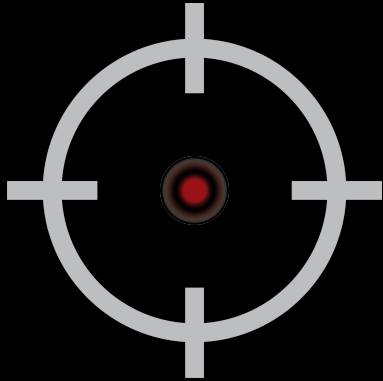# Gun Deaths in America

By the "International Group"

Chris Janssen

Bhumika Sharma

Cong Tran

Vijaybabu Gangaprasad

Imran Bawany

Motivation

Gun violence in the United States results in tens of thousands of deaths and injuries annually.The rate of firearm deaths per 100,000 people rose from 10.3 per 100,000 in 1999 to 12 per 100,000 in 2017, with 109 people dying per day.The ownership and control of guns are among the most widely debated issues in the country.

As a concerned citizen we wanted to understand the nature of gun violence in America.Some questions and assumptions come to the mind whenever there is such discussion in current times.We wanted to get a better perspective about it using the available data from CDC(Centers for Disease Control and Prevention). Mortality data filtered on Gun Deaths is used.

Hypothesis analysed were:
1. Does race play a factor in suicide/homicide by gun?
2. Does gender play a role in suicide/homicide by gun?
3. Does race play a factor in legal intervention (i.e. police shootings) by gun?
4. Are gun deaths getting worse and by what type of death (suicide, homicide, or accident)
5. Have gun deaths by assault weapons/rifles/large weapons increased?
6. Do gun deaths get worse on the weekends?
7. Is Age a factor in gun deaths?

Data Cleanup and Exploration

CDC-Mortality Multiple Cause Files for three years (2015,2016 and 2017) is used. The analysis is centered around Gun Deaths,so the data is filtered accordingly.

Data Exploration and Cleanup:
1. Unwanted columns were dropped from each of the files and the 3 years data files merged
2. The data is checked for NaN values and cleaned for it
3. All the data columns were decoded using the data mapping file to convert the data in more readable format. The numerical values were turned into categorical values based on a provided PDF that the CDC includes for each year. Causes of death were converted from ICD 10 codes to descriptions as well.
4. The cleaned and re-formatted data is saved into a csv .This csv is then used for further analysis
5. Races were simplified since multiple columns contained variables related to race. Specifically, individuals of hispanic origin had a separate variable. We used a conditional statement to turn multiple columns pertaining to race into one final simplified race. Additionally, we combined different nationalities of Asia (i.e Filipino, Vietnamese, Japanese, etc.) into one broad category called Asian. We did this since the counts per year were too low to for our analysis purposes.

Chris: Race and Suicide
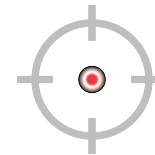
Q. **Does race play a role in suicide by gun?**

- The data for 3 years of observation show that Gun deaths by suicide are statistically increasing.

- On the rise, specifically are the rates of the top three races (white, black, hispanic). People who are white have the high rates of suicide.

