The Effects of Mass Shootings on Guns and Violence in America

W200; Section 3
Project 2: Data Analysis
Presented: December 14th, 2017
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Abstract

This study, using a combination of 4 datasets, aims to discover changes in Americans' relationship with firearms when a mass shooting occurs. The team leveraged datasets from the Mother Jones investigative news group on historical mass shootings as the central source for mass shooting timing, location and scale. After recognizing that the numbers in the mass shooting dataset did not reveal those most influential across the country, the New York Times was interrogated for the period 1999 to 2015 to identify those incidents that generated most media attention. These can be termed catastrophic shooting events. The National Instant Criminal Background Check System (NICS) detailing the number of requests received for gun license applications was extracted and used as a proxy for the rate at which guns were purchased. The CDC WONDER database was interrogated for gun related deaths by month/year and County/State. The NICS data suggests that as mass shootings become more frequent, applications for gun licences and therefore gun purchases, increased. This was most notable after the Sandy Hook killing and the San Bernardino terrorist attack within the time period analyzed. It is unclear if this is due to Americans feeling less safe and in need of protection, or if the threat of gun control regulations prompted more gun sales. There is no indication in the data if the background checks are for new gun owners or purchases of more weapons by existing gun owners. Analysis of the fatalities, separated by the cause of death, revealed patterns in the homicide and suicide rates in the months after a catastrophic mass shooting in the state in which it occurred: Gun murder rates down; suicide rates peak initially, then lower, then climb again. These observations were more consistent when applied to catastrophic shootings in educational establishments. While the findings were indicative, they were not conclusive and more research should be completed to understand if there were other factors in these states that generated these patterns, or indeed if both event and impact on fatalities were symptoms of another causality. If there are patterns in gun behaviour, they are likely present in other behaviour. Research on impact of other indicators should be undertaken to understand if catastrophic shootings damage local society. If so, authorities can be prepared to help the population recover when the next one occurs

1.0 Introduction

Sutherland Springs; Aurora, Colorado; Fort Hood, Texas, Newtown, Connecticut. The names of mass shooting locations trigger strong emotions in the memory of Americans across the country. We were interested in understanding if anything else changed in people's behaviour upon these events. In particular we wanted to know if mass shooting tragedies, such as those above, triggered any changes to the underlying number of firearm related deaths in the United States, be that local to the event, regionally or even nationally.

It has been much publicized that the United States [has the highest death rate by firearms in the rich world](), by far. Even after the increase in violence, Mexico's gun mortality rate [is lower](). In

fact, it is as likely that an American will be killed in a car related incident as by a gun. Between 2000 and 2015, half a million people were killed by guns. For comparison, [that is around 65 thousand more than Americans killed on active military service](#) since 1900 - which includes the Vietnam war and the two World Wars.

Mass shootings are particularly well publicized gun related events, which as we will demonstrate, appear to be becoming more common and more deadly. A mass shooting is often classified as shootings culminating in 3 or more victims, not necessarily fatalities. Under this definition, there have been 243 mass shooting events in the U.S. from 2000 to November 2017. Those 243 events have taken over 1,000 lives leaving an additional 1,500 injured. We note that there are some varying definitions of mass shootings (the Mother Jones dataset explained below for example defines it as 3 or more fatalities in a public place) which may change these statistics slightly.

Our team will demonstrate what, if any, relationship exists between a mass shooting and the underlying gun deaths in its locale.

2.0 Datasets utilized

The team used the mass shooting index maintained by [Mother Jones](#) to identify occurrences and attributes of mass shootings, and utilized several additional datasets to analyze the impacts of these events.

2.1 Mother Jones Dataset

The Mother Jones initiative to record and characterize every mass shooting in America was started in July 2012 after the movie theater shooting in Aurora, Colorado and has grown to include a record with attributes for each mass shooting from 1982 to 2017. It contains the following key attributes:

- **Date**: The date can be linked to the CDC gun death dataset for comparatives by month or year.
- **Fatalities, injuries and total victims**: Counts of mass shooting victims. Mass shooting in this case is defined as an incident with a total of 3 fatalities in a public place. The

number of events per the Mother Jones dataset appear to be increasing in frequency, the number of victims has increased in the past 5 years.

- **Location**: Each incident has a location of a town and state, along with latitude and longitude of the location. Using this we can plot where the incidents occurred and the total victims at each location. Location was a very effective means to cross reference other datasets (e.g. city/state population, regional gun violence).
- **Other attributes**: The data also includes qualitative data about the incident (shooter attributes, scenario, event description), and incidents were also categorized as either a mass murder (single location) vs. a spree killing (more than location in short amount of time). This additional detail allows us to draw additional conclusions. For example, 54% of the perpetrators had signs of mental health issues prior the incident.

2.2 CDC WONDER (Wide-ranging Online Data for Epidemiologic Research)

The Center for Disease Control provides a [dataset detailing the death statistics for Americans](#). The database contains data through the end of 2015 and has many parameters to interrogate. We have filtered the dataset on gun related deaths, either accidental, intentional self harm or assault. The following parameters have been extracted from 1999 to 2015 to help understand the impacts of shootings on death rates:

- **Year / Month:** A summary of total fatalities by month and year is available
- **State / County:** State and county where death occured is also made available
- **Cause of death:** By homicide, suicide, accidental death or undetermined intent
- **Fatality Count:** Number of people killed per record (month or year)
- **Population:** Population of the record observed (either county population or state population based on the data pulled)

Note that one limitation of the data is that if any observation had less than 10 fatalities, it is not included in the extract, ostensibly to protect the identity of the people involved in the incident. For example, the mass shooting in Nebraska that resulted in 9 deaths does not appear in the CDC data set for that month because no other gun related assault deaths occured. This limitation most greatly impacts the completeness of the data when examining county by month, causing us to primarily look at county by year or state related aggregates.

2.3 New York Times API

Connecting to an [API feed for the New York Times](#) has allowed us to extract any article with the words 'Gun' and 'Killed' in the title, abstract, or text since 1999. An additional filter excluded world events, sports or cultural articles, and therefore focused our search on domestic news. The following data was maintained:

- **Date/Time:** The date and time the article was published.
- **Headline:** Includes the original headline that the story was covered under.
- **Web address:** While repeating the date published and the headline, this also includes. the section in the NYT that the article was published in.

Note that due to the New York Times being located in New York, there may be a bias towards coverage of incidents occurring in that city or state. While no bias was detected during data interrogations, it may be there in some instances and may skew some of the national events if high profile shootings occur during the same week.

2.4 National Instant Criminal Background Check System (NICS)

[This dataset](#) provides us with data relating to the number of background checks sent to the NICS prior to firearm purchases as required in most jurisdictions. It gives us an indication of the changing volume of firearm purchases around the U.S.. The following data is made available to the public:

- **State:** The state in which the application for purchase is being made, usually the state of sale.
- **Month / Year:** Indicates the timing that the application was made.
- **Gun Type:** Indicated gun type as handgun, long gun or other.

Note that sales between private individuals and [sales at gun shows](#) do not require background checks in many states and are therefore unlikely to have been captured. Additionally, background checks are dependent upon state compliance which has been [hampered by not being fully computerized](#). We believe errors are present in the states of North Carolina, Kentucky and Utah.

3.0 Exploratory Investigation

The initial investigation began by exploring and identifying relevant data sets and then transitioned to focus on understanding the underlying information. The intention was to broaden our knowledge of the data, learn about the contents, identify gaps, outliers or misstatements, and allow those findings to guide us to the next analyses.

3.1 Mother Jones Data Investigation

This compact log of all mass shootings since 1982 was reviewed to better understand the nature of mass shooting events. There are a total of 95 events that were covered at the time of developing this report with a total of 795 fatalities and 1,260 injuries relating to the Mother Jones definition of mass shooting of 3 or more fatalities in a public place which is in line with the In [federal definition implemented on January 2013](#). Note that prior to this, mass shootings were first defined by the [FBI to consist of 4 fatalities in a public place](#). Location is available as a key, and this was used to map the location of each incident along with the total victim count in the chart below (and available interactively at https://plot.ly/~luke.d.evans/0).

Mass Shooting Locations 1983 - 2017
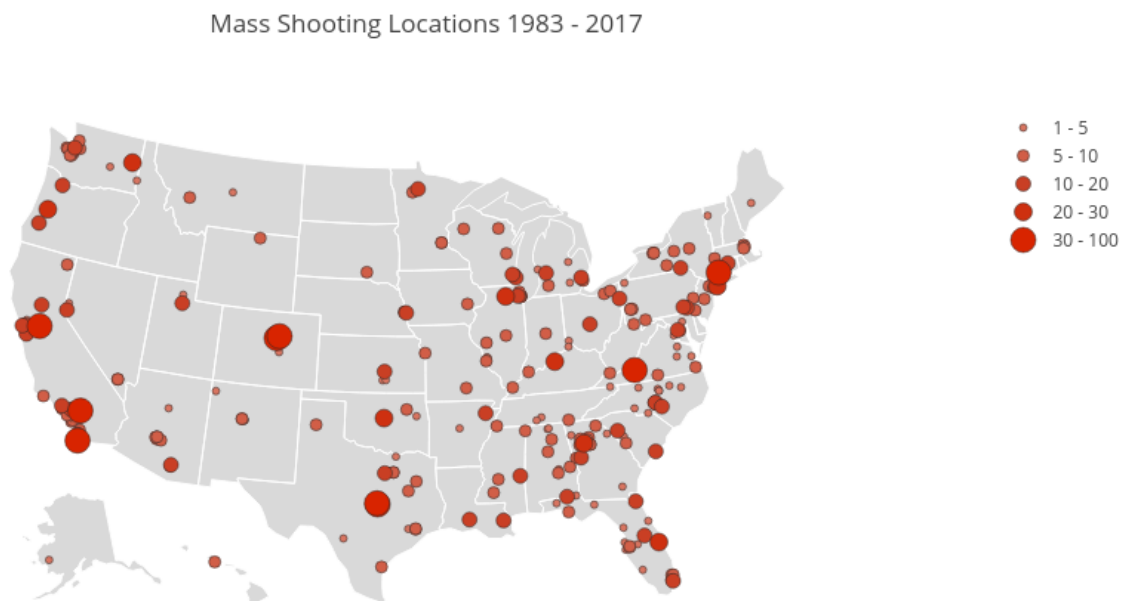
It can be seen that these events are widespread across the country and generally occur where the bulk of population is located: along the coasts or in cities.

