More Permits More Problems?

Tracing Factors Correlated to Gun Violence

December 13, 2019

Abstract

Why does the number of gun violence incidents continue to increase despite background checks and state policies? In my project, I explored the connection between gun violence and the number of permits granted which correlates to the number of firearms sold. By analyzing the number of permits granted each month between 2013 and 2017, I noticed a trend where the most permits sold was often in the month of March and the state that often sold the most permits was Kentucky. Through my data analysis, I also noticed that the number of permits sold has a positive correlation to the number of gun violence incidents. For a fixed number of permits granted, states in the south often had more gun violence incidents. However, states that require gun registration and other policies designed to reduce gun violence, such as bans on assault weapons, did not have drastically different levels of gun violence incidents compared to states that did not have these policies.

Background and Significance

Every year 36,000 people living in the United States are killed as a result of gun violence.[1] Individuals of all ages and from around the United States are at risk of becoming gun violence victims. Yet, with incidents of gun violence as increasingly constant fixtures of news broadcasts and articles, we are at the risk of growing desensitized to the epidemic of gun violence currently plaguing the United States. It is crucially important that we maintain an engaged and informed conversation about gun violence in the United States by focusing on data to work towards the creation of laws and programs that decrease rates of gun violence.

When discussing gun violence, the weather is often discussed as a potential cause. Giffords Law Center to Prevent Gun Violence argues that the number of murders increase with rising temperatures in summer months.[2] Additionally, an article called "A Rise in Murder, Let's Talk About the Weather" published in the New York Times argues that murders increase in summer months.[3] However, connecting gun violence to the weather is a dangerously detached approach to reducing gun violence as it implicates that gun violence is as unpredictable as the weather. What other factors lead to gun violence that politicians and citizens can modify to reduce rates of gun violence?

The number of permits granted is a strong indicator of the number of firearms sold. Further, sudden increases in background checks often parallel stricter gun laws following gun violence incidents.[4] For my data analysis, I focused my analysis of factors correlated to gun violence by exploring the months and states that granted the highest number of permits (Appendix A and B). I then connected those months and states to the number of gun violence incidents for a given year (Appendix G). By looking at gun violence through the lens of permits sold, I analyzed the average number of permits granted and the number of gun violence incidents grouped by region and state (Appendix E and F). I would expect that more permits would lead to an increase in gun violence incidents. Exploration that focuses on a comparison between states that have certain gun violence policies and states that do not could provide insight into whether current state policy on gun violence is effective.

Methods

For my project, I combined data from The National Instant Criminal Background Check System provided by the Federal Bureau of Investigation with population data from The United States Census Bureau. I also joined a gun violence data set which uses data from the Gun Violence Archive, an organization that provides data for specific instances of gun violence. Additionally,

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[1] Gun Violence Statistics. (n.d.). Retrieved from https://lawcenter.giffords.org/facts/gun-violence-statistics/.

[2] Shootings Spike in Summer Months. (n.d.). Retrieved from https://lawcenter.giffords.org/resources/publications/shootings-spike-in-summer-months/.

[3] Asher, J. (2018, September 21). A Rise in Murder? Let's Talk About the Weather. Retrieved from https://www.nytimes.com/2018/09/21/upshot/a-rise-in-murder-lets-talk-about-the-weather.html.

[4] Johnson, K. (2019, November 25). Black Friday gun deals: Background checks surge as shoppers buy in response to gun control proposals. Retrieved from https://www.usatoday.com/story/news/politics/2019/11/25/fbi-background-checks-rise-amid-mass-shootings-calls-gun-control/4228725002/.

I used a dataset called Correlates of State Policy which provides information on which states have policies related to guns.

To combine my data, I joined by state, year, and month while only keeping the columns that were relevant to my project. The primary analytic method that I used to explore the connection between permits granted and gun violence incidents were multivariate linear regressions. I created a multivariate linear regression where gun violence is my dependent variable and the number of permits granted and population are the independent variables (Appendix E and F). By creating linear regressions for geographic regions as well as for all 50 states, I was able to see how the number of permits granted and gun violence incidents varied by region in the United States.

