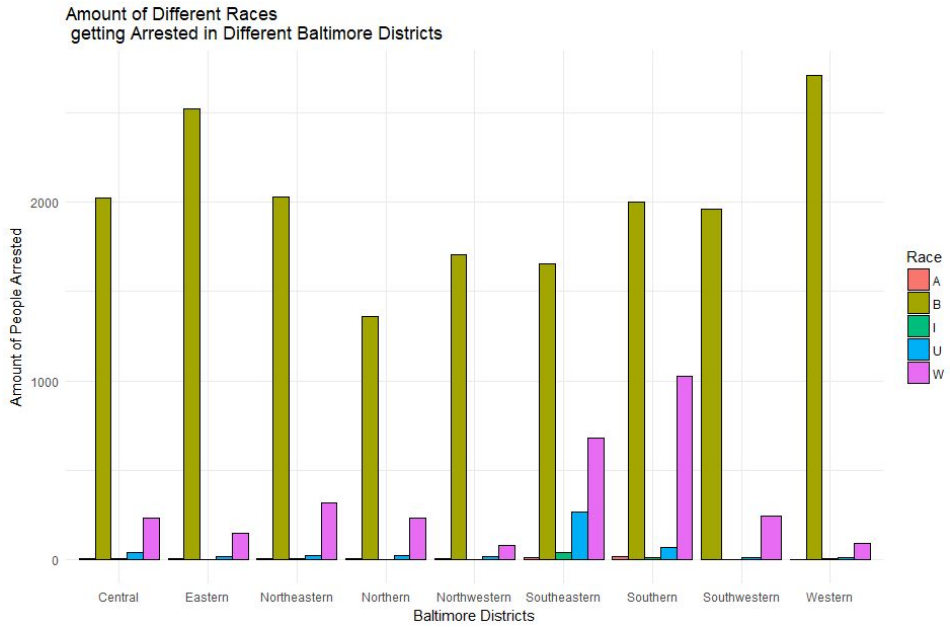


Figure 2.1: The Number of Arrests for Each Race for Each District