A count of mass shootings by state can also show the distribution of events around the country. California clearly earns the salubrious title of the state with the most mass shootings (16), with Texas (8), Florida (9) and Washington (7) vying for second.

Number of Mass Shootings by State
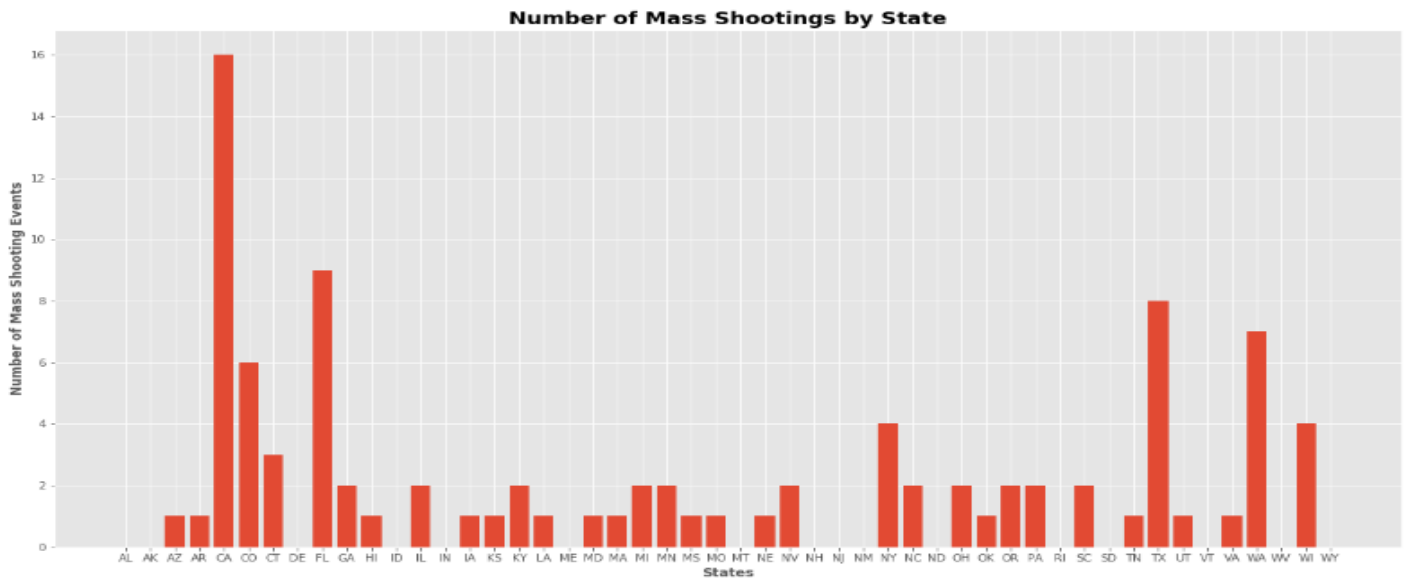
The events are becoming more numerous and more deadly. The bar plot below presents the increasing number of incidents and the box plot indicates depicts shooting fatalities each year since 1982. The charts show the record of number of fatalities during a single event, sadly increasing.


Mass shootings by Year

Boxplot grouped by Year
Fatalities by Year
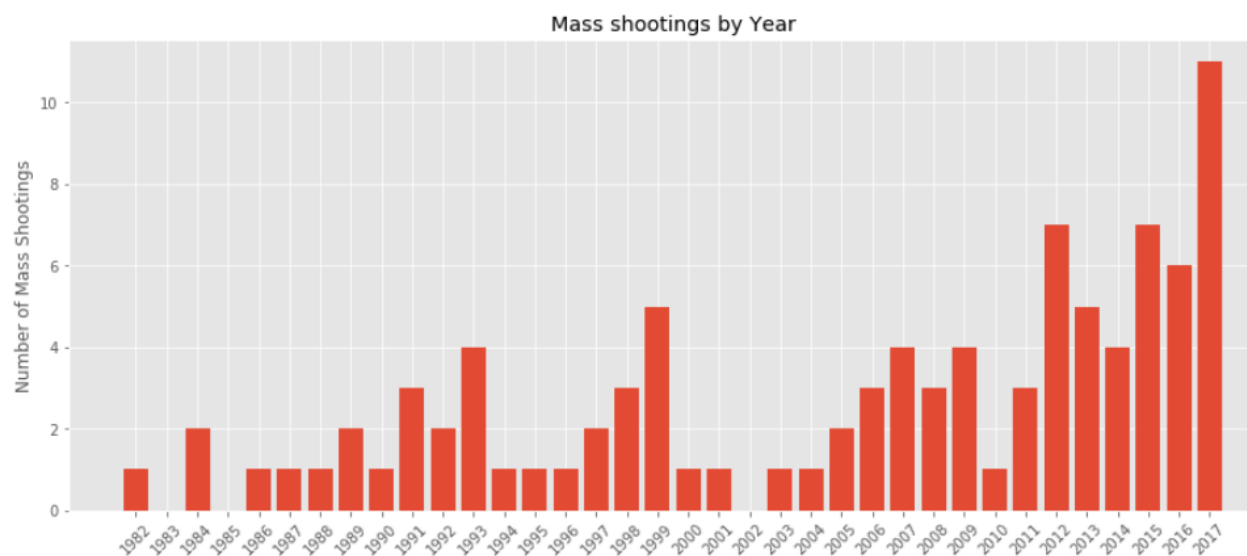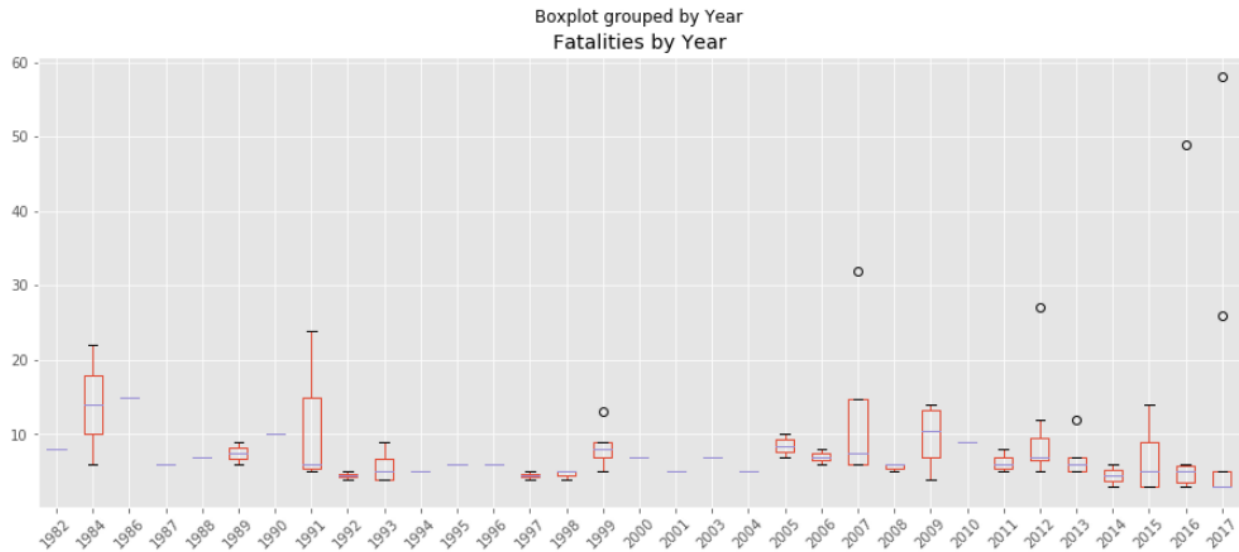
Perhaps most alarming is that the 4 years with the highest number of annual mass shooting incidents have occured in the past 6 years. There have been 31 mass shootings under the Mother Jones definition during those 4 years. This accounts for one third of the total incidents in Mother Jones total dataset. What's more, these 31 incidents have led to 305 fatalities, which is almost a quarter of the database total.

Year	Num_Incidents	Fatalities	Most_Fatalities_single_incident
2017	11	117	58
2015	7	46	14
2012	7	71	27
2016	6	71	49

Mass shootings by Prior signs of mental health issues
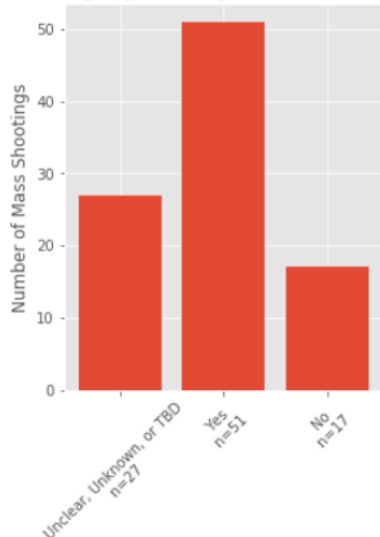
Some patterns do emerge when describing the characteristics of the perpetrator, but a careful study of the psychology of these perpetrators is beyond the scope of this report. We investigated available attributes such as the gender - all but 3 were male. About half the perpetrators are white at 57% (54/95), as per the chart. However, these numbers do broadly resemble the racial makeup of the country, so the most to be concluded is that no one race has disproportionately committed such

Mass shootings by Race of Shooter
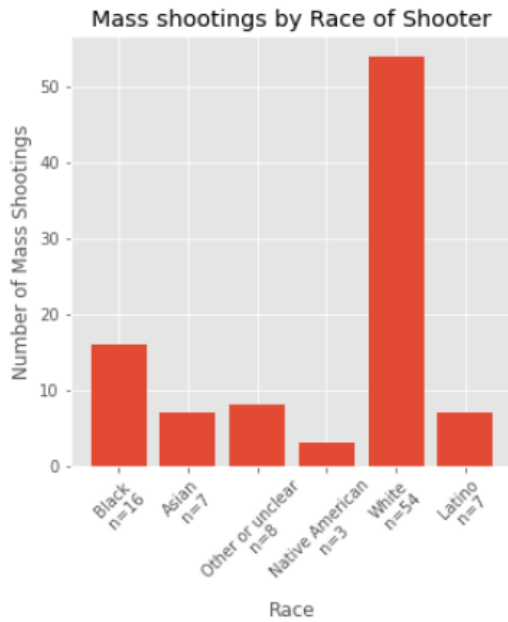
crimes. Mental health issues are also identified and it does appear that the profile of a shooter has a greater incidence of psychological problems than does the broader population.

