



Historical Examination of United States Intentional Mass School Shootings in the 20th and 21st Centuries: Implications for Students, Schools, and Society

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Abstract

The deadliest U.S. school shooting to date, occurring on February 14, 2018 at Marjory Stoneman Douglas High School in Parkland, Florida serves as a powerful reminder that school violence is ever present. Addressing school violence, however, has been an elusive endeavor. The purpose of this review is to provide a historical examination of United States intentional mass school shootings in the 20th and 21st centuries. In addition, implications for students, schools, and society are discussed in light of policy and legislative initiatives as well as school-based prevention and intervention tiered models of support, such as positive behavior interventions and supports (PBIS).

Keywords Shooting · Guns · Violence · Schools · PBIS · Mental health

The mass school shooting on February 14, 2018 at Marjory Stoneman Douglas High School in Parkland, FL shocked the conscience of a nation once more (Astor et al. 2018). This event, however, is not an isolated one and does present a persistent concern over gun violence in general and school shootings in particular. Schools are expected to be conducive to learning environments where students feel safe and secure to pursue boundless learning opportunities. Unfortunately school violence is ever present and fear for safety affects not only students but also teachers, staff, and communities. The purpose of this paper is to provide an overview of school violence in the United States with an emphasis on school related mass shootings in the 20th and 21st centuries.

Gun Violence in the United States

Gun related violence in the United States has been characterized as an epidemic and a public health crisis with a substantial financial burden estimated to be \$174 billion in 2010 (Miller 2012; for cost estimates see also Follman et al. 2015). Specifically, in 2015, there were a total of 36,252 gun related fatalities (35.8% fatalities were non-law enforcement related and 60.74% were suicides). Regarding children and youth, 142 children ages 5 to 12 died from gun related injuries (73.94% were non-law enforcement related) and 1851 adolescents ages 13–18 died from gun related injuries (55.00% were non-law enforcement related and 40.25% were suicides; Katsiyannis et al. 2018; see also Centers for Disease Control and Prevention 2017).

In 2014, data from the National Crime Victimization Survey showed that students ages 12 to 18 experienced 841,100 nonfatal victimizations at school and 545,100 nonfatal victimizations away from school (Musu-Gillette et al. 2017; see also Centers for Disease Control and Prevention 2016). Between 1992 and 2014, total victimization rates for students ages 12 to 18 at school declined 82%, from 181 victimizations per 1000 students in 1992 to 33 victimizations per 1000 students in 2014 (Zhang et al. 2016). Overall, during 2013–14 school year, 65% of public schools documented one or more incidents of violence resulting in about 757,000 crimes. Specifically, 58% of

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schools recorded one or more incidents of a physical attack or fight without a weapon, 47% of schools recorded one or more incidents of threat of physical attack without a weapon, and 13% of public schools recorded one or more serious violent incidents (Musu-Gillette et al. 2017, p. v). Further, in 2015, 7.8% students in grades 9–12 reported being in a physical fight, 6.0% reported being threatened or injured with a weapon; 20.2% reported being bullied; and 15.5% reported being bullied electronically during the previous 12 months. In addition, 5.6% of students reported missing school one or more days because they felt unsafe and 4.1% reported carrying a weapon during the previous 30 days (Centers for Disease Control & Prevention 2016). Though violent deaths at school are rare, 53 school-associated violent deaths occurred from July 1, 2012 to June 30, 2013 (Musu-Gillette et al. 2017). Figure 1 illustrates school-associated homicides and suicides of youth ages 5–18 at school since 1992.

Despite calls to the contrary, Lemieux (2014) concluded that gun access was the best predictor of gun deaths. Indeed, Lemieux (2014), in examining mass shootings, found no support indicating that armed guards or citizens reduced deaths or injuries, though firepower capacity was a key factor associated with the number of deaths; in fact, only 17% of shooters were killed by police, but after they inflicted substantial casualties. Further, Wintemute (2008) reported that risk of death by gun increased 40 to 170% and Dahlberg et al. (2004) reported a 90% increase when living in a home with guns. Related to home safety, keeping guns locked, unloaded, and storing ammunition separately reduced youth suicide and unintentional injury (Grossman et al. 2005).

Efforts to curb gun violence, such as the federal ban on assault weapons and large capacity ammunition magazines (expired in 2004), were effective in reducing availability and use. For example, Fallis et al. (2011) reported that in Virginia during the ban (1994–2004) there was a decline in weapons with large capacity magazines reaching a low of 10% in 2004. Following the expiration of the ban the

number increased by 24%, and by 2010, 22% of weapons received had large capacity magazines. Similarly, since the enactment of the Brady law (1994) and 2012, background checks blocked 2.4 million individuals from purchasing guns (e.g., domestic abusers, felons, mentally ill); in 2012, 82,000 felons were blocked from buying guns because of background checks.

