

An Inquiry into the Cross-States Impacts of Gun-Control Legislations following the 2018 Parkland High School Shooting

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Data Description

The dataset used for this research is panel data gathered from the Center for Disease Control's WONDER "Underlying Cause of Death" database. The database aggregates the information available through the Vital Statistics Cooperative Program, which is provided through state-operated registration systems and is based on vital records filed in state vital statistics offices. Data are based on death certificates for U.S. residents. Each death certificate identifies a single underlying cause of death and ethnicity data.

From this dataset, we grouped the number of gun-related deaths, as well as the crude-rate gun-related deaths by state, year, and ethnicity. We defined gun-related deaths as the count of death by unintentional discharge of firearms, intentional self-harm (suicide), assault (homicide), and finally, by undetermined intent. These four categories compose the "Injury Intent" variable. The "Race" variable only takes four different values, as individuals were identified by a unique race: African American, White, Asian & Pacific Islanders, and American Indian. The "Crude Rate" variable is defined as the rate of gun-related death among all deaths in a given racial group and state ($Crude\ Rate = Count/Population * 100,000$). Overall, the dataset is comprised of 4,432 observations, with two target variables: the number of death and crude death rate across time, grouped by race and state. The strength of the dataset resides in its granularity; more specifically, the "Injury Intent" variable provides great insights regarding the evolution of the different classifications of gun-related deaths over time. This will allow us to infer the heterogeneous treatment effects on the different types of deaths of the gun-restriction policies across states. The main weakness of the data is its aggregation by uniquely identified race; for example, the White category takes into account the Hispanic and Latinx ethnicities. For this reason, we will not be able to differentiate the evolution of the death patterns of these two demographics. In addition, the death rate has been normalized by the total population of a given ethnicity in a given state, therefore not taking into account the variation in overall deaths trends across time. Additionally, controlling for income brackets in addition to the ethnicity variable would be optimal, but these data points are not included in an individual death certificate.

We conducted an exploratory data analysis (EDA) providing important insights regarding the high-level trends on the evolution and characteristics of gun-related deaths, aggregated by state and ethnicity. As illustrated by Figure 1), both the crude death rate and the absolute number of

gun-related deaths have consistently been increasing for the past 20 years across the 50 states. The crude rate has remained around 7 and 8 for 100,000 people, but has been drastically increasing every single year since 2014. As illustrated by *Figure 4*), the number of unintentional and undetermined deaths has remained low for the past 20 years (in absolute terms), but in relative terms, the number of unintentional deaths has sharply increased since 2014, compared to other injury intents such as suicide or homicide. More precisely, the number of homicides has been consistently decreasing for the past 20 years. In absolute terms, the White population seems to be the most hit by gun-related deaths (in all categories), followed by African Americans, both increasing since 2000. However, in relative terms, the most hardly hit population is American Indians, followed by the White population. Lastly, it seems like the evolution number of gun-related deaths differs greatly across states (both in relative and absolute terms). More specifically, only Oklahoma has seen its crude death rate increase in the past 20 years, as opposed to other states like Texas, California, Arizona, or North Carolina, which saw a stagnation or slight decline in their crude death rates. As illustrated by *Figure 5*), when aggregated by the five states with the highest deaths attributed to firearms, the rates are in majority driven by suicide and homicide, most notably among African American, White, and American Indian populations. For example, in Arizona and Oklahoma, the crude death rate for suicide was respectively around 9 and 10, and 8.5 and 10.5 for homicides. In addition, in North Carolina, 15 out of 100,000 American Indians died as a result of the discharge of a firearm, compared to about 7.5 for African Americans in the State.

As illustrated by *Table 1*), the average number of deaths by state and race is 159.9, and about 8.02 for the crude death rate, with respective standard deviations of 236.79 and 7.56.

Table 2) shows that homicides and suicides accounted for 86.778% of all gun-related deaths, with respective shares of deaths of 43.62% and 43.16%. Lastly, *Table 3*) emphasizes that the majority of gun-related deaths are accounted by White and African American individuals (for a cumulative share of 90.433% of all gun-related deaths).