Number of Gun Deaths By Suicide By Year

Rate of Gun Deaths By Suicide By Race
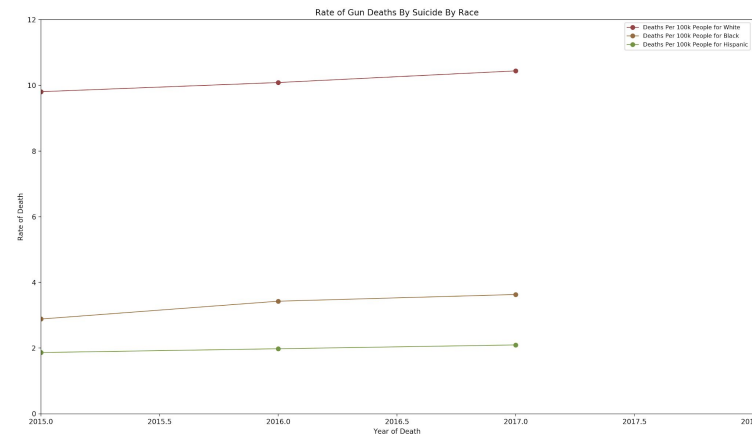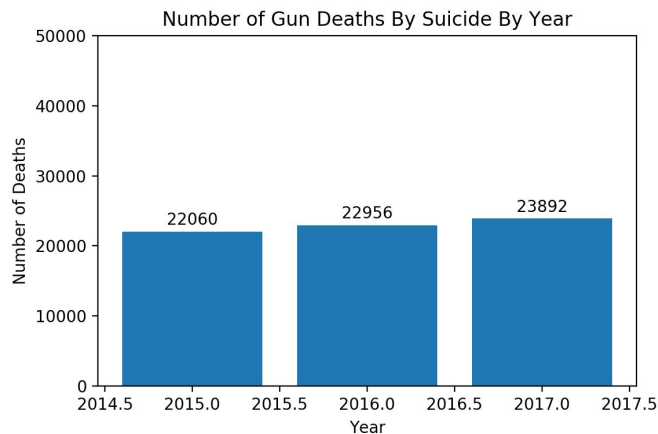
Chris: Rifles/Large Gun Deaths

Q. <u>Are Deaths By Large Guns Increasing?</u>

- According to the data, no, since the number of deaths has remained about the same. (Chi square =
- When we break down the causes of death by large guns, suicide by rifles is decreasing while the number of deaths attributable to homicide have increased.
- Classification by the coroner/medical examiner could have missing data
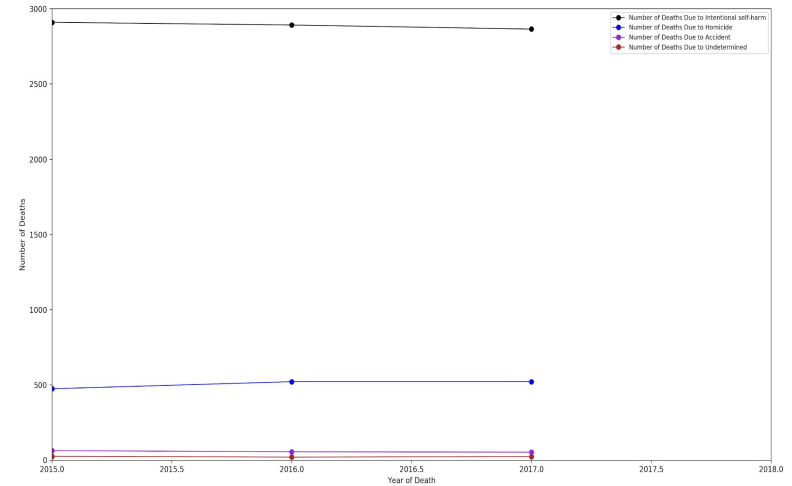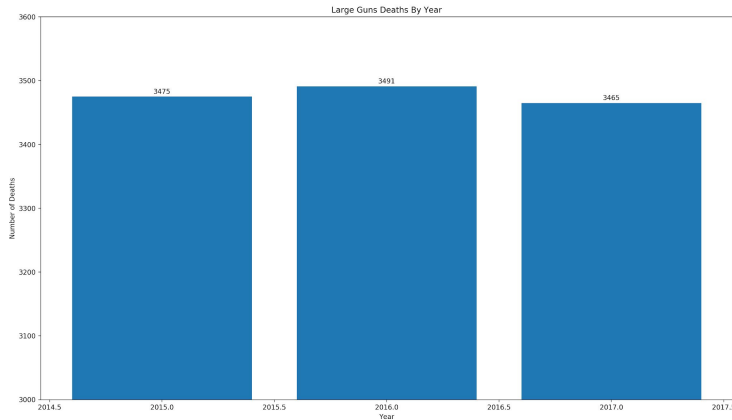
Gender in Suicide and Homicide
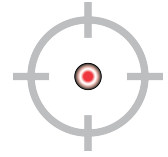
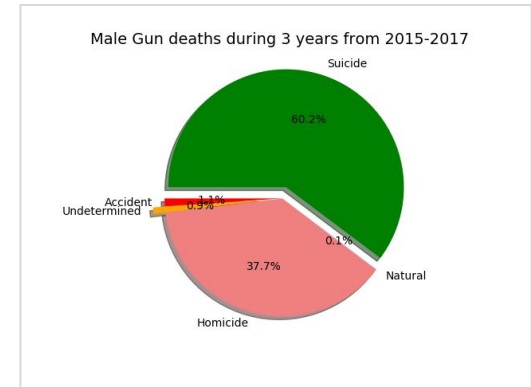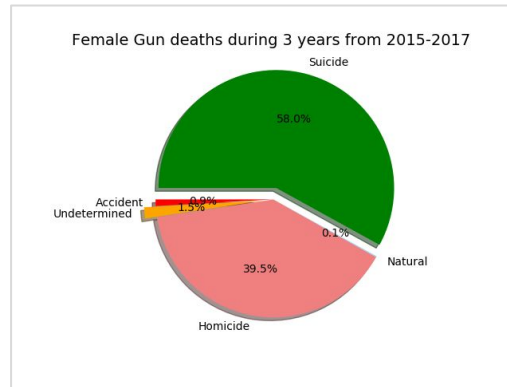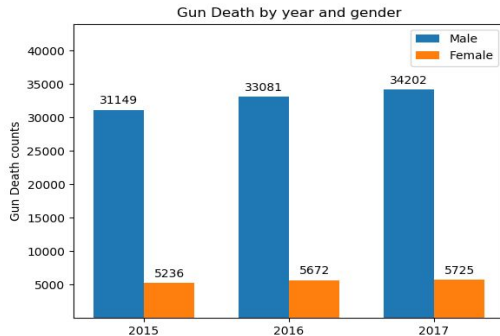Q. <u>Does gender play a role in suicide/homicide by gun?</u>

