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Title

Effect of mass shootings on gun sales-A 20-year perspective.

Permalink

<https://escholarship.org/uc/item/2zh512zw>

Journal

The journal of trauma and acute care surgery, 87(3)

ISSN

2163-0755

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Publication Date

2019-09-01

DOI

10.1097/ta.0000000000002399

Peer reviewed



HHS Public Access

Author manuscript

J Trauma Acute Care Surg. Author manuscript; available in PMC 2020 September 01.

Published in final edited form as:

J Trauma Acute Care Surg. 2019 September ; 87(3): 531–540. doi:10.1097/TA.0000000000002399.

Effect of mass shootings on gun sales—A 20-year perspective

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Abstract

BACKGROUND—Granular data on gun sales has been historically difficult to obtain. In 2016, California (CA) made monthly data from 1996 to 2015 publically available. Control charts are a method to analyze how a process changes over time in response to nonroutine events. We utilized this technique to study the impact of US mass shootings on CA gun sales.

METHODS—Monthly gun sales were provided by the CA Department of Justice and monthly fatalities from the CDC Wonder Death Certificate Registry. Mass shooting events were obtained from after-action reports, news media, and court proceedings. Time-ordered data were analyzed with control charts with 95% confidence intervals (upper control limit, lower control limit) using QiMacros.

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AUTHORSHIP

R.A.C., M.W.M. participated in the study design. R.A.C., M.W.M. participated in the data analysis. R.A.C., A.M.R., L.Z.K., R.E.P., M.W.M. participated in the data interpretation. R.A.C. participated in the writing. A.M.R., L.Z.K., R.E.P., M.W.M. participated in the critical review.

DISCLOSURE

The authors declare no funding or conflicts of interest.

Presented at the 77th Annual Meeting of the American Association for the Surgery of Trauma(AAST), September 27, 2018, in San Diego, California.

Supplemental digital content is available for this article. Direct URL citations appear in the printed text, and links to the digital files are provided in the HTML text of this article on the journal's Web site (www.jtrauma.com).

RESULTS—Individual gun sales of 9,917,811 occurred in CA with a median monthly rate of 41,324 (range, 20,057–132,903). A median of 263 people lost their lives monthly from firearms (124 homicides, 128 suicides), totaling 53,975 fatalities from 1999 to 2015. Fifteen of 21 current deadliest mass shootings occurred during this study period with 40% from 2012 to 2015. Also, 36 school shootings occurred during the study (mean, 5 deaths; range, 0–33; 6 injuries; range, 0–23) with 31% in 2012 to 2015 at rate of 3 events/year versus 1.4 events/year in the 17 prior years ($p < 0.05$). Sales were generally consistent from 1996 to 2011 (except post-Columbine, Col). Starting in 2011, sales exceeded the 95% predicted upper control limit every single month. Before October 2011, there was no statistically significant sustained effect of mass shootings on sales (except Col); however, since a statistically significant proportional spike in sales occurred in the months immediately following every single deadliest mass shooting event. Every year since 2012, CA has strengthened gun laws in response to mass shootings yet sales have risen immediately preceding enactment of these laws each January.

CONCLUSION—Gun sales are more frequent since 2012, with an additional increase following both mass shootings and legislative changes enacted in response to these shootings.

LEVEL OF EVIDENCE—Epidemiology, level III.

Keywords

Gun violence; firearms; gun sales; mass shootings

According to the Centers for Disease Control, from 2001 to 2016, 515,000 lives were lost in the United States from firearms with another 1,204,058 suffering nonfatal injuries.¹ The societal and economic burdens of disease are staggering with estimates as high as US \$175 billion dollars spent on the direct medical expenses and work loss^{1,2} from firearm-related homicides and suicides. Prior research has correlated access to firearms with risk for both homicide and suicide.^{2–8}

As the United States struggles to address this public health crisis, attention has been directed toward legislative actions including closing gun show loopholes, universal background checks, safe gun storage, and limiting access for those who are not permitted to carry firearms.^{9–12} These efforts intensified in the period immediately after Sandy Hook (SH) in 2012 with many states attempting, some successfully, to strengthen gun laws.^{13–15} In the immediate aftermath of each US mass shooting, access to guns is initially intensely debated, but fairly rapidly dissipates from the general public's attention until the next event.^{14–17}