The type of location that the shooting took place is also available, detailing the common establishments where such events occur. As the city or town is provided, the population of that area was applied to the data set. The combinatination of the two attributes can be seen in the scatterplot below. Apart from some outliers which are the Orlando and Las Vegas shootings, there is little correlation between the number of fatalities and the size of the city. It is, however, curious to note that school shootings tend to take place in smaller towns, with clusters of blue dots towards the left of the chart
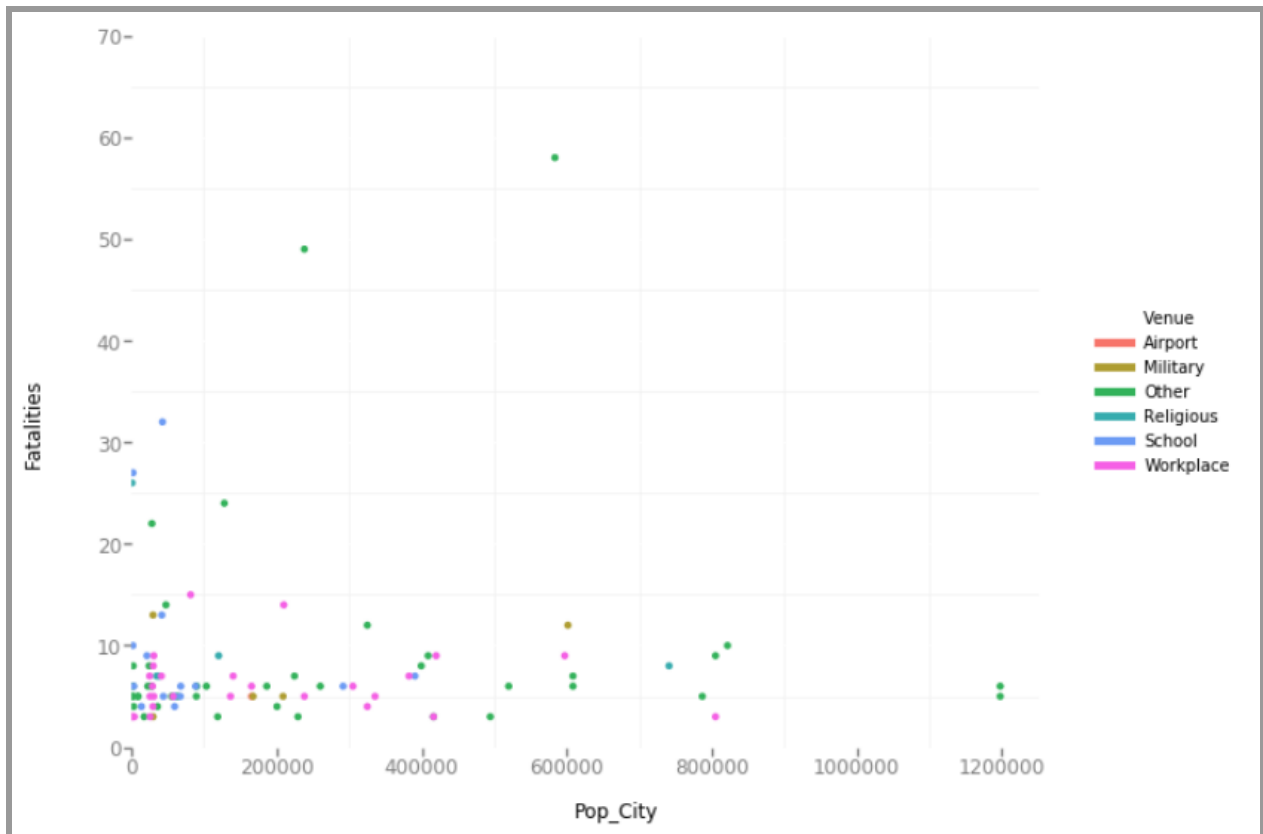
3.2 CDC WONDER Data Investigation

The WONDER database is large. Not all data can be extracted and utilized in a single file, therefore several queries were developed, extracting data using the parameters required. In order to create some of the summary charts, additional queries were generated with smaller more summarized datasets. The extracts carefully limited the detailed causes of death to the following ICD codes to maintain consistency:

W32 (Handgun discharge)
W33 (Rifle, shotgun and larger firearm discharge)
W34 (Discharge from other and unspecified firearms)
X72 (Intentional self-harm by handgun discharge)
X73 (Intentional self-harm by rifle, shotgun and larger firearm discharge)
X74 (Intentional self-harm by other and unspecified firearm discharge)
X93 (Assault by handgun discharge)
X94 (Assault by rifle, shotgun and larger firearm discharge)
X95 (Assault by other and unspecified firearm discharge)
Y22 (Handgun discharge, undetermined intent)
Y23 (Rifle, shotgun and larger firearm discharge, undetermined intent)
Y24 (Other and unspecified firearm discharge, undetermined intent)

Extracts were generated by month or by year, and at the state and county level. Additionally, data was summarised by cause of death, those being intentional self harm, assault, accidental, or undetermined.

In total, from 1999 to 2015, the CDC has recorded 527,690 gun related deaths in all states. The totals by year can be seen in the table, along with the death rate per million people. You will note that the fatality count increases steadily throughout the time period, but the population also increases leaving the death rate fairly stable until early in this decade, when the rate appears to increase.

U.S. Gun death trends 1999 - 2015

Year	Fatalities	Population	Death_Rate
1999	28575.0	279040168.0	102.404612
2000	28393.0	281421906.0	100.891222
2001	29250.0	284968955.0	102.642760
2002	29942.0	287625193.0	104.100756
2003	29789.0	290107933.0	102.682473
2004	29258.0	292805298.0	99.923055
2005	30364.0	295516599.0	102.748881
2006	30536.0	298379912.0	102.339329
2007	30873.0	301231207.0	102.489381
2008	31267.0	304093966.0	102.820192
2009	31014.0	306771529.0	101.098039
2010	31328.0	308745538.0	101.468673
2011	31897.0	311591917.0	102.367867
2012	33092.0	313914040.0	105.417394
2013	33168.0	316128839.0	104.919248
2014	33130.0	318857056.0	103.902358
2015	35763.0	321418820.0	111.266042

This can be more easily visualized in the below chart titled Gun Death Rate 1999 - 2015, for each year where clear evidence of a correlation can be seen in the years between 2000 and 2010. This starts to change in the 2010's, culminating in a significant peak in 2015. Additionally, the correlation prior to 2010 was 0.94, whereas the correlation after 2010's drops to 0.87 as the data after 2010 becomes more erratic.

The data suggests that there has been an overall increase in gun violence in the US in the past five years after holding steady for some time.

Data is available by state and by county, however there are limitations to the most detailed views as there must be at least 10 victims in each of the lowest splits for the values to be displayed

At the state level of detail, there are no such data exclusions. A chart showing the heat map of states and the increasing rate of death by guns can be seen in this data extraction from Wonder on the following page. Note how the states retain some lighter colors throughout the 2010's, but as we enter this decade there is a darkening of the map. Note also that, while some states such as Wyoming have been darkening in color, others, such as Arizona, have been lightening in the past few years, meaning that there are differences in trends between states. And, of course, there are very different firearm death rates across:

Gun Death Rate 1999 - 2015
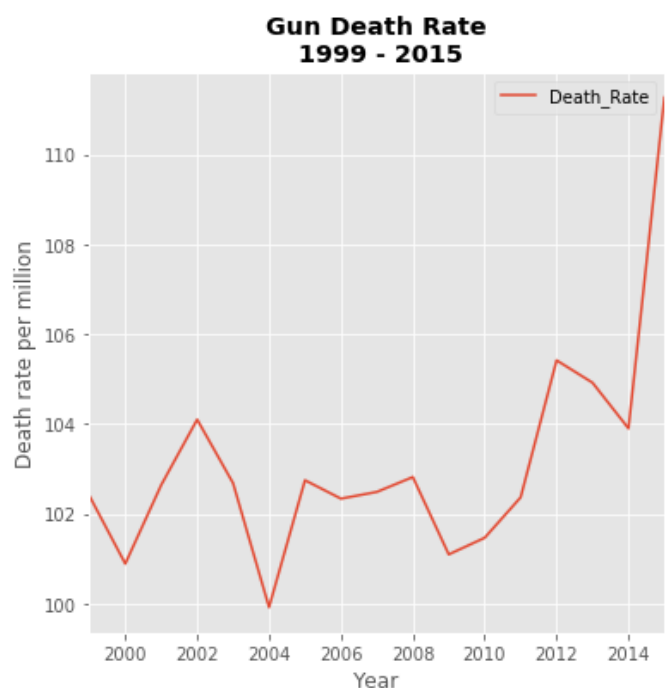
Lower rates around the great lakes, and higher in the South. As we investigate the impacts of mass shooting events, we will look into any correlations they have with the death rates of the states and counties and perhaps understand some of the differences in trends.
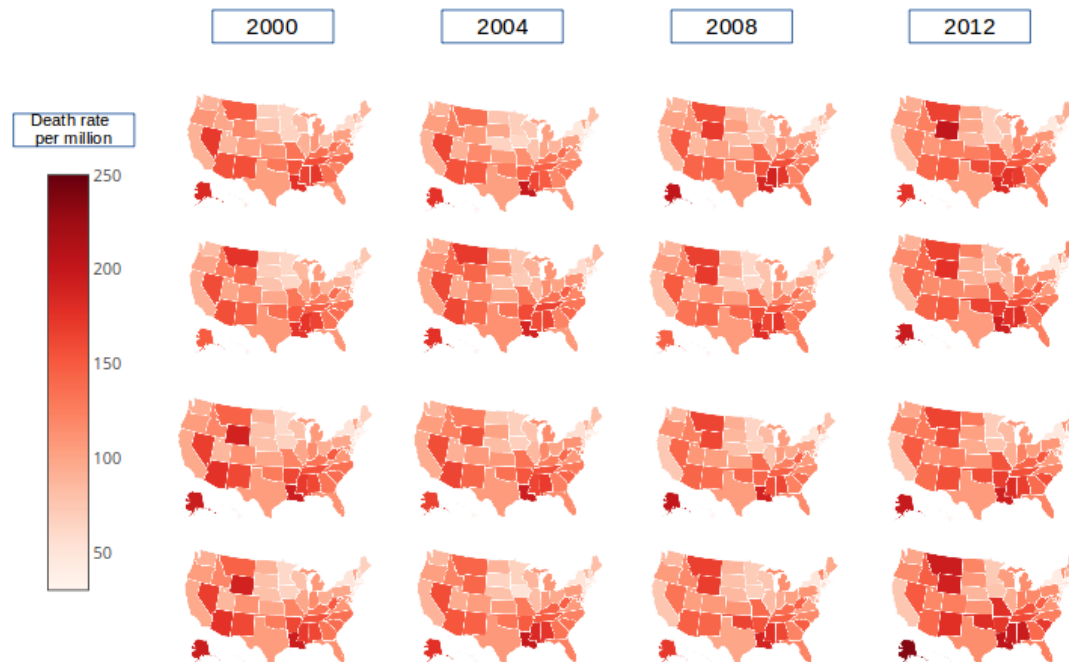

