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Thoughtful Data Science Bootcamp

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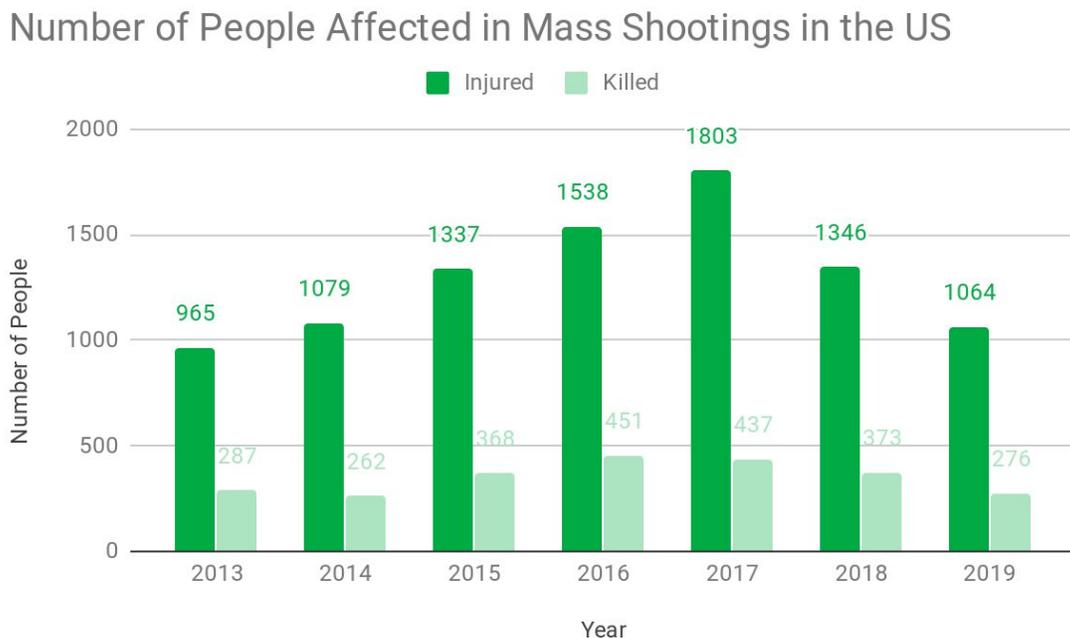
Efficacy of Gun Control Laws

OVERVIEW

During the past 20 years the United States has witnessed an alarming number of mass shootings. From Columbine to El Paso, people have been shot in schools, movie theaters, concerts, workplaces, and city streets. Despite the consensus on the horror of such acts, the discussion of potential solutions has been highly contentious. One of the primary issues of contention is gun control, seen by some as a restriction of their freedoms and by others as a necessary action in the wake of so many shootings.

To begin to understand the issue of mass shootings and actions to take, we must first look at the data. The Gun Violence Archives is a not for profit corporation that has been collecting data on gun violence since 2013. They define a mass shooting as a single incident in which four or more people are shot and injured or killed, not including the shooter. From 2013 through August 13, 2019 there have been 2,183 mass shootings injuring 9,132 and killing 2,454 people.

Fig. 1 Number of people injured or killed in mass shootings in the United States. Mass shooting is defined as an incident in which four or more people are injured or killed with a gun, not including the shooter. Data from GunViolenceArchive.org.