A large focus of those debates centers on the role of gun manufacturing and sales. Research on gun sales including the impact of mass shootings has been challenging to conduct. Granular data on actual sales historically has not been accessible, and there is no federal registration system for gun sales.¹⁶ This requires surrogates to be utilized including suicide rates and the FBI National Instant Criminal Background Check System (NICS).^{16,18} Although common proxies, both have significant limitations in tracking and understanding the flow of guns in our country.^{16,18,19}

In 2016, in an extraordinary departure from long-standing policy, then California Attorney General Kamala Harris in the aftermath of several mass shootings released to the public

California's monthly gun sale data for 1996–2015. The data included both new sales and resale of all long-guns and handguns. Control charts are a method to analyze how a process changes over time in response to nonroutine events. We utilized this technique to study the impact of US mass shootings on CA gun sales over the last 20 years.

METHODS

Monthly gun sales from 1996 to 2015 were provided by the California Department of Justice. Monthly fatality data for the state was only available from 1999 to 2015 and was extracted from the CDC Wonder Death Certificate Registry.²⁰ Mass shooting events have no standard accepted definition, and databases are widely variable in interpretation of categorization as a mass shooting.^{16,21–25} Some databases utilize those injured rather than killed, and others only fatalities as the benchmark for inclusion. Definitions within the databases have also evolved over time with a trend toward decreasing the number of minimum victims from 4 to 3.^{16,21,22}

Mass shooting data was ascertained following a comprehensive search of available databases and cross-referenced for accuracy against after-action reports, news media, and court proceedings. These databases including Mother Jones, The Gun Violence Archive, Everytown for Gun Safety, and the Federal Bureau of Investigation (FBI).^{21–25} All events with a minimum of four victims (not including the perpetrators) were selected. This inclusion criteria were selected as older data from each source was limited to events with four or more victims. Additionally, to be inclusive, victims included those sustaining either fatal or nonfatal injuries were included.

Each mass shooting event was also classified as school-related or nonrelated. The definition of school-related was adapted from the gun violence archive that defines a school shooting as “An incident that occurs on school property when students, faculty, and/or staff are on the premises; incidents that take place on or near school property when no students or faculty/staff are present are not considered ‘school shootings.’”²³

The association between mass casualty events and gun sales was statistically evaluated using statistical process control analysis. With this process gun sales were charted over time with upper control limits (UCL) and lower control limits (LCL) defined as three standard deviations above and below the mean respectively. Sales were considered unstable (unexpected variability) if one or more of the six following criteria were met: (1) one or more points fall outside of the UCL or LCL; (2) two of three successive points fall in the area that is beyond two standard deviations from the mean, either above or below; (3) four of five successive points fall in the area that is beyond one standard deviation from the mean, (4) here is a run of six or more points that are all either successively higher or successively lower; (5) eight or more points fall on either side of the mean; (6) 15 points in a row fall within the area on either side of the mean that is one standard deviation from the mean.²⁶ Statistical analysis was performed using QiMacros (SPC Software for QiMacros, version 2018, KnowWare International, Inc, Denver, CO).

Mass casualty events occurring through 2015 were ranked from the most deadly to the least. The events in the top 20 of the most deadly that occurred from 1996 to 2015, and all school-associated shootings were selected. These were temporarily related to gun sales to determine if the events were associated with special cause variation that created instability in gun sales.

RESULTS

Overall Gun Sales and Fatalities

Over 20 years, 9,917,811 individual gun sales occurred in California, with an overall increase in yearly sales of 168% comparing 1996 to 2015 (Table 1). The largest single increases from year to year occurred in 1998 to 1999 (52%) and 2011 to 2012 (34%). Trends for handgun sales versus long-gun sales by year were identical (Supplemental Digital Content, Figure 1, <http://links.lww.com/TA/B431>). The median monthly gun sale rate was 41,324 (range, 20,057–132,903). By month, guns sales were most common in December in 17/20 years. In 2008, 2009, and 2013 December was the second busiest purchase month. The last month released, December 2015, had the highest sales at 132,903.

A total of 53,975 fatalities occurred from 1999 to 2015 (Table 1). The total median monthly lives lost was 263 people (interquartile range [IQR], 245–283). Homicide accounted for 47% of the total deaths with a monthly median of 124 (IQR, 114–132). Suicide had a median monthly rate of 128 (IQR, 110–144). There was no statistical difference in the yearly rate of homicide or suicide over the 20-year study period (Fig. 1).