3.3 New York Times API Data Investigation

The New York Times have opened up their entire history of publication for non profit interrogation via API. A user can search by date range, key words and several other criteria. The words used to search must be full words rather than disambiguations. For example, 'kill' is seen as a full word and would not pull 'killed', 'killing' or 'kills'. A search for 'gun' and 'kill' retrieved limited results due to the use of the present tense. A second extract using the past tense 'killed' generated many more results over the period.

Our expectation was to discover which of the mass shooting events generated the most media coverage and therefore would be more likely to change behaviours. To broaden the perspective, coverage of the specific event was expanded to any shooting related coverage at or around the time of a mass shooting, as it is not uncommon for coverage of an emotive or

popular event to spawn interest in that topic and therefore broaden coverage of similar topics. Therefore we did not look for mentions of a single event (e.g. "Sandy Hook") in the coverage and filter based on that, but instead looked for how gun death coverage (i.e. "Guns" and "Killed") as a whole increased during the period after a shooting.

A total of 5,766 stories were extracted using these defined criteria over the period in question and these were further filtered to remove sports, technology, fashion and culture related articles yielding 5,027 articles. These were then analyzed to identify any trends in the volume of gun death related stories at the time a mass shooting occurred. Due to the relative infrequency of reports, we have grouped the data by week rather than by day, to identify any trends. One point to note is that if an event occurred on a weekend, a peak in gun related stories is often observed during the following week's article count.

The time series was reviewed in increments of a year or two with mass shooting event count and fatality total superimposed in the chart. This was reviewed for the number of news clip counts surrounding the dates of mass shootings (see sample charts below for 2003/2004 and for 2014/2015). As you will note, some events generated a lot of media interest where you will notice peaks in clips, whereas others of equal and sometimes greater fatalities, appeared not to generate as much media coverage.

Clip Count by Week, 2014 to 2015
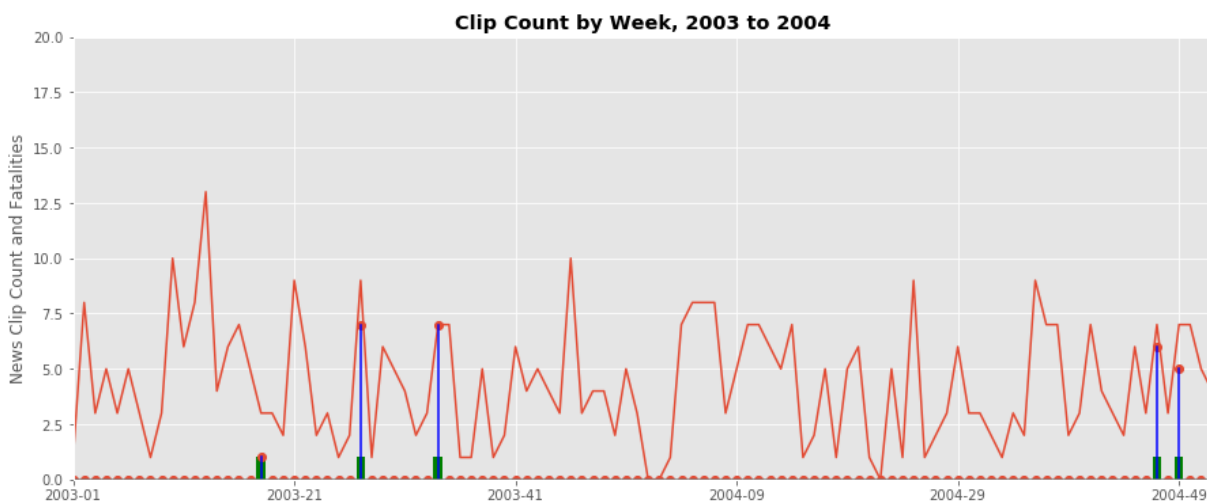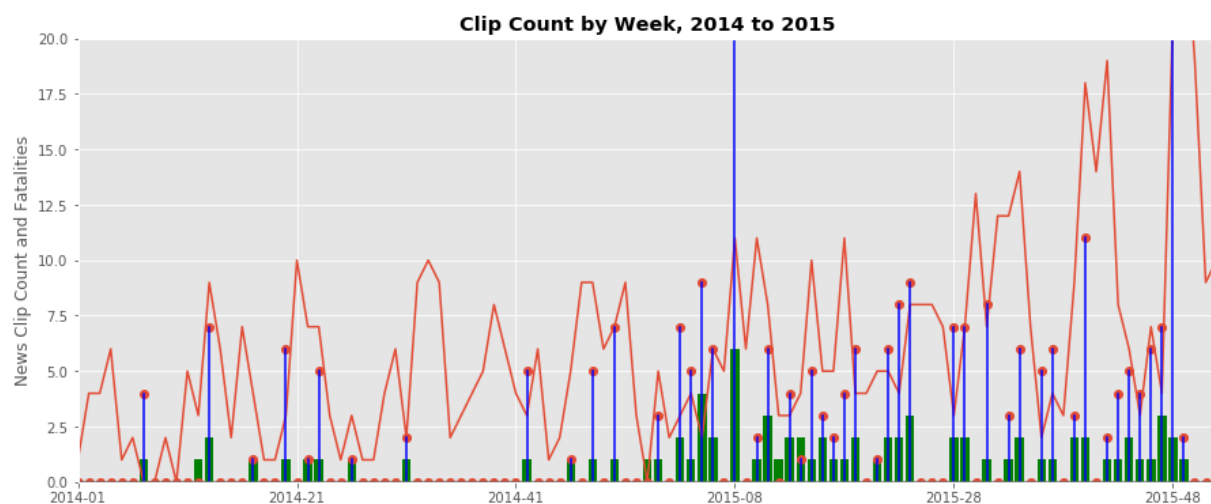
Additionally, you will notice that there are several peaks in clips where no mass shootings took place. These were individual shootings, especially in the New York area, key court cases of shooting suspects or times when legislation was being pressed or discussed. Several of these examples are more clear in the chart below of the entire time period and rolling 12 month average clip counts. The chart has been annotated with events driving the significant news coverage on firearms.

Clip Count 2000 to 2017
Rolling 12 month Average
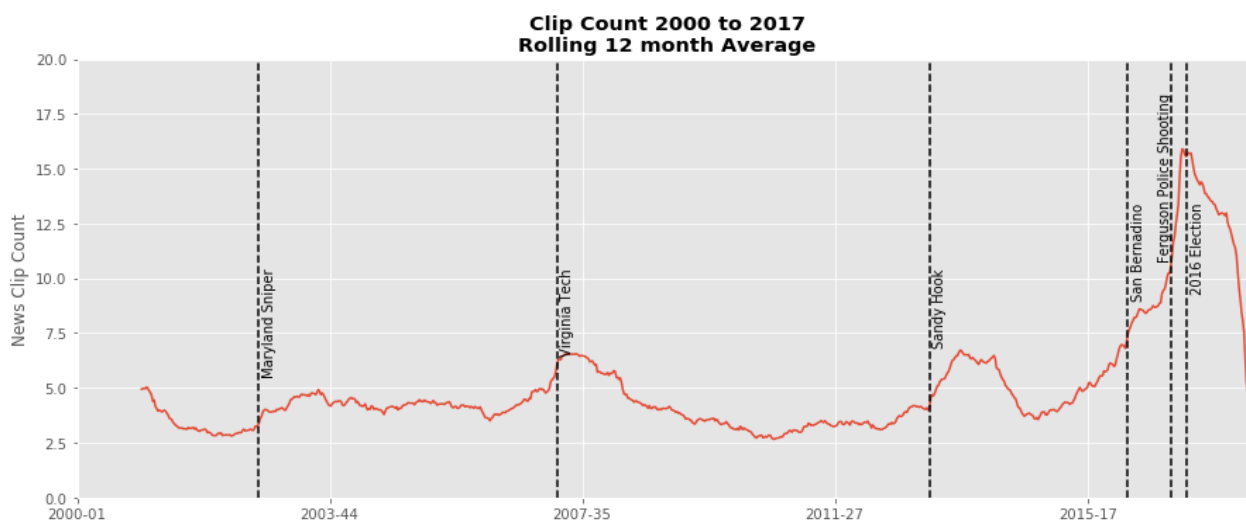
Note that, whereas the Virginia Tech, Sandy Hook and San Bernardino tragedies are considered mass shooting events, there are other events that appear to drive significant gun coverage. The Maryland Sniper in 2002 had 27 victims over the course of 2002 culminating in a more rapid

frequency of attacks during October that year. You will note also that the summer of 2016 saw the start of a series of young black men killed by the police that also generated a significant amount of gun related articles. Finally, the election of 2016 and the legislative discussions surrounding the gun debate, from 'Black Lives Matter' to terrorism and mass shootings, has generated the largest gun related coverage in the past 15 years - more than 3 times the average for the period.

While not explicitly annotated on this chart, the ongoing legislative debate relating to stricter controls generated by Sandy Hook and the Boston Marathon Bombing helps explain the increasing coverage of guns soon after that event in early 2013.

