

Gun Violence and its Trends in USA

ECE 143

Group - 15

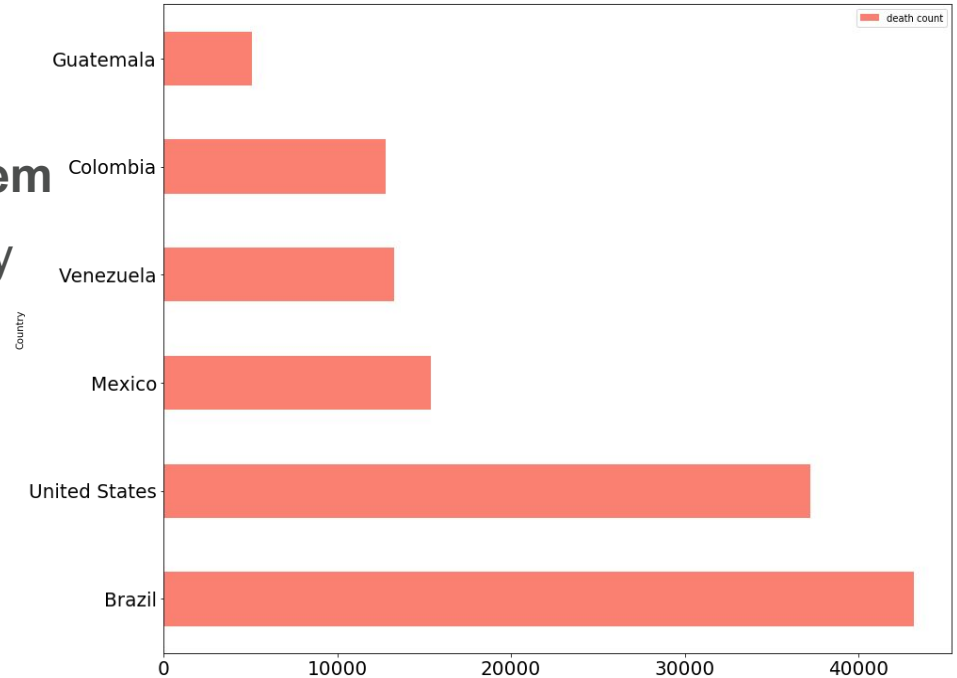
Arunkumar Ravichandran, Shiang Wu,
Saideep Reddy Pakkeer, Tongji Luo



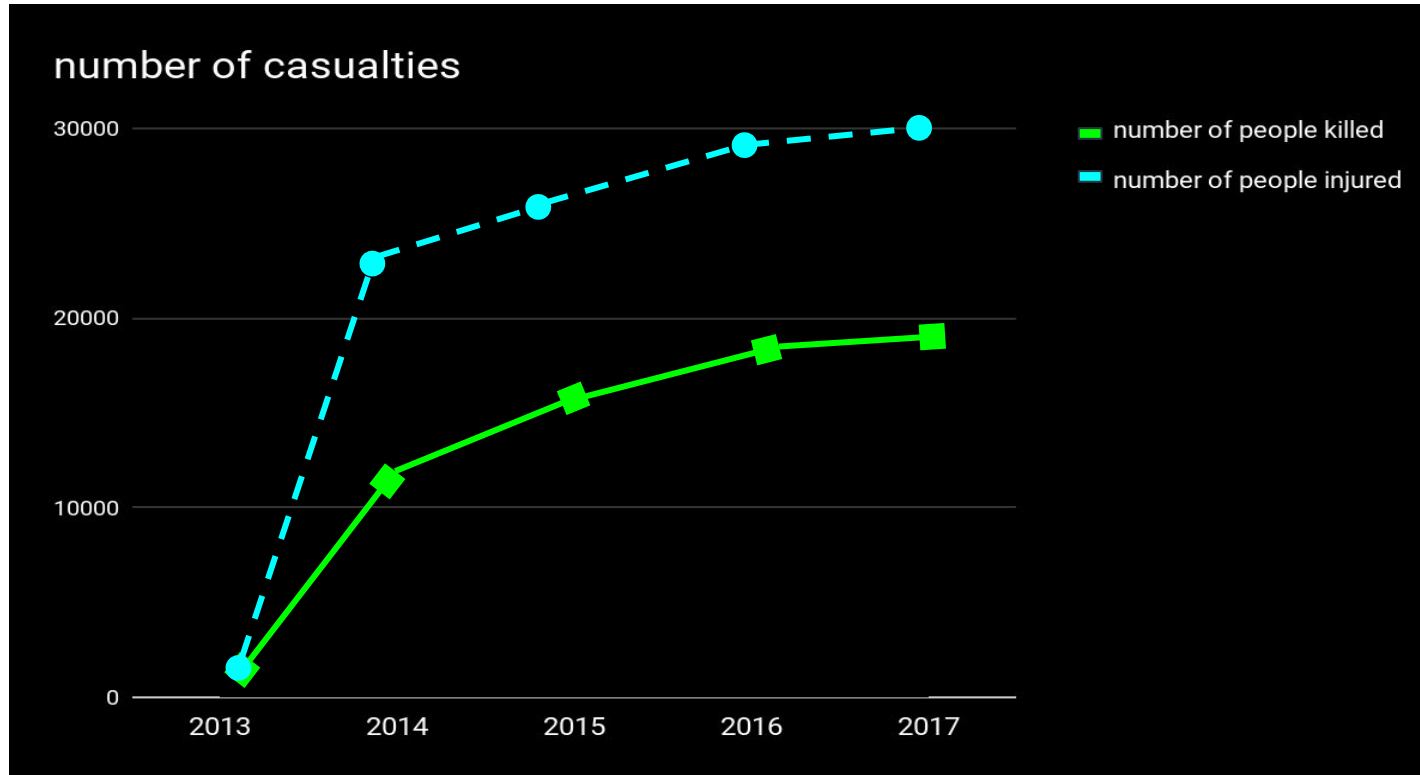
Gun Violence in USA

America's unique gun violence problem

- It has way more gun deaths than any other developed nation
- It has far higher levels of gun ownership than any other country in the world



Over the past few years the number of casualties related to gun violence has increased significantly



Goals

- Collect data related to Gun Violence including mental health, unemployment rate, gun licenses per state, funding by lobbyists, suicide rate, crime rate.
- Visualize data to find insights on key factors and trends

Data Collection

- We scraped the data from Gun Violence online archive using the BeautifulSoup package in python.
- We used several other sources including Kaggle for other datasets

The screenshot displays the Gun Violence Archive website interface. At the top, the header includes the site name 'GUN VIOLENCE Archive', navigation links (HOME, CHARTS & MAPS, LAST 72 HOURS, REPORTS, ANALYSIS/OPINION, ABOUT US, PAST YEARS, CONGRESSIONAL REPORTS), and user options (LOGIN, CONTACT US, Search Database) along with social media icons. The main content area features a title bar 'INCIDENT' and a specific incident entry: '3-11-2019 PENNSYLVANIA PHILADELPHIA 1-0'. Below this, the 'Location' section lists the date 'MARCH 11, 2019' and the address '800 block of S Cecil St Philadelphia, Pennsylvania'. The 'Participants' section provides a list of details: 'Type: Victim', 'Age: 17', 'Age Group: Teen 12-17', 'Gender: Male', and 'Status: Injured'. The 'Incident Characteristics' section notes 'Shot - Wounded/Injured'. The 'Notes' section states 'Shot in groin, leg, buttocks'. Finally, the 'Guns Involved' section is present but contains no text.

