Report of Relative Risks of Death in U.S. K-12 Schools

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ABSTRACT

December 14, 2012 thrust school safety firmly into the public's eye. Unlike previous tragedies, this mass casualty attack was the third most deadly K12 school attack in U.S. history and involved the deaths of 20 very young children. Their deaths cut to the core of Americans, especially those whose task is to protect others. The pain and suffering of this tragedy was surpassed only by the Our Lady of Angels Fire in Chicago and the Bath, Michigan bombing. This created a compelling desire among people who care deeply about children to "do something" with a wide range of approaches to making schools safer passionately debated at local, state and the national level.

After Columbine, the field of law enforcement changed their approach to focus on active shooter incidents. Prior to Columbine, most law enforcement agencies were trained to establish a perimeter and wait for the Special Weapons and Tactics (SWAT) Unit when someone who was brandishing a gun was reported in a facility. Though some law enforcement agencies had already adopted concepts to actively engage an active shooter from other countries, most agencies had not adopted these approaches at the time of the deadly Columbine attack. The Columbine incident caused law enforcement tactics to evolve. Across American, officers began to adopt new approaches from Israel and other countries where officers had traditionally been trained and equipped to enter the scene of an active shooter in teams as soon as they arrived.

The Sandy Hook attack has become a similar watershed event, causing law enforcement agencies to reconsider their tactics. Many agencies have modified their active shooter response approaches. In these agencies, the first officer on the scene now enters immediately, seeking to engage shooters to neutralize them as quickly as possible.

Many law enforcement agencies have also taken the next evolutionary step in training school employees to become first responders. This has been called "proactive response" and has been presented in various ways to school personnel. Thus far, none of these approaches has been demonstrated to be effective through evaluation and testing, and law enforcement officers and school officials remain heavily divided on the appropriateness of these approaches. However, it is clear that considerable time, energy and fiscal resources are being devoted to these approaches.

Additionally, millions of dollars are being spent on school security devices, equipment and facilities upgrades which focus primarily on the prevention and mitigation of active shooter events in schools. School safety experts have expressed concern that many schools lacking other basic safety measures have been equipped with these physical security measures while other life and death concerns are being ignored (Dorn, 2013).

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This raises a very critical question: Are active shooter incidents being addressed at the expense of the all-hazards approach? This question is a crucial one because preventable deaths may be occurring if resource allocation does not match the actual safety risks for K12 schools. When preparing a school for an incident, the first step is to conduct a risk assessment. Yet, this is often not being done. Many schools and state Departments of Education have reacted by adopting "proactive response" protocols with minimal training and even less study via a risk assessment. The application of scarce resources to a rare but catastrophic type of situation that, while having a major emotional impact on stakeholders, is not statistically likely to occur at any one particular school in relation to other more common forms of fatal incidents.

Deaths in schools from active shooter incidents appear to be a relatively small subset of school fatalities. This study addresses the question of the various fatal risks schools face, and how active shooter incidents, as a subset, compare with the other mortal dangers faced by children. This information is designed to help school and public safety officials utilize scarce time and resources to address all school safety risks in an efficient and logical manner.

METHODOLOGY

This is an observational study of open-source material. Two main sources were used to help determine fatalities in schools from active shooter incidents. The first was the book *Active Shooter Events and Response* by J. Pete Bair, Terry Nichols, David Burns and John R. Curnutt. The second was the New York Police Department study *Active Shooter: Recommendations and Analysis for Risk Mitigation*, the 2012 edition. Other sources included a search of the Internet using the Google search engine and the key words "active shooter" and "schools", and the National School Safety Center. These sources identified numerous incidents for evaluation. The Internet search was relied upon to provide incidents for the year 2013 as the printed sources came out prior to that year.

The results were then analyzed using the Department of Homeland Security's (DHS) definition of Active Shooter - "An Active Shooter is an individual **actively engaged** in killing or attempting to kill people in a confined and populated area; in most cases, active shooters use firearms(s) and there is no **pattern** or **method** to their selection of **victims."** (DHS, 2013)

Proposed active shooter incidents were identified using the DHS definition. Therefore, targeted acts of violence were not included nor were gang incidents or incidents involving hostages or stand-alone suicides. Incidents such as the Platte Canyon and Nickel Mines school shootings were not included as they were initially hostage situations, and so do not meet the study's criteria. The Nickel Mines incident also did not qualify as an active shooter event. The killer initially took

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hostages, which is inconsistent with the USDHS definition for active shooter incidents. This places this deadly attack outside the scope of the study's criteria. The Cazenovia, Wisconsin shooting was a targeted act of violence as the gunman had stated intent to see that Principal Klang would not "make it through homecoming" ("Wisconsin principal", 2006). A shooting at Henry Ford High School in Detroit, Michigan was not included because an Appeals Court noted the incident as "gang-related" (Michigan Court of Appeals, 2012).

Incidents in which the gun fired once or did not fire at all due to a malfunction were not included as this study is analyzing the results of Active Shooter Incidents, not intentions. Similarly, incidents in which active shooter incidents were foiled were not counted as they are beyond the scope of this study.

All school-related fatalities for which statistics could be found were considered. The NCES identifies a school-associated violent death as "a homicide, suicide, or legal intervention (involving a law enforcement officer), in which the fatal injury occurred on the campus of a functioning elementary or secondary school in the United States, including while the victim was on the way to or from regular sessions at school or while the victim was attending or traveling to or from an official school-sponsored event. Victims include students, staff members, and others who are not students" (NCES, 2012). Where possible, students and teacher fatalities will be differentiated, but a proper risk assessment does not focus on one specific population subset within the facility in which the risk assessment is being done.

In addition to the sources for active shooter incidents above, the following resources are also used:

- National Center for Education Statistics (NCES) for school homicides and suicides

- National School Safety Center (NSSC) for school-related fatalities

- School fire data was retrieved from the National Fire Data Center (NFDC)

- Data pertaining to illnesses was retrieved from the CDC website

- Playground fatality data was retrieved from the Consumer Product Safety Commission (CPSCP)

- Severe wind data was obtained from the National Weather Service (NWS)

- School transportation-related data was retrieved from the National Highway and Transportation Safety Administration (NHTSA)

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When considering school-related fatalities, the research revealed two types of results. One type of results, identified as Tier 1, involved data specifically pertaining to schools and people in schools. Another type of results, identified as Tier 2, involved data pertaining to school age children but was not school-specific. Tier 2 results are included under the premise that a U.S. K-12 school is a reflection of the community in which it is located. Thus the school will face any dangers faced by the community as well.

Tier 1 results cover school fire deaths from the National Fire Protection Association, school transportation-related deaths from the NHTSA, school violence-related deaths and school suicides from the NCES. Tier 2 results cover school asthma-related deaths from the Centers for Disease Control (CDC), lightning-related deaths, deaths relating to illness (other than asthma), and playground accidents for children aged five through eighteen.

When the data was provided in a range of years less than 1998-2012, an average per year of the given data will be computed then extrapolated over the time period to get an estimated fatality count. We have established a common timeframe of 15 years, from 1998 to 2012. NCES data is given in school years, so that data would begin with the 1998-1999 school year and end with the 2012-2013 school year.

For purposes of this study, the numbers of deaths are being given in whole numbers. Decimals are rounded to the nearest whole number, as we want to consider whole people. For example, the rounded up number for 2.92 and 2.12 are 3 and 2, respectively.