Mass Shootings

Overall, 82 mass shootings events occurred from 1996 to 2015 with 34% ($n = 28$) of these taking place since 2012. Mass shooting events were more frequent in the last 4 years of study (rate, 7 events/year) compared with the first 16 years of the study (3.3 events/year, $p < 0.05$). This includes 36 (44%) school mass shootings (median, 2 deaths; range, 0–33; 4 injuries, range, 0–23) with 31% in 2012–2015 (Table 2). Assailants were almost exclusively male (98%), with median age 18 years (IQR, 15–23; $p < 0.05$). Handguns were used by 86% (37/43) of the assailants, rifles in 30% (13/43), and 23% (10/43) shotguns. In events where a weapon was recovered and tracking data released, 78% (21/27) were obtained originally legally. However, juvenile offenders often ascertained these weapons through an adult legal owner known to the perpetrator.

As of 2015, the 20 deadliest mass shootings in recorded US history (21 events with one tie) had a median of 12 fatalities each (IQR, 9–14.5) and 8 additional injured (IQR, 4–20.5; Table 3). The median age of the assailants was 34 years (IQR, 22–41.5), and all but one were male. Firearms were legally obtained in 76% (16/21). Assailants typically utilized multiple weapons (median, 2; IQR, 2–4) with at least one semiautomatic firearm used in all but one event. Handguns were the predominant firearm of choice with 95% (20/21) of assailants using at least one, followed by rifles in 52% (11/21), and shotguns in 33% (7/21). Fifteen (71%) of the 21 events occurred from 1996 to 2015 (Table 3). Of these, 60% occurred over a 15-year span from 1996 to 2011, and 40% happened in the later years of 2012 to 2015.

It is important to acknowledge that since 2016, 32 additional mass shootings have been recorded with the Las Vegas event now the deadliest claiming 58 lives and resulting in 546 injuries. During this period, the mass shooting event rate was significantly higher than previous years (12.8 mass shootings per year ($p < 0.005$, Fig. 2)). If the shootings since 2016 were included in the deadliest mass shootings, an additional five events would have been included in the most deadly (nine or more fatalities) with 20/26 (77%) taking place since 1996.

Effect of Mass Shootings on Gun Sales

Sales were generally consistent from 1996 to 2011 (except post-Columbine [Col]). Starting in October 2011 (Fig. 3), sales exceeded the Upper Control Limit in every single month. Before October 2011, there was no statistically significant sustained effect of mass shootings on sales (except Col). However, since two high-profile events in September and October 2011, coupled with SH in early 2012, a statistically significant and persistent proportional spike in sales occurred in the months immediately following every single deadliest mass shooting event. Every year since SH, California has strengthened gun laws in response to mass shootings yet sales have risen immediately preceding enactment of these laws each January.

DISCUSSION

With the release of 20 years of firearm sale statistics by then California Attorney General Kamala Harris in 2016, California became the first state in the United States to provide this type of detailed purchase information to the public. The granularity of these records were particularly valuable as they included both new and resales of all firearm types, were presented as monthly totals, based on actual sales, and spanned a long period. Prior to this release of information gun sale research was based on differing surrogates for gun ownership, such as suicide rates as a proxy and background check requests. Each of these substitutes has a significant number of drawbacks and firearm research advocates have long requested release of this data. As such, our study provided a unique opportunity to investigate the longitudinal impact of gun sales in California.

Statistical process control analysis is a method used to analyze how a process changes over time in response to nonroutine events. If sales were unstable in a response to a nonroutine event, such as a mass shooting, one would see a deviation above or below the mean of expected sales. This technique revealed that during the first 16 years of the study gun sales were in a steady state, and the only deviation occurred following the Columbine shooting with a progressive rise in the months following the incident and peak in December 1999. Importantly, the upward trend in gun sales was not maintained, and the trend returned to baseline the following month (January 2000, Table 3). There were no sustained and significant UCL monthly deviations from steady state for more than a decade, and no effect was seen following the repeal of the assault weapon ban. During this period there were 8 of the top 20 most deadly mass shootings, but there was no measurable effect on gun sales.