GUN VIOLENCE Archive

LOGIN CONTACT US Search Database

HOME CHARTS & MAPS LAST 72 HOURS REPORTS ANALYSIS/OPINION ABOUT US PAST YEARS CONGRESSIONAL REPORTS

INCIDENT

3-11-2019 PENNSYLVANIA PHILADELPHIA 1-0

Location

MARCH 11, 2019
800 block of S Cecil St
Philadelphia, Pennsylvania

Participants

- Type: Victim
- Age: 17
- Age Group: Teen 12-17
- Gender: Male
- Status: Injured

Incident Characteristics

- Shot - Wounded/Injured

Notes

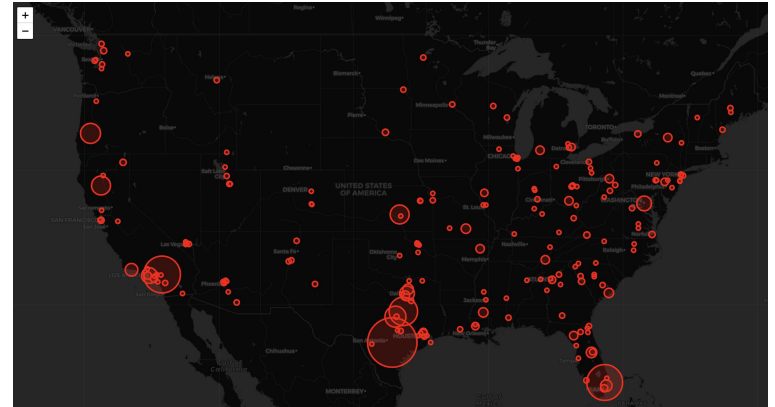
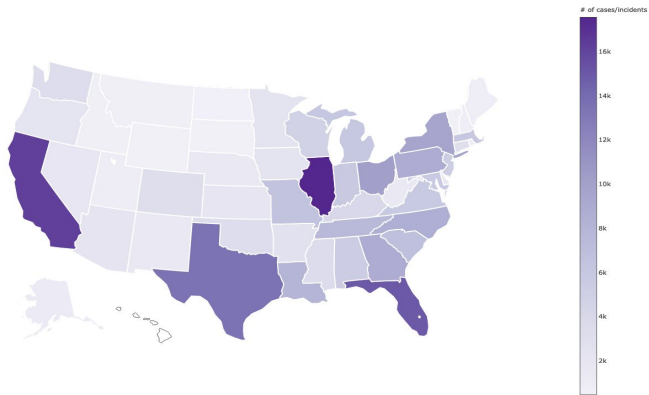
Shot in groin, leg, buttocks.