Unfortunately, there is a paucity of research related to gun violence and gun policy, which limits the ability to evaluate the effectiveness of gun violence prevention efforts. Therefore, there is a need to establish a robust and comprehensive research agenda regarding gun law and policy as well as a need for substantial federal funding (National Research Council 2005; Weiner et al. 2007). Such effort, however, will necessitate the repeal of a 1994 law limiting federal government research on the health implications of firearms by restricting the funding for the National Center for Injury Prevention and Control at the CDC. The law dictates that that “none of the funds made available for injury prevention and control at the Centers for Disease Control and Prevention may be used to advocate or promote firearm control” (Kellermann and Rivara 2013; see also, Alcorn 2017).

School Related Legislative Initiatives to Curb Gun Violence

The Gun-Free School Zones Act of 1990 imposes criminal penalties for the possession or discharge of a firearm in a school zone, though specific exceptions apply (e.g., the possession or discharge by an individual as part of a school program, law enforcement officer acting in an official capacity). This law significantly reduced gun violence in schools and fewer students reported carrying guns Centers for Disease Control & Prevention 2008a; Centers for Disease Control & Prevention 2008b). Although almost all states prohibit guns in K–12 schools, only 40 states and Washington, D.C. extend this prohibition to people who have

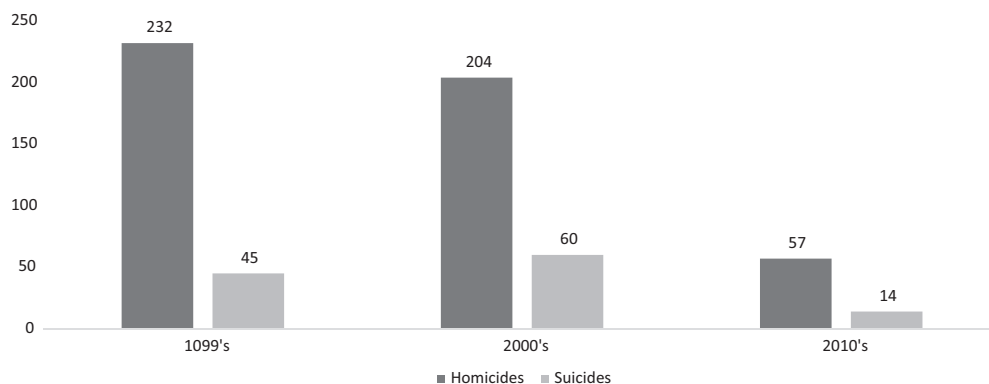


Fig. 1 Homicides and suicides of youth ages 5–18 at school (https://nces.ed.gov/programs/digest/d15/tables/dt15_228.10.asp)

been granted a permit to carry a concealed weapon (Cliffords Law Center 2018). Further, the Gun-Free Schools Act of 1994 requires states receiving federal funds to have a law requiring school districts to expel, for at least 1 year, any student carrying a gun to school unless a chief administering officer may modify such expulsion on a case-by-case basis. Further, schools are directed to develop policies requiring referral to the criminal justice or juvenile delinquency system for any student who brings a firearm or weapon to school.

Following the Columbine mass shooting, the secret service in collaboration with the U.S. Department of Education reviewed 37 incidents of “targeted school violence” and identified 10 key findings associated with these incidents. Specifically, (a) incidents were not sudden or impulsive, (b) others knew of the attacker’s idea, (c) most attackers did not threaten targets ahead of the attack time, (d) no accurate or useful profile of the attackers exist, (e) most attackers exhibited behavior of concern prior to the attack, (f) most attackers experienced problems coping with losses or personal failures, (g) most attackers felt bullied or injured by others, (h) most attackers had access to guns, (i) often other students were involved, and (j) most shootings ended without law enforcement intervention though officers responded (Vossekuil et al. 2004, p.31). The U.S. Secret Service, FBI and U.S. Department of Education have all recommended that K–12 schools implement threat assessment teams. The primary charge of these teams is to identify (authorities identify threats), assess (involves gathering and evaluating information from multiple sources), and manage (often an assessment reveals a manageable underlying issue such as bullying, anxiety or depression that mental health professionals are trained to handle; American Psychological Association 2018).