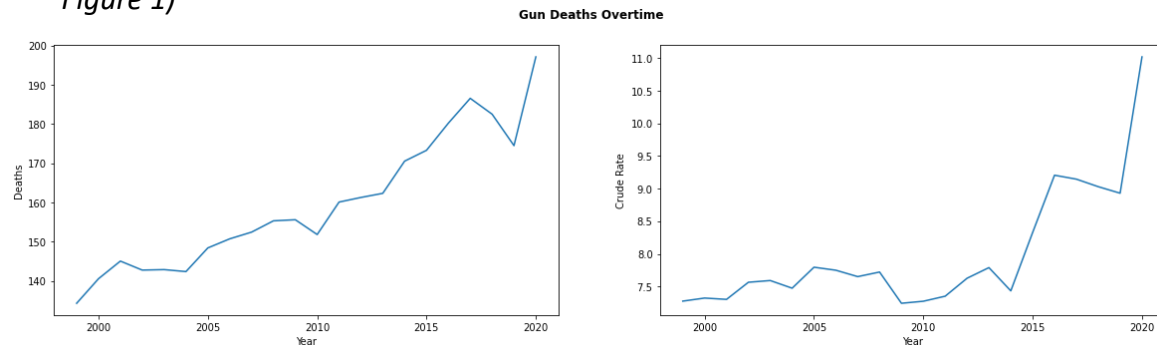
The compiled dataset provides many insights regarding the evolution of gun-related deaths across 50 states for the past two decades. The granularity of the observation, as well as the details about ethnicity and injury intents, will allow us to draw meaningful and important insights about the causal effect of the various gun-control policies that have been implemented following the Parkland High School Shooting in 2018.

References

- Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999-2020 on CDC WONDER Online Database, released in 2021. Data are from the Multiple Cause of Death Files, 1999-2020, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program

Figures (Across all figures & tables, there are 4,432 observations, exclusively gathered from the CDC)

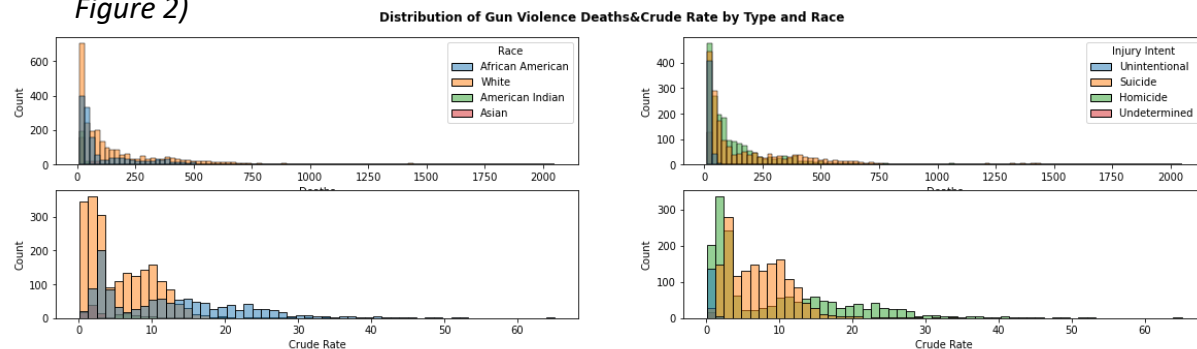
Figure 1)



Source: Center for Disease Control

Figure 1) represents the evolution of gun related deaths (absolute number of deaths and Crude death rate) across all injury intents.