In contrast, beginning in October of 2011, and in every subsequent month, the gun sales figures exceeded the predicted sale mean based on historic data and never returned back to

the pre-October 2011 baseline. The 1-year preceding this rise was historically one of the lowest volume years for mass shooting events within the 20-year time span (Fig. 2). Ascertaining specifically what changed is difficult; however, there appears to be a correlation based on the control charts to a significant mass shooting incident (Fig. 3). On October 12, 2011, a mass shooting occurred that claimed the lives of eight individuals in a hair salon in California.²⁷ This event which was widely carried by the media, and ranks 25th on our all-time deadliest US mass shooting list as of 2015. This event occurred within 5 weeks of another high-profile shooting at an International House of Pancake in Carson City, Nevada (September 6, 2011) where four persons died (plus the assailant) and seven were injured. The assailant used an AK-47²⁸ during that attack which was only the third US event utilizing such a weapon and had not been the firearm of choice of any mass shooting assailant in more than 11 years. Combined, these two events spurred significant and widespread discussion on gun legislation shortly thereafter.

Our analysis suggests that the most deadly mass shootings have continued to occur in close proximity to the spike in gun sales. Beginning in late 2011, related and proportional spikes in gun sales occurred in 1 month to 3 months immediately following each subsequent shooting on the deadliest list. Each one lasted approximately 2 months to 3 months following the event, and in the case of rapid succession events, the effect appeared additive.

This finding is consistent with studies performed on the increase in background checks following these events which show a relatively early increase that tapers fairly rapidly within 3 months to 6 months of an incident,²⁹ and are also consistent with related analyses that have shown a proportional spike in federal background checks and sales following selected mass shootings including SH.^{13,16,30,31} In the current study, the largest spike occurred immediately following the SH shooting where the rate of gun sales was more than double the UCL and only exceeded by the last month of available data (December 2015).

The potential explanations that have been explored largely in survey data has resulted in two postulated theory by experts. One is the fear of personal harm and risk of being a victim of a mass casualty and the perception that a personal firearm is protective^{16,31}; the other is fear of legislation that will prevent future purchasing of firearms.^{16,19} Although often debated by pro- and anti-gun advocates, the vast majority of the studies have shown that gun ownership is unlikely to be protective in most incidences.³²⁻³⁴ Additionally, survey studies have shown that personal protection appears to be a minority reason for gun purchasing following mass casualty events. Following the Orlando Pulse Nightclub shooting the overwhelming majority of the public did not seek to ascertain a weapon, and they did not perceive a sustainable risk of personal harm.^{16,31}

Our study supports the paradoxical increase in gun sales with new gun legislation. California has strengthened gun laws every year including and since 2012. For nearly every year, December was the month with the highest sales. New laws go into effect January 1st each year in California. Thus, this spike occurs in the 30 days immediately preceding the timing of the new laws taking effect. Although other factors such as holiday sales and mass shooting events in the latter part of the year may also contribute to this observation, new laws appears to be an important driving force of gun sales. This is supported by studies

showing that gun owners fear that these high-profile events will lead to increased gun regulation making it more difficult to acquire a firearm in future years.^{16,19}

There is extensive literature linking the estimated rate of gun ownership to increased suicides, fatalities, and violent crimes.²⁻⁸ Although this was not demonstrated in the current study, this is not unexpected considering the narrow scope of data from a singular state with the strictest gun laws in the Nation. This observation may reflect other confounding factors as well. First, it is possible that California is saturated with firearms. Miller et al. reported that an estimated 360 million firearms have been sold in the United States since 1900,³⁵ and nearly 10 million guns entered California through legal sales in the last 20 years with a tremendous influx of firearms most significantly in the last 3 years of study. Given this saturation, the introduction of each new firearm, especially since a large proportion of purchasers based on this data and previously reported studies are repeat purchasers,¹⁶ may have a proportionally smaller impact on relationship to deaths and injuries.

Additionally, the entry of new firearms to the market may require more than 3 years of data to see the potential effect on subsequent fatalities. Pierce et al. found that the mean time-to-crime (a standard metric of gun tracking) was 12.2 years in California from original purchase to use in a crime compared with a much shorter time frame for other states. Similar work demonstrated that less than one third of guns used in crimes in California were 3 years or younger.^{36,37} Thus, a 3-year lag time from increased sales may not be enough time to see the net effect on fatalities. It is also possible that other confounders not measurable in this study including advances in care have decreased the mortality from firearm injury, and therefore, the risk of death differed across the 20 years of the study from similar injuries.