LIMITATIONS

This study will confine itself to K-12 schools. Higher education is a completely different type of educational setting, with vastly different victim sets, predominant types of safety incidents and response capabilities.

There is a scarcity of studies that specifically address many types of school-related fatalities. This makes finding Tier 1 data problematic. Tier 2 data is more readily available, but a much more involved study has to be done that will drill down the Tier 2 results to pull out the data that relates only to people who have died in schools. Due to these limitations, Tier 2 data will be used to identify trends and generalities, and only Tier 1 results will be used to directly compare to active shooter incidents.

The NCES states, "The data from 1999–2000 onward are subject to change until interviews with school and law enforcement officials have been completed. The details learned during the interviews can occasionally change the classification of a case" (NCES, 2012). Thus it will be important to frequently check the NCES figures for changes.

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Data on fatal accidents that do not involve traffic-related incidents at schools (such as fatal school playground accidents) is extremely limited as these types of situations are rarely covered in the national news. Therefore, no comprehensive database for these types of events could be located. The author's personal

experience has been that these types of incidents are probably more common than available data indicates as the author is aware of some accidental deaths on school property that were not included in the National School Safety Center information reviewed for this study.

Finally, the names of the gunmen in the incidents in this report have been purposefully left out, and their deaths, if applicable, are not counted in the casualty figures for any incident. These deaths would be counted in the suicide data, so reporting them in active shooter deaths would create duplicate reporting.

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TIER 1 DATA

Note: The following information is derived from the sources listed. In some instances, the summaries of these incidents have been edited for factual accuracy based on interviews with school safety experts who worked on these incidents after they took place.

1) Active Shooter Incidents from 1998 – 2012:
a) March 24, 1998
Two gunmen opened fire outside their middle school, killing five people and wounding ten others. Prior to the attack, the gunmen pulled the fire alarm, luring the students and teachers outside the building and into the gunmen's line of fire. The attackers stole a cache of weapons from the house of the grandfather of one of them. Reports state that the attackers had warned classmates of the impending attack (NYPD, 2012).
Westside Middle School in Jonesboro, Arkansas: **4 students, 1 teacher killed**

b) May 21, 1998
A gunman opened fire in the cafeteria of his high school, killing two students and wounding 22 other people. Prior to the attack, the gunman fatally shot his parents at home. (NYPD, 2012).
Thurston High School in Springfield, Oregon: **2 students killed**

c) April 16, 1999
A gunman opened fire at his high school. The attack resulted in zero casualties. Students barricaded themselves in classrooms when the gunman began firing his shotgun at students and faculty. The gunman surrendered after a 20-minute standoff with police (NYPD, 2012).
Notus Junior-Senior High School in Notus, Idaho: **No one was killed**

d) April 20, 1999
Two gunmen opened fire at Columbine High School, killing 12 fellow students and a teacher and wounding 24 others (NYPD, 2012).
Columbine High School in Littleton, Colorado: **12 students, 1 teacher killed**

e) May 21, 1999
A gunman opened fire at his high school, wounding six students. An assistant principal eventually disarmed the gunman, who had attempted to commit suicide. Authorities later discovered printouts of bomb recipes and notes detailing his plot to plant explosives in the school building the gunman's bedroom (NYPD, 2012).
Heritage High School in Conyers, Georgia: **No one killed**

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f) December 6, 1999
A gunman opened fire on a crowd of students at his middle school, wounding four people. A teacher then subdued the gunman after he ran out of ammunition (NYPD, 2012)
Fort Gibson Middle School in Fort Gibson, Oklahoma: **No one was killed**

g) March 5, 2001
A 15-year-old gunman armed with a .22-caliber revolver attacked Santana High School located in Santee, California. The gunman opened fire in the restroom of the school and even reloaded his revolver. An off-duty police officer, at the school registering his child, responded to the sound of gunshots. Fifteen people were shot, two of whom were killed. Blair, John P. (2013-06-12). Active Shooter Events and Response (Page 227). CRC Press. Kindle Edition.
Santana High School in Santee, California: **2 students killed**

h) March 22, 2001
An 18-year-old male armed with both a 12-gauge shotgun and a .22-caliber pistol attacked a high school located in El Cajon, California. The gunman opened fire indiscriminately throughout the school. The timeline is unclear; however, it is known that a police officer shot the gunman to stop the event. Five people were shot; none were killed. Blair, John P. (2013-06-12). Active Shooter Events and Response (Page 227). CRC Press. Kindle Edition.
Granite Hills High School in El Cajon, California: **No one was killed**

i) April 24, 2003
A 14-year-old male armed with three pistols (.44–, .357, and .22– caliber) attacked his school. The gunman opened fire in the cafeteria before classes began. He killed himself before police arrived on scene 4 minutes later. One person was shot and died at the scene. Blair, John P. (2013-06-12). Active Shooter Events and Response (Page 224). CRC Press. Kindle Edition.
Red Lion Area Junior High in Red Lion, Pennsylvania: **1 student killed**

j) September 24, 2003
A 15-year-old male armed with a .22-caliber pistol attacked his high school. The gunman targeted one individual but shot at multiple individuals. While he was shooting in the gym, the coach confronted and stopped the gunman before law enforcement was on scene. Two people were shot; one was killed. Blair, John P. (2013-06-12). Active Shooter Events and Response (Page 222). CRC Press. Kindle Edition.
Rocori High School in Cold Spring, Minnesota: **1 student killed**

k) February 9, 2004
A 16-year-old male armed with a 12-gauge shotgun carried out an attack at his school. The gunman opened fire while walking through the school. Administrators confronted the gunman, wrestled the shotgun away, and subdued him before law

enforcement arrived on scene. One person was shot and survived. Blair, John P. (2013-06-12). Active Shooter Events and Response (Page 222). CRC Press. Kindle Edition.
Columbia High School in East Greenbush, New York: **No one was killed**

l) March 21. 2005
A gunman opened fire at an Indian reservation high school, killing five fellow students and a teacher. The shooting spree lasted approximately 10 minutes (NYPD, 2012).
Red Lake High School in Red Lake, Minnesota: **5 students, 1 teacher, 1 staff killed**

m) March 14, 2006
A 14-year-old male armed with a .38-caliber pistol carried out an attack at his middle school. The gunman opened fire outside the school cafeteria. A teacher coaxed him to stop shooting and then subdued him with a "bear-hug" until police arrived on scene. Two people were shot; neither was killed. Blair, John P. (2013-06-12). Active Shooter Events and Response (Page 219). CRC Press. Kindle Edition.
Pine Middle School in Reno, Nevada: **No one was killed**

n) August 24, 2006
A 26-year-old male armed with a pistol carried out an attack at multiple locations, including an elementary school. After opening fire at a home, the gunman attacked Essex Elementary School. The gunman fled the school and moved to a third location where he opened fire again. He shot himself before police arrived. When casualties at all three locations are counted, four people were shot, three of whom were killed. Blair, John P. (2013-06-12). Active Shooter Events and Response (Page 218). CRC Press. Kindle Edition.
Essex Elementary School in Essex, Vermont: **1 teacher killed**

o) August 30, 2006
A 19-year-old male armed with a rifle carried out an attack at his former high school. The gunman, after killing his father at home early in the morning, drove to the school where he opened fire from his vehicle. An SRO and an off-duty state trooper were at the school and tackled the student taking him into custody. Two students were
injured; none were killed. Blair, John P. (2013-06-12). Active Shooter Events and Response (Page 218). CRC Press. Kindle Edition.
Orange High School in Hillsborough, North Carolina: **No one was killed**

p) October 10, 2007
A 14-year-old male armed with both .38- and .22-caliber pistols carried out an attack at the Success Tech Academy located in Cleveland, Ohio. The gunman walked up two flights of stairs before opening fire in the crowded hallway of the third floor. The gunman walked up to the fourth floor and continued shooting before killing himself prior to police arrival. Four people were shot, none of whom were killed.

