Gun Deaths vs. Background Checks in the U.S.

Introduction

This is an exploration of how gun deaths occur in the United State with a final analysis of comparing overall gun deaths vs. background checks on a state by state and year by year basis for 2014-2017. The data was compiled from multiple queries to the database at www.gunviolence.com and a dataset from data.gov on background checks.

Compilation of data

The www.gunviolence.com database contains records of incidents of gun violence for the past 4 years. Although the database is searchable, it limits the size of the the .csv file that can be output. I did over 200 searches in the database compile the data and then loaded and merged all 200 files to create my main dataset.

Exploration of data

Monthly Data for the Entire United States

With grouping I produced a compilation of monthly totals from the incident entries in the main dataset. The first monthly trendline is shown comparing overall deaths due to gun violence to those caused by accidents, suicides and domestic violence.
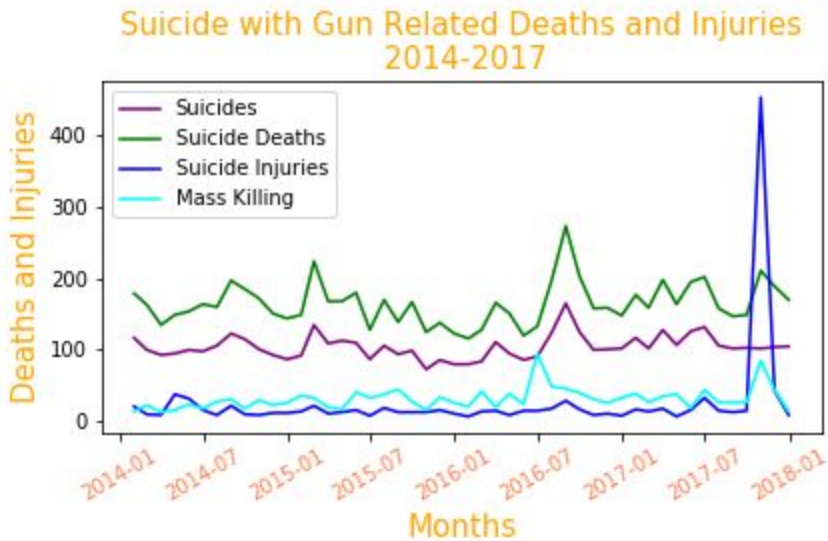
Gun Violence Deaths, 2014-2017
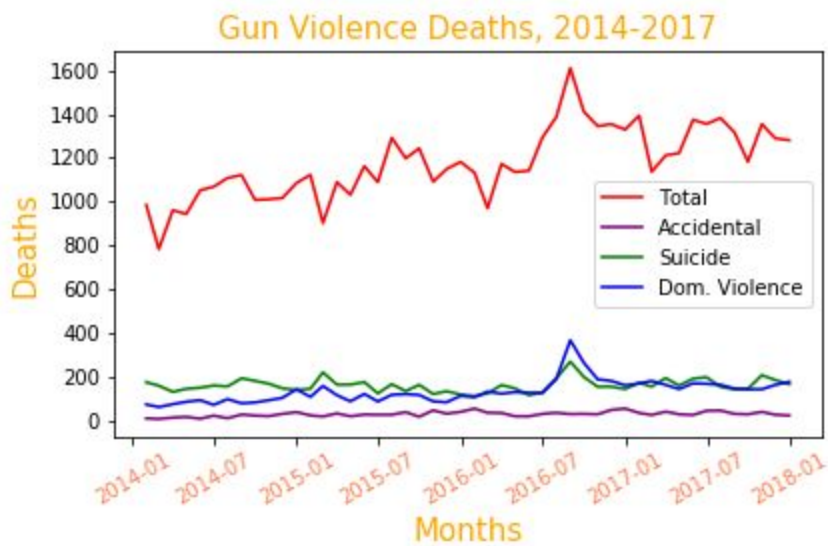
Deaths from accident, suicide and domestic violence in better detail.