Finally, although there was not a direct correlation to overall fatalities, the alarming and precipitous increase in mass casualty events beginning in 2012 and continue to present day highlights a disturbing trend and shift. This study employed a broad definition of mass casualty adapted from the major leading groups that track these events. Importantly, an extensive search was undertaken tracing data back to original sources to provide as thorough as possible of an understanding of the scope of the problem.

Mass media outlets have reported dissenting opinions regarding the comparison of contemporary mass shooting event rates with historic trends. Most of the available major databases track incidence since the early 1980s. Criticism of differing definitions of mass shootings has contributed to the debate^{16,31}; however, our approach using a broad definition was a comprehensive attempt to eliminate bias in inclusion criteria. An expanded definition has been advocated for by many investigators to construct the most complete viewpoint on this issue.³⁵

Although there remains no reporting or measuring standard, without question our data show a disturbing, exponential growth that appears to be sustained since the end of our initial gun sales period and is consistent with other investigations utilizing differing definitions of mass shootings.¹⁶ These studies demonstrate a clear pattern of overall slow growth until the last decade where exponential growth has been seen. In a study performed by USA Today, in the 1970s, events occurred on average once per year, rising slowly until the early 2000s where

the peak incidence was 4.5 events per year from 2010 to 2014. Cohen et al.³⁸ found these events tripled between 2011 and 2014. Our results confirm that this is a real and sustained finding with a particularly troublesome growth curve since 2012.

Especially unsettling is the rise in school-related shootings which now constitute over 44% of all mass shootings. This risk profile is highlighted by the findings of Towers et al. that a school shooting occurs on average monthly with an increased risk of copycat events in the 13 days following the incident.⁴ Whether one is pro- or anti-gun control, this should give each and every one of us significant pause. This internal reflection is important as we as a society embark on trying to curb this epidemic. As Towers et al. note, 87% of all children age 0 year to 14 years worldwide killed by firearms are living in the United States despite the fact that less than 5% of the world's children live in the United States.⁴

No matter what personal stance one has on firearm policy, it is a fundamental standard that children and young adults should have the security in knowing that they can attend school in a safe environment. They should not have to engage in active shooter exercises routinely, yet, this has become the norm in many places. These school-related shootings have touched all aspects of our country from urban, inner city environments, to rural communities, to prestigious universities.

By definition, firearm-related violence is an epidemic. This fact is not debatable as it remains a leading cause of death and is responsible for the greatest years of productive life lost in the United States according to the CDC. Yet, it remains the most poorly funded and the least investigated public health concern. The issues that contribute to mass shootings and gun violence are complex and require vigor in research approaches to unravel the multitude of factors that contribute. The solutions will not be simple. On average, mass shootings are now occurring every 2 weeks in the United States.⁴ This study along with others reinforce the need to commit energy and funding toward investigating this health-related cause of death as any other major cause of loss of human life.

CONCLUSION

Mass shootings continue to increase at an exponential rate in the United States. These mass shootings along with the legislative changes enacted in response appear to have a proportional and additive effect on gun sales.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Biography

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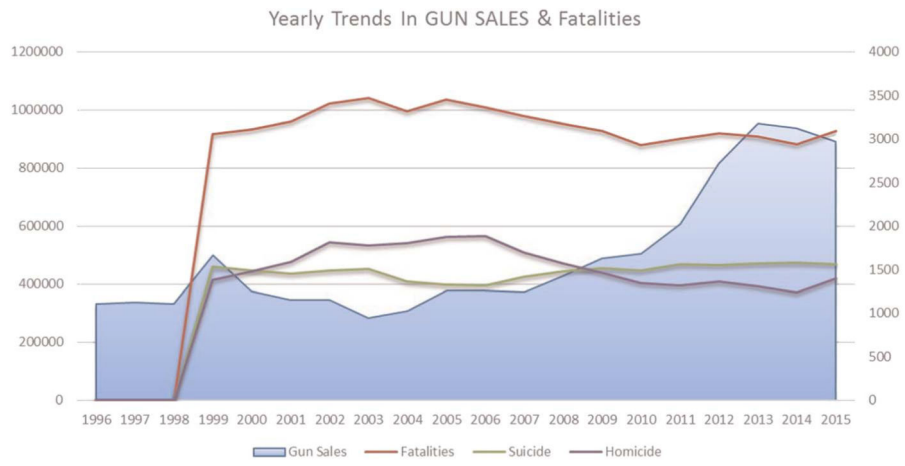


Figure 1. Yearly trends in gun sales and fatalities. *Fatality data only available from the CDC Wonders Database beginning in 1999.