Historical Analysis of Major School Shootings in the United States

Sporadic school shootings have occurred at various points in the history of the United States; some occurred without death, by accident, and during fights between students. Many school shootings are planned with the intention of killing one person. For example, (a) the 1853 shooting in Louisville, Kentucky of an administrator by the sibling of one of his students, as retaliation for administering corporal punishment to the shooter’s brother (New York Times 1853); (b) the 1890 shooting in Brazil, Indiana of a 10-year-old girl by her male peer, as retaliation for informing adults of his behavior (Daily Alta California 1890); (c) the 1983 shooting in St. Louis, Missouri of two 15-year-old students, by their peer and his immediate suicide, for unknown reasons (Ribbing 1999), and (d) the 1998 shooting in Fayetteville, Tennessee of an 18-year-old male peer,

as retaliation for dating the perpetrator’s ex-girlfriend (Sharp 1998).

The Federal Bureau of Investigation (FBI) does not have a definition for mass school shootings. They do however, define mass murder as the killing of four or more people in the same incident (Federal Bureau of Investigation 2005). Based on this criteria, we define mass school shooting as a situation in which one or more people intentionally plan and execute the killing or injury of four or more people, not including themselves, using one or more guns, with the killings or injuries taking place on school grounds during the school day or during a school-sponsored event on school grounds. For the purposes of this paper, we focus on mass shootings perpetrated by adolescents and adults at K-12 schools, and excluded organized gang shootings and those that occurred at universities.

Figure 2 shows the increase in mass school shootings and their related deaths from the first one in 1940 to the most current in early 2018. The United States had no mass school shootings that fit our criteria until 1940, when a junior high school principal killed the superintendent, the high school principal, the district business manager, and two teachers, before attempting suicide, because he thought he was going to be fired at the end of the school year (Williams 2017). The United States had no mass school shootings in the 1950’s and 1960’s, but started a steady increase beginning with a school shooting in 1979 orchestrated by a 16-year-old female with mental health issues who began shooting at an elementary school, killing two adults and injuring eight students and one adult (Daly 2014). Since 1979, the number of shootings increased and then decreased, with the 1990’s being a peak period. However, deaths from shootings went from 12 in the 1980’s, to 36 in the 1990’s, 14 in the 2000’s, and a high of 51 in the 2010’s.

In the 20th century, 22 school shootings that fit our criteria occurred in the United States. The mass school shootings were perpetrated by 15 (60%) adolescents and by 10 (40%) adults. Characteristics of mass school shootings in the 20th century perpetrated by adolescents can be found in Table 1 and characteristics of those perpetrated by adults can be found in Table 2. The adolescent shooters ranged in age from 11- to 18-years-old ($M = 14.71$; $SD = 1.82$), while the adult shooters ranged in age from 19- to 47-years-old ($M = 33.4$; $SD = 10.55$). The perpetrators were overwhelmingly White males ($n = 19$; 76%); 88% ($n = 22$) of the shooters were White, 88% ($n = 22$) males, 36% ($n = 9$) were identified as having a mental illness at the time of the shooting, 76% ($n = 19$) acted alone, and 32% ($n = 8$) committed suicide. The shootings predominantly occurred at high schools when adolescents were the shooters ($n = 7$; 54%), and predominantly occurred at elementary schools when adults were the shooters ($n = 5$; 56%). In total, 55 people were killed; 71% students and 29% adults.