Results and Discussion

According to my data analysis, March is most often the month with the most number of permits granted as the most number of permits were granted in March in 2014, 2016, and 2017 and the second highest number of permits was granted in March 2015 (Appendix A). Furthermore, Kentucky is the state that granted the most number of permits in the month of March as it granted the most number of permits in 2015, 2016, and 2017 and was the state that granted the second highest number of permits in 2014 (Appendix B). Kentucky often granted more permits than much larger states such as California which has a population of about 40 million compared to the population of Kentucky at 4 million.[5] However, Kentucky also granted the most number of permits in December 2015 when officials granted the most permits in December.

How do gun permits specifically relate to gun violence? States that granted a high number of permits saw higher numbers of gun violence incidents compared to states that granted less permits. Furthermore, four of the nine states in Appendix G that are highlighted to indicate that they were a state that granted a top number of permits are in the south. In all regions of the United States, there is a strong positive correlation between the number of permits granted and the number of gun violence incidents (Appendix E). For example, for a fixed number of one thousand permits granted in a given month, states in the south have more gun violence incidents than states in the west, northeast, and midwest (Appendix F).

In the coefficient plot, the constant, or intercept, is the expected regression estimate (Appendix C). The horizontal lines show the 95% confidence intervals for the constant value. This indicates that if we were to get more samples with the same methods, it would be expected that the value of the constant would be within the lines of the confidence interval 95% of the time. Despite the small values of the regression estimates, the permit and population are still significant because the likelihood of no interaction between the variables of permit and population and gun violence is .05, or 5%. Therefore, the independent variables of permits granted and the population are expected to have a positive relationship with the dependent variable of gun

[5] Data Access and Dissemination Systems (DADS). (2010, October 5). American FactFinder. Retrieved from https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml?src=bkmk.

violence. As the population in a particular area increases, the number of gun violence incidents are also expected to increase. However, in order to more accurately view the values of the variables of permit and population in the regression, I omitted the intercept to create a fixed effects model. The negative regression estimate associated with the permit indicates that the permit value has an extremely slight negative relationship with gun violence as the regression estimate is between -0.0002 and -0.001 (Appendix D). Since the regression estimate associated with population is a very small positive number, as the population increases the number of gun violence incidents increases. Therefore, a population increase is a better predictor of an increase in gun violence while an increase in the number of permits granted likely indicates less gun violence incidents.

In analyzing factors correlated to gun violence, I also looked at state-wide gun registration requirements and laws (Appendix H). The specific policies I looked at were gun registration requirements, waiting period laws, bans on assault weapons, open carry policies, and stand your ground policies. I compared states that did have certain policies designed to reduce gun violence with states that did not have the policies. By taking the population of each state into account, I found the per capita number of incidents in each state. Considering the gun violence in each state in terms of the population allows for a stronger comparison of gun violence levels in each state. Without considering gun violence per capita, it would not be accurate to compare the levels of gun violence in California to New Hampshire as the population of California is much higher than the population in New Hampshire.