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Blair, John P. (2013-06-12). Active Shooter Events and Response (Page 215). CRC Press. Kindle Edition.
Success Tech in Cleveland, Ohio: **No one was killed**

q) February 10, 2010
A 48-year-old male armed with a pistol attacked an elementary school. The gunman was an employee of the school and opened fire on members of the administration. He fled the scene only to be stuck in a construction roadblock. Police apprehended him 14 minutes after the initial report. Two people were shot and none were killed. Blair, John P. (2013-06-12). Active Shooter Events and Response (Page 207). CRC Press. Kindle Edition.
Inskip Elementary School in Knoxville, Tennessee: **No one was killed**

r) February 23, 2010
A 32-year-old male armed with a .30-06 hunting rifle carried out an attack at the Deer Creek Middle School in Littleton, Colorado. The gunman walked up to a group of students and opened fire. A nearby teacher subdued the gunman while he was attempting to reload the weapon. Police arrived on scene within minutes, but the gunman was already subdued. Two people were shot and none were killed. Blair, John P. (2013-06-12). Active Shooter Events and Response (Page 206). CRC Press. Kindle Edition.
Deer Creek Middle School in Littleton, Colorado: **No one was killed**

s) October 8, 2010
A 41-year-old male armed with a .357 magnum pistol carried out an attack at a grade school. The gunman jumped the fence surrounding the school and opened fire at a group of students. Two construction workers tackled the shooter before police arrived. Two people were shot, but none were killed. Blair, John P. (2013-06-12). Active Shooter Events and Response (Page 202). CRC Press. Kindle Edition.
Kelly Elementary School in San Diego, California: **No one was killed**

t) January 5, 2011
A gunman opened fire at Millard South High School, killing one person and injuring two others. Prior to the attack, Butler Jr. had been suspended from school for a trespassing violation. Butler Jr. used a handgun he stole from his father and had indicated his plans on Facebook prior to the attack. (NYPD, 2012)
Millard South High School in Omaha, Nebraska: **1 school administrator killed**

u) February 27, 2012
A gunman opened fire in Chardon High School, killing three students and wounding three others. Lane attended a nearby school and was waiting for a bus at the Chardon campus prior to the attack (NYPD, 2012).
Chardon High School in Chardon, Ohio: **3 students killed**

v) December 14, 2012

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A gunman opened fire in Sandy Hook Elementary School, killing 26 people (including 20 children) and wounding two others before committing suicide. The gunman was a former student of Sandy Hook Elementary School (NYPD, 2012).
Sandy Hook Elementary in Newtown, Connecticut: **20 students, 6 staff were killed**

Summary
Based on the USDHS definition for active shooter incidents, there have been 22 active shooter incidents on K12 school property and at K12 school events, with 50 student and 12 staff fatalities in the 15-year period between 1998 and 2012. Based on this data, an average of 4 people was killed per year in U.S. K12 active shooter incidents during this time period.

FIGURE 1

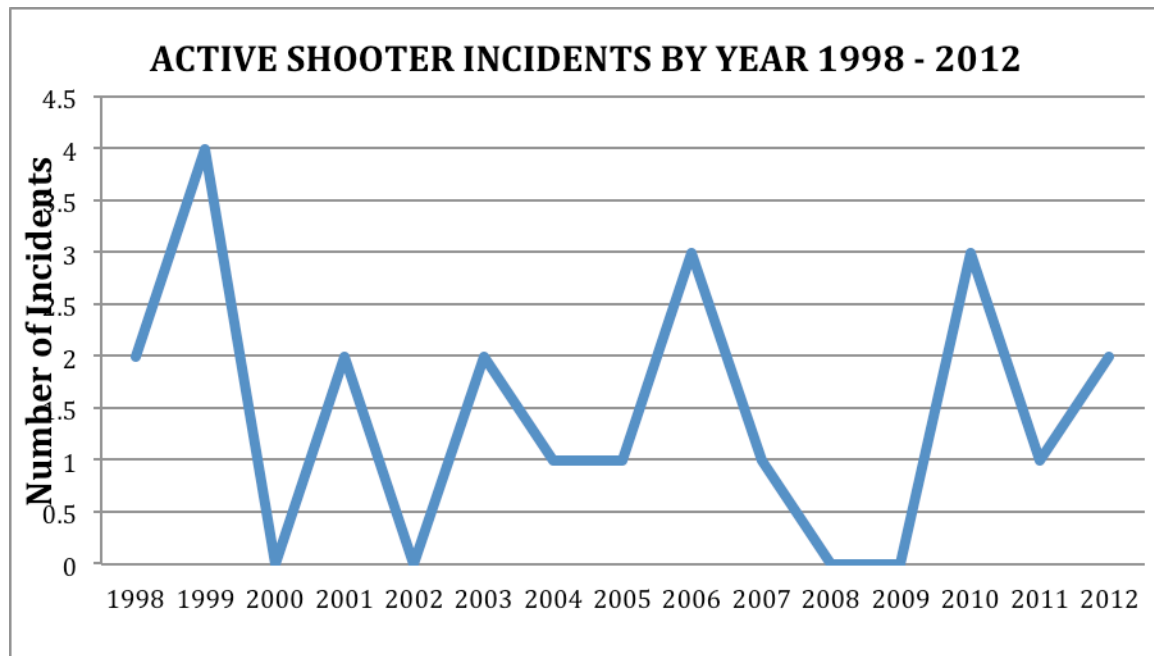**Students Killed in Active Shooter Incidents by Year**
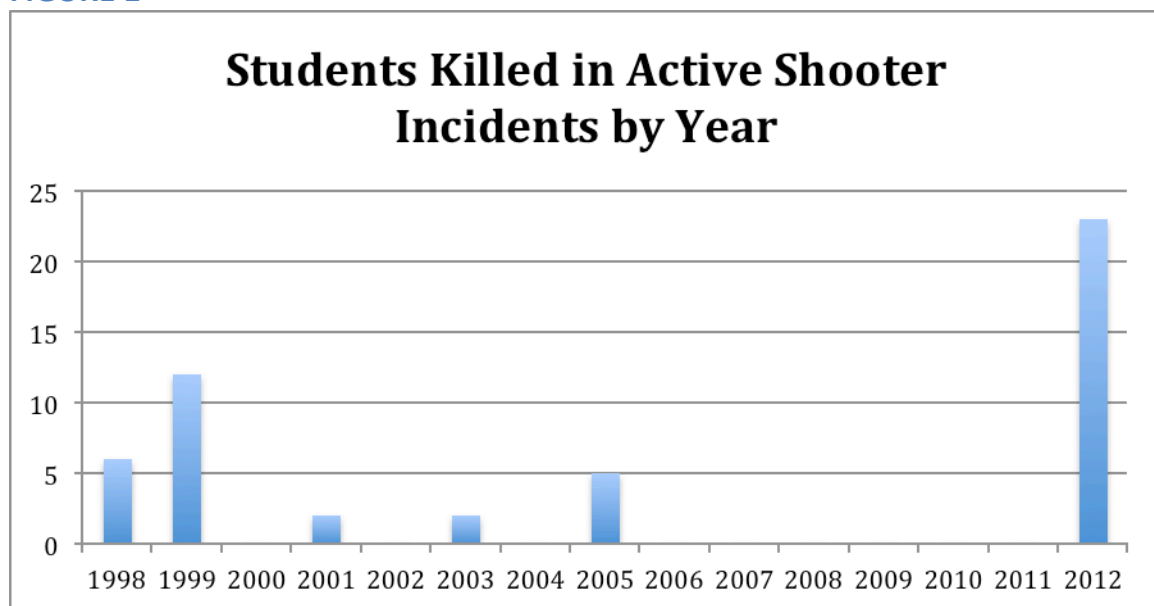
(Satterly, 2014)