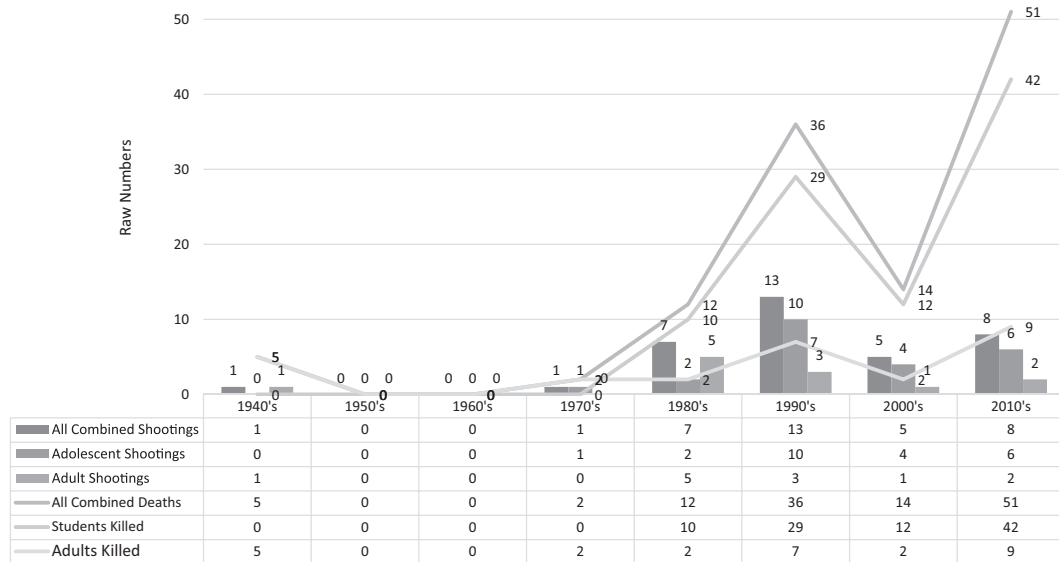


Fig. 2 Number of mass school shootings and deaths from 1940-early 2018

Additionally, 260 people were injured, but survived; 93% students and 7% adults. The mass shootings took place predominately in the Western region of the United States ($n = 12$; 55%).

In the first segment of the 21st century, 13 school shootings that fit our criteria, occurred in the United States. The mass school shootings were perpetrated by 10 (77%) adolescents and by 3 (23%) adults. Characteristics of mass school shootings in the 21st century perpetrated by adolescents can be found in Table 3 and characteristics of those perpetrated by adults can be found in Table 4. The adolescent shooters ranged in age from 14- to 18-years-old ($M = 15.4$; $SD = 1.35$), while the adult shooters ranged in age from 19- to 32-years-old ($M = 23.67$; $SD = 7.23$). The perpetrators were overwhelmingly White males ($n = 11$; 85%); 85% ($n = 11$) of the shooters were White, 100% ($n = 13$) males, 46% ($n = 6$) were identified as having a mental illness at the time of the shooting, 100% ($n = 13$) acted alone, and 38% ($n = 5$) committed suicide. The shootings predominantly occurred at high schools when adolescents were the shooters ($n = 9$; 90%). In total, 66 people were killed; 82% students and 18% adults. Additionally, 81 people were injured, but survived; 93% students and 7% adults. The mass shootings have taken place predominately in the Western ($n = 4$; 31%) and Midwestern ($n = 4$; 31%) regions of the United States.

Discussion

Clearly, mass school shootings present an epidemic that must be addressed. Firearm violence in the United States is

viewed as a public health crisis by the Centers for Disease Control & Prevention (2016). When evaluating the number of shooting in the 20th and 21st centuries, it is alarming that in the span of less than 18 years, the 21st century has already seen more deaths than the 20th century, which represents shootings spanning from 1940 to 2000. Of shootings in the 20th century, a surge of shootings in the 1990's represents the overwhelming majority of school shooting deaths and injuries. Another alarming trend is that the overwhelming majority of 21st century shooters were adolescents, suggesting that it is now easier for adolescents to access guns and adolescents are more frequently suffering from mental illness or limited conflict resolution skills. Finally, to date, the 21st century shootings have resulted in 66 deaths as opposed to 55 for the entirety of the 20th century. Likewise, in the 20th century there were more injuries related to school shootings than in the 21st (260 and 81 respectfully). This alarming trend may be attributed to easy access to high-power firearms used in many of the mass shootings of the 21st century. While these figures do not clearly link recent shootings to more adolescent problems or high-powered weapons as a causality, the trends must be noted. Several school shooters noted the ease with which they secured guns from parents and grandparents (Dickey 2013; Anchorage Daily News 2017), while some noted that they would not have carried out the attacks had they not had easy access to the weapons (Anchorage Daily News 2017). Some of the students who served their sentences for the shootings, continued to have serious legal challenges related to gun violence after they were released (Bult 2016).

In addition to the many school-related legislative issues previously discussed, in 2018, in response to the school

Table 1 20th Century Intentional Mass School Shootings Perpetrated by Adolescents in United States K-12 Schools