Guns Involved

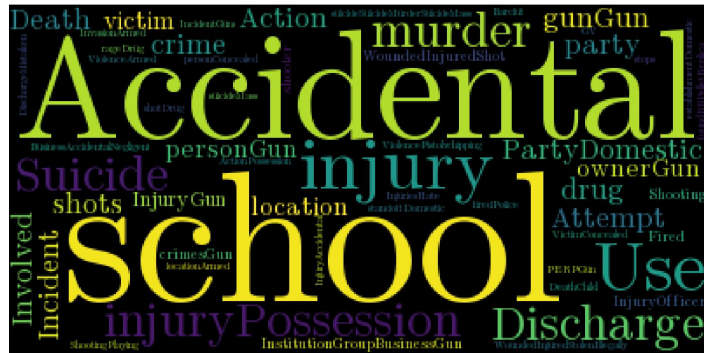
1 more involved

Exploratory Analysis

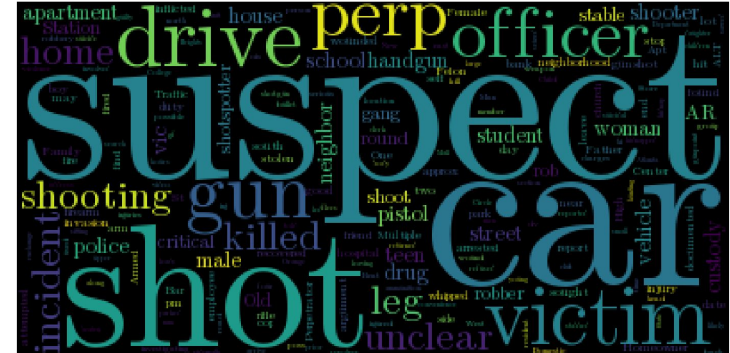
Gun Violence across different states



Characteristics of Gun Violence



Incident Characteristics



Notes

Data Sets of Interest

Mental Illness History

Unemployment

State Firearms

Crime Rate

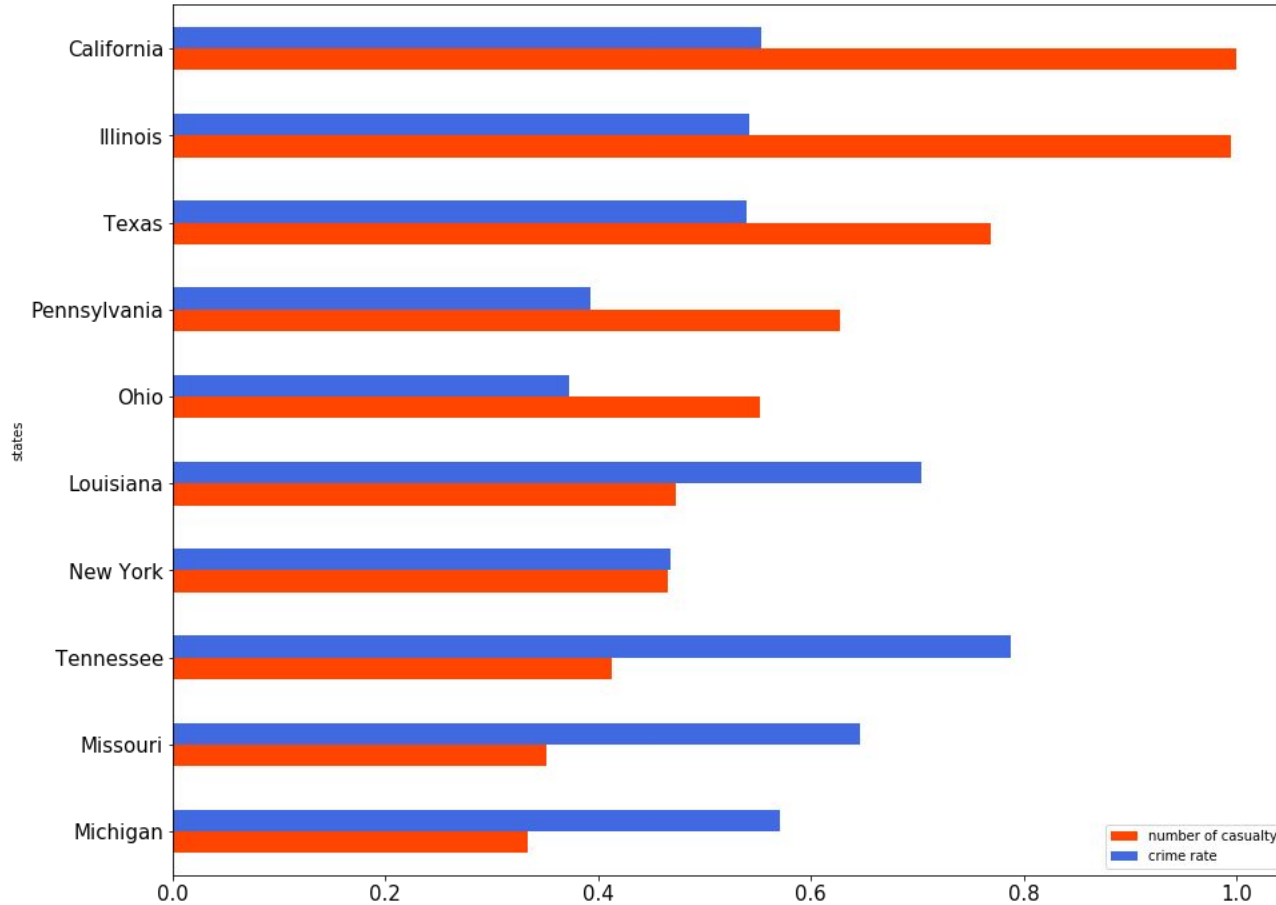
Gun Laws

Drug Use

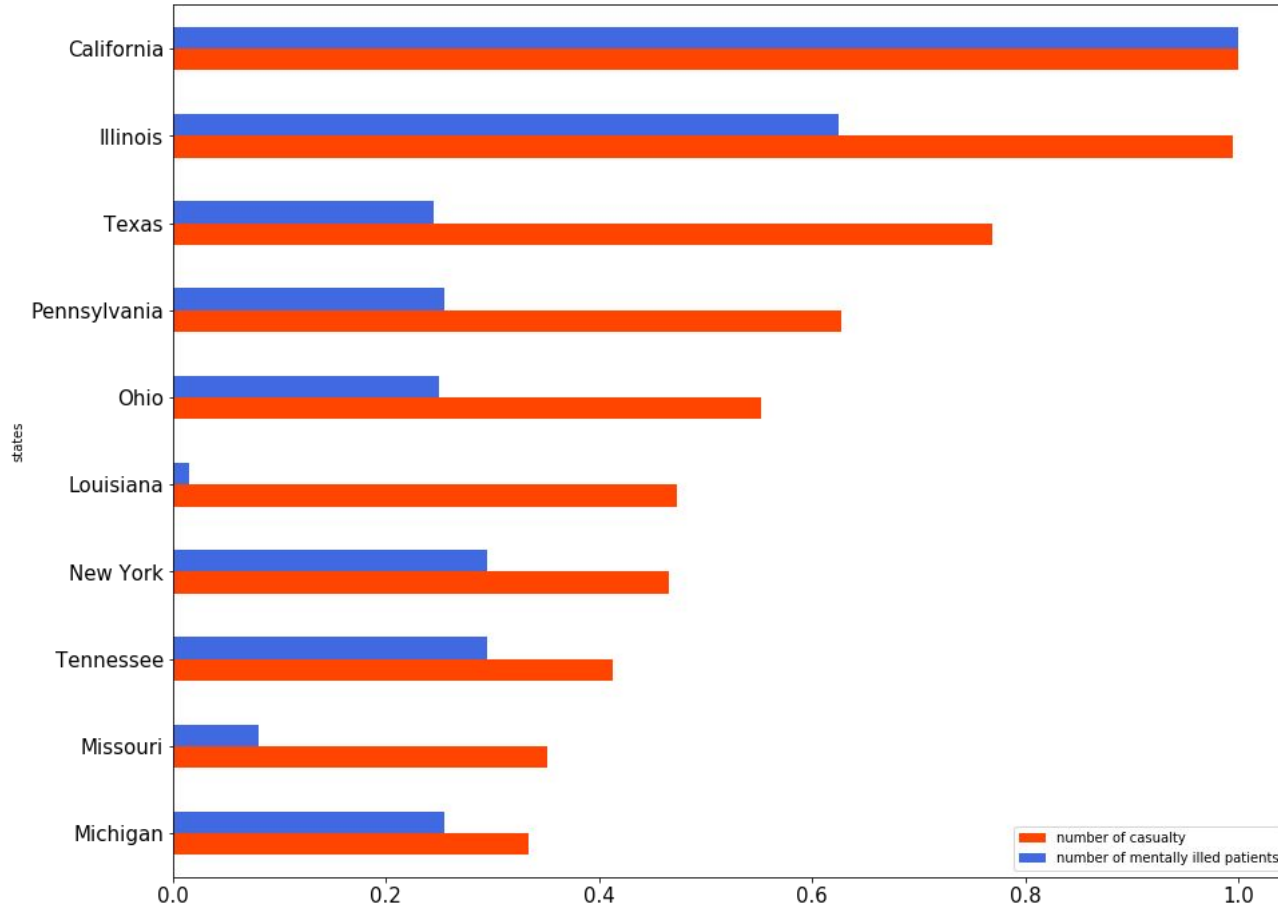
Gun Lobbyists Funding for election campaigns