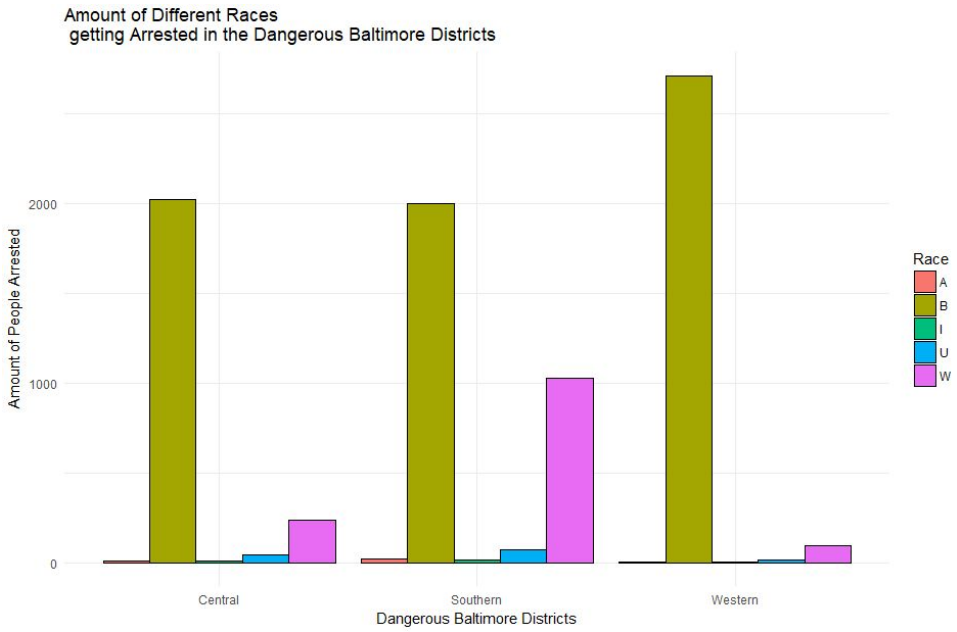
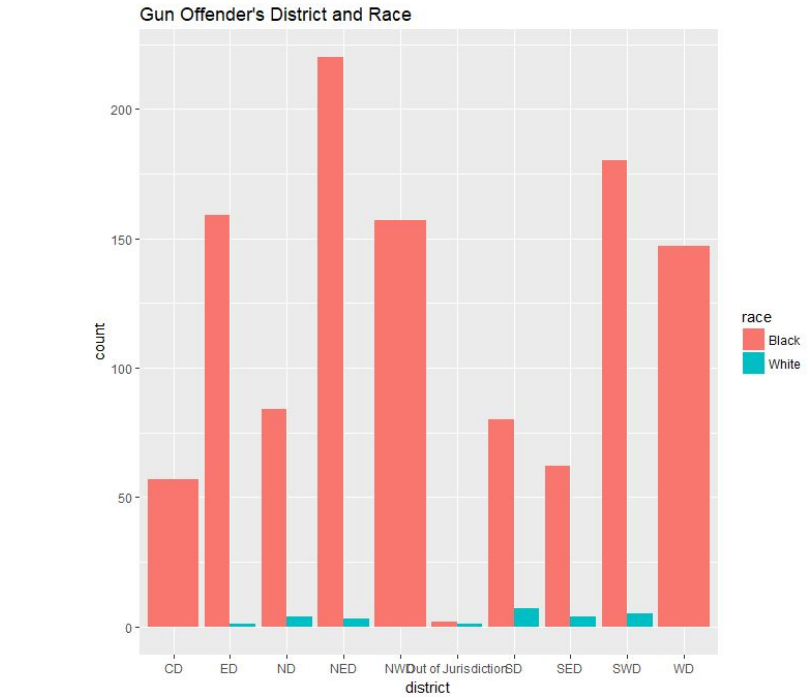
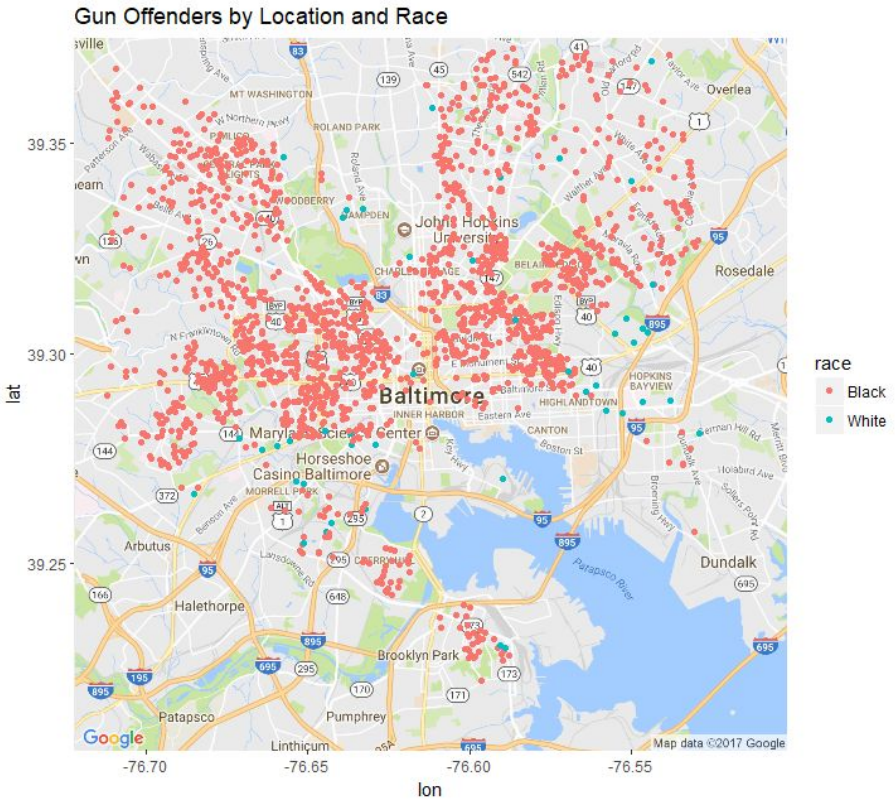