Date	Location	School Level	Perpetrator(s)	Victim(s)	Firearm(s)	Description of the Perpetrator(s)
6 December 1999	Fort Gibson, OK	Jr. High/ Middle School	1 student (survived)	5 students (injured)	One 9 mm handgun	A 13-year-old Native American male. He was an honor student who was seeing a psychiatrist for mental health issues before the shooting (Walton 2005).
20 May 1999	Conyers, GA	High School	1 student (survived)	6 students (injured)	One .22 caliber rifle	A 15-year-old White male. He threatened to kill himself, but did not (Queen 2016).
20 April 1999	Littleton, CO	High School	2 students (committed suicide)	12 students and 1 adult (killed) 21 students (injured)	Two shotguns, one assault rifle, and one semi-automatic pistol	A 17-year-old White male and an 18-year-old White male, described as mentally ill, and having been bullied (Kohn 2001).
21 May 1998	Springfield, OR	High School	1 student (survived)	2 students (killed) 25 students (injured)	One semiautomatic rifle	A 15-year-old White male who took Prozac, killed his parents and then went to school during the lunch hour (Bennett 2012).
24 April 1998	Edinboro, PA	Jr. High/ Middle School	1 student (survived)	1 adult (killed) 2 students and 1 adult (injured)	One .25 caliber handgun	A 14-year-old White male, described by peers as a "loner who never smiled and dressed sloppily," (Associated Press 1998).
24 March 1998	Jonesboro, AR	Jr. High/ Middle School	2 students (survived)	4 students and 1 adult (killed) 10 students (injured)	Four revolvers, three rifles, and two pistols	An 11-year-old White male and 13-year-old White male, described as bullies by their peers (Bult 2016).
1 December 1997	West Paducah, KY	High School	1 student (survived)	3 students (killed) 5 students (injured)	Two Marlin .22 rifles, one Ruger 10/22 .22 rifle, one Remington .22 rifle, two 12 gauge pump-action shotguns, one Marlin 336 .30-30 rifle, and one .38 special revolver Ruger MK II .22-caliber pistol	A 14-year-old White male on schizophrenia medication (Associated Press 2010).
1 October 1997	Pearl, MI	High School	1 student (survived)	2 students (killed) 7 students (injured)	One .30/30 rifle	A 16-year-old White male, who killed his mother (Mitchell 2016).
19 February 1997	Bethel, AK	High School	1 student (survived)	1 student and 1 adult (killed) 2 students (injured)	One shotgun	A 16-year-old White and Alaska Native male who was abused and lived in foster care (Anchorage Daily News 2017).
2 February 1996	Moses Lake, WA	Jr. High/ Middle School	1 student (survived)	2 students and 1 adult (killed) 1 student (injured)	One .30/30 caliber hunting rifle, one .357 caliber revolver, and one .25 caliber semiautomatic pistol	A 14-year-old White male who had mental health issues at the time of the shooting (Geranios 2017b).
4 December 1986	Lewistown, MT	High School	1 student (survived)	1 adult (killed) 2 students and 1 adult (injured)	One .44 Magnum	A 14-year-old White male went to school with the intention of killing his teacher for giving him a failing grade (Associated Press 1986).
21 January 1985	Goddard, KS	Jr. High/ Middle School	1 student (survived)	1 adult (killed) 1 student and 2 adults (injured)	One M1A .308 caliber semiautomatic rifle and one .357 caliber Magnum pistol	A 14-year-old White male, described as a loner who was bullied (Adame 2015).
29 January 1979	San Diego, CA	Elementary School	1 student (survived)	2 adults (killed) 8 students and 1 adult (injured)	One 10/22 semi-automatic .22 caliber rifle with a telescope	A 16-year-old White female, described as having mental health issues at the time of the shooting (Daly 2014).

Table 2 20th Century Intentional Mass School Shootings Perpetrated by Adults in United States K-12 Schools