Suicide Rate

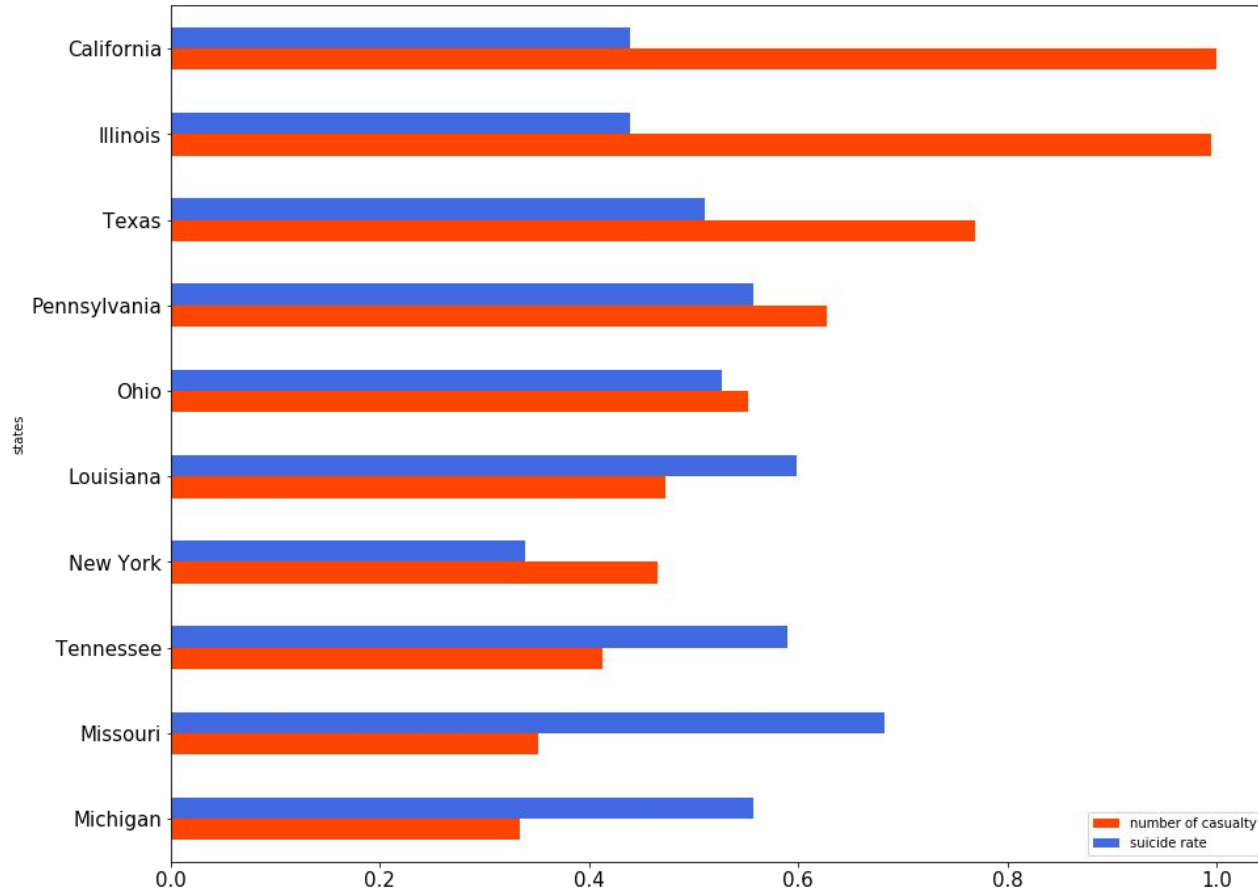
Gun Violence vs Crime Rate



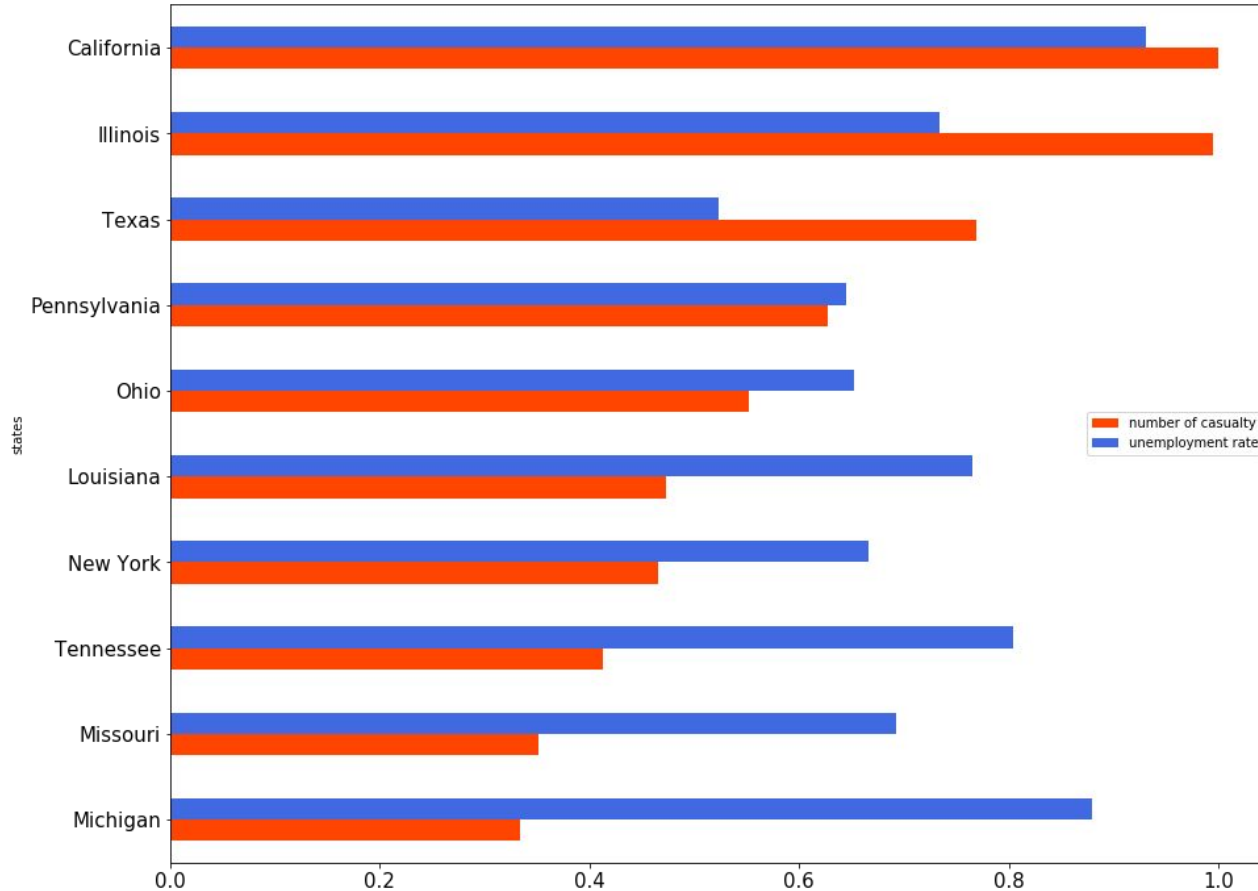
Gun Violence vs Mental Health



Gun Violence vs Suicide Rate