From 1998 to 2012, there were four years in which there were no active shooter incidents in U.S. K12 schools. There were never more than four active shooter incidents in schools in any one-year time period, using the USDHS definition. Looking at the data points over the 15-year period, it does not appear that there is an increase in the number of active shooter incidents in schools. But looking at the past three years, the number of active shooter incidents appears to be on the increase; however, more time will have to pass to see if this pattern continues or not.

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FIGURE 2

ACTIVE SHOOTER INCIDENTS BY YEAR 1998 - 2012

(Satterly, 2014)

In the fifteen-year period, there have been 22 active shooter incidents in K-12 schools; 11 of those incidents did not involve any deaths of victims. That leaves 11 fatal active shooter incidents, resulting in the deaths of 50 students and 12 staff. Forty-six (70.8%) of those fatalities occurred in three active shooter incidents: Columbine, Red Lake, and Sandy Hook. Only 8 of the 15 years had any fatal active shooter incidents. The average numbers of fatalities resulted from active shooter incidents per year and per incident are four and three, respectively, for the fifteen-year period.

2) School Transportation-Related Incidents from 1998 – 2012:

According to the NHTSA, from 1998 to 2008, **118 people** were killed riding school transportation while **267 people** were killed as pedestrians when struck by a school bus or other school vehicle or were killed by a non-school vehicle while on school property (Table 5, 2008). Over the 11-year period of the data, that is an average of **11 people killed** in school transportation vehicles and an average of **24 killed as pedestrians**. Using these averages to calculate for the years from 2009-2012 gives us an estimated number of **525 people** killed when riding school transportation or as pedestrians struck by school transportation or by other vehicles on school property during 1998-2012.

When adding the non-occupants and occupants of other vehicles killed in school transportation-related incidents, the **total number is 1,564**, with an average of **142 people** killed per year from 1998-2008. Using this average, an estimated total of **568 fatalities** caused by school transportation-related can be extrapolated from

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this data for the years 2009 to 2012 (142 x 4 = 568). This gives an estimated total of **2,132** people killed in all types of school-related transportation incidents (1,564 + 568 = 2,132).

Figure 3

Table 5
Fatalities in School Transportation-Related Crashes, 1998-2008

Year	Occupants of School Transportation Vehicle*			Pedestrians			Other Non-occupants	Occupants of Other Vehicles	Total
	Driver	Passenger	Total	Struck by School Vehicle**	Struck by Other Vehicle	Total			
1998	3	3	6	21	3	24	7	91	128
1999	6	4	10	20	6	26	4	127	167
2000	8	13	21	19	7	26	1	99	147
2001	6	12	18	18	4	22	6	95	141
2002	1	2	3	16	4	20	6	100	129
2003	6	5	11	22	5	27	2	100	140
2004	3	4	7	27	3	30	3	93	133
2005	5	5	10	27	3	30	7	87	134
2006	3	5	8	19	3	22	2	118	150
2007	4	1	5	16	2	19	6	112	142
2008	4	15	19	20	1	21	8	105	153
Total	49	69	118	225	41	267	52	1,127	1,564
Average	4	6	11	20	4	24	5	102	142

(NHTSA, 2008)

3) School Fatalities of Several Other Causes from 1998-2012:
The following results were calculated based on the data obtained from the NSSC (2010):

a) **School-Related Accidents**
The NSSC lists 8 deaths due to accidents during the school years of 1998-1999 through 2009-2010. This is an average rate of 0.67 per school year. Using this average to extrapolate the numbers for school years of 2010-2011 to 2012-2013 gives us an estimated number of **10 fatalities** during the school years of 1998-1999 through 2002-2013, a period of 15 years. This data is derived largely from media accounts. Fatal accidents in schools rarely receive national media coverage resulting in very limited data for this cause of death (NSSC, 2010).

b) **Bullying Fatalities**
The NSSC lists 1 death due to bullying related causes during the school years of 1998-1999 through 2009-2010. This is an average rate of 0.08 per school year. Using this average to extrapolate the numbers for school years of 2010-2011 to 2012-2013 gives us an estimated number of **1 fatality** during the school years of 1998-1999 through 2002-2013, a period of 15 years.

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c) **Gang-Related Fatalities**
The NSSC lists 19 gang-related fatalities during the school years of 1998-1999 through 2009-2010. This is an average rate of 1.58 per school year. Using this average to extrapolate the numbers for school years of 2010-2011 to 2012-2013 gives us an estimated number of **24 fatalities** during the school years of 1998-1999 through 2002-2013, a period of 15 years.

d) **Hate Crime**
The NSSC lists 1 hate crime-related fatality during the school years of 1998-1999 through 2009-2010. This is an average of 0.08 per school year. Using this average to extrapolate the numbers for school years of 2010-2011 to 2012-2013 gives us an estimated number of **1 fatality** during the school years of 1998-1999 through 2002-2013, a period of 15 years.

e) **Interpersonal Disputes**
The NSSC lists 49 deaths related to interpersonal disputes during the school years of 1998-1999 through 2009-2010. This is an average of 4.08 per school year. Using this average to extrapolate the numbers for school years of 2010-2011 to 2012-2013 gives us an estimated number of **61 fatalities** during the school years of 1998-1999 through 2002-2013, a period of 15 years.

f) **Robbery**
The NSSC lists 4 deaths related to robbery during the school years of 1998-1999 through 2009-2010. This is an average rate of 0.33 per school year. Using this average to extrapolate the numbers for school years of 2010-2011 to 2012-2013 gives us an estimated number of **5 fatalities** during the school years of 1998-1999 through 2002-2013, a period of 15 years.

g) **Unknown**
The NSSC lists 107 deaths of unknown causes during the school years of 1998-1999 through 2009-2010. This is an average rate of 8.92 per school year. Using this average to extrapolate the numbers for school years of 2010-2011 to 2012-2013 gives us an estimated number of **134 fatalities** during the school years of 1998-1999 through 2002-2013, a period of 15 years.