3.4 NICS Data Investigation

National Instant Criminal Background Check System (NICS) has been administered by the FBI since 1998 and is mandated by the Brady Handgun Violence Prevention Act (Brady Law) of 1993. Prospective gun buyers must complete a Firearms Transaction Record and the recorded data is checked against three databases by the FBI. The FBI has 3 days to make a decision on whether to sell the individual a gun or not. The FBI publishes the number of background checks per month per year by state in pdf files. The file was converted to a spreadsheet to access the data. It is an excellent database to gauge interest in firearms and a proxy for sales of firearms.

4.0 Initial Results

Once data exploration was complete, a more focused investigation was completed on the local impacts of a mass shooting during the months before and after the event to identify impacts on gun sales or fatalities.
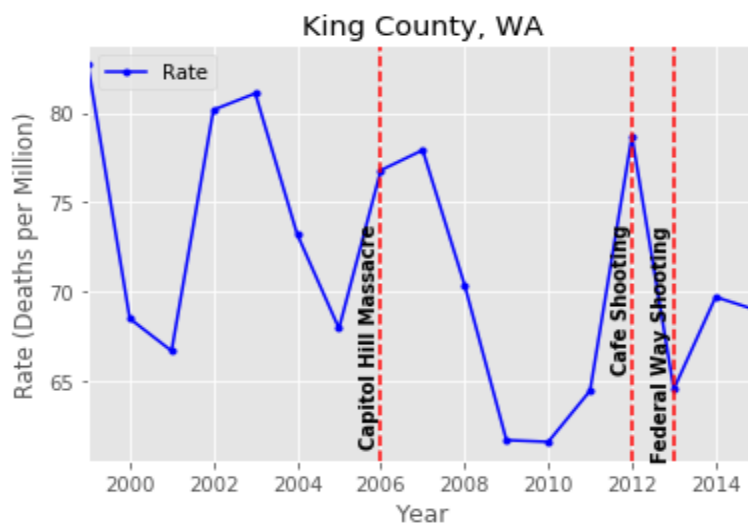
A number of plots were made, starting with the counties in which the authors of this document lived. These plots examined death rates (inclusive of all gun related deaths, suicides, homicides, accidental) by year, as

this was the most consistent data at the county level of detail. When the same charts were observed at a monthly level of detail by county, many of the counties that suffered mass shootings few months when gun related fatalities were above 10 were present in WONDER.

This same pattern of low correlation was demonstrated throughout all charts for counties in the WONDER data that had experienced mass shootings. Any effects of mass shootings were very hard to discern.

As analysis of mass shooting events progressed, reviewed and discussed, it became apparent that while recognizing many of these tragedies, the team had not been aware of the majority of the events that had taken place over the past fifteen years. If the population were also unaware of an event, then it is unlikely that it would change their behavior. Therefore, attention was refocused on the most well covered of the mass shooting events as most people will have heard of them and therefore would have had the opportunity to be affected by them.

Using the NYT news clips, the events generating the greatest amount of gun related coverage were identified. The time frame was limited to consider only to the end of 2015 as this is extent of current CDC WONDER data.

The output of this analysis was the table below showing top 10 weeks for shootings, but this was expanded to replace some of those so close to the end of the 2015 period that trends after the shooting were not yet available.

Top ten dates covered mass shootings from 1999 - 2015

Date	Title	State	Clip Count	Fatalities
2007-04-16	Virginia Tech massacre	Virginia	19	32
2015-10-05	Umpqua Community College	Oregon	18	10
2015-10-09	Northern Arizona University at Flagstaff Campus	Arizona	18	1
2015-12-02	San Bernardino mass shooting	California	18	14
2015-12-06	Omaha, Nebraska	Nebraska	17	2
2012-12-16	Sandy Hook Elementary School	Connecticut	14	28
2015-10-21	Colerain Township, Ohio	Ohio	13	2
2015-08-19	Parking lot near Boys and Girls Club	New York	12	3
2015-08-26	Virginia WDBJ live TV interview shooting	Virginia	12	3
2015-08-29	Bristol, Tennessee	Tennessee	12	3
2012-07-23	Aurora theater shooting	Colorado	10	12
2013-02-03	Los Angeles Police Department	California	10	4

Note that on some dates multiple events were identified, although most of the coverage went to one of them. Reviews have been completed on both events as this is useful as a control. Additionally, the dates and events are skewed towards the more recent years as this is when the most coverage was provided and a greater portion of the shooting events took place. Fort Hood, Texas, in 2014 and Arizona College of Nursing in 2002 were added to this list also

Using this more limited list, a revised and more detailed data investigation was undertaken.

5.0 Results of Final Investigation

Both the NICS and CDC data were analysed again in an effort to identify patterns with a focus on the most significant of the mass shooting events that have occured.

5.1 Impact of Mass Shooting on State Death Rates

The state that each event occured in was analyzed by month for trends in the fatality rate in the periods before and after an event. When the cause of death was also considered separately, some patterns started to emerge.

The most publicised individual event in a single week was the Virginia Tech massacre in 2007, in which 32 people died. The chart demonstrating suicide and homicide rates involving guns can be seen below.
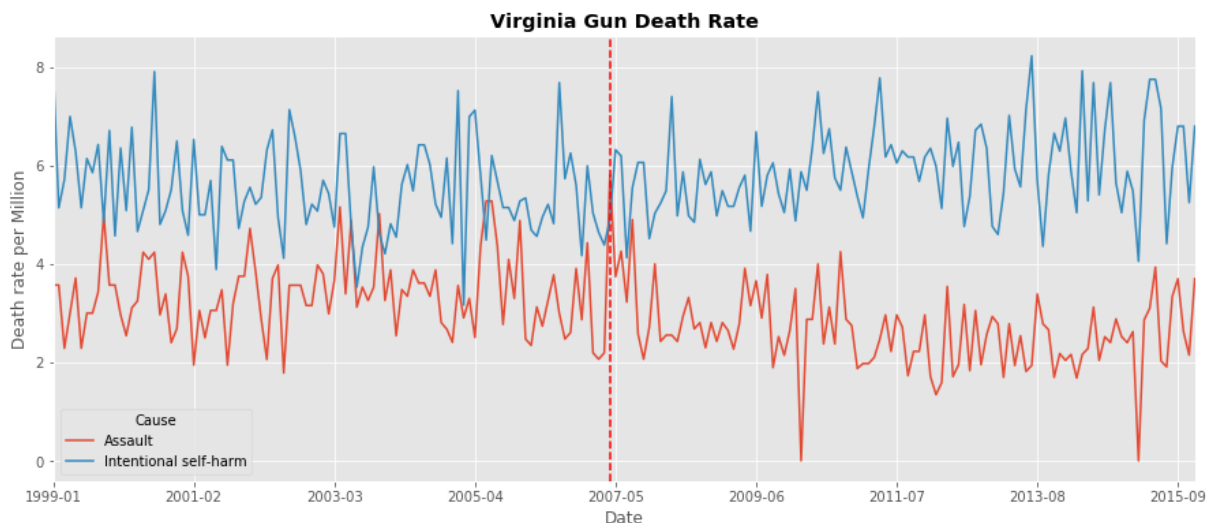
You can notice that there is a downward trend in gun related homicides after the event which lasts several years. This effect is even clearer when we apply the 12 month rolling average to smooth some of the fluctuating data points, as per the below.
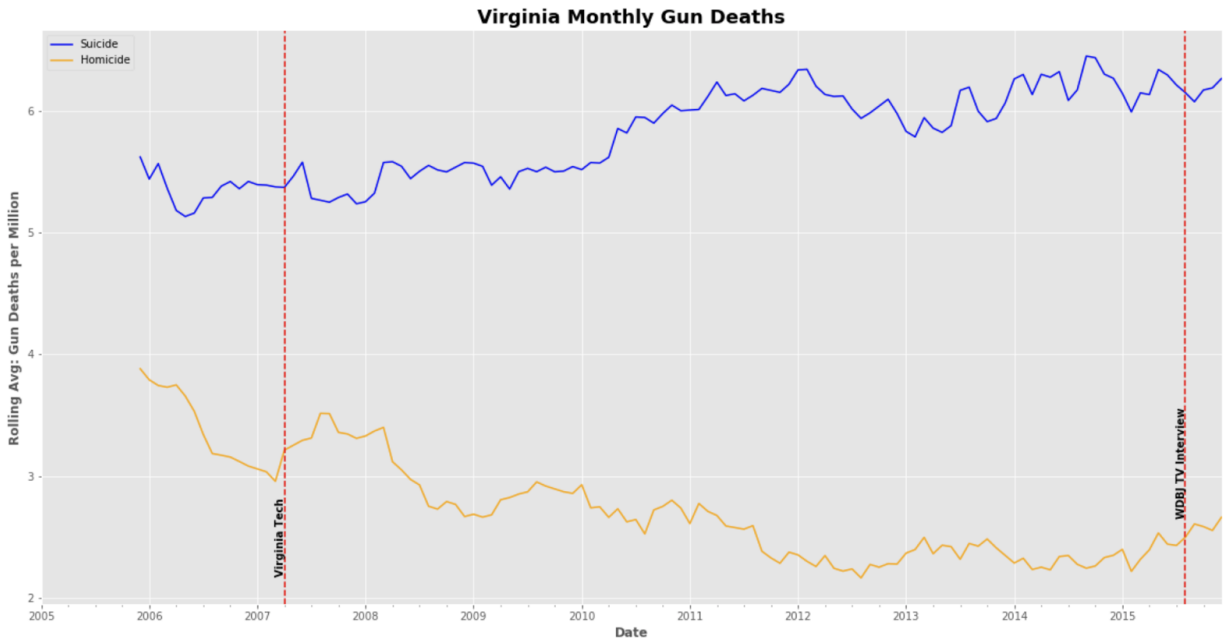

After the impact of the shooting on the 12 month rolling average has expired, the firearm related homicide rate drops to a lower point than at any time since 1999. Disturbingly, however, it is also clear that after a peak and a brief fall after the event, gun related suicide rates have increased on the average. The clearer perspective gained from the 12 month rolling average was applied throughout the results charts

In Newtown CT, after the Sandy Hook tragedy a similar effect can be observed, although somewhat more pronounced. The surrounding States of Rhode Island and Massachusetts were combined in this chart to provide some critical mass to the underlying numbers. The gun related homicide rate (orange) falls significantly after the impact of the school shooting on the 12 month rolling average. Suicides (blue) follow the Virginia pattern also and, after an initial increase, they drop and remain low for the following year - a little longer than Virginia. After this, rates do increase but do not continue to do so. They remain more constant, even falling again in the later years.