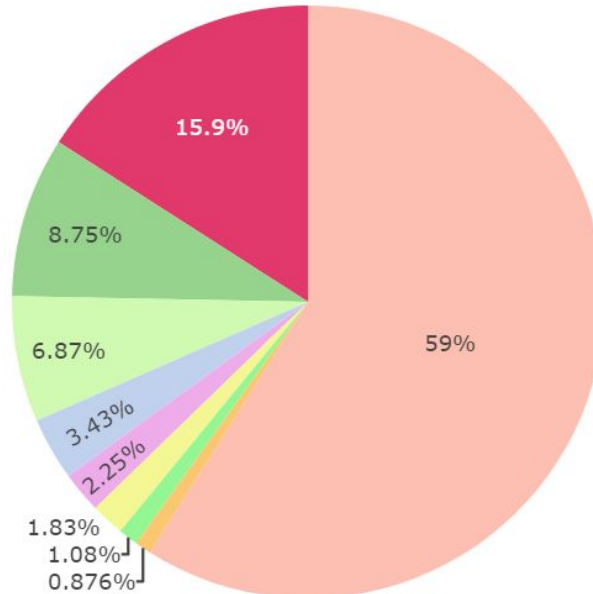


Gun Violence vs Unemployment



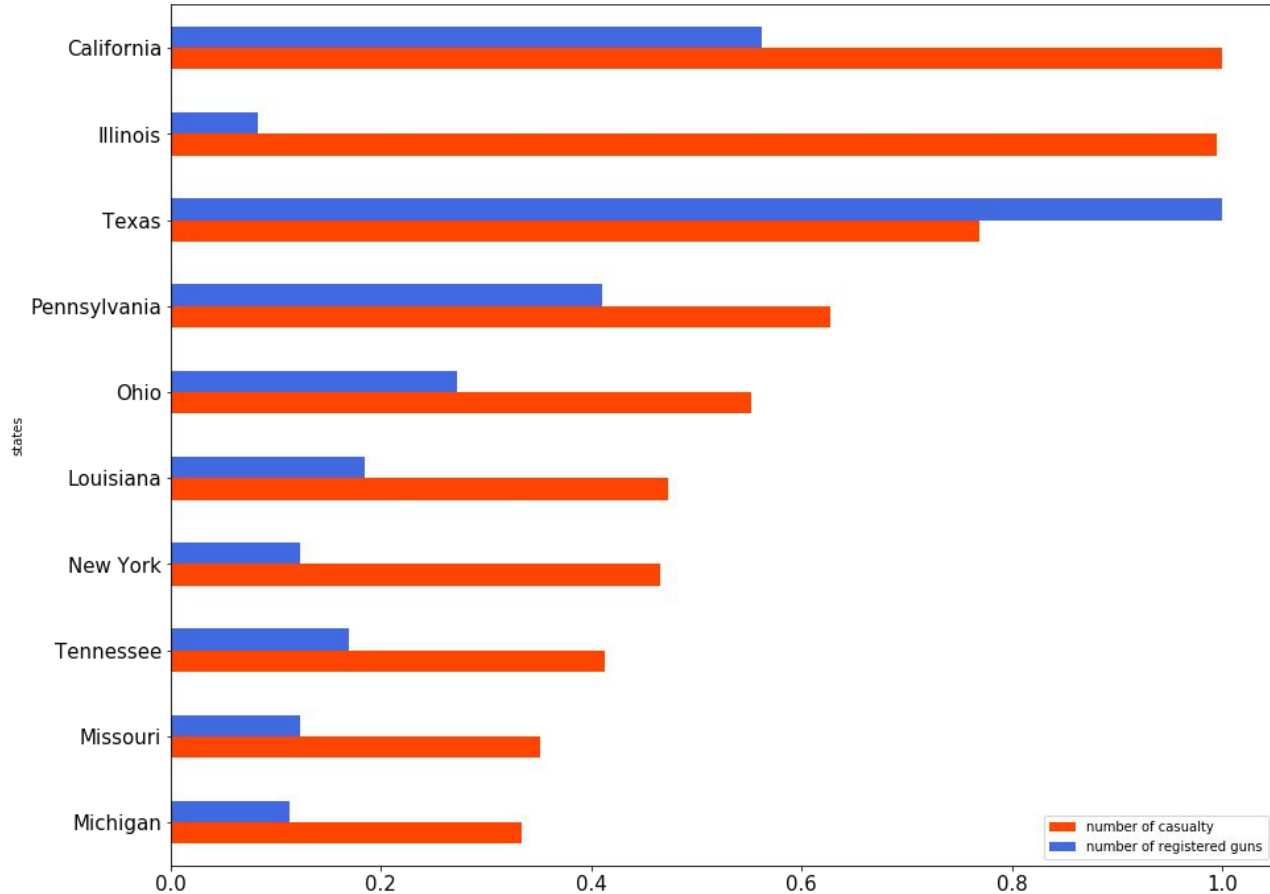
Guns used per incident

Number of Guns Used (More than 1)