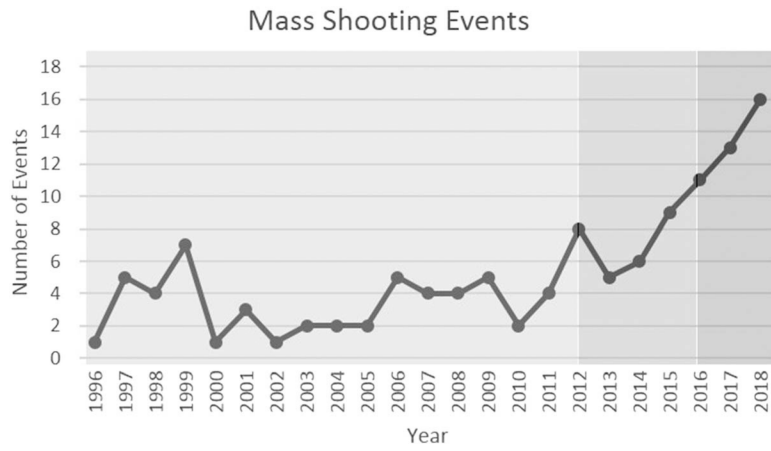


Figure 2. Longitudinal trend in mass shootings events per year. 1996–2011: period 1, rate 3.3 events/year. 2012–2015: period 2, rate 7 events/year. 2016–2018: Period 3, rate 12.8 events/year $p = 0.005$.

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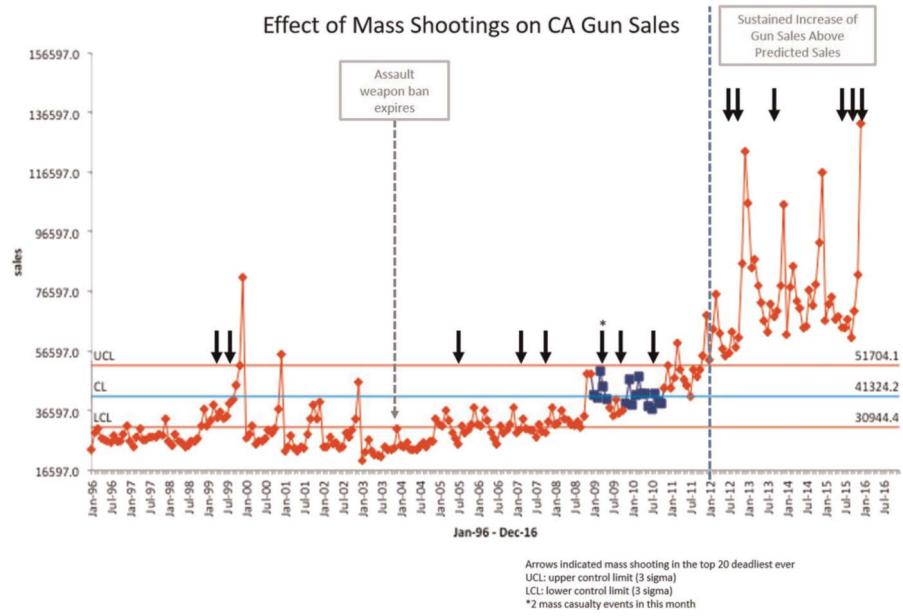


Figure 3.
Effect of Mass Shootings on California Gun Sales (CA: California).

TABLE 1.

Yearly Totals of California Gun Sales and Fatalities

Year	Gun Sales	% Change From Prior	Total Fatalities	Suicide	Homicide
1996	332,133		*	*	*
1997	337,785	1.7	*	*	*
1998	330,675	-2.1	*	*	*
1999	500,041	51.2	3054	1,532	1,380
2000	376,234	-24.8	3108	1,487	1,483
2001	346,752	-7.8	3200	1,450	1,589
2002	344,360	-0.7	3410	1,490	1,810
2003	283,955	-17.5	3468	1,505	1,782
2004	308,095	8.5	3316	1,366	1,808
2005	377,131	22.4	3453	1,329	1,878
2006	376,881	-0.1	3363	1,319	1,883
2007	373,502	-0.9	3268	1,422	1,701
2008	429,189	14.9	3171	1,478	1,569
2009	489,735	14.1	3094	1,519	1,460
2010	505,589	3.2	2935	1,492	1,342
2011	607,876	20.2	3004	1,564	1,314
2012	815,629	34.2	3068	1,549	1,362
2013	953,916	17.0	3026	1,571	1,312
2014	936,471	-1.8	2942	1,582	1,233
2015	891,862	-4.8	3095	1,559	1,396
Total	9,917,811	168.5**	53975	25,214	26,302

* CDC Wonders data only available beginning in 1999.