Gun Violence Deaths, 2014-2017
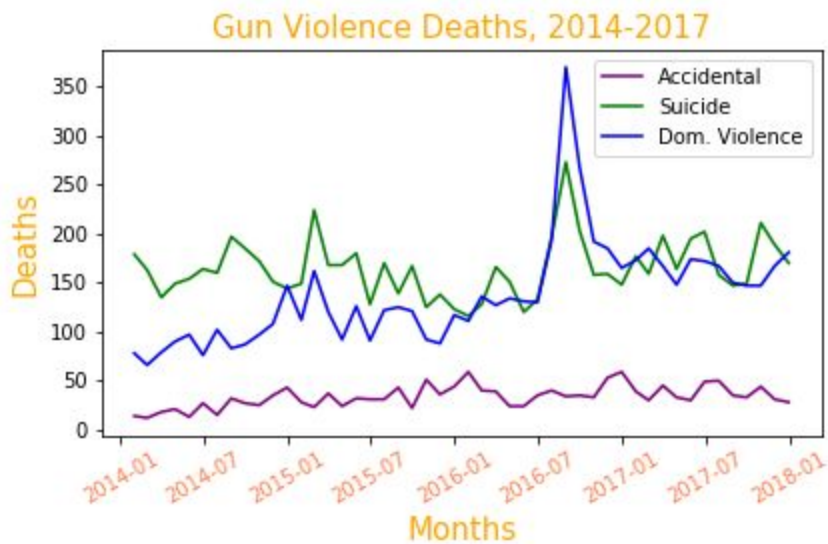
As you can see these kind of incidents are a low total of overall gun deaths, particularly accidents.

One thing that jumped out at me when looking at the incident reports was that multiple deaths often occurred in suicide related deaths, so I counted the actual suicide incidents to

compare with the overall deaths and injuries from the suicide incidents.

I also looked at gun violence deaths where police were involved in either being killed or killing someone. Here I used incident counts, as the overall death counts would be inflated as typically the police only kill one person per incident and only one officer is killed per incident typically. Unfortunately the data didn't allow me to do a more accurate analysis.
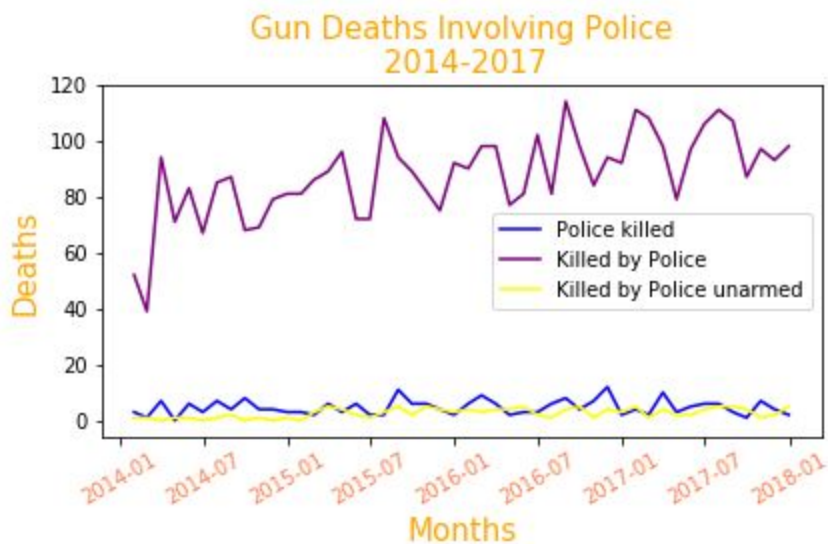
I also wanted to look at children dying from gun violence and the following chart gives is a summary of child deaths due to gun violence.
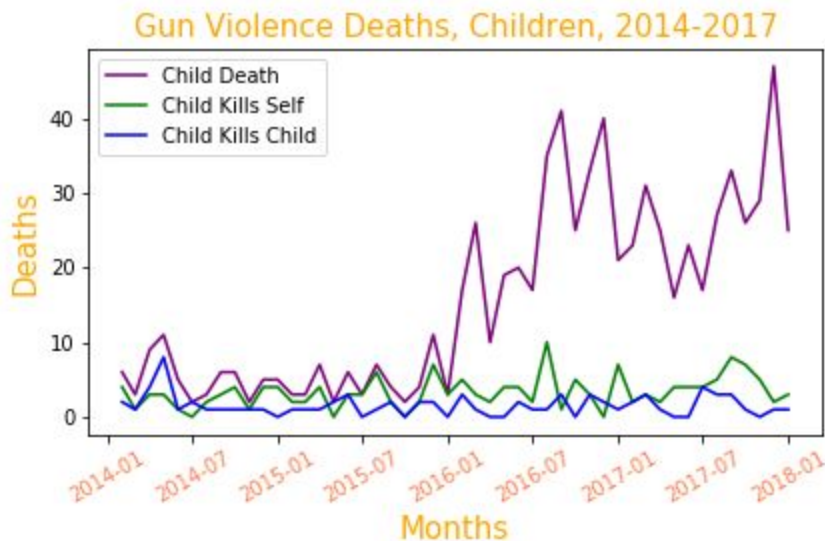