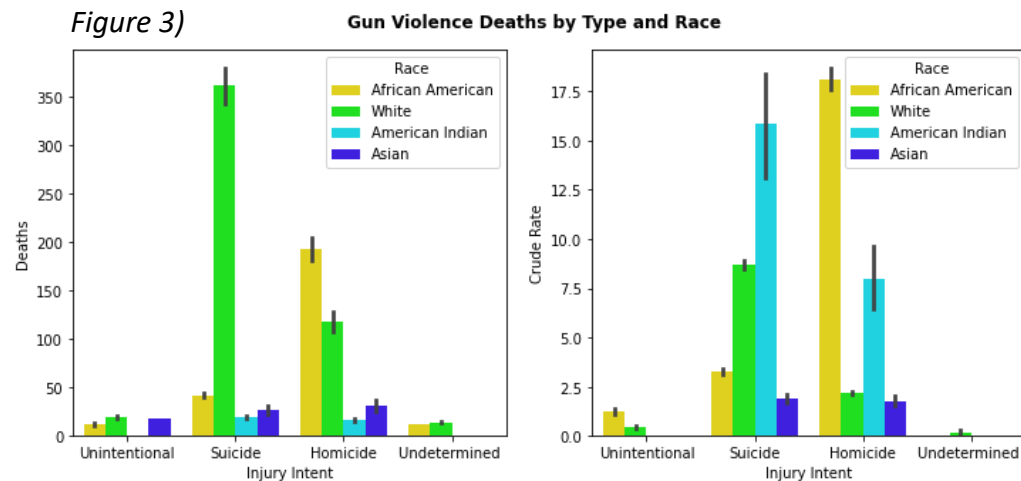
Figure 2)



Source: Center for Disease Control

Figure 2) represents the distribution of gun related deaths across states grouped by Race and Injury Intent.

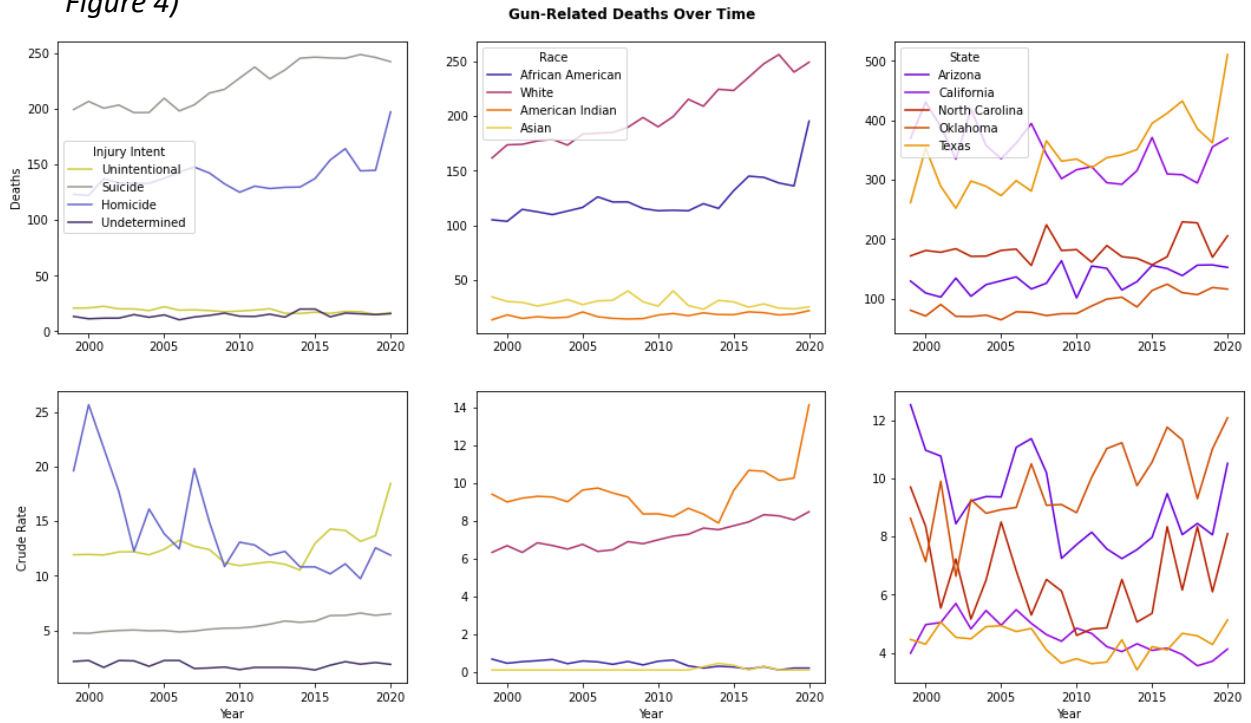
Figure 3)



Source: Center for Disease Control

Figure 3) represents the distribution of gun related deaths across states grouped by Race and Injury Intent.