Number of Mass Shootings

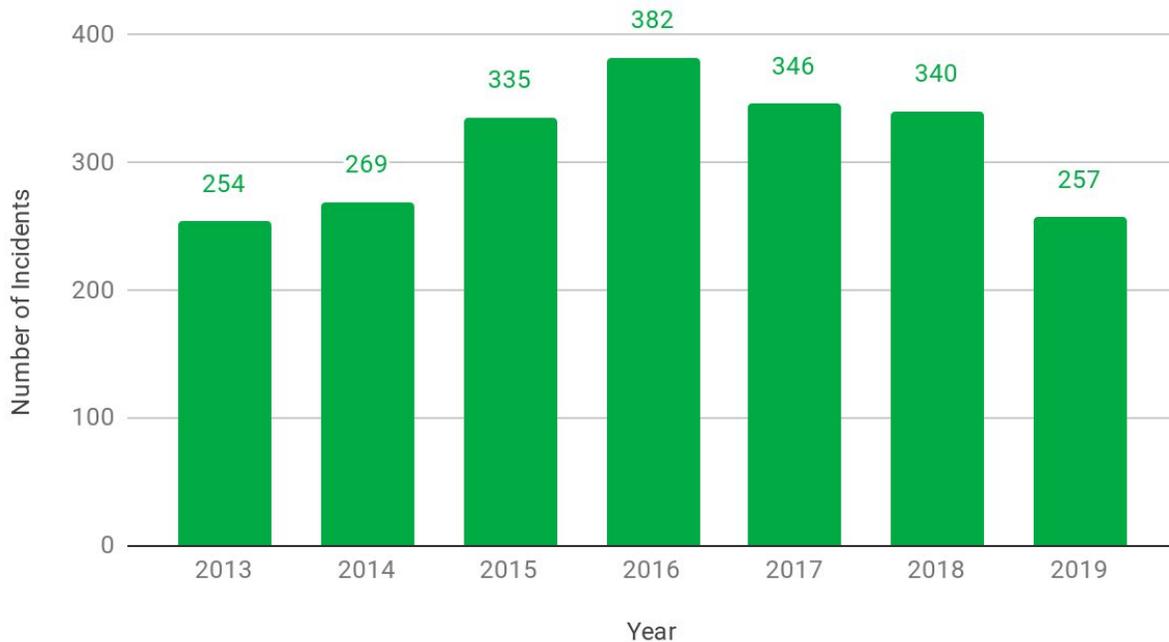


Fig. 2 Number of mass shootings in the United States. Mass shooting is defined as an incident in which four or more people are injured or killed with a gun, not including the shooter. Data from GunViolenceArchive.org.

The number of people injured in mass shootings during this time period appears to have peaked in 2017 and has been decreasing since then (Fig. 1). However, caution should be taken in uncovering trends in this data since it only spans six and a half years. Despite there being insufficient data to assess long-term trends in mass shootings, there is sufficient data to use as a relative baseline. With the US Congress discussing potential bills to reduce mass shootings, there is an opportunity to use this baseline data to assess the efficacy of any laws that are enacted.

HYPOTHESIS

No matter the law enacted, the following hypotheses can be tested.

1. Enactment of gun control legislation will reduce the *severity* of mass shootings.
2. Enactment of gun control legislation will reduce the *frequency* of mass shootings.

The severity of mass shootings is the number of people injured and/or killed during a single incident. For example, in 2013 about one person was killed and four people were injured per mass shooting (Figs. 1 and 2; 1.13 and 3.80, respectively). And in 2016 those numbers were the

same. This indicates the severity of incidents did not change, even if the frequency may have changed.

The frequency of mass shootings tells us how often they occur. For instance, in 2013 mass shootings occurred at a rate of almost five mass shootings a week (Fig. 2, 4.88/week). And in 2016 they occurred at a rate of about seven a week, or one each day (Fig. 2, 7.35/week). The frequency increased from 2013 to 2016.

SPECIFICATIONS

The Gun Violence Archive organization collects data on shootings daily, amassing data from local and state police, media, and other sources. This frequency of data collection will allow us to quantify gun violence incidents before, during, and after implementation of a law. “During” implementation refers to the time from when a bill is signed into law to when law enforcement agencies are implementing the law throughout the country.

EVALUATION

For the last seven years the incidence of mass shootings has fluctuated from 254 in 2013 to 382 in 2016. As such, the incidence of mass shootings after enactment of a law will fluctuate within and between years too. Therefore, data should continue to be collected daily for at least three years before commencing the analysis of the efficacy of the law. A statistically significant difference (0.05 significance level) between pre- and post-legislation data would suggest the legislation has had an effect on mass shootings. The following metrics will be analyzed:

Number of Mass Shootings

The number of mass shootings per week, month, and year

Number of People Injured

The number of people injured per incident, week, month and year.

Number of People Killed

The number of people killed per incident, week, month and year.