The first two years of the database did not do a good job of recording overall deaths children killed due to gun violence, which is why you see a huge jump in overall deaths in the last 2 years. The last two years are more representative of overall statistics of children killed by gun violence.

Yearly Data on a State by State Basis

With grouping I produced a compilation of yearly totals per state from the incident entries in the main dataset. The distribution of the state yearly totals is shown.

Histogram State Yearly Totals of Gun Violence Deaths
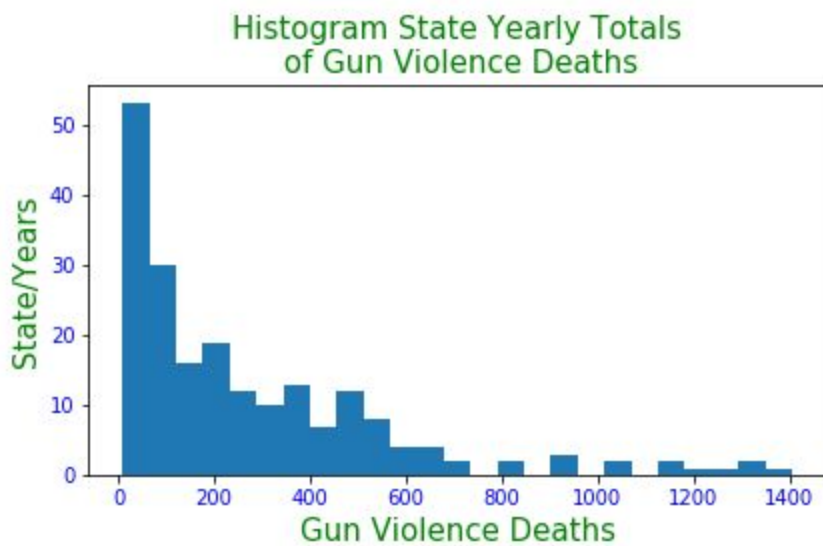
I further broke down the distribution by year in a violin plot, which is an enhanced box plot.
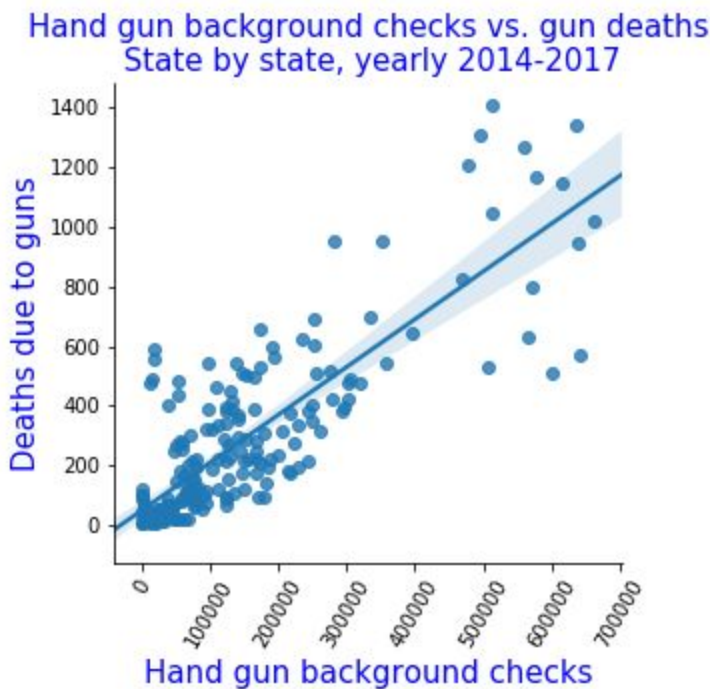