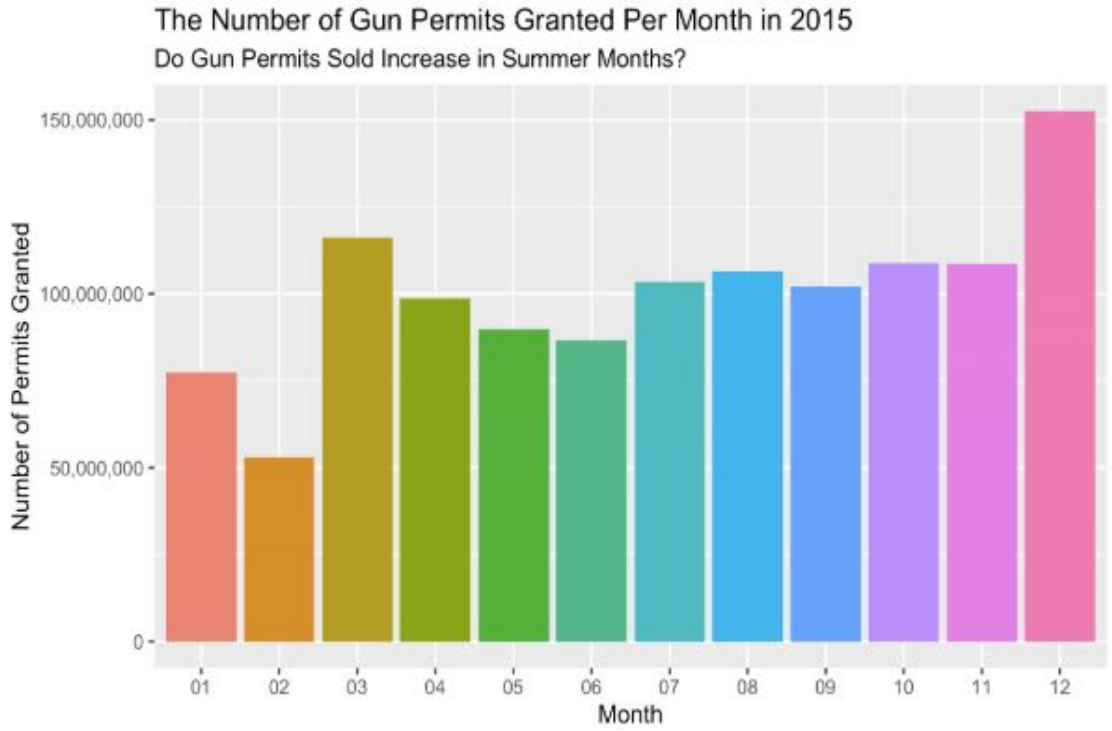
More specifically, I found that there were fewer states that surpassed 200 incidents per million residents for states that require gun registration compared to states that did not require gun registration (Appendix H). Across all the state policies I analyzed, Delaware often had an extremely high per capita number of incidents and did not require gun registration, does not have a waiting period law or a ban on assault weapons, and has a stand your ground policy. Stand your ground policies permit individuals to defend themselves with firearms without first trying to negotiate or retreat.[6] Furthermore, only two states that have waiting period laws had more than 200 per capita number of incidents while nine states that did not have a waiting period law had more than 200 per capita number of incidents. Similarly, ten states that do not have a ban on assault weapons had more than 200 per capita incidents while only one state that did not have an assault weapon ban had more than 200 incidents per capita.

Opportunities for further study include looking at state policy data as well as specific state policies for a longer period of time, as my state policy data was restricted to 2013 and 2014. Furthermore, potentially finding sources of information that detail rates of gun violence in a specific area before and after the implementation of a gun violence prevention program could function with my data on the number of permits granted per month.