Date	Location	School Level	Perpetrator(s)	Victim(s)	Firearm(s)	Description of the Perpetrator(s)
7 November 1994	Wickliffe, OH	Jr. High/ Middle School	1 adult (survived)	1 adult (killed) 1 student and 4 adults (injured)	One shotgun	A 37-year-old White male, described as a former student with mental health issues (O'Donnell 2014).
17 September 1993	Sheridan, WY	Jr. High/ Middle School	1 adult (committed suicide)	4 students (injured)	One 9 mm handgun	A 29-year-old White male, described as a former student with a recent less-than-honorable discharge from the Navy (Associated Press 1993).
1 May 1992	Olivehurst, CA	High School	1 adult (survived)	3 students and 1 adult (killed) 9 students and 1 adult (injured)	One 12 gauge pump action shotgun and one sawed-off .22 caliber rifle	A 20-year-old White male, described as a former student with a grudge against a teacher who failed him (Luery 2017).
17 January 1989	Stockton, CA	Elementary School	1 adult (committed suicide)	5 students (killed) 31 students and 1 adult (injured)	One AK-47 assault rifle	A 24-year-old White male, described as a drifter (Emmons and Richman 2016).
26 September 1988	Greenwood, SC	Elementary School	1 adult (survived)	2 students (killed) 7 students and 2 adults (injured)	One revolver	A 19-year-old White male, described as having a history of mental health issues (Knapp 2012).
20 May 1988	Winnetka, IL	Elementary School	1 adult (committed suicide)	2 students (killed) 6 students and 2 adults (injured)	One .22 semi-automatic pistol, one .357 Magnum revolver, and one .32 Smith & Wesson	A 30-year-old White female, described as having mental health issues (McCoppin and Berger 2013).
16 May 1986	Cokeville, WY	Elementary School	2 adults (committed suicide)	78 students and 1 adult (injured)	Five rifles	A 43-year-old White male and a 47-year-old White female, husband and wife, took 136 children and 18 adults hostage because the husband was fired from his position as the town marshal (Mitchell 1996).
24 February 1984	Los Angeles, CA	Elementary School	1 adult (committed suicide)	1 student (killed) 11 students and 1 adult (injured)	One AR-15 rifle, one 12 gauge double-barreled shotgun, and one 12 gauge pump-action shotgun	A 47-year-old Black male, described as a surviving child of parents and siblings from the Jonestown massacre (Lindsey 1984).
6 May 1940	Pasadena, CA	Jr. High/ Middle School	1 adult (survived)	5 adults (killed) 1 adult (injured)	One .22-caliber Colt Woodsman semiautomatic pistol	A 38-year-old White male, described as the junior high school's principal, thought he was going to be fired at the end of the school year (Williams 2017).

Table 3 21st Century Intentional Mass School Shootings Perpetrated by Adolescents in United States K-12 Schools

Date	Location	School Level	Perpetrator(s)	Victim(s)	Firearm(s)	Description of the Perpetrator(s)
23 January 2018	Benton, KY	High School	1 student (survived)	2 students (killed) 14 students (injured)	One 9 mm semi-automatic pistol	A 16-year-old White male (Sayers and Wolfson 2018).
13 September 2017	Rockford, WA	High School	1 student (survived)	1 student (killed) 3 students (injured)	One assault weapon and one pistol	A 15-year-old White male, described as having mental health issues and having been bullied by peers (Geramios 2017a).
28 September 2016	Townville, SC	Elementary School	1 student (survived)	1 student (killed) 2 students and 1 adult (injured)	One .40 caliber pistol	A 14-year-old White male who killed his father. He was homeschooled after being expelled for bringing a hatchet to his middle school (Mayo 2018).
29 February 2016	Middletown, OH	High School	1 student (survived)	4 students (injured)	One .38 caliber handgun	A 14-year-old White male, self-described as having abused Adderall and not being wanted by others, including his parents (BieryGolick 2018).
24 October 2014	Marysville, WA	High School	1 student (committed suicide)	1 student (killed) 4 students (injured)	One .40 caliber pistol	A 15-year-old Native American male, described by his peers as an outgoing and popular football player (Johnson and Dewan 2014).
27 February 2012	Chardon, OH	High School	1 student (survived)	3 students (killed) 3 students (injured)	One .22 caliber semi-automatic handgun	A 17-year-old White male (Caniglia 2014).
10 October 2007	Cleveland, OH	High School	1 student (committed suicide)	3 students and 2 adults (injured)	One .22 caliber revolver and one .38 caliber revolver	A 14-year-old White male at an alternative high school, described as having mental health issues and having been bullied and suspended from school (Maag 2007).
21 March 2005	Red Lake, MN	High School	1 student (committed suicide)	5 students and 2 adults (killed) 5 students (injured)	One .22 caliber pistol	A 16-year-old Native American male, who killed two family members, was described as having been bullied and was on Prozac and anti-depressants at the time of the shootings (Roberts 2005).
22 March 2001	El Cajon, CA	High School	1 student (survived)	4 students (injured)	One pump-action 12-gauge shotgun and one .22 caliber pistol	An 18-year-old White male, described as a loner with a history of mental illness (Texeira et al. 2001).
5 March 2001	Santee, CA	High School	1 student (survived)	2 students (killed) 11 students and 2 adults (injured)	One .22 caliber double-action revolver	A 15-year-old White male, described as having been bullied and sexually abused by an adult (Dickey 2013).

shooting at Stoneman Douglas High School, an Interdisciplinary Group on Preventing School and Community Violence wrote a call to action with several action items related to both increased gun control and increased preventative and responsive mental health services within K-12 schools (Astor et al. 2018). The interdisciplinary group used a three-tiered model, common in both public health and schoolwide systems of positive behavioral interventions and supports (PBIS), to seek to protect individuals from gun violence using universal approaches for all (Tier 1), targeted approaches to reduce risk factors and promote protective factors (Tier 2), and individualized interventions for individuals for whom violence appears imminent (Tier 3).