\# The data for 3 years of observation show that Gun deaths are on rise

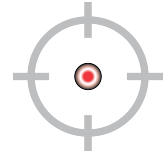\# Gender data show that the Male deaths are almost 6 times female deaths

\# Most common gun death manner is 'Suicide' followed closely by 'Homicide'

\# Almost 60% of deaths are by 'Suicide'

Manner_of_Death	2015		2016		2017	
	Male	Female	Male	Female	Male	Female
Homicide	11556	1977	12757	2230	12822	2356
Suicide	18956	3113	19678	3293	20668	3242
Accident	324	43	358	51	365	54
Undetermined	284	92	259	96	328	66
Natural	29	11	29	2	19	7
Total Death Cnt	31149	5236	33081	5672	34202	5725

Gun Death by year and gender

Female Gun deaths during 3 years from 2015-2017

Male Gun deaths during 3 years from 2015-2017

Race in Police Shootings

Q. How does the breakdown of gun deaths by legal intervention by race compare to total gun deaths by race?

Deaths by legal intervention 2015 - 2017

Deaths by legal intervention 2015 - 2017
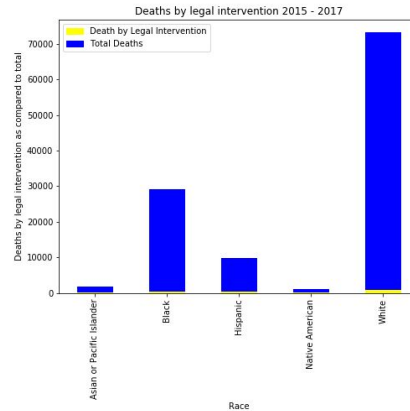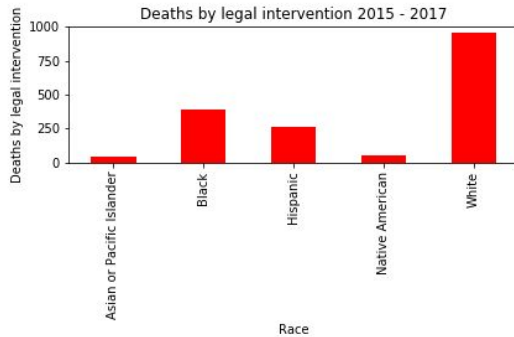
	Totals
Race-Simplified	
Asian or Pacific Islander	1712
Black	29165
Hispanic	9846
Native American	1169
White	73173