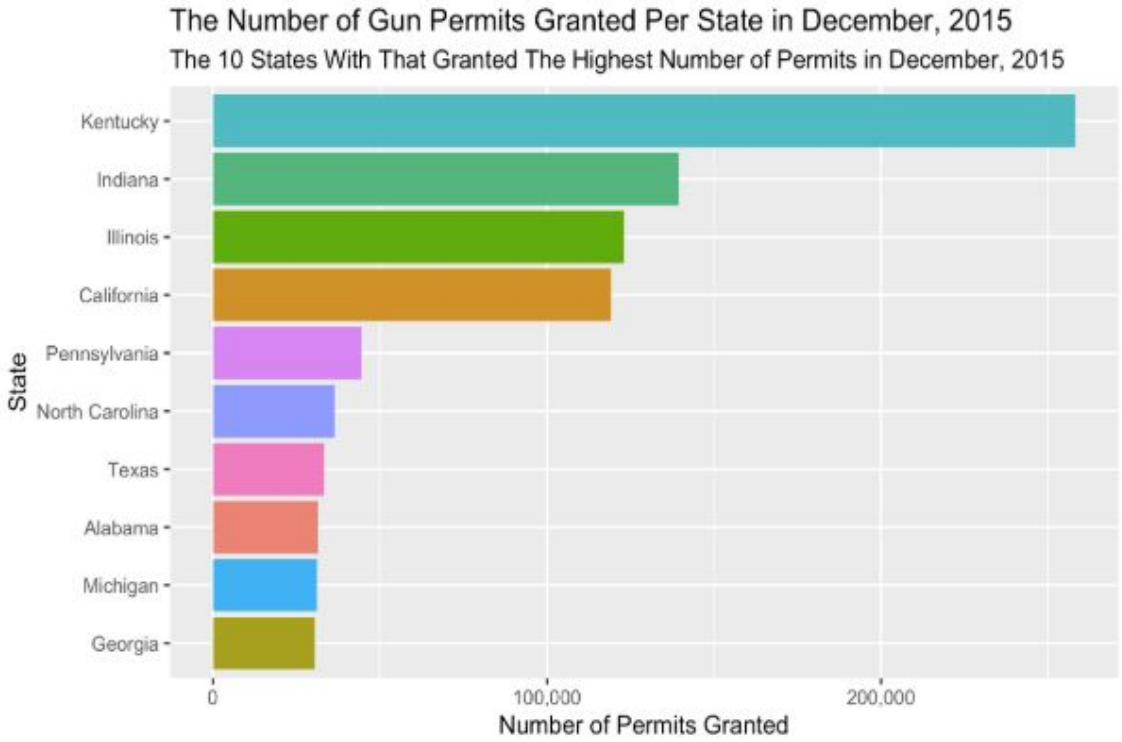
Appendix

[6] "Stand Your Ground" Laws. (n.d.). Retrieved from https://lawcenter.giffords.org/gun-laws/policy-areas/guns-in-public/stand-your-ground-laws/.

A


The Number of Gun Permits Granted Per Month in 2015
Do Gun Permits Sold Increase in Summer Months?
150,000,000
100,000,000
50,000,000
0
Number of Permits Granted
01
02
03
04
05
06
07
08
09
10
11
12
Month

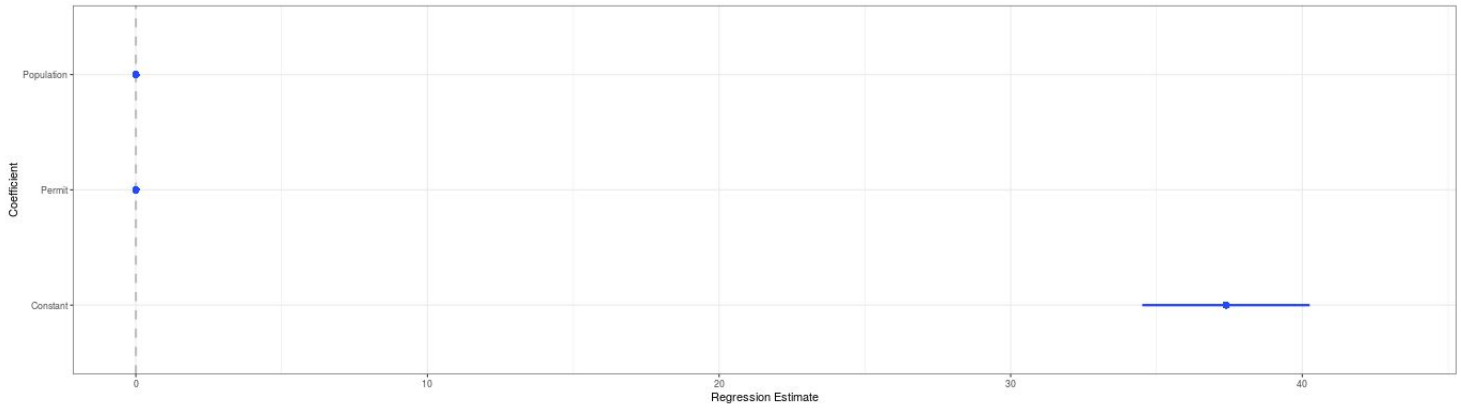
B


The Number of Gun Permits Granted Per State in December, 2015
The 10 States With That Granted The Highest Number of Permits in December, 2015
Kentucky
Indiana
Illinois
California
Pennsylvania
North Carolina
Texas
Alabama
Michigan
Georgia
State
0
100,000
200,000
Number of Permits Granted