4) School-Related Homicides and Suicides from 1998-2012:
The following data based on the information from the NCES:

a) For a 13-year period from the 1998-1999 to the 2010-2011 school year, there were 424 school-related homicides (Table 1.2, 2012). That is an average rate of 32.62 per year. Using this average to extrapolate the numbers for the remaining two school years gives us an estimated number of **489 homicides** during the school years of 1998-1999 through 2002-2013, a period of 15 years.

b) For a 13-year period from the 1998-1999 to the 2010-2011 school year, there were 112 school-related suicides (Table 1.2, 2012). That is an average rate of 8.62

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per year. Using this average to extrapolate the numbers for the remaining two school years gives us an estimated number of **129 suicides** during the school years of 1998-1999 through 2002-2013, a period of 15 years.

FIGURE 4

Table 1.2. Number of school-associated violent deaths of students, staff, and nonstudents, by type: School years 1992–93 to 2010–11

Year	Total	Homicides	Suicides	Legal interventions	Unintentional firearm-related deaths
1998–99	37	38	6	2	1
1999–2000[1]	37	26	11	0	0
2000–01[1]	34	26	7	1	0
2001–02[1]	36	27	8	1	0
2002–03[1]	36	25	11	0	0
2003–04[1]	45	37	7	1	0
2004–05[1]	52	40	10	2	0
2005–06[1]	44	37	6	1	0
2006–07[1]	63	48	13	2	0
2007–08[1]	48	39	7	2	0
2008–09[1]	44	29	15	0	0
2009–10[1]	35	27	5	3	0
2010–11[1]	31	25	6	0	0
	552	424	112	15	1

[1] The data from 1999–2000 onward are subject to change until interviews with school and law enforcement officials have been completed. The details learned during the interviews can occasionally change the classification of a case. For more information on this survey, please see appendix A.

NOTE: A school-associated violent death is defined as "a homicide, suicide, or legal intervention (involving a law enforcement officer), in which the fatal injury occurred on the campus of a functioning elementary or secondary school in the United States," including while the victim was on the way to or from regular sessions at school or while the victim was attending or traveling to or from an official school-sponsored event. Victims include students, staff members, and others who are not students. Estimates were revised and may differ from previously published data.
(CDC), 2012).

5) School Fire Fatalities from 1998-2012:
The U.S. Fire Administration website was accessed and searched for data pertaining to school fire fatalities. The U.S. Fire Administration data shows no fatalities for the years of 1992-1998, 2002, and 2003-2005 (NFDC, 2002; NFDC, 2004; NFDC, 2006). School-related fatalities by fire are rare, and no documented instances have been found from 1998-2012.

6) Severe Wind-Related Fatalities from 1998-2012:
Using the Google search engine and the key words "school fatalities" and "tornado", links to several stories were found for the 1998-2012 time period.

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a) On Nov. 16, 1989, a reported tornado jumped out of a storm cloud and knocked a wall onto 120 kids eating lunch in the cafeteria at East Coldenham Elementary School. A nearby insurance agent described what would become New York's deadliest tornado as a "black, black — twisty thing". Seven kids were killed that day. Two more died later in hospitals. It was later declared to be a downburst (Montgomery and Kruse, 2005). A total of **9 deaths** resulted from this incident.

b) On August 28, 1990, a principal was killed in St. Mary's School, and three people (a teacher and two maintenance workers) were killed in Plainfield High School by a tornado (CBS, 2006). A total of **4 deaths** resulted from this incident.

c) On April 8, 1993, one person was killed in a school in Grand Isle, Louisiana by a tornado (Grazulis, 1993). A total of **1 death** resulted from this incident.

d) On March 1, 2007, an EF-4 tornado hit Enterprise High School in Enterprise, Alabama, killing 8 students and wounded 50 (NWS, 2009). A total of **8 deaths** resulted from this incident

In general, there were a total of **22 people killed** in schools caused by severe wind incidents during the school years of 1998-1999 through 2002-2013, a period of 15 years.

Summary
Based on the data from the NHTSA and NSSC, between 1998 and 2012 there were an estimated total of **525 killed** by school transportation-related causes and **10 killed** in school-related accidents.

Based on the data from NSSC and other media sources (such as Google), there were **62 people killed** in active shooter incidents, an estimated total of **61 people killed** as a result of interpersonal disputes, **24** in gang-related incidents on school property, **5** in robberies, **1** in schools by incidents categorized as bullying, **1** as a result of a hate crime, and **124** by other unknown causes. Based on the data from the NCES, there were an estimated total of **489** school-related homicides and **129** school-related suicides during 1998-2012.

Also based on the data from NFDC and other media sources, no deaths were reported for school-related fires while **22 were killed** in tornado incidents during this 15-year period. This means that there were an estimated total of **1,299 people killed** in schools and school related incidents in 15 years. That averages out to **87 school-associated deaths per year**. The charts below show the percentage of deaths caused by the types of causes presented in this report:
In Figure 4, the assumption was made that the deaths in active shooter, interpersonal dispute, gang-related, robberies, bullying and hate crime incidents were distinct from Homicides.
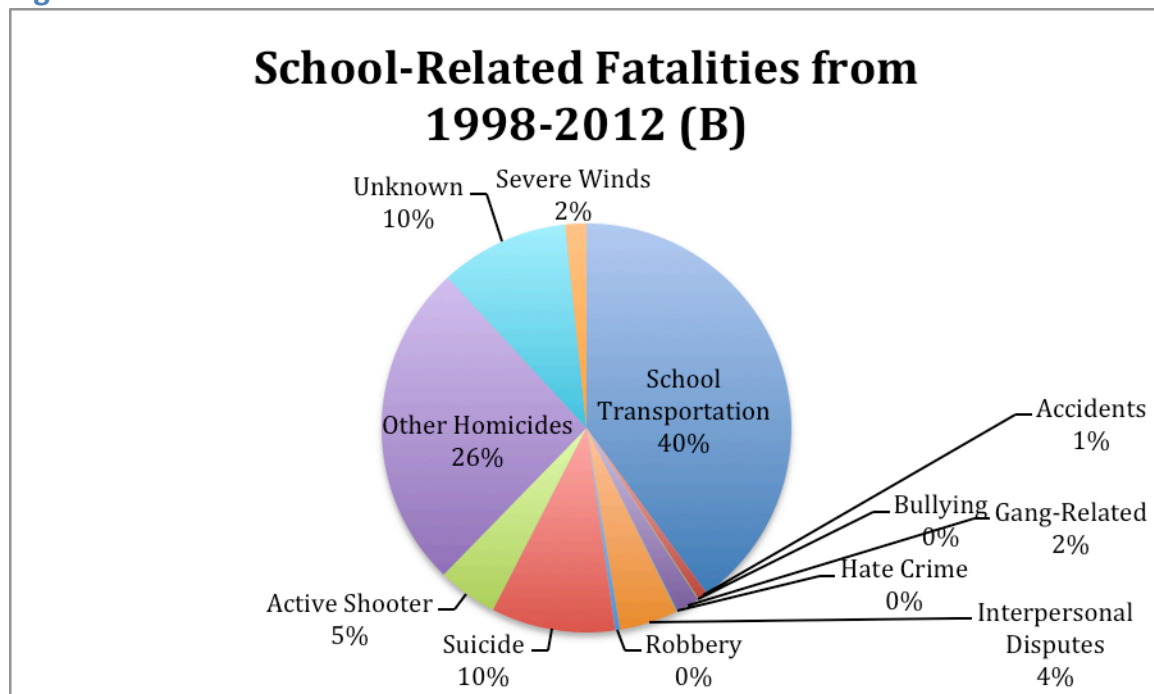
17