Connecticut and Massachusetts and Rhode Island Monthly Gun Deaths
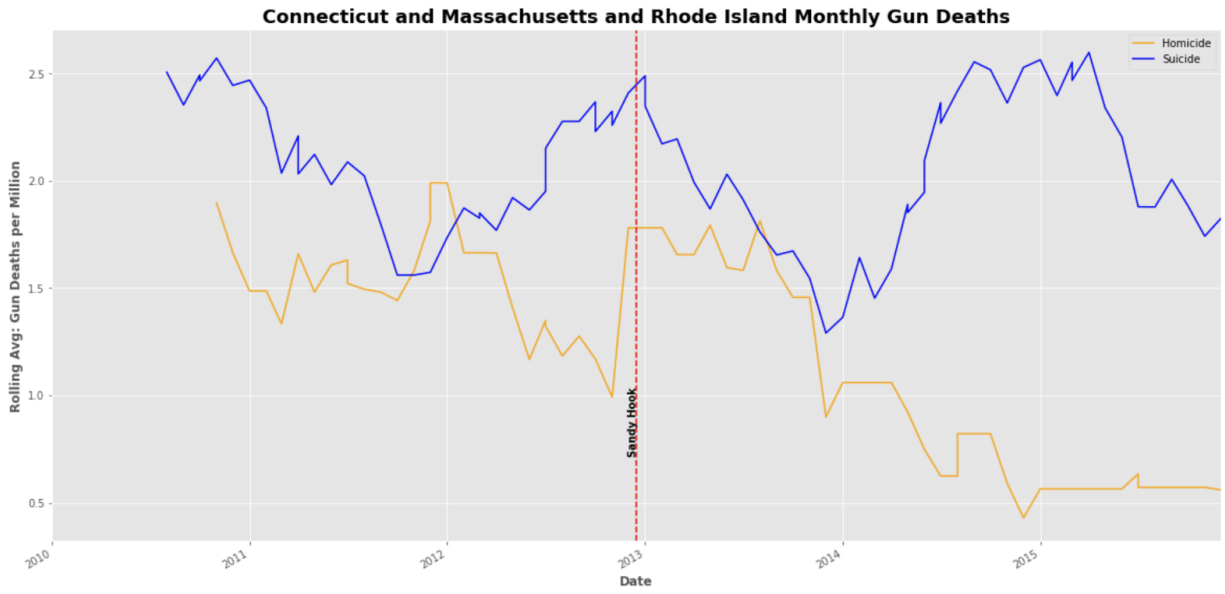
The Aurora Movie Theatre shooting, near Colorado, generated a great deal of media interest around the country after a gunman killed 12 people and injured about 70. Similar to Newtown


Colorado Monthly Gun Deaths
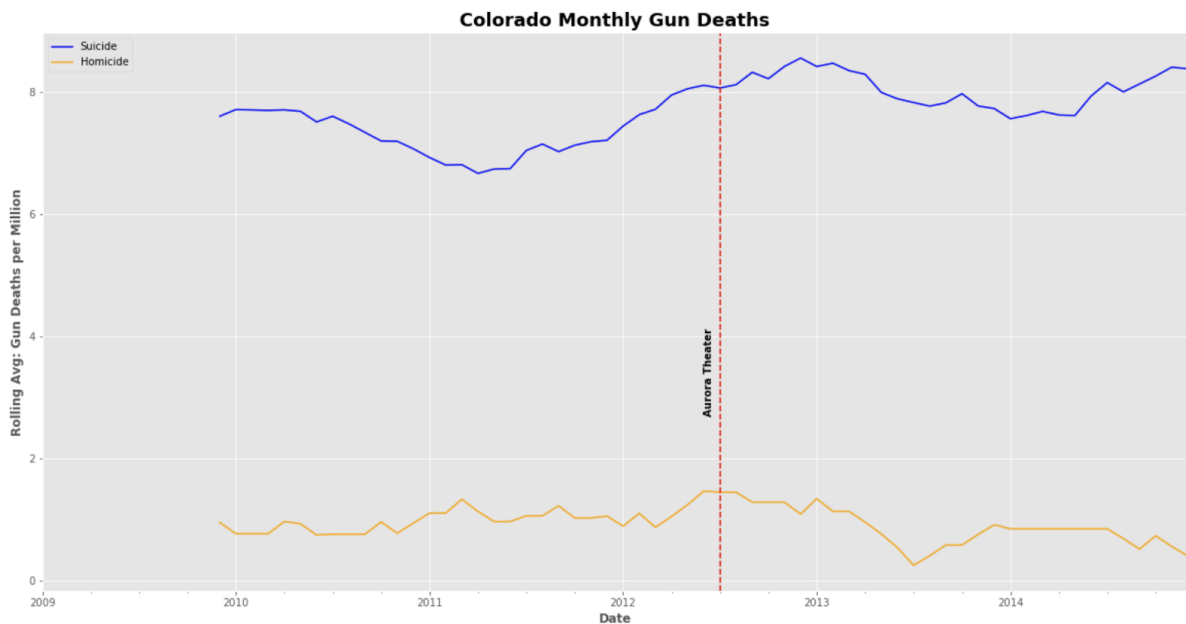
and Virginia Tech, we note the reduction in homicides after the incident, and the continuing lower level. However, suicides actually increased after the event for the following year before dropping back down. Suicides were at a much lower level in the year before the mass shooting that they were afterwards.

In 2013 in the U.S. Navy shipyard, Washington D.C., a civilian contractor opened fire, killing 13. This event was followed closely as it unfolded throughout the day. As with Sandy Hook, the statistics for DC have been combined with Virginia and Maryland as the area is small and impacts might be felt across the region.

The results, however, were unlike any other. This act of workplace violence, classified as Terrorism my Mother Jones, generated no significant change in homicide rate in the area but the suicide rate does appear to drop afterwards for the next before increasing sharply.
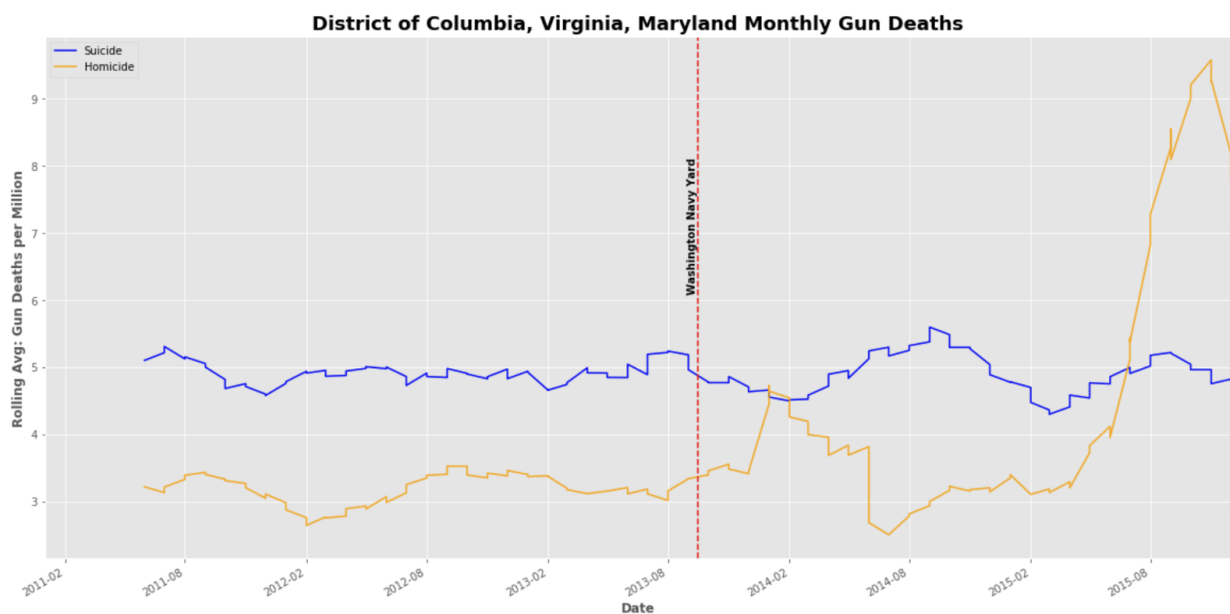
Texas Fort Hood was scene to a Terrorist attack in 2014 that killed 9 service men and women. The effect immediately after this tragedy was, again, a drop in homicides over the course of the following year, which then began to increase into 2015. The suicide trend does mimik the homicide trend and drops after the event, remaining low for a year then rising steeply again.