C

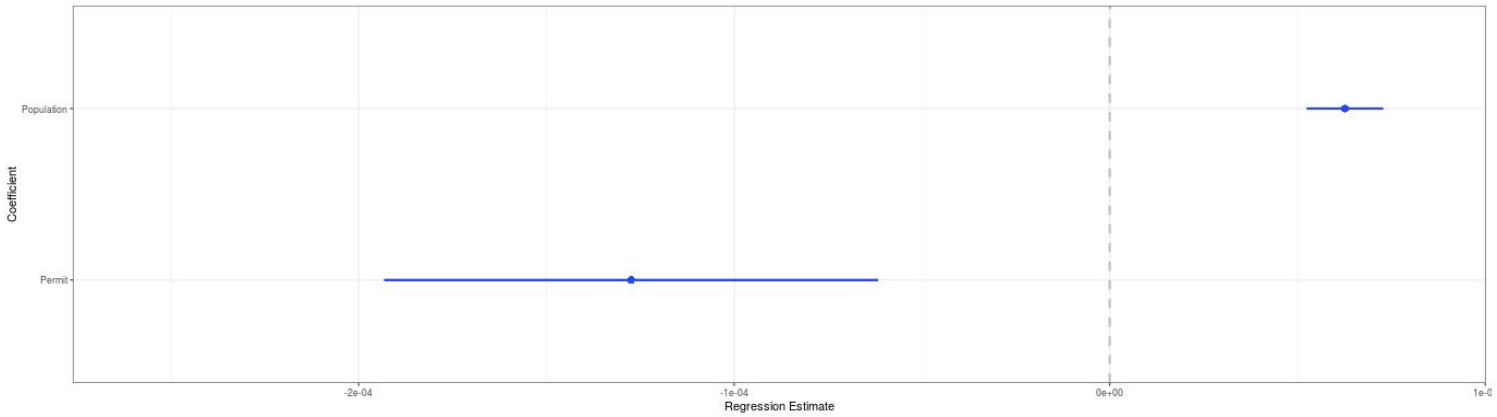
Coefficient plot with the intercept

The following plots estimate the number of gun violence incidents dependent on the number of permits granted and the population.



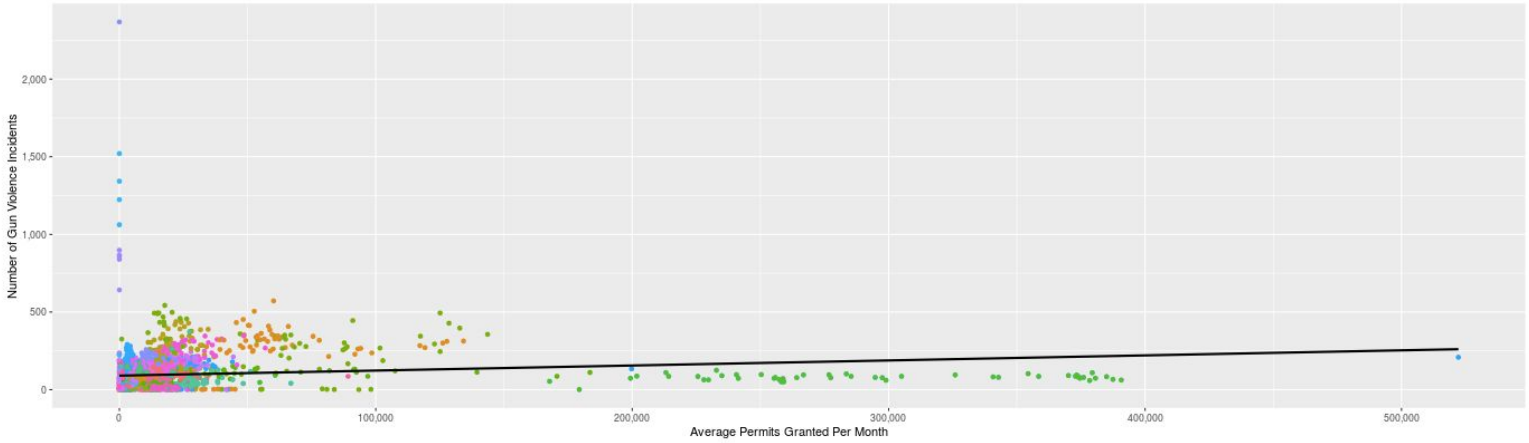
D

Fixed effects model (omitting the intercept)