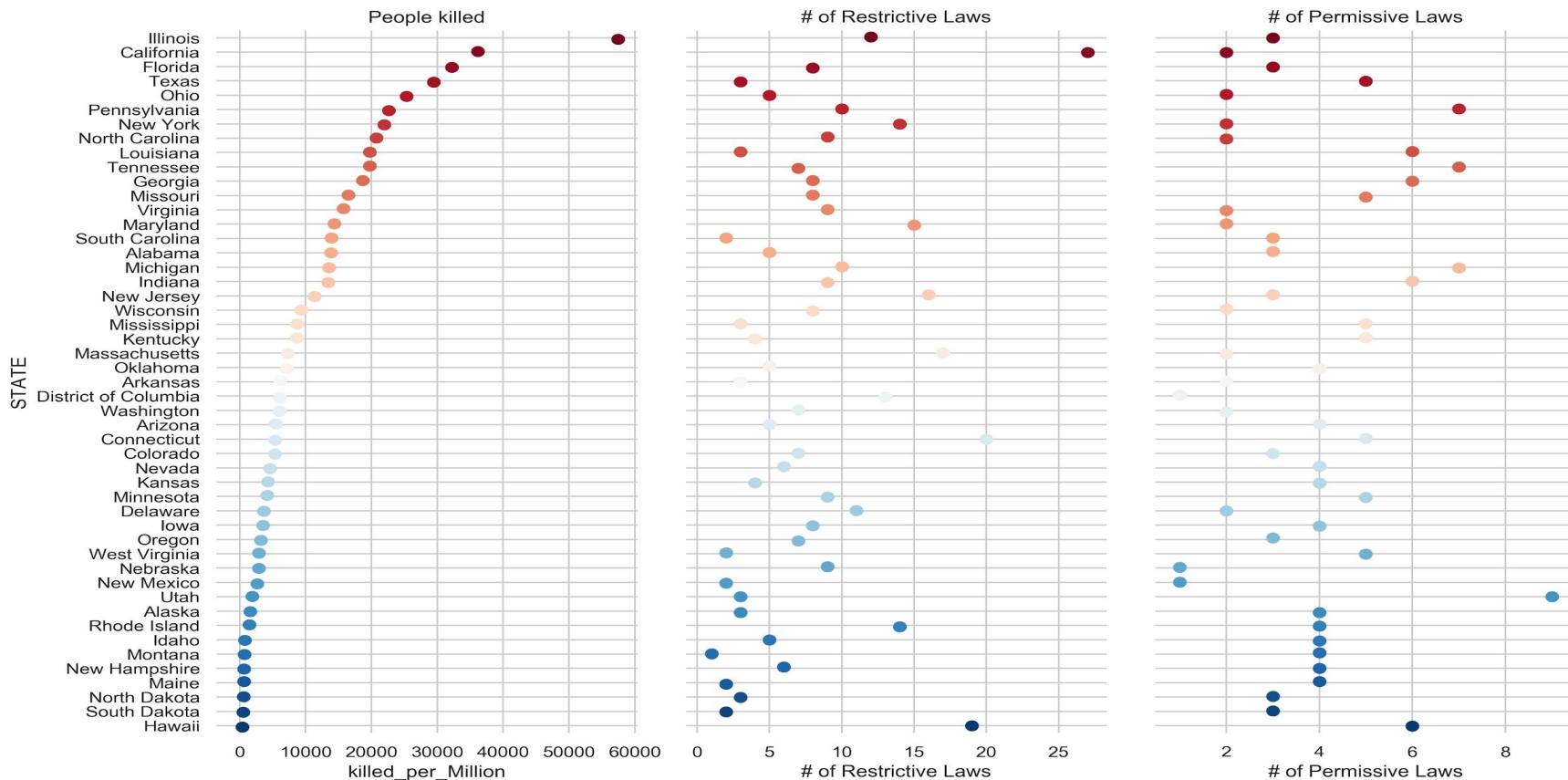


2.0 3.0 10+ 4.0 5.0 6.0 7.0 8.0 9.0

Gun Violence vs # Guns registered



Gun Violence vs Gun Laws

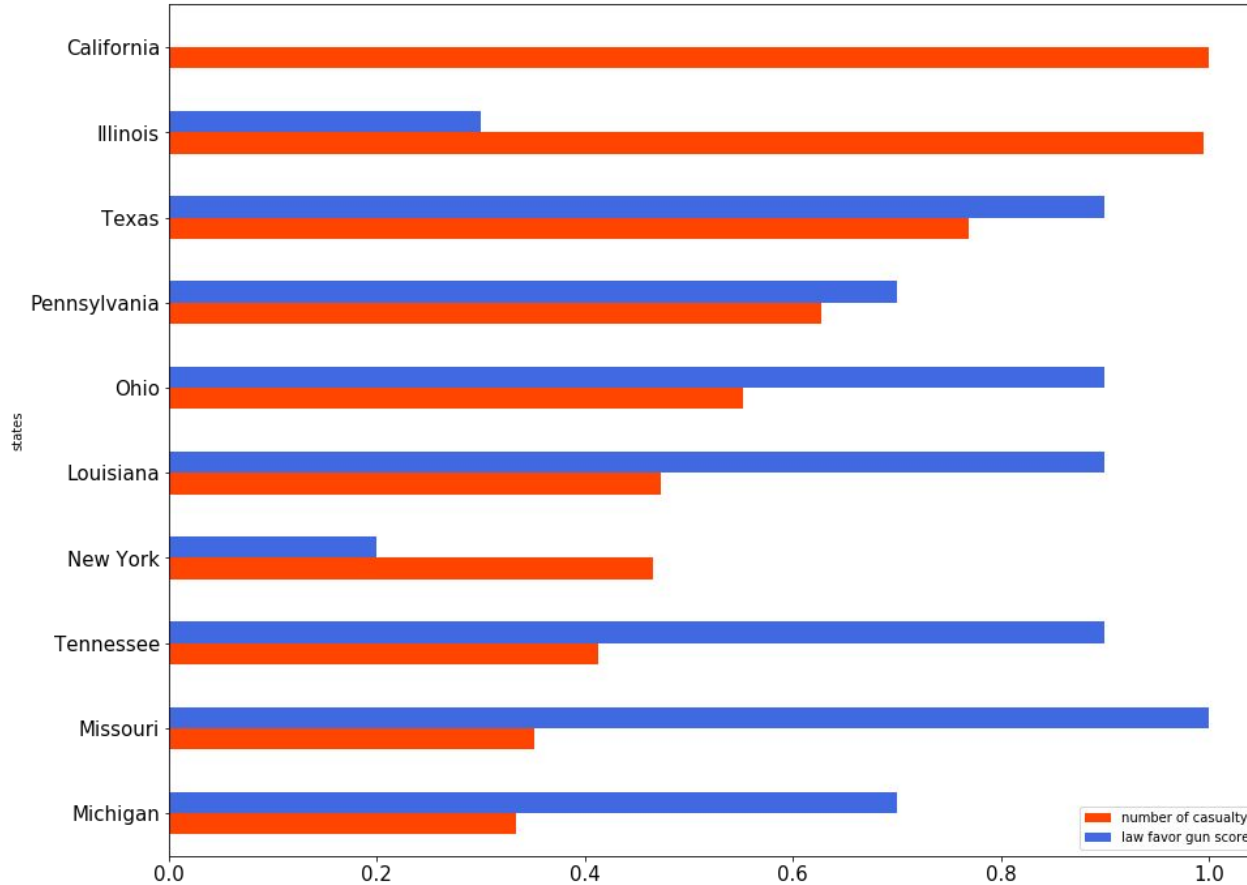


Numericalize States gun laws

✓ Georgia

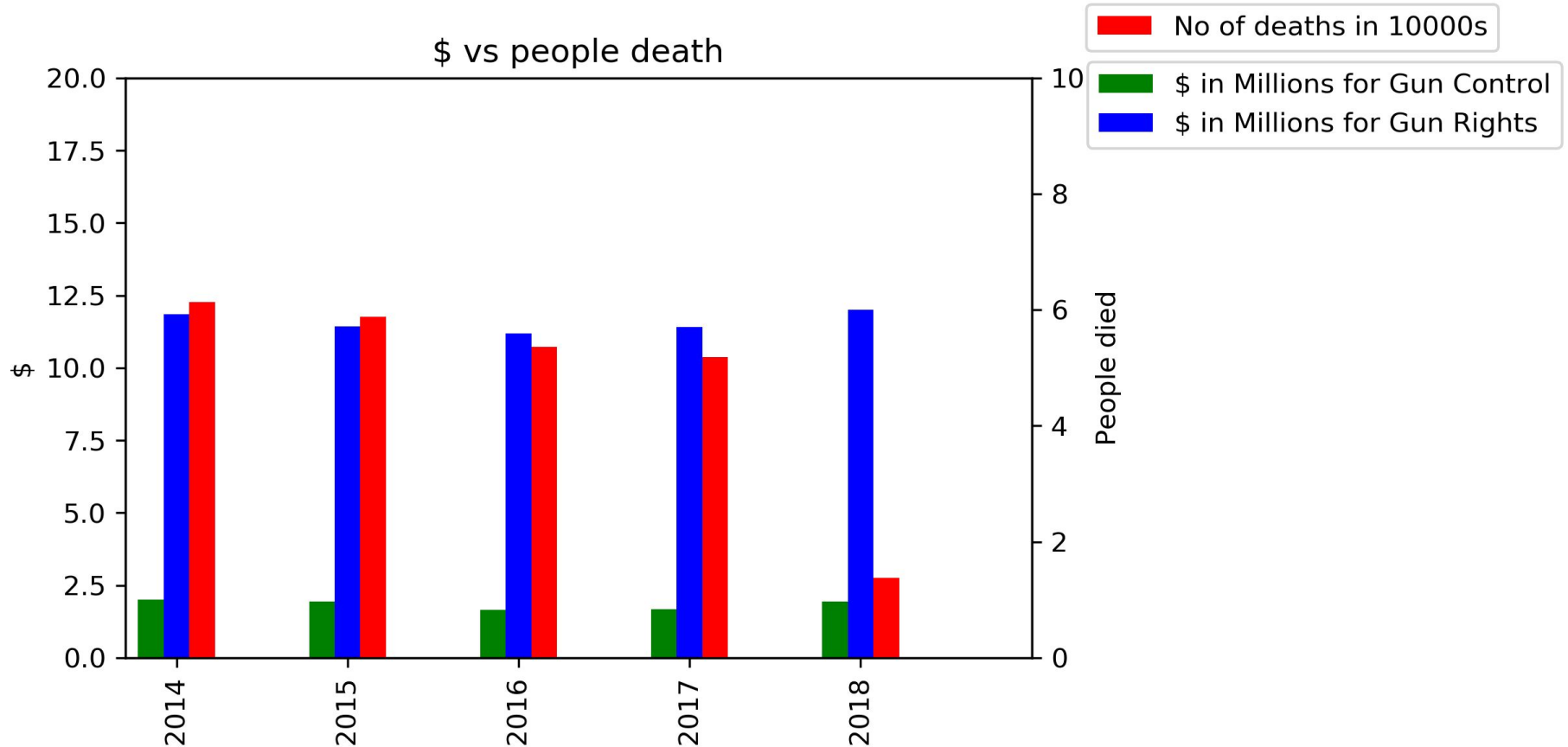
Subject	Handguns	Long Guns
Permit required	Yes	No
Purchase permit required	No	No
Registration of firearm	No	No
Open carry allowed	Yes	Yes
Background checks on private gun sales required	No	No
Magazine size restriction	No	No