Texas Monthly Gun Deaths
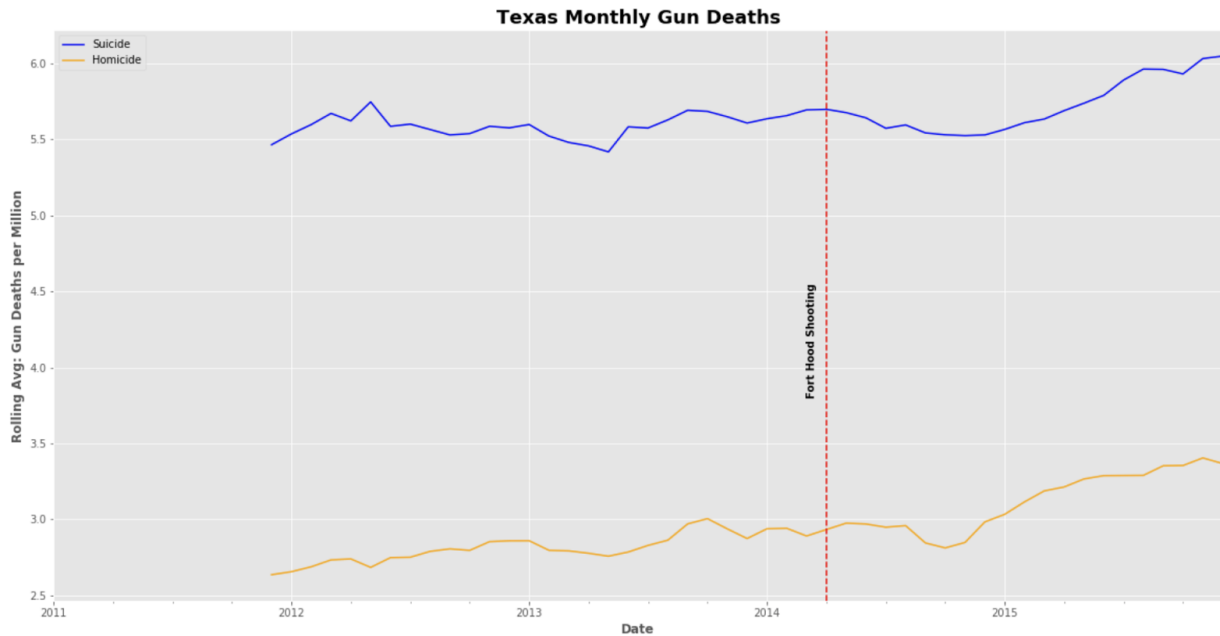
Finally, in 2002, there was an attack on the college of nursing in Arizona that left 4 teachers dead and generated a lot of news at the time. The impacts on the homicide and suicide rate are the now quite familiar ones related to school shootings, with gun related homicides dropping in the following year, and gun related suicides peaking immediately afterwards, then dropping off. The increased suicides, however, do appear to be more persistent in this shooting.
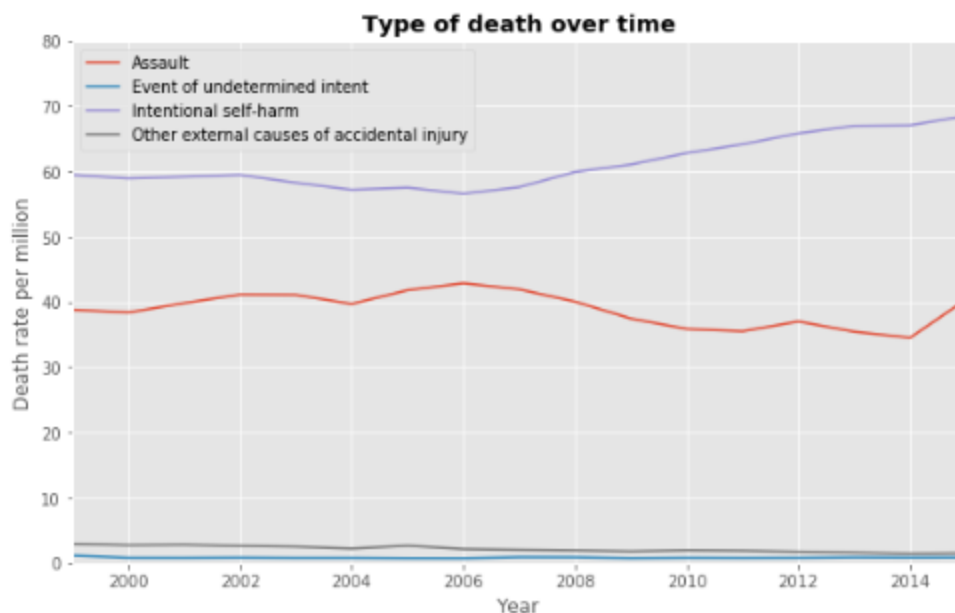

Arizona Monthly Gun Deaths
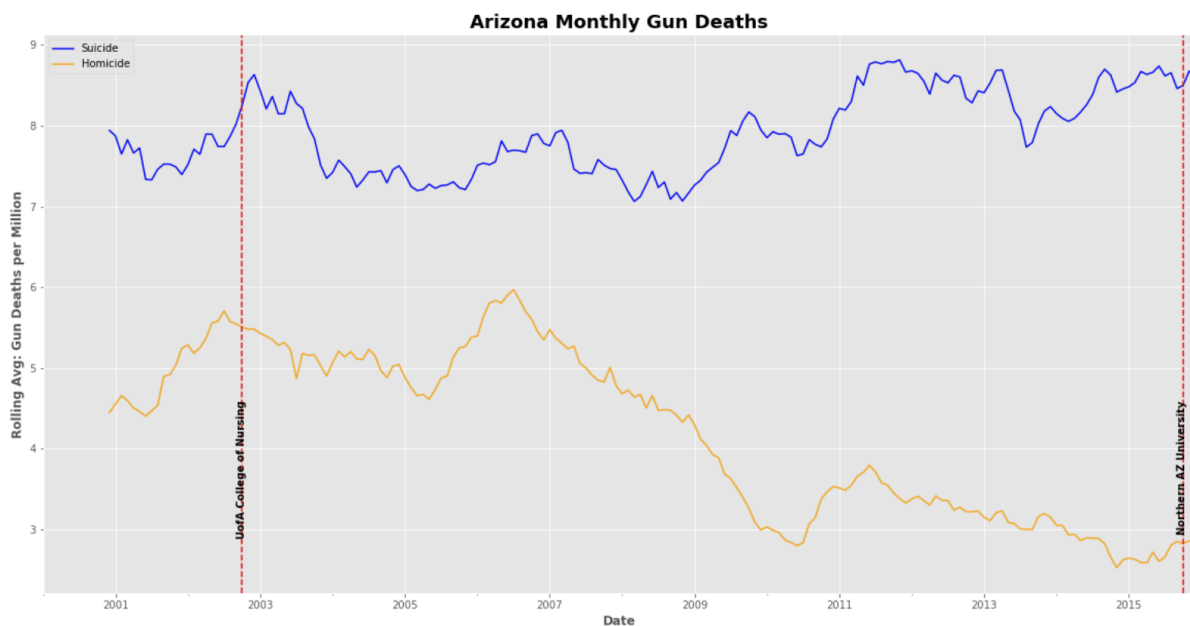
Those events occuring during 2015 have been disregarded as it was not yet possible to effectively monitor their trends.

There is certainly some consistency in the patterns of firearm related deaths after a significant mass shooting event. The similarities of death rates after mass shootings at educational establishments is of interest.

5.2 Country Death Rates in Total

Given the State based results, a chart was created from the WONDER database to review the broader national trends, and this does appear to demonstrate a similar pattern; gun related homicides have been dropping throughout


the country while suicides have been rising. The downwards trend has been progressing since mid 2006 and continues throughout this decade, with an interruption in 2012.   It is too early to assess if the significant uptick in 2015 is another interruption of a persistently downwards trend or if this is the start of a rise in gun related homicides. The rates of gun death by suicide show no such change in direction and have steadily increased 20% in the same period.

5.3 Comparison of Gun Purchases

Background checks are good indicators of gun buying and we suspect much of it is related to hunting as it is a big part of the culture in certain states. To gain a sense of states with a tradition of hunting we analyzed the National Hunting License Report by the US Fish and Wildlife

Services for 2016. Below are the top 5 states with most hunting licenses total and per capita, the NICS check for the top states and whether any mass shooting occurred within the state.

State	Paid_Hunting_License_Holders
TX	1132099
PA	980613
MI	767896
TN	734733
WI	719110

name	Population	Lic_per_capita
South Dakota	865454.0	0.256489
Montana	1042520.0	0.229772
Wyoming	585501.0	0.225689
North Dakota	757952.0	0.192015
Idaho	1683140.0	0.158042

Texas Background Checks

South Dakota Background Checks
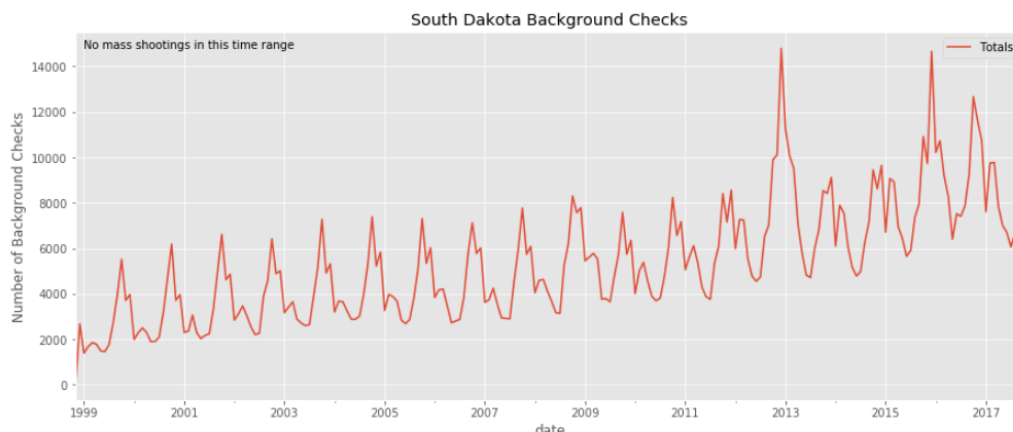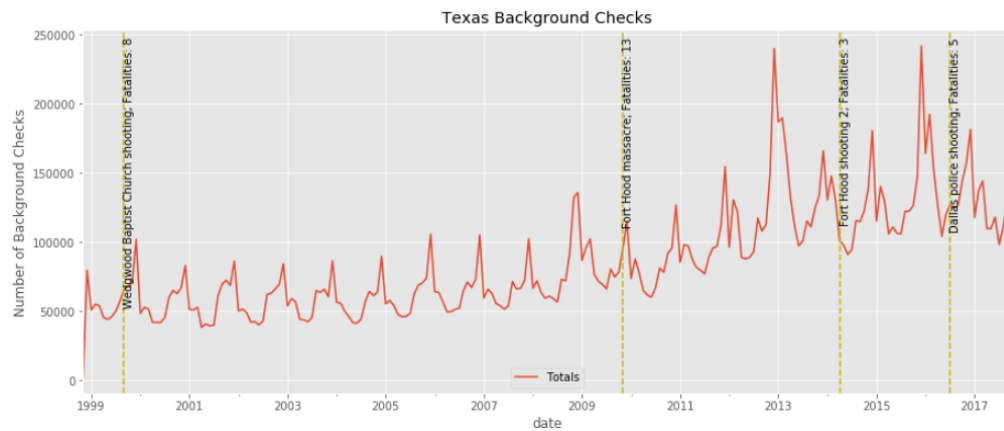
In contrast, we analyzed states with the least gun licenses total and per capita.