School-Related Fatalities from 1998-2012 (A)
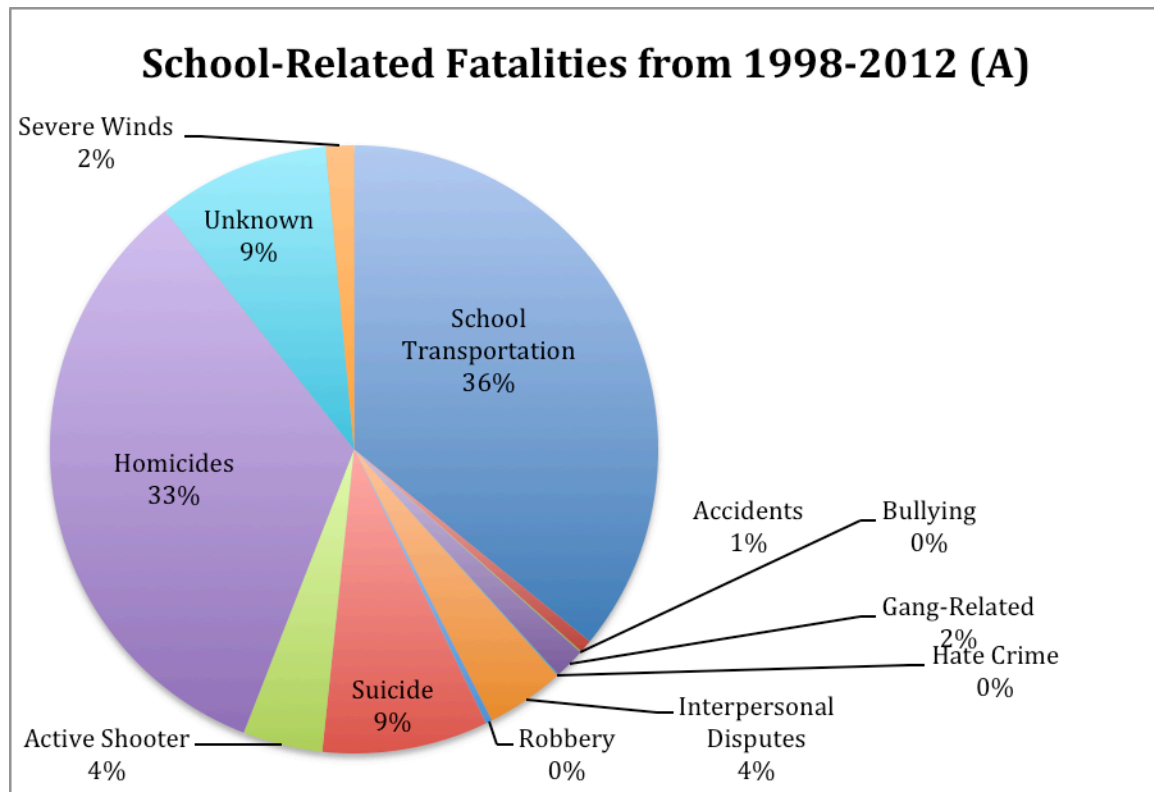
(Satterly, 2014)

In Figure 5, the assumption is made that active shooter, interpersonal dispute, gang-related, robberies, bullying and hate crime incidents are not subsets within Homicides, which makes the overall number of incidents smaller. By graphing the two extremes, we provide a range in which the actual numbers exist, but cannot be determined from the data we have available.

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Figure 6

School-Related Fatalities from 1998-2012 (B)

- Unknown 10%
- Severe Winds 2%
- School Transportation 40%
- Accidents 1%
- Bullying 0%
- Gang-Related 2%
- Hate Crime 0%
- Interpersonal Disputes 4%
- Robbery 0%
- Suicide 10%
- Active Shooter 5%
- Other Homicides 26%

(Satterly, 2014)

Since the NCES did not specify the sources of the number of homicides in their report, based on the common meaning of the word "homicide", we consider the deaths caused by intentional man-made causes (such as active shooter incidents) among homicides. In other words, for the 15-year period, the estimated number of school-related homicides caused by other causes rather than active shooter, interpersonal dispute, gang-related, robberies, bullying and hate crime incidents presented above is 339. This uses the assumption that all of the deaths in active shooter, interpersonal dispute, gang-related, robberies, bullying and hate crime incidents were homicides.

We were not able to find any national data on students and staff who have died of medical causes in schools. Data for deaths for adults and school-aged child ranks deaths from medical situations as among the top fifteen causes of death for both adults and school aged children. It is likely that if data for deaths from medical emergencies on school property were available, this category would be among the leading causes of death at school.

Personal experience and anecdotal evidence indicates that the number of deaths in schools from accidents is much high than the available data indicates. No national data on this cause of death could be located for the study.

TIER 2 RESULTS

1) Asthma-Related Fatalities

The Centers for Disease Control (CDC) report that the prevalence of asthma in children ages 0-17 was 9.5%, from 2008-2010 (Figure 2, 2011).

FIGURE 7

Data Brief 94. Trends in Asthma Prevalence, Health Care Use, and Mortality in the United States, 2001–2010

Data table for Figure 2. Asthma prevalence, by selected demographic characteristics: United States, average annual 2008–2010

	Percent (standard error)
Total	8.2 (0.1)
Children aged 0–17 years	9.5 (0.2)
Adults aged 18 years and over	7.7 (0.1)
Male	7.0 (0.2)
Female	9.2 (0.2)
White	7.7 (0.1)
Black	11.2 (0.3)
American Indian or Alaska Native	9.4 (1.4)
Asian	5.2 (0.4)
Multiple race	14.1 (1.0)
Total Hispanic	6.5 (0.2)
Puerto Rican	16.1 (1.0)
Mexican	5.4 (0.3)
Less than 100% poverty	11.2 (0.3)
100% to less than 200% poverty	8.7 (0.2)
200% or more of poverty	7.3 (0.1)

SOURCES: CDC/NCHS, Health Data Interactive and National Health Interview Survey.

From 2007-2009, the mortality rate per 1,000 people was 0.03 (Figure 5, 2011). From 2001 to 2009, the overall mortality rate went from 0.21 per 1,000 persons to 0.14 per 1,000 persons.

Data Brief 94. Trends in Asthma Prevalence, Health Care Use, and Mortality in the United States, 2001–2010

Data table for Figure 5. Asthma deaths per 1,000 persons with asthma, by selected demographic characteristics: United States, average annual 2007–2009

	Rate per 1,000 (standard error)
Total	0.15 (0.003)
Male	0.12 (0.004)
Female	0.16 (0.004)
White	0.13 (0.003)
Black	0.23 (0.009)
Child	0.03 (0.001)
Adult	0.19 (0.004)
0–14 years	0.03 (0.002)
15–34 years	0.05 (0.002)
35–64 years	0.15 (0.004)
65 years and over	0.58 (0.002)

SOURCES: CDC/NCHS, National Vital Statistics System and National Health Interview Survey.