** % change from 1996 to 2015.

TABLE 2.

School Shootings From 1996 to 2015

Event	Date	Location	Venue	Dead	Injured	Assailant Age	Assailant Dead	Firearm Originally Legally Obtained	Weapon	Assailant Sex
1	2/19/1997	Bethel, Alaska	Bethel Regional HS	2	2	16	No	Not released	Shotgun	Male
2	10/1/1997	Pearl, MS	Pearl HS	3	7	16	No	Not released	Rifle	Male
3	12/1/1997	West Paducah, KY	Heath HS	3	5	14	No	Yes	Rifle/Shotgun/Handgun	Male
4	3/24/1998	Craighead, AR	Westside MS	5	10	11	No	Yes	Rifle/Shotgun/Handgun	Male
5	4/24/1998	Edinboro, PA	Parker MS	1	3	14	No	Yes	Rifle/Shotgun/Handgun	Male
6	5/21/1998	Springfield, OR	Thurston HS	4	25	15	No	Yes	Rifle/Handgun	Male
7	4/20/1999	Aurora, CO	Columbine HS	15	21	18	Suicide	Yes	Rifle/Shotgun	Male
8	5/20/1999	Conyers, GA	Heritage HS	0	6	15	No	Yes	Rifle/Handgun	Male
9	12/6/1999	Ft. Gibson, OK	Ft. Gibson MS	0	6	13	No	Yes	Handgun	Male
10	3/5/2001	Santee, CA	Santana HS	2	13	15	No	Not released	Handgun	Male
11	3/22/2001	El Cajon, CA	Granite Hills HS	0	5	18	No	Not released	Shotgun	Male
12	1/16/2002	Grundy, VA	Appalachian School of Law	3	3	42	No	Not released	Handgun	Male
13	4/14/2003	New Orleans, LA	John McDonogh HS	1	3	18	No	No	Rifle/Handgun	Male
14	5/4/2004	Randallstown MD	Randallstown HS	0	4	17	No	Not released	Rifle/Handgun	Male
15	3/21/2005	Red Lake, MN	Red Lake Senior HS	10	7	16	Suicide	Yes	Handgun	Male
16	8/24/2006	Essex Junction, VT	Essex Elementary School	2	3	26	No	Yes	Shotgun/Handgun	Male
17	9/17/2006	Pittsburg, PA	Duquesne College	0	5	18	No	Weapon not recovered	Handgun	Male
18	10/2/2006	Nickels Mines, PA	West Nickel Mines HS	6	3	32	Suicide	Yes	Rifle/Shotgun/Handgun	Male
19	4/16/2007	Blacksburg, VA	Virginia Tech University	33	23	23	Suicide	Yes	Handgun	Male
20	10/10/2007	Cleveland, OH	SuccessTech Academy	1	4	14	Suicide	Not released	Handgun	Male
21	2/14/2008	DeKalb, IL	Norther Illinois University	6	21	27	Suicide	Yes	Shotgun/Handgun	Male