Figure 2.2: The Number of Arrests for Each Race in Most "Dangerous" Baltimore Districts

The majority of the people getting arrested in each district, especially in the districts with the most arrests, are African American. However, this may not take in the general demographics of Baltimore City. Thus, more demographic analysis needs to conducted to determine if the proportion of African American arrests are proportional to the proportion of African Americans living in the area.





Figures 2.3: The Number of Gun Offenders per Race and District/Location

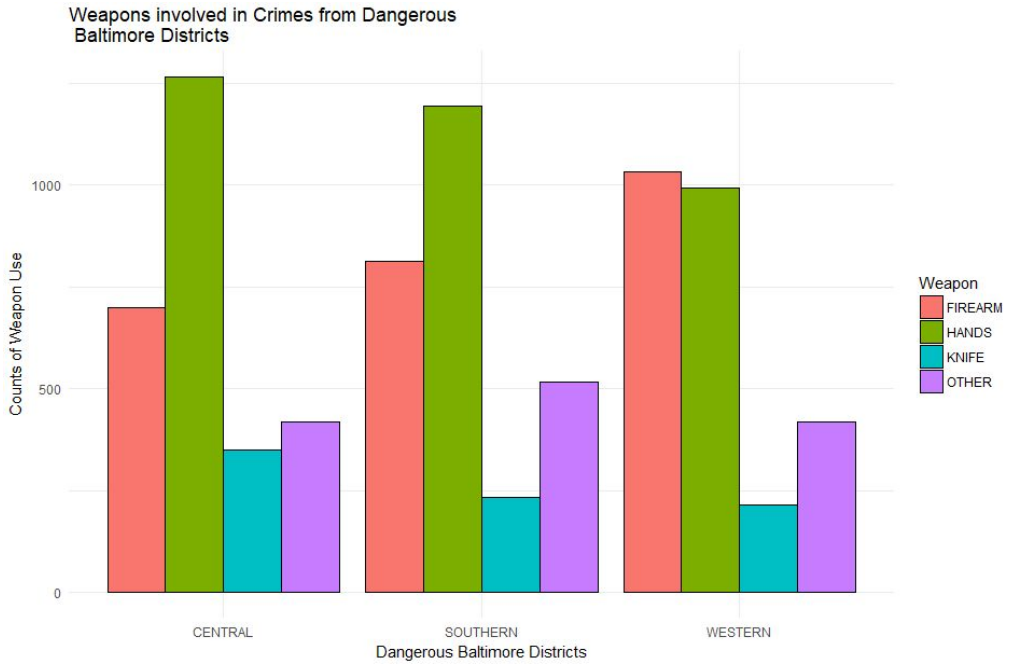


Figure 2.4: Weapons Involved in Crimes from Most "Dangerous" Baltimore Districts

At first we were uncertain of a possible important role that District could play in our exploration. After some further investigation about Baltimore and its crime (https://dubofflawgroup.com/blog/violent-crimes/), we found that the proclaimed most dangerous districts would be the Central, Southern, and Western districts. After looking at the bar graph of races, even disregarding race, it seems that perhaps the Eastern district could be considered dangerous as well (which was not mentioned in the blog posting). The investigation as to what kind of weapons were involved in victim crimes in these districts as well as what races elicited our curiosity into comparing dangerous vs non/less dangerous districts of Baltimore. This will help us address how Baltimore police can more efficiently and effectively deal with crime since we will be able to dive into potential factors that are causing these districts to be more dangerous e.g. it seems that in the most dangerous districts, hands are the most prominent use of weapon.. perhaps install self defense classes, or some other solution of the sort.