Gun Violence vs Gun Law Restriction

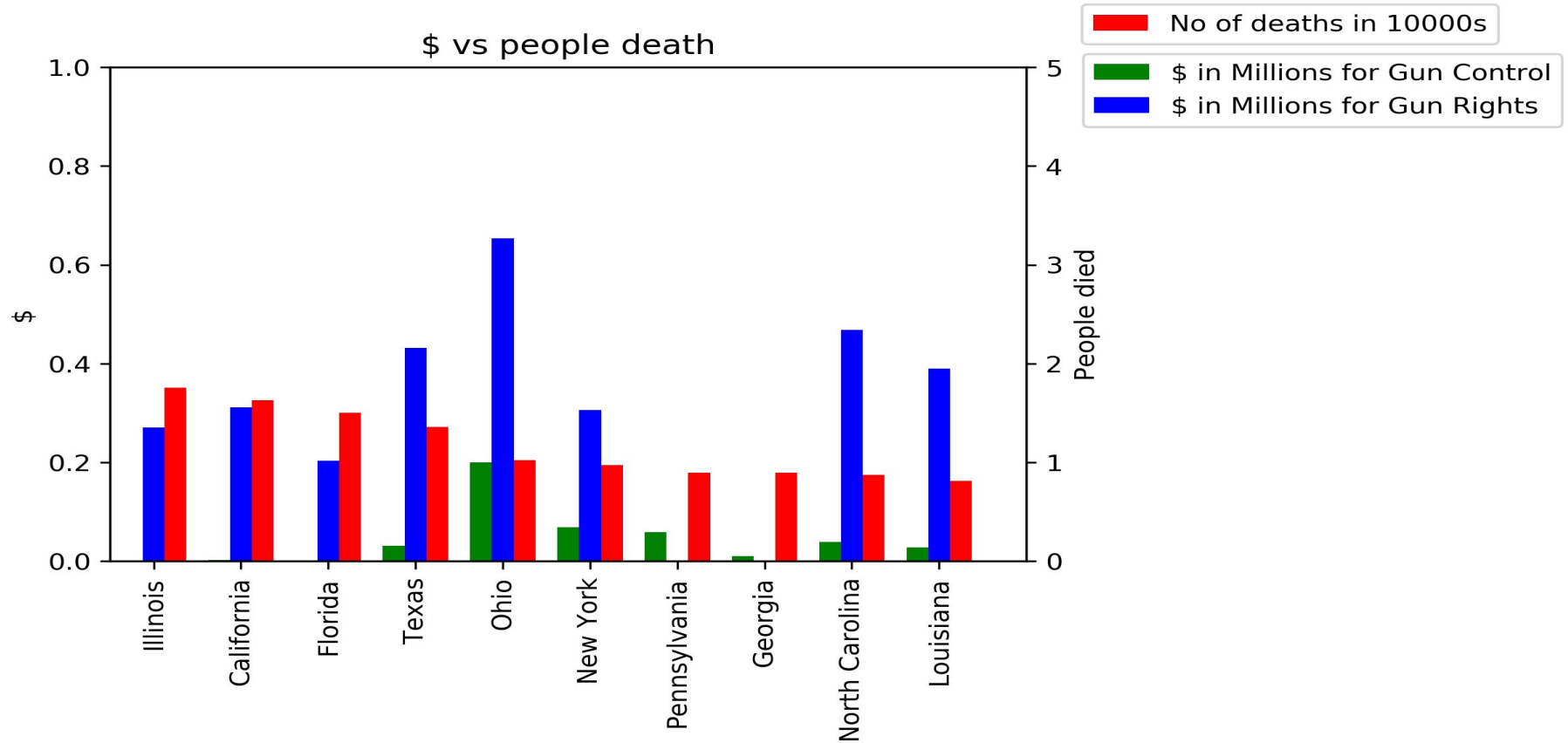


Guns and Money

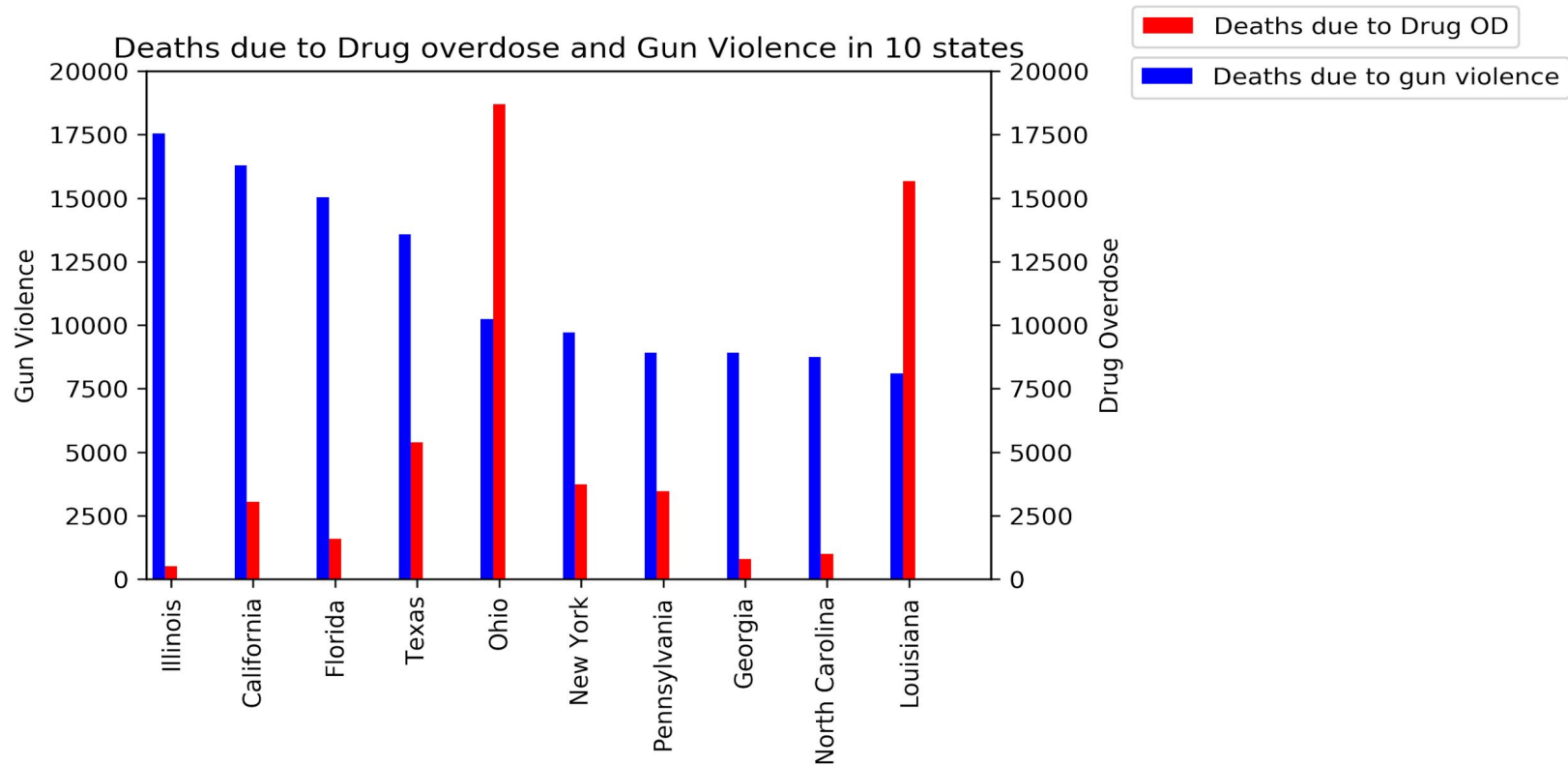
\$ vs people death



Gun Violence vs Political Funding across states



Is drug overdose an indicator for gun violence?



The coefficient rate for each factors



Pearson correlation coefficient

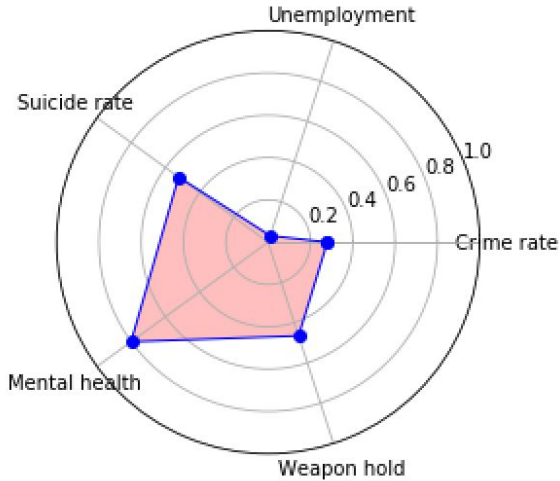
$$r = \frac{\sum_{i=1}^n (X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum_{i=1}^n (X_i - \bar{X})^2} \sqrt{\sum_{i=1}^n (Y_i - \bar{Y})^2}}$$

Year Features	2014	2015	2016
Suicide Rate	0.523	0.657	0.475
Crime Rate	0.280	0.243	0.163
Weapon Hold	0.466	0.313	0.219
Mental Health Rate	0.801	0.821	0.883
Unemployment Rate	0.032	0.065	0.314