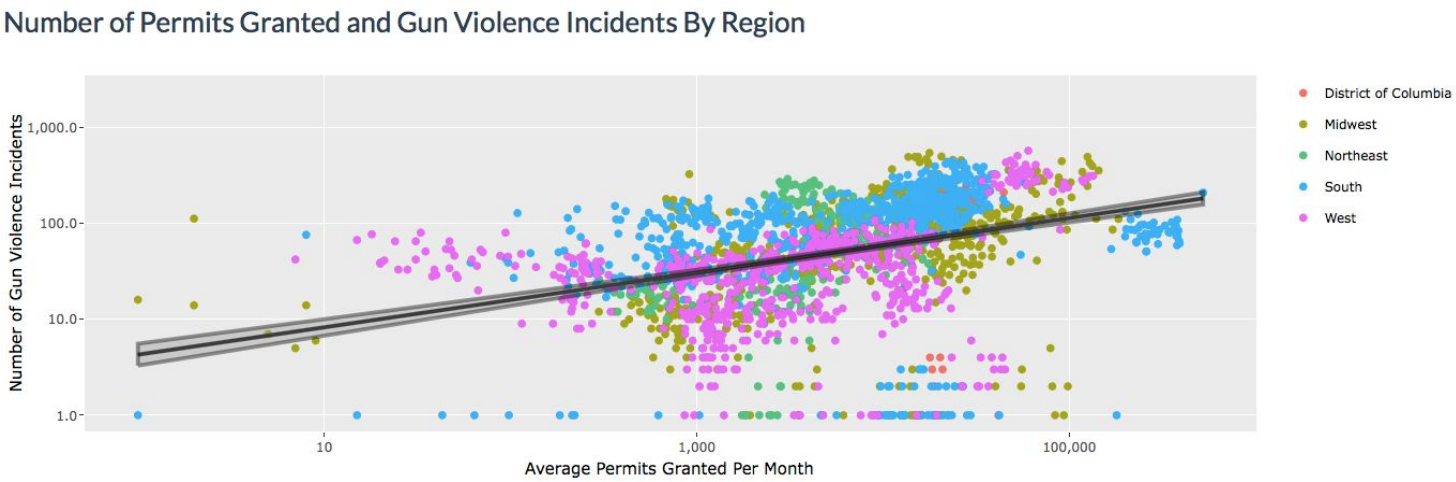


E

The Impact of Permits Granted on the Number of Gun Violence Incidents



F



G

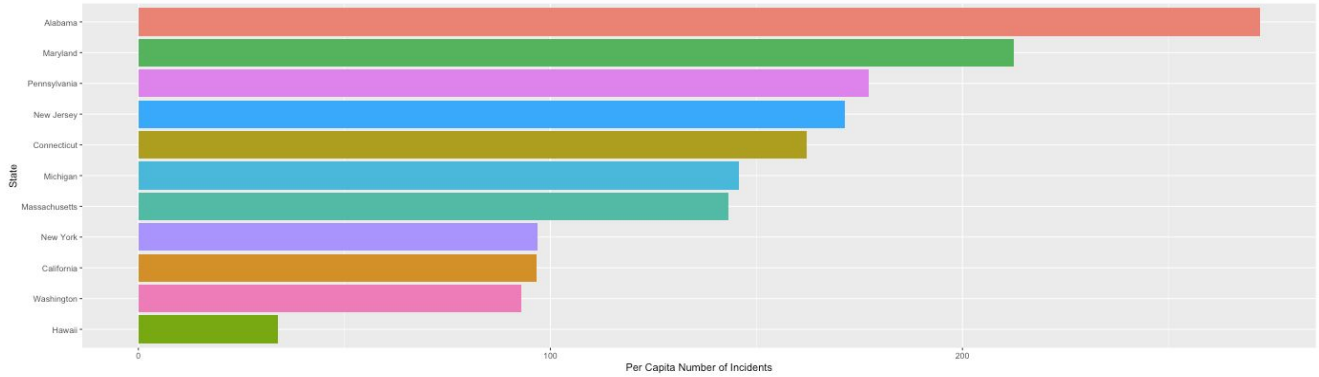
Number of Gun Violence Incidents In June 2013

The top ten states that granted the highest number of permits are formatted in bold text and with the same color as the 2013 gun permit bar graph.