		Totals
Race-Simplified	**Causes_of_Death**	
Asian or Pacific Islander	legal intervention	41
Black	legal intervention	389
Hispanic	legal intervention	259
Native American	legal intervention	51
White	legal intervention	958

		% of total deaths
Race-Simplified	**Causes_of_Death**	
Asian or Pacific Islander	legal intervention	2.39
Black	legal intervention	1.33
Hispanic	legal intervention	2.63
Native American	legal intervention	4.36
White	legal intervention	1.31

- White people still have the highest percentage of gun deaths at 63.6%. Out of this, 1.31% are by legal intervention
- Native American deaths by legal intervention is the highest percentage rate at 4.36 % of all Native American gun deaths with Hispanics and Asians at 2.63% and 2.39% respectively.
- The rate for Black people comes in slightly higher than Whites at 1.33%

Percentage of Police shootings by race

- White deaths makeup 56.4% of total gun deaths by legal intervention compared to 63.6% of overall gun deaths

- Black gun deaths in this category makeup 22.9% as compared to 25.3 % of overall gun deaths.

- Hispanics have almost twice the rate in this category at 15.3% compared to 8.6% of overall gun deaths for Hispanics

- Native Americans makeup 1 % of overall gun deaths but the percentage in this category is triple at 3% followed by Asians at 1.5% and 2.4% respectively

Total Gun Deaths 2015 - 2017 by Race %
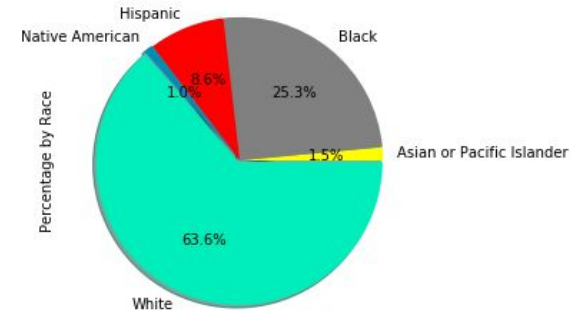

Deaths by legal intervention 2015 - 2017 by Race %
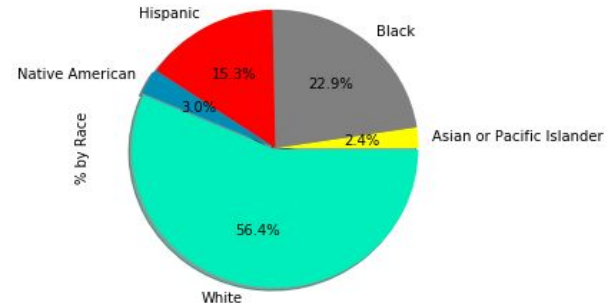
Gun Deaths Overall