Related to gun control, the group called for a ban on “assault-style weapons, high-capacity ammunition clips, and products that modify semi-automatic firearms to enable them to function like automatic firearms” (Astor et al. 2018; p. 1). This universal, preventative support is in line with the Obama administration’s recommendation to Congress following the Newton, CO shooting (The White House 2013a). As a secondary prevention measure, the group called for universal background checks to screen for individuals with a history of violence to themselves or others or those suspected of terrorist activity. At Tier 3, the group called for laws allowing for short-term protection orders allowing for the recovery of firearms by law enforcement when violence is imminent (Astor et al. 2018).

Related to school-based safety measures, the interdisciplinary group called for a standard, universal practice of assessing school climate and maintaining safe schools, including both physically and emotionally. As a targeted, Tier 2, support they identified a need for increased staffing of service providers who can deliver coordinated mental health services for those with violent risk factors, including counselors, psychologists, and social workers. Astor et al. (2018) also noted a need to acknowledge that not all violence stems from mental illness, a notion supported by the summary of 20th and 21st century mass school shooting presented herein. Increased funding for school based mental health services is essential and should involve partnerships among schools, families, and community agencies (see Durlak et al. 2011; Kern et al. 2016; Kern et al. 2017). Likewise, the group called for the adoption of discipline practices that “foster positive social, behavioral, emotional, and academic success” along with the reduction of exclusionary practices in school discipline (Astor et al. 2018, p. 1). At Tier 3, they recommend programs to allow mental health, school, and law enforcement officials to conduct threat assessments, including interventions to support individuals who pose a threat, once identified. This practice was also supported by the U.S. Secret Service (2004) in their report on school violence prevention. In the same vein, the interdisciplinary group called for increased sharing of

Table 4 21st Century Intentional Mass School Shootings Perpetrated by Adults in United States K-12 Schools

Date	Location	School Level	Perpetrator(s)	Victim(s)	Firearm(s)	Description of the Perpetrator(s)
14 February 2018	Parkland, FL	High School	1 adult (survived)	14 students and 3 adults (killed) 17 students (injured)	One AR-15 style semi-automatic rifle	A 19-year-old White male, described as a former student with mental health issues (Berman 2018).
14 December 2012	Newtown, CT	Elementary School	1 adult (committed suicide)	20 students and 6 adults (killed) 2 adults (injured)	One .22 caliber bolt action rifle and one Bushmaster XM15-E2S rifle	A 20-year-old White male who killed his mother, was described as having mental health issues (Vogel et al. 2012).
2 October 2006	Nickel Mines, PA	Elementary/ Middle School	1 adult (committed suicide)	5 students (killed) 5 students (injured)	One 9 mm handgun, one 12 gauge pump-action shotgun, and one .30-06 bolt-action rifle	A 32-year-old White male (Folmer et al. 2013).

information among mental health, school, and law enforcement officials, which necessitates a removal of legal barriers (Astor et al. 2018). Again, these recommendations are consistent with those made by the Obama Administration in 2013 (White House 2013b).

Policy Implications

Many of the above changes require significant changes in public policy and law. Many researchers (e.g., Katsiyannis et al. 2018; Kellerman and Rivara 2013) and public entities alike have called for the removal of current restrictions on research regarding the implications of firearm violence. Funding is needed to better understand the impact of mass school shootings on students, school personnel, and society as a whole. This information will further our knowledge of how to prevent and respond to such incidents. As educators, like any citizen, we must speak out about the negative impacts we are seeing in schools as a result of the surge in mass school shootings by contacting our lawmakers. Many organizations, such as the American Psychological Association, the Council for Exceptional Children, the Council for Children with Behavioral Disorders, and the Prevention Institute, lobby for change on the behalf of their membership. Educators should consider supporting and becoming a member of such organizations to facilitate coordinated efforts among professionals. Similarly, we encourage educators to support the grass roots efforts of community members and students against gun violence in schools and in support of increased school-based prevention and intervention practices (e.g., Associated Press 2018).