2) Lightning-Related Fatalities

From 2006 to 2012, lightning killed approximately 52 children ages 0-19. That is an average of 8 per year. Thus from 1998 to 2013, an estimated 120 children were killed in the U.S. by lightning.
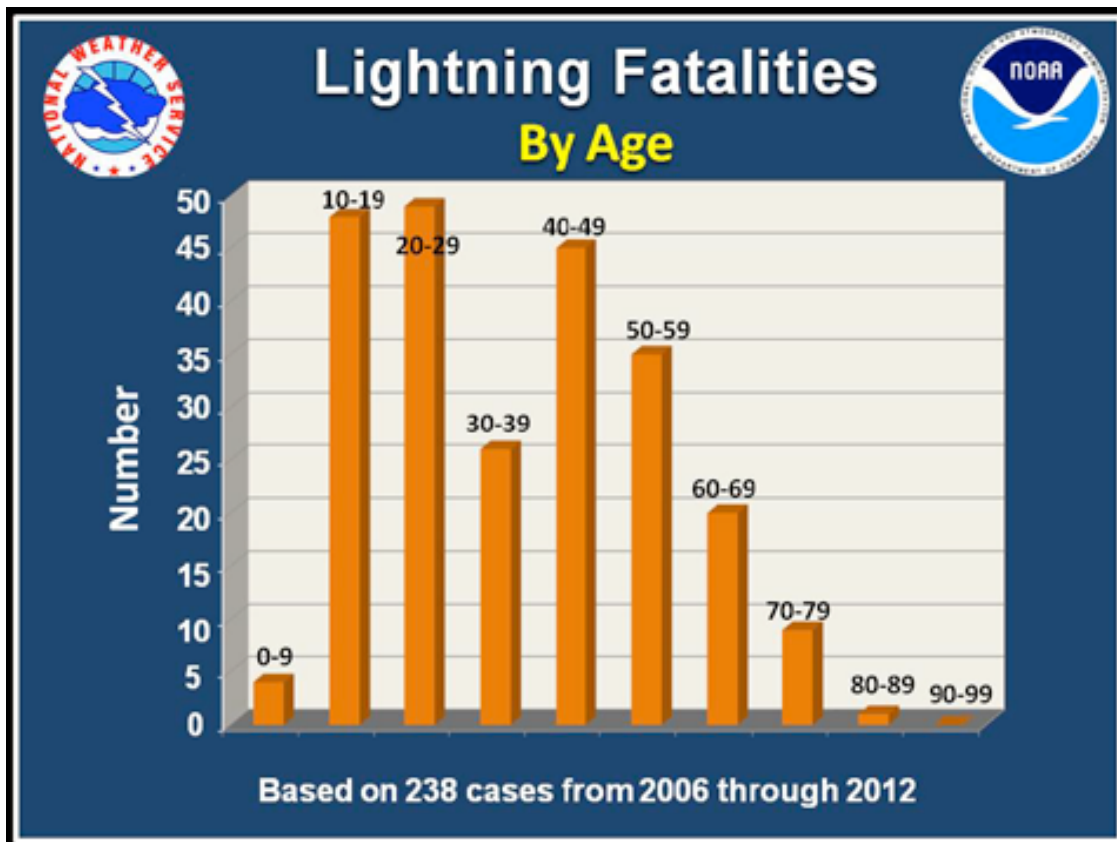
FIGURE 9

Figure 3.2a Number of lightning fatalities from 2006-2012 by age category. (Jensenius, 2013)

3) Playground-Related Fatalities

Forty deaths on playground equipment were investigated between 2001 and 2008. One death was of a 21-year old who hit his head on playground equipment while riding an ATV, then subsequently ran into a tree. The other 39 were younger than 21-years old. This is an average of 5 per year (Rounded up to the nearest whole number). Thus for the years 1998-2013, there was an estimated 75 fatalities on playground equipment (5 x 15 = 75). This does not take into account variances of fatalities from year to year, nor does it address the significant number of children injured every year on playground equipment, which is outside of the scope of this study. (O'Brien, 2009)

4) Top 15 Causes of Death

In 2010, the fifteen overall leading causes of death were by rank: 1) Diseases of heart (heart disease), 2) Malignant neoplasms (cancer), 3) Chronic lower respiratory diseases, 4) Cerebrovascular diseases (stroke), 5) Accidents (unintentional injuries), 6) Alzheimer's disease, 7) Diabetes mellitus (diabetes), 8) Nephritis, nephrotic syndrome and nephrosis (kidney disease), 9) Influenza and pneumonia,10) Intentional self-harm (suicide), 11) Septicemia, 12) Chronic liver disease and cirrhosis, 13) Essential hypertension and hypertensive renal disease

(hypertension), 14) Parkinson's disease, 15) Pneumonitis due to solids and liquids. These accounted for 80.4% of all deaths in 2010. (Murphy *et al*, 2013) Homicide is not listed. In 2009, Homicide was 15th, but dropped out in 2010.

FIGURE 10*

Table 3. Number of deaths and death rates, by age, race, and sex: United States, 2010

[Rates per 100,000 population in specified group. Rates are based on populations enumerated in the 2010 census as of April 1; see Technical Notes. Data for specified races other than white and black should be interpreted with caution because of inconsistencies between reporting race on death certificates and on censuses and surveys; see Technical Notes]

Age (years)	All races			White[1]			Black[1]			American Indian or Alaska Native[1,2]			Asian or Pacific Islander[1,3]		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
	Number														
All ages	2,468,435	1,232,432	1,236,003	2,114,749	1,051,514	1,063,235	286,959	145,802	141,157	15,565	8,516	7,049	51,162	26,600	24,562
Under 1 year	24,586	13,702	10,884	15,954	8,871	7,083	7,401	4,116	3,285	354	213	141	877	502	375
1-4	4,316	2,460	1,856	3,015	1,718	1,297	1,041	595	446	93	55	38	167	92	75
5-9	2,330	1,325	1,005	1,691	957	734	494	283	211	46	29	17	99	56	43
10-14	2,949	1,729	1,220	2,150	1,265	885	651	384	267	62	40	22	86	40	46
15-19	10,887	7,866	3,021	7,847	5,549	2,298	2,531	1,965	566	242	176	66	267	176	91
20-24	18,664	13,924	4,740	13,662	10,112	3,550	4,144	3,164	980	373	290	93	485	368	117
25-29	20,263	14,429	5,834	15,097	10,817	4,280	4,246	2,997	1,249	376	246	130	544	369	175
30-34	21,996	14,763	7,233	16,328	11,066	5,262	4,674	3,074	1,600	419	279	140	575	344	231
35-39	28,012	17,614	10,398	20,935	13,391	7,544	5,810	3,440	2,370	513	321	192	754	462	292
40-44	42,021	25,820	16,201	32,125	20,095	12,030	8,206	4,675	3,531	650	428	222	1,040	622	418
45-49	73,569	44,946	28,623	57,398	35,738	21,660	13,581	7,665	5,916	990	607	383	1,600	936	664
50-54	109,638	67,072	42,566	85,651	53,279	32,372	20,512	11,728	8,784	1,213	704	509	2,262	1,361	901
55-59	139,961	86,775	53,186	110,343	69,195	41,148	25,246	14,939	10,307	1,380	837	543	2,992	1,804	1,188
60-64	170,841	102,520	68,321	139,240	84,101	55,139	26,570	15,519	11,051	1,324	753	571	3,707	2,147	1,560
65-69	189,962	109,519	80,443	158,882	92,194	66,698	25,781	14,289	11,492	1,349	738	611	3,950	2,308	1,642
70-74	217,189	120,185	97,004	184,095	102,609	81,486	26,710	14,106	12,604	1,454	769	685	4,930	2,701	2,229
75-79	273,348	143,006	130,342	237,879	125,427	112,452	28,238	13,898	14,340	1,388	705	683	5,843	2,976	2,867
80-84	352,303	168,824	183,479	314,629	152,116	162,513	29,305	12,704	16,601	1,297	593	704	7,072	3,411	3,661
85 and over	765,474	275,866	489,608	697,733	252,958	444,775	51,795	16,243	35,552	2,042	743	1,299	13,904	5,922	7,982
Not stated	126	87	39	95	66	29	23	18	5	–	–	–	8	3	5

See footnotes at end of table.