Q. Are gun deaths getting worse and by what type of death (suicide, homicide, or accident)?

- **The chart data showing that the highest causes of gun death are suicide by firearms.**
- **Followed by that are Assault(homicide) by discharge of firearms.**
- **Overall most types of gun death are getting worse by year from 2015-2017 especially suicide by firearms.**
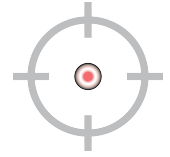
Does Age Play A Role In Gun Deaths?
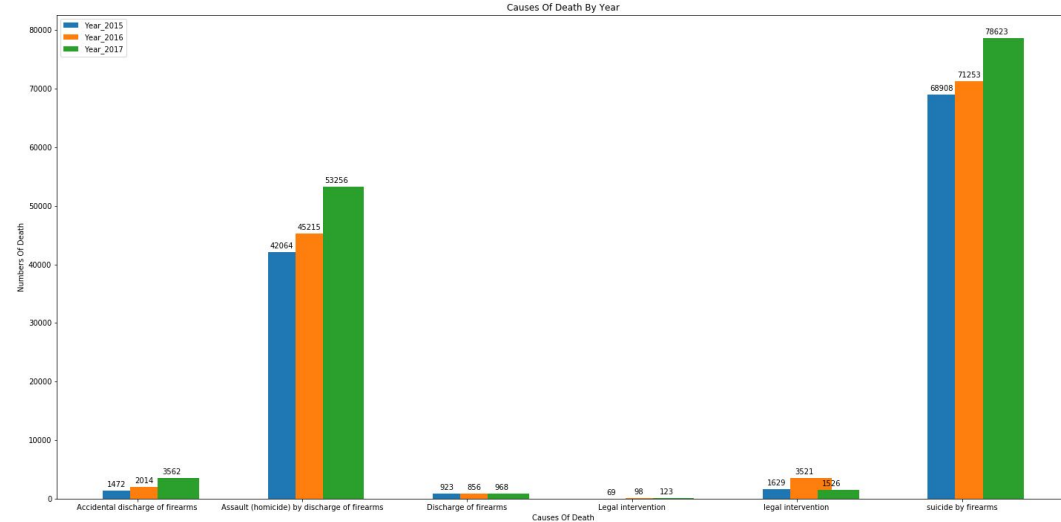
Age Play A Role In Gun Deaths
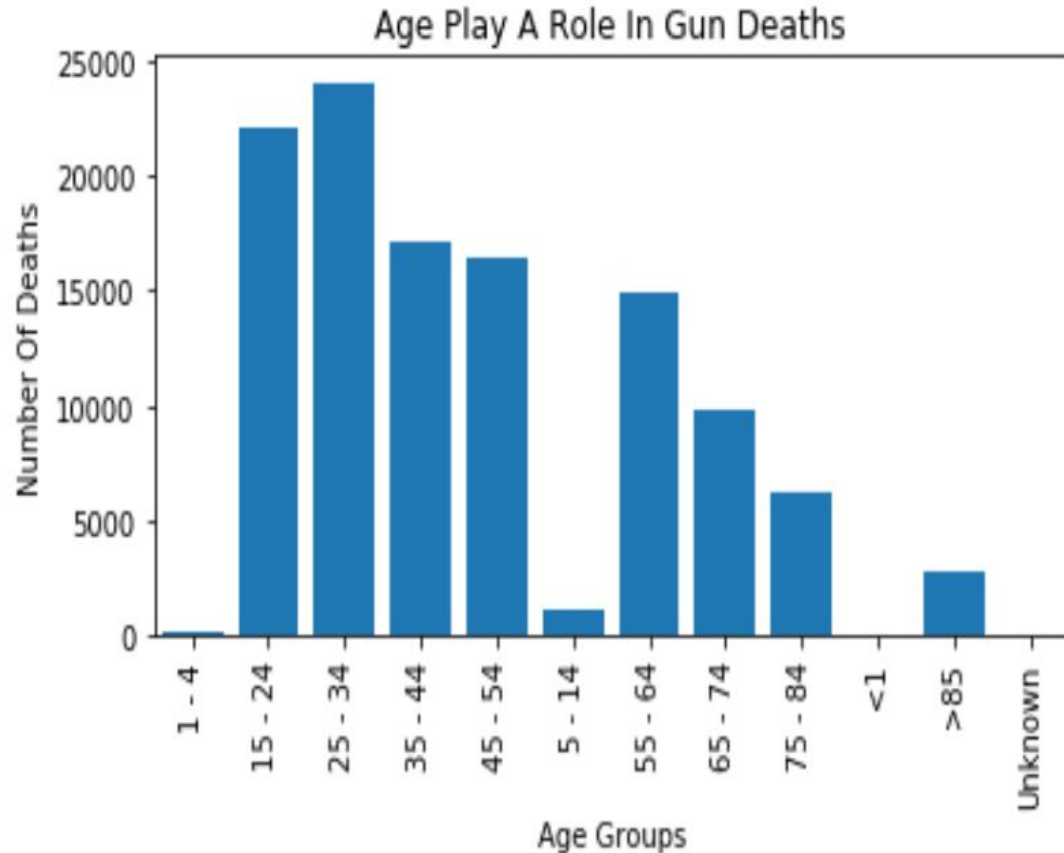
- Age groups range between 25-34 occur the highest number of deaths.
- Age groups range between 15-24 occupy the second highest .