Further, it is necessary to strengthen and reinforce President Obama's executive orders to address school safety in the aftermath of the Newtown, CT shooting in 2013. These executive orders resulted in (a) the Departments of Justice and Homeland Security providing continuing training and security assessments for law enforcement, first responders, and school officials on active shooter situations, (b) the Departments of Education, Justice, Homeland Security, and Health and Human Services developing model emergency management planning guides to help schools prepare for shootings, and (c) the Department of Justice (DOJ) making Community Oriented Policing Services (COPS) Hiring Grants available to fund school resource officers (SRO). In September 2013, the DOJ awarded approximately \$125 million, including around \$45 million to fund 356 new school resource officer positions (The White House 2013a). SROs, are uniformed, armed police officers trained to work in schools; they are involved in patrolling the school, handling student rule/law violators, minimizing disruptions, and engaging in preventative programs (Finn and McDevitt 2005). The National Association of School Resource

Officers (NASRO) estimates that they are between 14,000 and 20,000 SROs with about a third of public schools employing at least one SRO (National Association of School Resource Officers n.d.)

Finally, the Obama administration's call for action to Congress is still timely after the Newtown shooting. Actions to be taken by Congress include "Strengthen the background check system for gun sales, pass a new, stronger ban on assault weapons, limit ammunition magazines to 10 rounds, finish the job of getting armor-piercing bullets off the streets, give law enforcement additional tools to prevent and prosecute gun crime, end the freeze on gun violence research, make our schools safer with new resource officers and counselors, better emergency response plans, and more nurturing school climates, and ensure quality coverage of mental health treatment, particularly for young people" (The White House 2013b). These actions have the potential as it has been already demonstrated (background checks, ban on assault weapons) to address the issue of school shootings and gun violence in general in a systemic, comprehensive, and effective manner.

School-based Prevention and Intervention

Tiered models of supports, such as PBIS and comprehensive, integrated three-tiered models of prevention (Ci3T; Lane et al. 2010) are essential to addressing many issues in schools, including those called for by Astor et al. (2018). Universal supports with PBIS such as the establishment of school-wide expectations, procedures for teaching, modeling, and reinforcing those expectations, provision of social and emotional awareness and prevention practices by all students, and consistent discipline practices across all individuals (Horner and Sugai 2015). Such practices have been shown to improve school climate, reduce office discipline referrals, and improve social emotional competence (e.g., Bradshaw et al. 2010; Bradshaw et al. 2012). For more information on these practices visit (pbis.org and ci3t.org). Within PBIS and Ci3T frameworks, an emphasis on using school-wide data to identify students with risk factors, including academic, behavior, and/or social, is essential for identifying students needing Tier 2 and Tier 3 supports. Many schools have responded to this by identifying systematic emotional and behavioral screeners to identify students with externalizing (e.g., aggression, disruption, property disruption), internalizing (e.g., painfully shy, socially withdrawn, depressed), and co-morbid (i.e., possessing both types of behaviors) behavior patterns. Screening involves the adoption of a school-wide measure (s), with strong psychometric properties that is also feasible and socially acceptable, to be administered at three time points each year (fall, winter, spring; Lane et al. 2012). These screening measures can be used to assess the overall

risk of schools as a whole or identify students needing more support through Tier 2 and Tier 3 supports.

Tier 2 and 3 supports include any intervention that can be used to address students' academic, behavioral, and/or social needs, with Tier 2 supports that involve targeted interventions offered to multiple students whereas Tier 3 supports involve individualized supports for students with the highest level of need/risk. Within this framework, schools can provide the most appropriate level of support, addressing issues pertinent to the prevention of mass school shootings, including the instruction and practice of social, conflict resolution, coping, and self-regulation skills, which have all been recommended as practices to reduce violence (Katsiyannis et al. 2018). Supports at Tier 2 and 3 can also involve small-group or individualized counseling, coordinated home-school supports through a school social worker, cognitive behavioral therapy, and other mental health services. However, even with these models in place, many schools struggle to meet the demands as they don't have inadequate student support services staff (e.g., counselors, social workers, school psychologists) to provide the level of support needed for many students, as increased funding and support is needed to support these practices. The good news, however, is that these systems do exist and with adequate funding can create a school culture and climate where violence is admonished and student communities are celebrated.

Conclusion

The horrific events associated with school shootings, mass shootings in particular, have had a negative impact on our society for a long time. Such events should not be part of school environments where the safety and welfare of students, teachers, and staff should be a given. Deliberate and sensible policy and legislative actions, such as expanded background checks and a ban on assault weapons, along with expanded support to address mental health issues among adolescent students and adults and other related preventative measures will likely reduce the occurrence of such events in the future. Further, school personnel are uniquely situated in implementing tiered models of supports, such as PBIS with a particular emphasis on school-based mental health services to address school violence. Such preventative efforts not only require policy/legislative action but increased and targeted funding across federal, state, local and private sectors.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

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