(Murphy *et al.*, 2013)

* We were not able to find any national data on students dying of medical causes in schools. The above data shows national trends, but statistics from drilling down the data to those specific to schools could not be located by the author.

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FINDINGS

1) **Active Shooter Incidents are not the leading threat for fatal incidents schools face.**
It is clear that Active Shooter Incidents are low-probability, high-impact events. It is also clear from the above data that Active Shooter Incidents are not the greatest risk a school faces when overall causes of mortality are considered. While Active Shooter incidents result in a disproportionate emotional impact and generate widespread fear, far more students and staff die from a variety of other causes. Though past incidents demonstrate that the threat of active shooter incidents exist in any school and should be taken seriously, common perceptions that Active Shooter Incidents are the leading cause of death at school are not accurate.

If one uses fatalities to establish importance in risk assessment, the greatest risk a student faces is getting to and from school everyday, as school-transportation related fatalities represent 37.89% of school related fatalities that can be tracked using reliable mortality data.

To put that figure into perspective, there were an estimated 602,764 fatal traffic accidents from 1998-2013 (414,399 + [37,673 x 5= 188,365] = 602,764), of which 1,564 were classified as school-transportation related. Therefore 0.26% of all traffic fatalities were school-transportation related (NHTSA, 2009). Thus, not only is the greatest risk insignificant when compared to overall traffic fatalities, it is much safer to ride a school bus than it is to get to school by any other means.

The second-rated risk, fatality-wise, is school homicides at 32.82%.

The third-rated risk is school suicides at 8.87%.

The fourth-rated risk is fatalities of unknown causes at 8.27%.

Active Shooter is fifth at 4.14%, and Interpersonal Disputes is sixth at 3.80%. This indicates that schools should give attention to school homicides and school suicides rather than focusing primarily on Active Shooter Incidents. It is important to point out that there are other causes of death that also account for many school associated deaths that we could not locate reliable data for, other forms of accidents and common medical emergencies. Though school safety experts and school officials have expressed concerns that these types of deaths occur with relative regularity in relation to deaths from acts of violence we were unable to locate any comprehensive national data.

The data shows an average of 100 school-related fatalities each year, of which 4 are from Active Shooter Incidents.

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2) **Active Shooter Incidents in schools are not happening more frequently.**
The FBI released a report in January 2014 that stated that from 2000-2012, Active Shooter Incidents were more frequent, and that 29% of these incidents occurred in schools. Yet, when school Active Shooter Incidents is looked at across a 15-year period from 1998-2012, a neutral trend can be seen. If one focuses on the last three years, it appears to be trending upward, but more time is needed to see of the trend continues, or if it continues to follow the long-term, neutral trend (Blair, et al, 2014)

3) **Active Shooter Incidents should not be the primary focus for a school's prevention and mitigation and emergency preparedness efforts**.
Coming in at fifth of the 12 types of fatalities in K-12 schools, it does not appear to be logical to use resources for Active Shooter while focusing less on more probable yet also lethal types of incidents. It is not logical to supplant an All-Hazards approach in favor of proactive response focused heavily on a type of event that results in fewer fatalities than other types of incidents. If a school wishes to implement proactive responses to Active Shooter Incidents, it should be as part of an All-Hazards approach. The time, energy and funding expended should be in balance with deadly risks that are more likely to occur.

It will be noted here that schools and school districts should conduct their own risk assessment, as each entity is unique, with unique needs. This data only represents national trends.

4) **More focus needs to be given to school transportation-related safety**.
More people die in school transportation-related crashes than by any other means. It therefore makes sense to devote more school resources to address this risk.

5) **More focus needs to be given to school homicides and school suicides**.
Like Active Shooter Incidents, school homicides and school suicides are violence-based. Homicides are more prevalent than Active Shooter Incidents. Suicides are also more common than Active Shooter Incidents. It makes sense to then direct more resources to reduce these more common and lethal risks.

6) **From 1998-2013, there are as nearly as many school tornado-related fatalities (22) as gang-related fatalities (24)**.

7) Based on the national data in Table 2, it would logically follow that there are significant numbers of students and staff dying in schools from medical causes (i.e. choking, allergic reactions, heart stoppage, etc.). We were unable to find any study that provided data for such fatalities in the school setting.

8) A true risk assessment would look at the likelihood of an incident happening, not mortality. For example, there were five Severe Wind events in which there were student fatalities, but there were numerous incidents in which schools were negatively affected by tornados. Thus there is more of a risk of schools, in certain parts of the country, facing severe wind threats than Active Shooters.

CONCLUSION

In using the All-Hazards approach to emergency management in schools, an important step in the approach is risk assessment. Having an effective plan is not enough, especially if that plan addresses and emphasizes less likely risks while ignoring or inadequately addressing more probable types of incident. While it is possible that a properly conducted risk assessment for a school would identify Active Shooter Incidents as a local priority, it is unlikely as demonstrated by the data relating to school-related fatalities. However, a true risk assessment is data-driven, documented and provides the local school district with the opportunity to be logical in making important life-safety decisions. This process should not be driven by emotion, approaches that have not been validated, nor by spur-of-the-moment decisions.

In a perfect world, schools would have all the resources they need to make their students and staff safe. The reality is that schools are often faced with inadequate resources for safety. This makes prioritization of risks important.

The tragedy at Sandy Hook Elementary School was a traumatic experience for the victims, their families, the community, the State of Connecticut, our nation and the world community. For Americans whose duty is to protect others, the acute stress response was often a powerful force. Over the years, educators and law enforcement officials have increasingly utilized research to guide the development of new school safety procedures. This drive to put proven and comprehensive approaches in place to prevent and respond more effectively to highly traumatic Active Shooter incidents appears at least in some cases to have interrupted a research-driven, and logical approach to school safety. This may be one reason that most new Active Shooter Response approaches and security options focused on Active Shooter Incidents have been hotly debated among both educators and public safety officials.

For such monumental changes in methods to occur, evaluation, testing, reason and data are important factors. Heart wrenching and deadly incidents should not cause us to cast aside a focus on effective risk assessment processes for the sake of "doing something" at the risk of taking actions that could be ineffective, counterproductive and could divert precious resources away from other deadly risks. The risk assessment process, as part of the All-Hazards approach, was designed to prevent organizations from making major changes without a reasoned analysis and proper planning. If it is important to fundamentally change a critical aspect of our prevention and preparedness strategies, then such a change should be made with great thought and consideration.

Our children and those who dedicated their lives to educating them deserve no less.

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