Gun Deaths are time sensitive

Q. <u>Does the time of year ,day of the week play a factor in gun deaths?</u>

#The plot by Months shows that the Gun deaths peak during the summer months.For the year 2015 and 2016 ,the counts peaked around July

#The plot by Weekdays show increase in gun deaths on Sunday and Monday .Thursday and Friday has the least deaths among all weekdays.

#Gun Deaths by Month plot shows that death counts were very high during the Months of May,July and October for 2017 and it was higher than the previous years

Gun Deaths by year for 2015-2017

Gun Deaths by Month

Gun Deaths by Weekdays
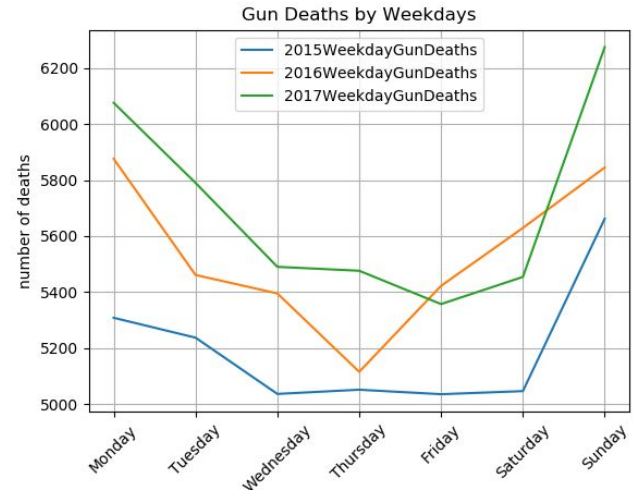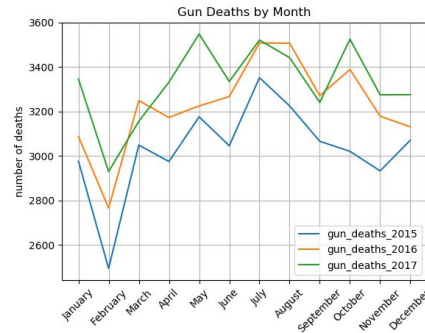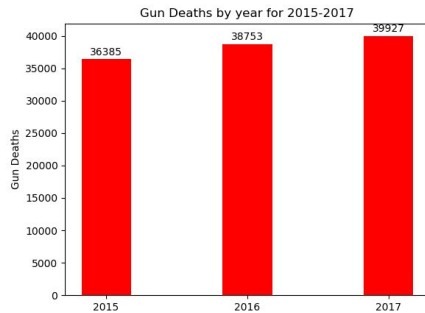
Is Race a factor in Homicide deaths?