Gun Violence Deaths per State
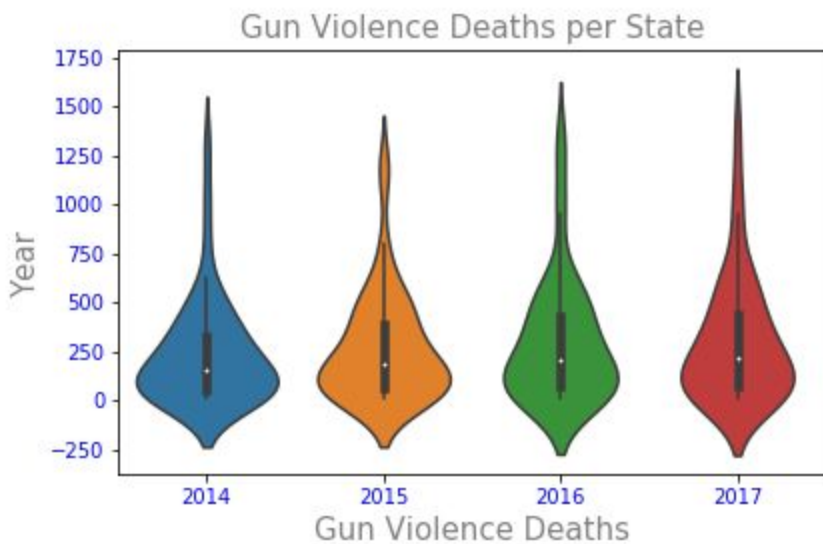
Hypothesis

H0 Hypothesis: Gun violence deaths and FBI background checks rates per state are related.

HA Hypothesis: Gun violence deaths and FBI background checks rates per state are not related.

I'm using FBI background checks to represent gun purchases per state as there is no real data for overall gun purchases.

Hypothesis testing

If there is a linear relationship between each state's deaths due to gun violence and FBI background checks then we say that they are related. I grouped the incidents by year and state to produce the following charts comparing overall gun deaths to FBI background checks for both handguns and long guns (rifles and shotguns).

Correlation for Handguns vs. Deaths/State/Year = 0.83078

Long gun background checks vs. gun deaths
State by state, yearly 2014-2017
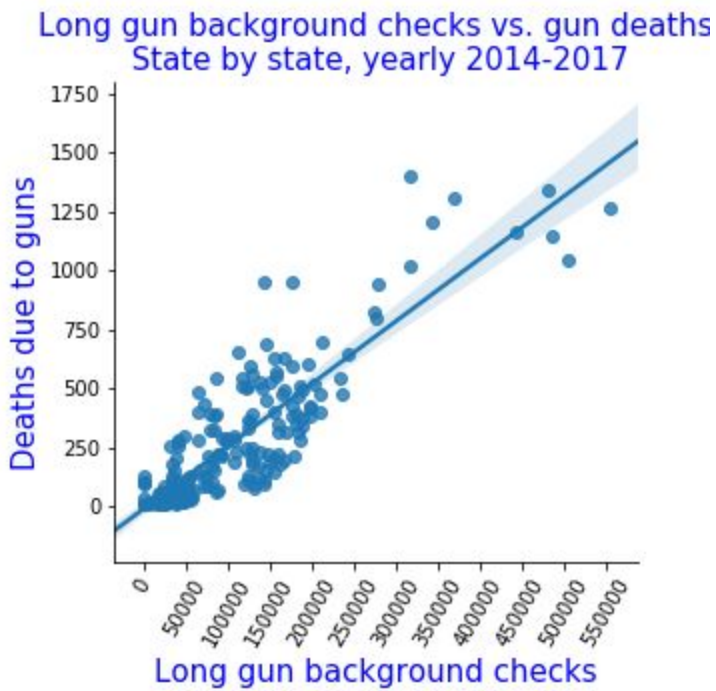
Correlation for Long Guns vs. Deaths/State/Year =0.86255

Conclusion

There is correlation between background checks and gun violence deaths, likely based on population as well.