abbreviation	Paid_Hunting_License_Holders	name		Population	Lic_per_capita
RI	8978.0	California		39250017.0	0.007316
HI	11113.0	Hawaii		1428557.0	0.007779
DE	17369.0	New Jersey		8944469.0	0.008386
CT	42924.0	Rhode Island		1056426.0	0.008498
MA	59669.0	Massachusetts		6811779.0	0.008760

Rhode Island Background Checks

California Background Checks
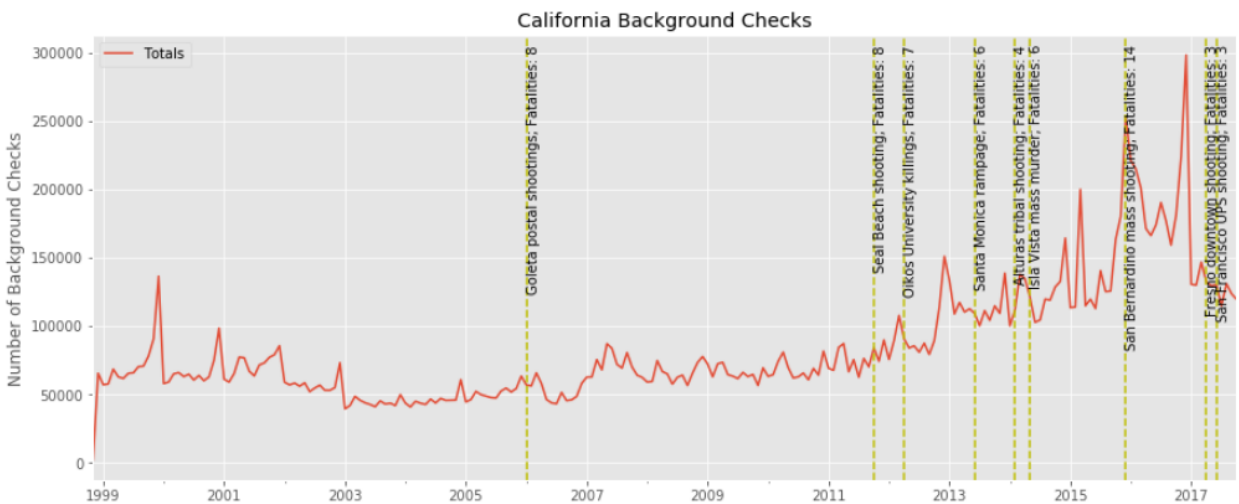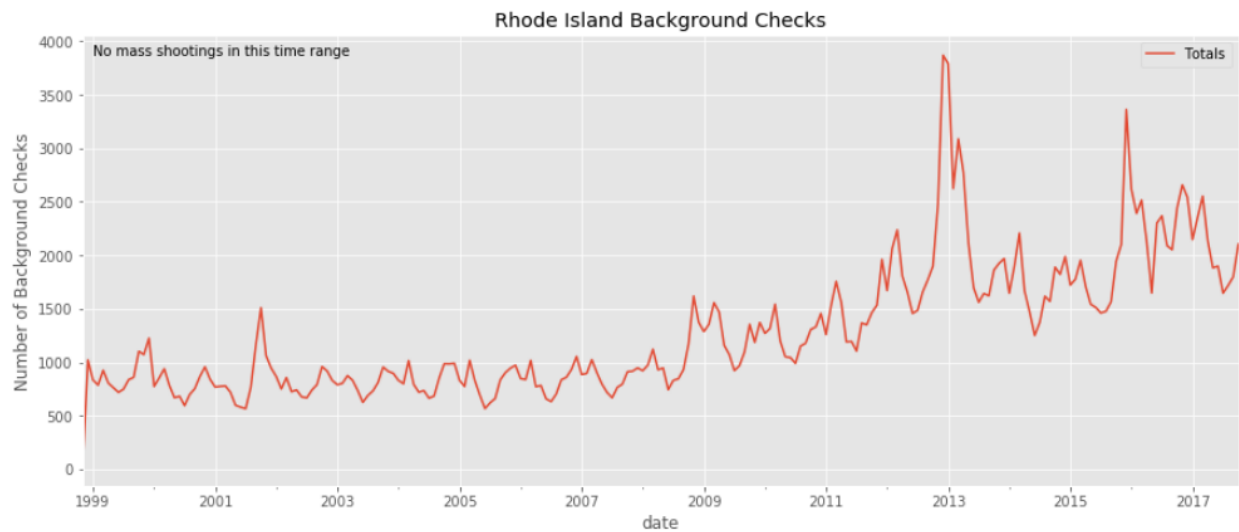
It appears that there is a strong correlation between the certain publicized mass shooting events and the purchase of guns. States with strong hunting and without have demonstrated almost

universal peaks during the significant nationally covered events which also sparked gun control debates, notably Sandy Hook and San Bernardino shootings.

While occurring at the start of hunting season in many southern states and therefore part of the seasonal increase, it can be seen that the 2012 increase in gun licence background checks, and therefore we assume gun purchases, was at the same time as the Sandy Hook tragedy. The San Bernardino event also reinvigorated calls from the Federal Government to tighten gun control also.

Background Checks USA, overlay cases with 13 or more fatalities

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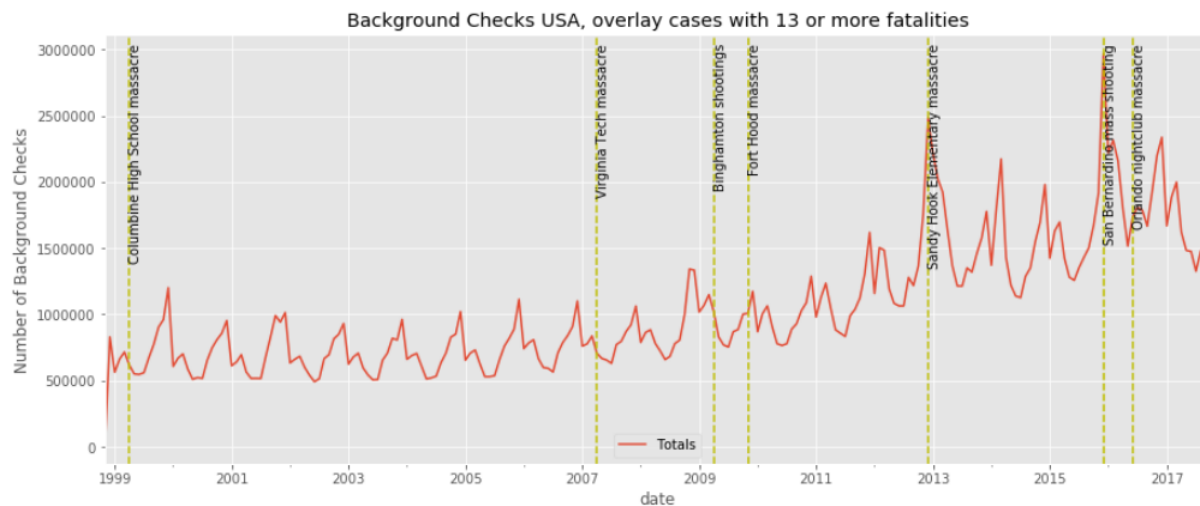
6.0 Conclusions

The relationship between mass shooting and the impact it has on the local area is complex. Some correlation appears to exist between the timing of a well publicized mass shooting event and a reduction in the rate of firearm related homicides in the states in which the shooting occurred. This correlation is often obscured by an offsetting increase in the suicide rate. It is not clear that the event triggered the lower incidence, and more investigation should be completed to understand if shootings have decreased or they have simply become less deadly.

There also appears to be some correlation between certain mass shootings and the purchasing of firearms. It is unclear whether this is in direct reaction to the event, and if people are purchasing a firearm to feel more secure against an existential threat, or if it is due to fear that firearm legislation will impact the ability to freely buy guns in the future. Additionally, since the

time of the Virginia Tech shooting, gun background checks have been increasing steadily each year. There has not been a significant tightening of licensing in states, therefore much of the increase in background checks is likely due to accelerated gun purchases. It is difficult to know if these are new gun owners or part of the [3% of Americans who own 50%](#) of the guns, and more research will be needed to confirm this.

Given the significant impact of some more publicized mass shootings, there may also be an argument about creating a new category of catastrophic shooting event that reflects the higher level of State or National horror and grief that accompany them. The impacts of Virginia Tech, Sandy Hook, the San Bernardino attackers and the Las Vegas shooting to name a few will have significant enough an impact on the national guns debate. If there impacts to the rates of gun violence and of purchasing guns, there is likely other effects on a local populations psychology. Analysis of arrests, rates of homelessness or alcoholism and other acts of violence may uncover further persistent negative impacts of such shocking events. A new designation may help promote further study of the impacts of such events and provide authorities and charities the means and ways to help.

7.0 Further Study

Given more time, we think it would be insightful to look for the event titles as key words in the extracts of the NYT to understand what types of events generated most publicity over time and identify those that were most persistent. This may also have removed the impact of other events generating gun related news.

Furthermore, we propose investigating potential trends and bias related to which states generate the most national coverage when mass shootings occur, including sources outside of the New York Times. For example, is a mass shooting resulting in 5 deaths at a school in Washington state likely to receive less national attention than a mass shooting resulting in 5 deaths at a school in New York? Our initial hypothesis is yes, but an investigation into this type of bias and interest in specific cities, states, or even type (urban or rural) could generate new insights, especially as we think about predicting the impact of such events.

A closer focus on the impact of gun related activities after shootings at educational establishments may be of particular interest to research as these types of shootings appear to solicit a more consistent pattern in gun deaths. A review of local gun related charges, gun club or shooting range membership applications and any local information on the numbers treated for gun related trauma may be able to support some of the results presented in this report.

8.0 Data Sets

Overall Data Folder
- New York Times API Results
- Deaths by state by year (Subset of CDC Wonder)
- County Deaths per Year (Subset of CDC Wonder)
- Mass Shootings per County (Mother Jones + additional variables)
- State Data by Death Type (Subset of CDC Wonder)
- Top Publicized Incidents (Output from NYT analysis)
- Mother Jones from Mother Jones website
- Populations by County
- State abbreviations
- State populations from US census
- USA cities used for city populations and zip codes from simplemaps
- NICS converted from pdf file and saved as df_NICS
- Natl Hunting License Report 2016 converted from pdf file and saved as df_hunt