74.8 homicide death victims per 1,000,000 people are Race - Black
34.73 homicide death victims per 1,000,000 people are Race - White
18.7 homicide death victims per 1,000,000 people are Race - Hispanic
1.34 homicide death victims per 1,000,000 people are Race - American Indian
Based on the chart below and the above analysis, Race does play a major factor.
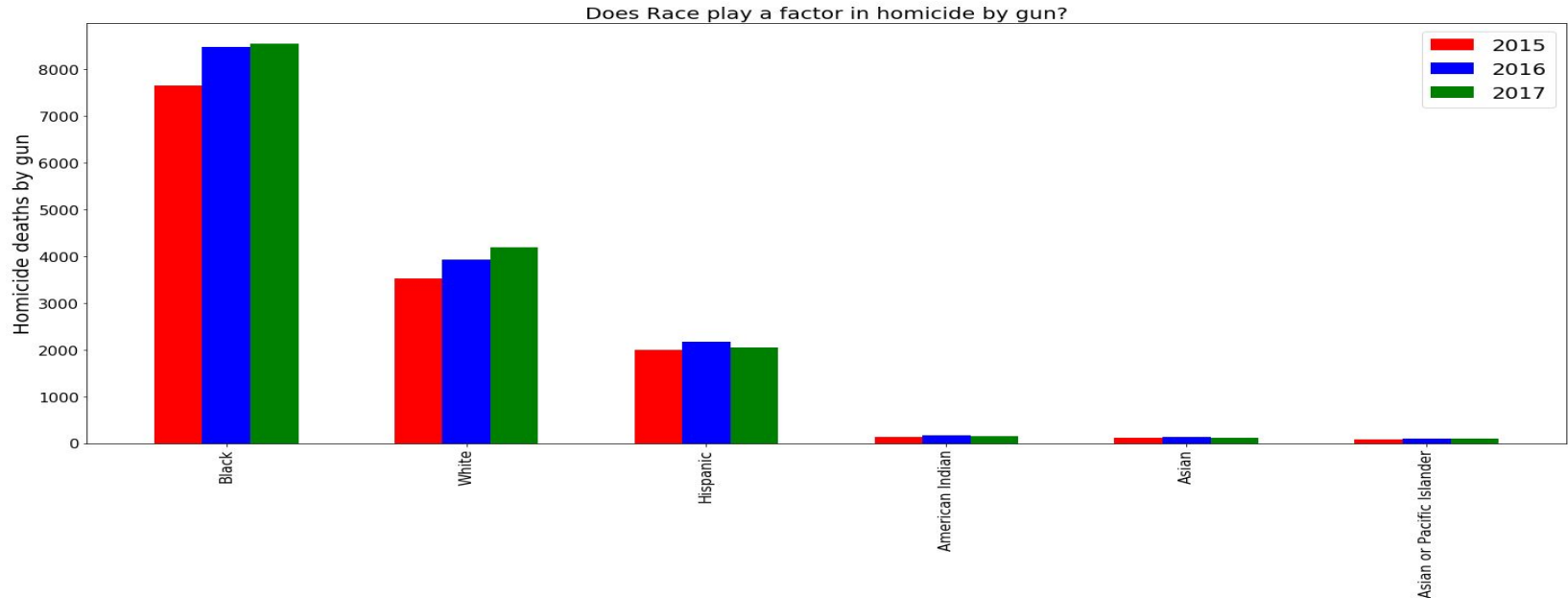
More Gun Deaths on Weekends?

- Here is the chart with the number of gun deaths by day
- Deaths on Sunday and Monday are more compared to the other days.
- Did a CHI SQUARE test on whether a day plays a significant role, Critical Value is 12.59 and Chi Square value is 235.50 which exceeds the critical value, so we conclude that day of the week play a significant factor in gun deaths.

Do gun deaths get worse on the weekends?

Summary

The data analysis proved our multiple hypothesis correct.

- Race is a major factor in Homicide. African Americans are almost twice as likely to be killed in legal intervention than Whites
- Whites have the highest suicide rate by firearms
- Gun-related suicide rates among men is strongly related to gun ownership and is many folds higher than female
- About 60% of all adult firearm deaths are by suicide, 61% more than deaths by homicide. Firearms remain the most common method of suicide
- There was a strong upward trend in adolescent suicides with guns as well as a sharp overall increase in suicides among those aged 75 and over
- The 15 through 34 age group remains significantly over-represented in violent crime statistics, particularly homicides involving firearms.
- Time of the Year (Summer) and Weekends do have higher death counts
- Chi-Suare test: Does Day of the week play a significant role?
  - Critical Value is 12.59 and Chi Square value is 235.50 which obviously exceeds the critical value, so we concluded that day play a factor as the results are statistically significant.
- Two Sample t test for whites vs black to determine if Race is a factor in Gun Violence:
  - The test for white death rate vs black death rate is statistically significant Ttest_ind Result(statistic=-5.7361192539804104, p-value=0.019696985270141125)

Summary continued….
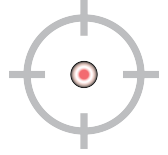
The data analysis proved our multiple hypothesis correct.

- Deaths by rifles have not gotten worse over time. In fact, the counts have decreased from 2016 to 2017, although the differences are not statistically significant. Of interest is the fact that suicides by large guns have decreased while homicides have increased, likely due to mass shootings.