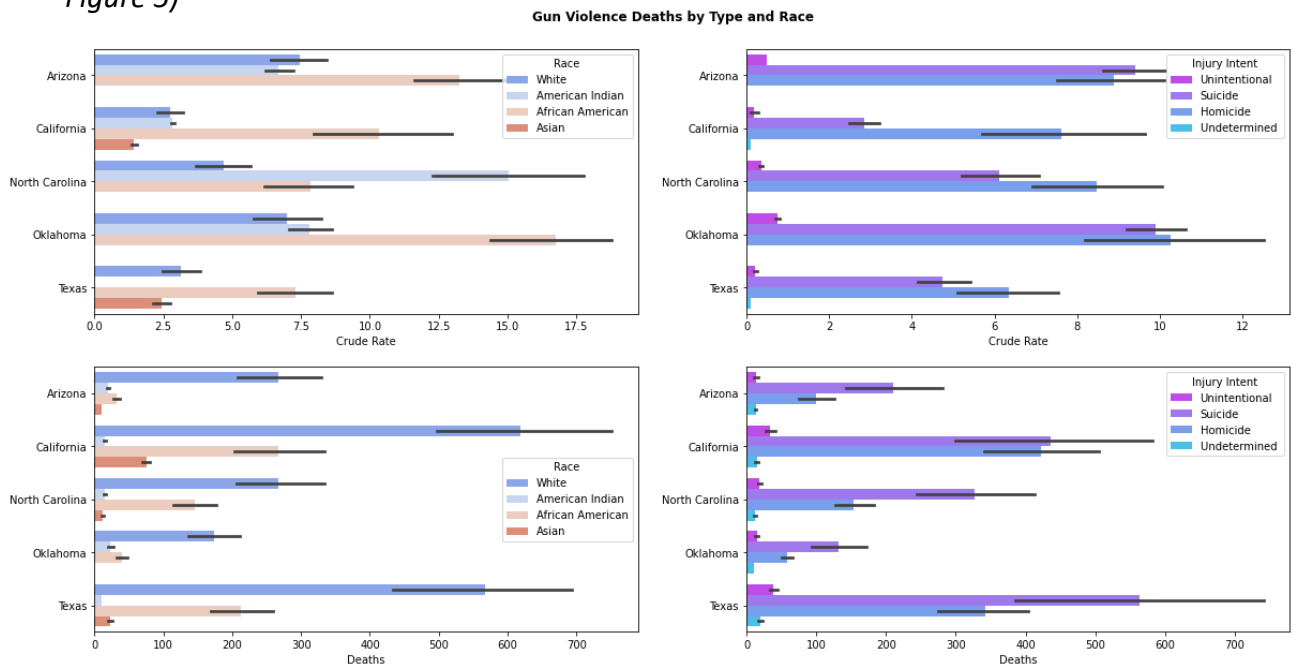
Figure 4)



Source: Center for Disease Control

Figure 4) represent the evolution of gun related deaths across States, Race, and Injury Intent

Figure 5)



Source: Center for Disease Control

Figure 5) represents the distribution of gun related deaths across states grouped by Race and Injury Intent.

Tables

Table 1) **Descriptive Statistics: Absolute Deaths, Crude Death Rate, and Population**

	Count	Mean	Std	Min	25%	50%	75%	Max
Deaths	4432.0	159.906	236.788	10.0	21.0	63.0	200.25	2050.0
Population	4432.0	3970499.157	5207286.663	36257.0	858662.0	2272052.0	5086681.0	29369542.0
Crude Rate	3395.0	8.017	7.56	0.1	2.4	5.8	11.4	65.1

Table 2) **Descriptive Statistics: Injury Intent**

Injury Intent	Count	Percent	Cumulative_Count	Cumulative_Percent
Homicide	1933	43.615	1933	43.615
Suicide	1913	43.163	3846	86.778
Unintentional	455	10.266	4301	97.044
Undetermined	131	2.956	4432	100.0

Table 3) **Descriptive Statistics: Ethnicity & Race**

Race	Count	Percent	Cumulative_Count	Cumulative_Percent
White	2569	57.965	2569	57.965
African American	1439	32.468	4008	90.433
American Indian	215	4.851	4223	95.284
Asian	209	4.716	4432	100.0