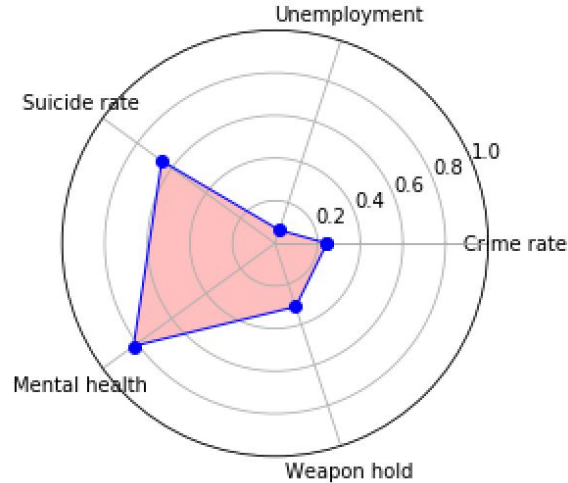
Radar Plots for the Coefficients



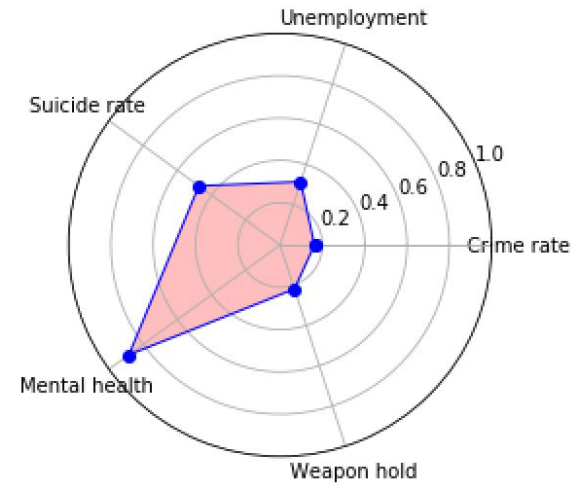
Radar plot for Cof 2014



Radar plot for Cof 2015



Radar plot for Cof 2016



Conclusion

US doesn't have one gun violence problem, it has several!

Insights Gathered:

- None of the features can determine the gun violence independently.
- All features are related to the gun violence by different magnitude.
- Compared to all the features which we studied, **mental health & suicide rate** have the highest correlation with gun violence and they need to be addressed.

(<https://www.vox.com/policy-and-politics/2017/10/2/16399418/us-gun-violence-statistics-maps-charts>)