Event	Date	Location	Venue	Dead	Injured	Assailant Age	Assailant Dead	Firearm Originally Legally Obtained	Weapon	Assailant Sex
22	10/6/2008	Detroit, MI	Henry Ford HS	1	3	15	No	No	Handgun	Male
23	1/9/2009	Chicago, IL	Dunbar HS	0	5	18	No	No	Handgun	Male
24	2/12/2010	Huntsville, AL	U of Alabama	3	3	44	No	Weapon not recovered	Handgun	Male
25	3/31/2011	Houston, TX	Worthing HS	1	5	unsolved	No	unsolved	Handgun	Female
26	2/27/2012	Chardon, OH	Chardon HS	3	3	17	No	Yes	Handgun	unsolved
27	4/2/2012	Oakland, CA	Oikos University	7	3	43	No	Yes	Handgun	Male
28	10/31/2012	Los Angeles, CA	University of Southern California	0	4	20	No	Not released	Handgun	Male
29	12/14/2012	Newton, Conn	SH Elementary	28	2	20	Suicide	Yes	Rifle/Handgun	Male
30	6/7/2013	Santa Monica, CA	Santa Monica Community College	6	4	23	Killed	No	Rifle/Handgun	Male
31	6/5/2014	Seattle, WA	Seattle Pacific University	1	3	26	No	Yes	Shotgun	Male
32	10/24/2014	Marysville, WA	Marysville Pitchuck HS	5	1	15	Suicide	Yes	Handgun	Male
33	12/12/2014	Portland, OR	Rosemary Anderson HS	0	4	22	No	Not released	Handgun	Male
34	10/1/2015	Roseburg, OR	Umpqua Community College	10	9	16	No	Not released	Handgun	Male
35	10/9/2015	Flagstaff, AZ	Northern Arizona University	1	3	18	No	Yes	Handgun	Male
36	10/22/2015	Nashville, TN	Tennessee State University	1	3	20	No	Weapon not recovered	Handgun	Male
						20	No	Weapon not recovered	Handgun	Male

TABLE 3.

Top 20 Deadliest Mass US Shootings

Event	Location	Date	Fatalities	Injured	Assailant Age	Assailant Sex	Firearm Originally Legally Obtained	No. Weapons	Semiautomatic	No. Weapons
Virginia Tech	Blacksburg, Virginia	4/16/2007	32	23	23	Male	Yes	2	Yes	Handgun
SH	Newtown, Connecticut	12/14/2012	27	2	20	Male	No	4	Yes	Rifle/shotgun/Handgun
Luby	Killeen, Texas	10/16/1991	24	20	35	Male	Yes	2	Yes	Handgun
San Ysidro McDonald's	San Ysidro, California	7/18/1984	22	19	41	Male	Yes	3	Yes	Rifle/shotgun/Handgun
US Postal	Edmond, Oklahoma	8/20/1986	15	6	44	Male	Yes	3	Yes	Handgun
San Bernardino	San Bernardino, California	12/2/2015	14	21	28	Male & Female	Yes	4	Yes	Rifle/Handgun
Binghamton	Binghamton, New York	4/3/2009	14	4	41	Male	Yes	2	Yes	Handgun
Fort Hood	Fort Hood, Texas	11/5/2009	13	30	39	Male	Yes	1	Yes	Handgun
Columbine High School	Littleton, Colorado	4/20/1999	13	24	17	Male	No	4	Yes	Rifle/shotgun/Handgun
Aurora Theater	Aurora, Colorado	7/20/2012	12	70	24	Male	Yes	4	Yes	Rifle/shotgun/Handgun
Washington Navy Yard	Washington, D.C.	9/16/2013	12	8	34	Male	Yes	2	Yes	Shotgun/Handgun
Geneva County	Geneva County, AL	3/9/2009	10	6	28	Male	Yes	4	Yes	Rifle/shotgun/Handgun
Red Lake	Red Lake, Minnesota	3/21/2005	10	5	16	Male	No	3	Yes	Shotgun/Handgun
GMAC	Jacksonville, Florida	6/18/1990	10	4	42	Male	Yes	2	Yes	Rifle/Handgun
Atlanta	Atlanta, Georgia	7/29/1999	9	13	44	Male	Yes	4	Yes	Handgun
Standard Gravure	Louisville, Kentucky	9/14/1989	9	12	47	Male	Yes	5	Yes	Rifle/Handgun
Umpqua Community College	Roseburg, Oregon	10/1/2015	9	9	26	Male	Yes	6	Yes	Rifle/Handgun
101 California St.	San Francisco, California	7/1/1993	9	6	55	Male	No	3	Yes	Handgun
Westroads Mall	Omaha, Nebraska	12/5/2007	9	4	19	Male	No	1	Yes	Rifle
Hartford Beer	Manchester, Connecticut	8/3/2010	9	2	34	Male	Yes	2	Yes	Handgun

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Event	Location	Date	Fatalities	Injured	Assailant Age	Assailant Sex	Firearm Originally Legally Obtained	No. Weapons	Semiautomatic	No. Weapons	Handgun
Charleston Church	Charleston, South Carolina	6/17/2015	9	1	21	Male	Yes	1	Yes		Handgun