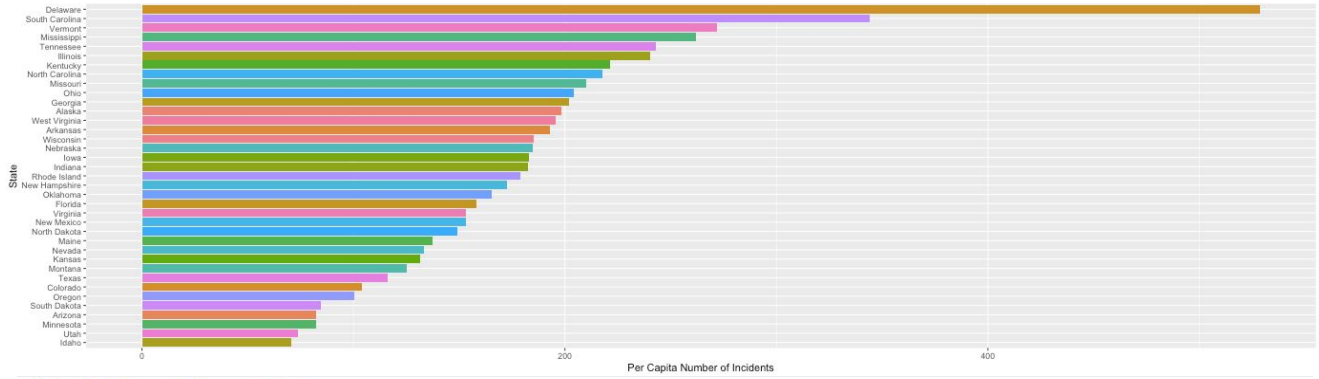
State	Number of Incidents
California	**39**
Pennsylvania	**20**
Illinois	**18**
New York	16
Michigan	14
New Jersey	14
Florida	13
North Carolina	**12**
Texas	**11**
Missouri	10
Ohio	10
Tennessee	**10**
Indiana	**7**
Georgia	**6**
Oklahoma	6
Virginia	6
Arizona	5
Maryland	5
South Carolina	5
Kansas	4
Washington	4
Colorado	**3**
Connecticut	3
Delaware	3
Kentucky	3
Alabama	2
Minnesota	2
Mississippi	2

H

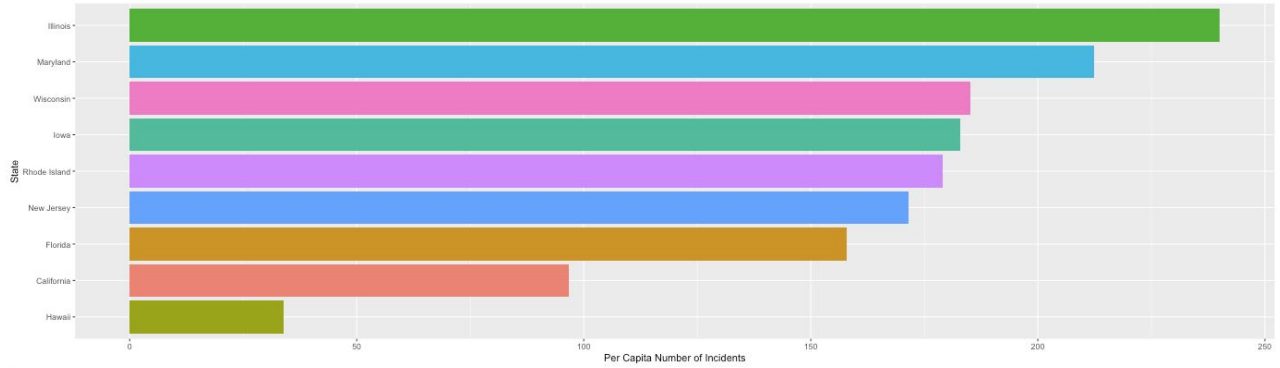
States that required gun registration:



States that did not require gun registration:



States that have a waiting period law:



States that do not have a waiting period law: