Article

Shooting for Accuracy: Comparing Data Sources on Mass Murder

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Abstract

Although researchers have questioned their coverage and accuracy, the media routinely are used as sources of data on mass murder in the United States. Databases compiled from media sources such as newspaper and network news programs include the New York Police Department's Active Shooters file, the Brady Campaign Mass Casualty Shootings data set, and the *Mother Jones* database. Conversely, official crime data have been underutilized by researchers who study mass murder (for exceptions, see Duwe, 2007; Fox & Levin, 1998). In this study, we compare similarities and differences for mass murder cases in the United States as portrayed by selected mass media sources. Then, we turn our focus to a comparison of the *Uniform Crime Reports'* (UCR) *Supplementary Homicide Report* (SHR) and the *National Incident-Based Reporting System* (NIBRS). Our primary focus is on mass murders involving four or more fatalities—not including the perpetrator—that have occurred between 2001 and 2010. Implications for enhancing the comprehensiveness and quality of mass murder data with the goal of increasing their usefulness for guiding prevention and risk mitigation efforts also are discussed.

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Introduction

Mass murder involves the killing of multiple people by one or more offenders in a short span of time, normally within a few hours, and either in the same place or in locations that are geographically near one another (Hickey, 2013). Beyond this broad characterization, researchers vary in their definitions. Some researchers suggest that a mass murder results in at least two victims being killed (Lester, Stack, Schmidtke, Schaller, & Muller, 2005; Messing & Heeren, 2004). However, Holmes and DeBurger (1985, 1988); Holmes and Holmes (1992, 2001); Petee, Padgett, and York (1997); Meloy, Hempel, Mohandie, et al. (2001); and Meloy, Hempel, Gray, et al. (2004) suggest that at least three people must be killed in one place or during one incident to be considered a mass murder. Dietz (1986) agrees that three people must be killed, but adds the condition that the perpetrator must injure five or more victims of whom at least three die as a result. Other researchers, such as Fox and Levin (1998), suggest that a minimum of four victims must be killed in a single incident for it to qualify as a mass murder. In this research, the Federal Bureau of Investigation (FBI) definition of mass murder as of 2010 will be employed, that is, murderous events resulting in at least four deaths and normally taking place at one or more geographical locations relatively near one another (FBI, 2008). Those incidents occurring near, but not at the same location are bifurcated; the murderer begins killing in one place and then moves to another nearby location to continue murdering more victims (Hickey, 2013). A well-known example of a bifurcated incident of mass murder is the massacre that occurred at Virginia Tech in 2007. Seung-Hui Cho began killing in the student residential dorm of West Ambler Johnston Hall and continued his attack across campus in the Norris Hall building 2 hours later.

Like serial and spree murder, mass murder certainly is not a new form of homicide. Documented cases date back well into the early 20th century, but according to Hickey (2013) the occurrence of mass murders recently has increased from "one case per month to approximately one case every 10 days" (p. 11) with approximately half occurring within or near the victims' residence and the other half in public venues, for example, shopping malls, schools, and workplaces. His estimate is higher than those by Fox and Levin (2012) and Duwe (2007), but the span of years differs; Hickey is not alone in suggesting a recent uptick in mass murder incidents. As a result, mass murder is demanding more attention from researchers to better describe and explain these events, as well as their causes and consequences.

In this article, we explore the strengths and weaknesses of various data sets that include information about mass murders in the United States. Following this presentation, we discuss the importance of improving the quality and quantity of data available for analysis. As was called for by federal, state, and local law enforcement personnel, primary and secondary school officials, private business representatives, and others at the National Summit on Mass Casualty Shootings held at the Federal Law Enforcement Training Center (FLETC) in December 2012, research is a logical next step required to better respond to and prevent mass murder.[1] This article and this special issue of

Homicide Studies are strides in that direction; strides that, in part, are meant to identify what we know and what more we need to know about mass murder in the United States.

Literature Review

Dowden (2005) has noted that researchers' lack of access to data on multiple murders has hampered any sustained progress in this field of inquiry. To date, prior research on mass murder has relied on two primary sources of data. The first is media accounts, typically newspapers (Petee, Padgett, & York, 1997), but also network television news and weekly news magazines (Duwe, 2007). A recent effort by the New York City Police Department (NYPD) to compile a comprehensive data set of active shooter incidents, some of which would meet the criterion of four fatalities for mass murder, relied on online searches to identify cases from various media sources (Kelly, 2010). The second source is official crime data[2] on killings included in the FBI's SHR (Duwe, 2007; Fox & Levin, 2012; Levin & Fox, 1985). In the existing literature, the most comprehensive description of how *both* media and official sources of crime can be used to compile a data set on mass murder is found in Duwe (2007). To our knowledge, NIBRS data have not been employed as a source for studies of mass murder. The strengths and weaknesses of media, SHR, and NIBRS as sources of data on mass murder are evaluated below.[3]

Media Sources of Data

Perhaps the primary advantage of using newspapers for obtaining data on mass murder in the United States is that they are the only available source for years prior to 1976 when the first annual SHR was published. For example, the *New York Times Index* was used by Duwe (2007) to estimate mass murder rates in the United States for 1900 through 1975. An important secondary advantage is that media sources typically provide more incident details than are available through the SHR or NIBRS. Media, for example, routinely include the names of offenders and victims, their known backgrounds, event outcomes for offenders, the exact location(s) of the incident(s), the police response, a time line for the killings, and selected commentary by local authorities, survivors, and witnesses, which can be used to supplement data available from law enforcement sources. Thus, media coverage lends itself to the compilation of data on mass murder. One example is the *Brady Campaign to Prevent Gun Violence: Mass Shootings in the United States Since 2005* (2013) database that draws upon media sources. Granted, it only begins coverage of mass murders in the United States in 2005 and deals only with gun-related killings, but it includes events where multiple people survived being shot, as well as those who died as a result. We also can learn a few more details about the shootings and, perhaps, some of the offenders' motivations for committing their crimes.

Selected examples include the following:

Auburn, AL
06/09/2012

A 22 year old man opened fire at University Heights apartments off West Longleaf Drive. The shooting left three men dead, including two former Auburn University football players, and three others wounded. (*Manhunt on for suspect in Auburn mass shooting*, Dothan Eagle, June 10, 2012)

Gilbert, AZ
05/01/2012

Four people killed by a former neo-Nazi before he turned the gun on himself. The killer shot and killed his girlfriend and three others, including a toddler as a result of a domestic dispute. (Armored gunman, 4 people dead in Arizona *shooting*, MSNBC, May 2, 2012)

Grapevine, TX
12/25/2011

On Christmas morning, police have said, a middle-aged man dressed in a Santa Claus suit shot and killed a man, a teenage boy and four women and then himself inside a unit at the Lincoln Vineyards Apartments in the 2500 block of Hall-Johnson Road. The attack was planned investigators said. (*Police say* gunman in Christmas shooting planted gun on victim, *Grapevine Courier*, December 28, 2011)

In each of the three cases quoted from the *Brady Campaign to Prevent Gun Violence: Mass Shootings in the United States Since 2005*, we learn information that would not be available using FBI data sources. In the first excerpt from a local newspaper, we learn that two of the victims once played football for Auburn University. From the second, which appeared on TV, in a domestic dispute, a former neo-Nazi apparently shot and killed four people, including a young child. Finally, in the third example, taken from a local newspaper, a man dressed as Santa shot and killed six people at a residence. Knowing the specific information about the victims and offenders in the cases above may provide insight into offender motivation and target selection. From some official sources that are discussed below, we can learn the exact ages of victims, but we would not find out that former football players were killed or that offenders in the latter two cases included a former neo-Nazi and a man in a Santa suit. Still, the weaknesses of media sources are also well known (Duwe, 2007). As has been established for crime in general, newspapers and other media outlets provide disproportionate coverage of selected crimes, notably murders and other violent offenses. Although rare, these crimes pique the interest of media consumers and hold the potential for increasing profits. Just as murders receive greater coverage than other Index crimes, mass murders with certain characteristics also receive more attention than others. Duwe (2000) shows, for example, that mass murders with more victims, those that occur in public places, and those that involve assault weapons receive more attention

from the national media than do family annihilations, the most common type of mass murder (Petee et al., 1997). Other facets of mass murder incidents that make them more newsworthy include those occurring in the workplace and those involving victims and offenders of different races (Duwe, 2000, 2007). While certainly tragic, these incidents, such as the 2012 mass killings in Aurora, Colorado, and Newtown, Connecticut, are rare mass murder events; they are nonetheless high-profile cases that shape public perceptions and lead people to view them as prototypical mass murders. These biases make it less likely that we can identify mass murders that mainly are of local significance, especially prior to the development of internet news services (Duwe, 2007; Kelly, 2010), and many of the annual numbers of mass murders compiled from media sources are likely to be underestimates, especially for earlier decades.

A second difficulty with the media is conflicting accounts related to the same mass murder event from different sources, or even the same source at different times. The NYPD found that this was especially a problem with information related to weapons, although all offenders in their data set used firearms (Kelly, 2010). Faced with discrepancies across media accounts, NYPD researchers chose to give added credence to more recent reports over older ones and to reports from government agencies over other sources (Kelly, 2010). Operating with a strong desire to get details of unfolding mass murder events to the public as soon as possible, it is likely that stories appearing soon after an incident will include more erroneous information than accounts that are released later, although the improvement in the accuracy of media information may be limited to certain characteristics, such as the number of dead and injured (Kelly, 2010) or the correct name of the offender as was the case for the mass shooting at Sandy Hook. Our examination of the media coverage of the December 2012 shootings at Sandy Hook School in Connecticut also indicates that improved validity of information in the media about mass murders may not be a linear process, and discrepancies still may be reported several weeks after an incident.[4]

Although there regularly is confusion in the immediate aftermath of chaotic events such as Sandy Hook, contradictory reports about the weapons used in the shooting persisted well into the month following the event. An NBC correspondent claimed in mid-January 2013 that contrary to prior reports, there was no assault rifle inside the school, there were only four handguns (Becker, 2013). Over 2 months later, reports by the *New York Times* identified a semiautomatic rifle used inside the school, as well as two semiautomatic handguns and a shotgun left in the suspect's car (Kleinfield, Rivera, & Kovaleski, 2013). High-profile cases such as this highlight the fact that the media may lack accurate information for even 4 months after a high-profile event. When researching lower profile events such as gang violence or less sensational shootings, the data about suspects, weapons used, and number killed may be even more unreliable when taken from media sources.

Police Data Sources: SHR and NIBRS

Available since 1976, the SHR offers definite advantages over the media as a source of data on mass murders. Notably, in place of the media's rush to get information about these events into print or onto the TV screen, law enforcement agencies are reticent to

share information in the early stages of an ongoing investigation and sometimes up to and after a case is closed. By the time a multiple victim offense is entered into the SHR, the data are likely to be as error free as they will ever become and, therefore, more valid than media accounts for some variables. In addition, although not discernible from the FBI's better-known annual report, *Crime in the United States*, the SHR allows researchers to determine the number of victims resulting from homicide incidents, including those with four or more fatalities. To our knowledge, all trend studies of mass murder have relied on the SHR, sometimes supplemented with cases from the media that did not find their way into the official law enforcement database (Duwe, 2007). Overall, compared with media sources the SHR provides less detail about mass murder (Duwe, 2000), but the data are of somewhat higher quality. However, the limitations of SHR have been identified by researchers, including Fox (2004) and Maxfield (1989). Fox (2004) has applied weighting and imputation procedures to correct for the problem of missing data in the SHR, but other problems exist. According to Fox (2004), the SHR contains details on approximately 90% of the homicides included in the *Uniform Crime Reports*, but the omissions are not at random. For example, Florida did not report SHR data to the FBI for the period of this study (Federal Bureau of Investigation [FBI], 2013c). An important problem for researchers using SHR data for studies of mass murder is that cases with multiple victims will list the same victim–offender relationship (that between the perpetrator and the first-listed victim) for all victims. This drawback can lead to erroneous classifications for mass murders. For example, a hypothetical case with the perpetrator's spouse, two children, and a friend of the spouse as victims will have "friend," "acquaintance," or "stranger" (dependent on the relationship between the perpetrator and the spouse's friend) for all documented victim–offender relationships if the friend of the spouse is the first-listed victim.

If researchers and policy makers' only interests in mass murder were reporting a yearly count and identifying whether these incidents were trending upward or downward, the SHR would be sufficient (see Fox & Levin, 1998). But if detailed case information is needed, especially data for evaluating the potential efficacy of interventions to decrease the number of multiple murder incidents and/or their victim toll, shortcomings in the SHR and corresponding advantages of NIBRS become evident.[5]

Promise of NIBRS

First, the NIBRS system was designed, in part, to enhance the quality and quantity of data reported to the FBI (Addington, 2004). From its inception, NIBRS required FBI certification for state agencies and state certification of individual law enforcement agencies reporting to the UCR, included more detailed instructions for data submission, and provided a process for data updates (Addington, 2004). Unfortunately, there have been only a few efforts to measure whether these procedures have produced more accurate data (Rantala & Edwards, 2000; Roberts, 1997).

Second, the SHR provides significantly less information on murder incidents than NIBRS and is, therefore, less useful for "strategic crime analysis" (Faggiani & McLaughlin, 1999). Currently, the SHR database is a hybrid product with data extracted from NIBRS for those states and agencies that report through the newer

system and from the UCR for other jurisdictions. However, NIBRS data are seriously truncated when they are entered into the SHR. The information related to the weapons used in a mass murder provides an important example. NIBRS allows for the inclusion of information for up to three weapons per incident, whereas the SHR allows information for only one. When a NIBRS case includes multiple weapons, a hierarchy rule is applied to denote the one that will be reported through the SHR. A firearm of unidentified type is first in the hierarchy, a handgun is second, a rifle is third, and a shotgun is fourth (FBI, 2013b). Thus, if a mass shooter uses a handgun and either a rifle or a shotgun in a mass murder incident, only the handgun will be reported in the SHR. Moreover, NIBRS weapons data designate if a firearm had an automatic firing mechanism, but this information is not converted into the SHR system. Given the sustained attention to an assault rifle ban as a response to the Aurora and Sandy Hook incidents, as well as other similar shootings, it is important to note the likelihood that the SHR systematically underreports the use of all long guns in mass murder incidents.

Although NIBRS data on weapons are truncated when extracted into the SHR, other NIBRS elements are completely absent. NIBRS, for example, reports whether a homicide case is cleared, and if so, if it was cleared by exceptional means. These variables are not available in the Summary UCR, and the data from NIBRS reporting agencies are excluded when the two sources are merged into the SHR. This information is important for evaluating the common belief that most mass murderers commit suicide or "suicide by cop."[6] In addition, both the SHR and NIBRS contain locational information that makes it possible to place a mass murder incident in the county or law enforcement jurisdiction where it occurred, but NIBRS also includes a variable providing for 25 specific location types, for example, residence/home, government/public building, school/college, identifying the type of location where the killings transpired. The advantages for understanding these events are obvious, since it is likely that several characteristics of mass murders are influenced by the context and geography in which they occur. Family killings are more likely to occur in residences, for example, and the tendency to commit suicide may be stronger for offenders in mass killings in some locations, for example, schools and public places, than others. Furthermore, the SHR allows for information on only 10 victims per incident, while the inclusion of up to 999 victims is possible in NIBRS, and information on the relationship(s) between victim(s) and offender(s) is more limited in the SHR. The additional data in NIBRS compared with the SHR are important for furthering our understanding of mass murder and for devising intervention strategies targeted at both prevention and risk mitigation.

The obvious disadvantage of the current NIBRS is the lower level of population coverage compared with the SHR. This shortcoming gradually will subside in significance as more states become fully or mostly NIBRS compliant over time, but researchers are encouraged to inspect for any significant differences between the SHR and NIBRS data when both sources contain information on the variables in question. Although the small agency bias will continue to exist for NIBRS data in the intermediate future, the primary shortcoming would be an undercount of the number of mass murders per annum. These numbers can be obtained through the SHR; however, the greater detail on mass murder incidents available from NIBRS makes it preferable to the SHR for answering many research questions. To illustrate this point, the following

section compares mass murder data from the SHR and NIBRS for the years 2001 through 2010.

Method

The data used to compare and contrast official sources of information on mass murders for this study come from the FBI's *Supplementary Homicide Report* (SHR) and *National Incident-Based Reporting System* (NIBRS; 2001-2010; FBI, 2013b. Scholars, law enforcement, and government officials use both the SHR and NIBRS as data systems for crimes reported to police. As noted in the literature review, a wide variety of incident-based data are gathered regarding crimes that are under the scope of law enforcement.

In 2011, approximately 18,000 agencies, including college, state, county, federal, and tribal organizations, reported their data to the *Uniform Crime Reports*, the nationwide program that has been used to measure crime on a national-level since the 1930s (FBI, 2011).

More specific details about murders are compiled in the SHR for which supplemental data are provided to the FBI: situation type (e.g., single victim/single offender); the age, sex, and race of the victim and the offender; the weapon used in the homicide as defined by the hierarchy rule; the relationship of the victim to the offender; and the circumstances surrounding the offense. In addition, a data field for the total number of victims allows for the identification of mass murders. The availability of these data makes the SHR a preferred source over the UCR for many studies of homicide. On the other hand, as noted above there are data limitations in the SHR.

In contrast, the six segments of the NIBRS database we employ in this study contain administrative, offense, victim, offender, property, and arrestee data. In total, 57 data elements are captured in this process. Agencies collect data on each crime occurrence within 22 offense categories made up of 46 specific crimes called Group A offenses. Group A offenses include arson, assault, burglary, drug/narcotic offenses, gambling offenses, homicide offenses, kidnapping, motor vehicle theft, prostitution offenses, sex offenses, and weapon law violations (FBI, 1992). Since NIBRS was established more recently, there are still many states that have yet to complete implementation. States that currently are fully compliant to NIBRS specifications include Arkansas, Delaware, Idaho, Iowa, Michigan, Montana, New Hampshire, North Dakota, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, and West Virginia (Justice Research & Statistics Association, 2012).

For the present study, data from the administrative, incident, offender, and victim segments of NIBRS were obtained from the Inter-University Consortium for Political and Social Research (ICPSR). Information about the victims, offenders, weapons, and locations were gathered from the NIBRS database.

The sample consisted of all mass murders resulting in four or more victims not counting the perpetrator (FBI, 2008) for the years 2001 through 2010. Because mass murder is an extremely rare event, including a range of years allows sufficient data to

run appropriate analyses and helps highlight potential patterns and elements by smoothing out the results that may be lost or biased if only 1 year was used.

Data and Analyses

Table 1 includes results comparing the 2001-2010 SHR and NIBRS data on mass murder offenders and victims. Nearly all law enforcement agencies in the United States report mass murder events to the FBI that are added to the SHR database. This source, which appears to report the most accurate count of mass murders, indicates that there were 298 such events recorded in the SHR during the decade being reviewed. Because NIBRS coverage of U.S. law enforcement agencies is not as complete as is found in the SHR, NIBRS reports 87 mass murder incidents during the same time. To examine the influence this difference in coverage may have on the data of offenders and victims, the mean number of offenders and victims reported by the SHR and NIBRS was calculated and *t* tests were run to determine whether there were or were not significant differences between the means. As noted in Table 1, the SHR shows that there were 1.49 offenders while NIBRS reports 1.72 offenders per event. The *t*-test results (-1.51, $p = .07$) indicate that there is no significant difference between the SHR and NIBRS means, thus the findings reported for the latter data set can be viewed as consistent with the more complete national data available in the SHR for mass murders in the United States between 2001 and 2010.

As with homicide in general, men are much more likely than women to commit mass murders. Among the offenders, the 445 men in the SHR and the 151 men in NIBRS constitute over 80% of the respective totals. The media portrayals of these incidents would lead one to view these offenders as young, White men (Duwe, 2007). Because we have been influenced by media coverage, just like most U.S. citizens, we were surprised to find that mass murder offenders are slightly more likely to be Black than White. The SHR reports 187 (42%) Black and 182 (41%) White men, while NIBRS data include 73 Black (48%) and 57 White (38%) men among the mass murderers. Given that Blacks comprise just over 13% and Whites make up approximately 78% of the U.S. population (U.S. Census Bureau, 2013), Blacks are clearly overrepresented among mass murder perpetrators during the decade under study. All data sources agree that relatively young men commit murder at higher rates than other age groups (Davies, 2008). The SHR data show that nearly 37% of the offenders were between 21 and 30 years old. NIBRS data are consistent with 60, or 40%, of the 151 offenders falling between 21 and 30 years of age. In both cases, persons between 31 and 40 years were the second largest group of offenders, but made up only approximately half as many mass murderers as were reported in the next younger group, the 21 to 30 years old.

The same process that was used to test for comparison of offenders was followed to inspect victim data in NIBRS compared to the SHR. According to both the SHR and NIBRS, there was an approximate mean of five victims per mass murder event. Results of the *t* test (-0.987, $p = .16$) examining the mean count difference per event as shown in Table 1 indicate that even though NIBRS geographically covers less of the United

Table 1. Comparisons of SHR and NIBRS Mass Murder Offender and Victim Characteristics, 2001-2010.*

	Offenders				Victims			
	SHR		NIBRS		SHR		NIBRS	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Event count	298		87					
$\bar{X}$ Count per event	1.49		1.72		4.73		4.94	
t test		−1.51 (p = .07)				−0.987 (p = .16)		
Variables								
Gender								
Men	358	80.45	123	81.46	791	56.34	261	60.84
Women	35	7.87	13	8.61	608	43.30	167	38.93
Unknown	51	11.46	15	9.93	5	.36	1	.23
Total	445	99.78	151	100.00	1404	100.00	429	100.00
Race								
White	182	40.90	57	37.75	823	58.37	240	55.81
Black	187	42.02	73	48.34	498	35.32	161	37.44
Other	14	3.12	5	3.31	55	3.90	20	4.65
Unknown	62	13.93	16	10.60	34	2.41	9	2.10
Total	445	99.97	151	100.00	1410	100.00	430	100.00
Age								
10 and under	1	.23	0	.00	299	21.21	65	15.12
11-20	65	14.64	25	16.56	260	18.44	107	24.88
21-30	164	36.94	60	39.74	303	21.49	113	26.28
31-40	81	18.24	29	19.21	179	12.70	54	12.56
41-50	49	11.04	15	9.93	164	11.63	42	9.77
51-60	15	3.38	4	2.65	82	5.82	24	5.58
61-70	2	0.45	0	0.00	49	3.48	6	1.40
71-80	1	0.23	0	0.00	27	1.91	4	.93
81-90	0	0.00	0	0.00	11	0.78	2	.47
91 and over	0	0.00	0	0.00	5	0.35	0	.00
Unknown	66	14.86	18	11.92	31	2.20	13	3.02
Total	444	100.01	151	100.01	1410	100.01	430	100.01

*The count of offenders and victims vary slightly due to missing data. Percentages that do not add up exactly to 100 percent are a result of rounding error.

States than the SHR, there is no significant influence on the findings related to the mean number of mass murder victims per incident. The small agency bias in NIBRS may not be as important for mass murder as for other offenses. Fox and Levin (2012) show that mass murder is not as geographically concentrated by region and size of community as other homicides.

Although women comprise nearly 51% of the total U.S. population, they typically make up only about 22% to 24% of the murder victims each year (FBI, 2013a). When examining the statistics for mass murders, however, women comprise 43% of the victims in the SHR data set and 39% of the total victims in NIBRS data. Therefore, even though men still make up the majority of the SHR (56%) and NIBRS (61%) victims, women are about 1.5 to 2 times more likely to be killed in a mass murder than in all homicides. An examination of statistics related to race show that even though their percentages are somewhat smaller than was the case for offenders, Blacks also are overrepresented among mass murder victims. The SHR indicates that 35% or 498 individuals of the total victimized were Black whereas 58% were White. Likewise, NIBRS data show that 37% of the victims were Black and 56% were White. Similar to the statistics on offenders, however, the individuals most likely to be killed were between the ages of 21 and 30 years in both the SHR (21%) and NIBRS (26%). Many children and younger persons also are among the victims of mass killers with 40% being between birth and 20 years old in both SHR and NIBRS. According to FBI statistics covering 2001-2010, young people under 22 years of age made up approximately 24% to 26% of the total murder victims during the decade. Therefore, like the statistics noted above for women, when the percentages of youth killed as a result of all types of murder are compared with those for mass murder it is clear that young people are killed at higher rates during these events, reflecting the prevalence of familicides among mass murder incidents.

Table 2 provides data from both the SHR and NIBRS on the weapons used in mass murder events. Both data sources show that firearms are disproportionately the weapons employed in mass murder incidents. Overall, the two sources are very close; firearms are involved in 67% of the mass murders in the SHR and 64% of those in NIBRS. Current debates over weapons in mass murder events more often target particular types of firearms, however, and assault rifles typically are portrayed as the most destructive type of weapon used in mass shootings. Both the SHR and NIBRS include categories for types of firearms, and the respective numbers show more differences than the overall statistics for weapons. The first notable finding is that handguns represent 44% of the total weapons and 66% of the firearms reported in the SHR but only 33% of the total weapons and 52% of the firearms from NIBRS data. Conversely, the specific type of firearm is less likely to be identified in NIBRS than in the SHR, 18% versus 10%, respectively. Why the type of firearm is less likely to be specified in NIBRS is unknown.

At first glance, both data sources appear consistent in the numbers and percentages of cases in which long guns, rifles and shotguns, are used as weapons. If untyped firearms are excluded from the data, however, an important difference emerges. Specifically, 29% of the firearms of known types reported in NIBRS are long guns versus 22% in the SHR. As noted earlier, because of the hierarchy rule for reporting weapons used by the SHR, it is not surprising that the resulting data undercount the use of rifles and shotguns as mass murder weapons. As a final note, while comparable data are not available in the SHR, NIBRS identifies only six firearms as having automatic firing mechanisms.

Table 2. Weapons Used in Mass Murder Events, SHR (*N* = 298) and NIBRS (*N* = 87).*

Weapon	SHR		NIBRS	
	Count	Percent	Count	Percent
Handgun	132	44.30	32[a]	32.99
Rifle	23	7.72	8	8.25
Shotgun	15	5.03	5	5.15
Firearm, type not stated	29	9.73	17[b]	17.53
Knife or cutting instrument	27	9.06	11	11.34
Blunt objects	8	2.68	3	3.10
Personal weapons	5	1.68	1	1.03
Fire	31	10.40	7	7.22
Other	8	2.68	6	6.19
Unknown	20	6.71	7	7.22
Total	298	99.99	97	100.02

*Percentages that do not add up exactly to 100 are a result of rounding error.

Overall, the numbers for other weapons in Table 2 are mostly similar. Knives or other cutting instruments are used as weapons in approximately 10% of the mass murders reported in the SHR and NIBRS. The only other weapon identified in a significant percentage of cases is fire, although it is identified as a weapon in 10% of the mass murders found in the SHR versus 7% in NIBRS. Not surprisingly, both blunt objects and personal weapons are rarely the weapons used in mass murders, undoubtedly because of the difficulty of killing several people with these less lethal means. The category of "Other" includes poisoning, suffocation, and other means that are rarely used in mass murders or other homicides.

The primary difference in weapons used in mass murders between SHR and NIBRS data is the identification of type of firearm. The pattern of findings supports our contention that the limitation on number of weapons that can be reported in SHR along with the hierarchy rule that give primacy to firearms of unidentified type is the explanation for this difference. NIBRS data on weapons used in mass murders are more valid and should be used for evaluations of interventions designed to affect the use of particular types of weapons in shooting incidents, regardless of the number of victims.

Table 3, which provides detailed information on the location of these events, demonstrates the further importance of mass murder data provided through NIBRS. Consistent with Duwe (2007), the media's emphasis on mass killings occurring in public locations and schools delivers a distorted perspective on the circumstances surrounding these tragic events. Instead of about 50% located in residences or homes as Hickey (2013) predicted, however, 62% of the mass killings (54 of 87) between 2001 and 2010 covered by NIBRS occurred in residences and homes. Although a few of these events may be related to drugs or other felonies, we suspect that most are family

Table 3. Location of Mass Murder Events, NIBRS 2001-2010.*

	NIBRS	
Mass murder location	Count	Percent
Residence/home	54	62.1
Highway/road/alley	14	16.1
School/college	3	3.4
Bar/nightclub	2	2.3
Commercial/office building	2	2.3
Hotel/motel	2	2.3
Convenience store	1	1.1
Department/discount store	1	1.1
Parking lot/garage	1	1.1
Restaurant	1	1.1
Other/unknown	6	6.9
Total	87	99.8

*This percentage does not add up exactly to 100 due to rounding error.

annihilations or domestic disputes with a high number of victims and a disproportionate number of women and children that account for the majority of mass murders in the United States.

In contrast to the predominance of mass killings in private locations, only three events occurred in schools and colleges, with a total of nine occurring in business and commercial locations. Of course, it is important to remember that these low numbers are not the totality of school shootings or those in business/commercial locations during this period. Some shootings will not be included because they transpired in jurisdictions that do not report data to NIBRS; others will not appear in a list of mass murders because the fatalities were fewer than four. Most of the school shootings in a more inclusive list compiled by the NYPD have fewer than four victims (Kelly, 2010).

Interestingly, the second highest number of incidents ($N = 14$) occurred in locations designated as "highway/road/alley," indicating that approximately 16% of mass murders occur in easily accessible public spaces. This location for mass murders has received little attention from the media or researchers and is worthy of further scrutiny.

The utility of the detailed data on location of the incident provided by NIBRS is shown in Table 4. Remember that the public stereotype of the typical mass murderer is that of a White man, but our data show that Black men are slightly more likely to be perpetrators of these crimes. Duwe (2007) has analyzed media biases in the level of coverage dependent on various characteristics of mass murder incidents and demonstrated that familicides are much less likely to be covered than other types of mass murder. Table 4 displays the race of the offender by the type of location of the incident, categorized as Private (residences/home and hotel/motel), Public (other identified

Table 4. Race of Offender and Location of Mass Murder Events, NIBRS 2001-2010.

Race of offender(s)	Location			
	Private	Public	Other/unknown	Total
White	19	9	6	34
%	56	26	18	100
Black	26	12	0	38
%	68	32	0	100
White/Black	2	1	0	3
%	67	33	0	100
Other	2	1	0	3
%	67	33	0	100
Total	49	23	6	78
%	63	29	8	100

Note. A chi-square analysis was not run on these data because of the low frequency counts in several cells.

locations from Table 3), and Other/Unknown. The primary finding is that two thirds of mass murders committed by Blacks, mixed race pairs, and other races occur in private locations, but the corresponding number for White perpetrators is 56%. Thus, Whites are more likely to commit mass murders in locations that attract a higher level of media attention than are Blacks. This relationship is worthy of more in-depth attention, but our primary purpose in including this preliminary analysis in the present article is to underscore the advantages researchers gain by utilizing NIBRS as a data source for studies of many aspects of mass murder.[7]

Discussion

As detailed above, media coverage of mass murders provides important information about how particular events unfold, but frequently are wrought with errors, even after the immediacy of the incident has passed. Overall, media also provide a distorted view of mass murderers and their victims (Duwe, 2007). Once official data are examined, specifically the SHR and NIBRS, it is clear that certain types of incidents, especially those involving Black offenders and victims, those occurring at private residences/homes, and those committed in open areas such as highways, roads, or alleys are systematically overlooked by the national media.

Based on the results obtained from official data sources for 2001 through 2010,[8] it is obvious that these data present a different picture of mass murder in the United States than is available in the media. According to the media, mass murder offenders would be predominantly young, White men, although the current analyses and Duwe (2007) present evidence suggesting that the media bias concerning race may reflect

differences in the types of incidents involving Black and White perpetrators. These data agree that men are more likely than women to commit mass murder. However, they indicate an age range among mass murder offenders that is broader than expected, with one offender under 10 years old and others reaching the 71-to-80-year-old category. As expected, however, official data indicate that the majority of offenders are between 21 and 30 years old.

The most significant difference between the media portrayals of mass murderers and official data sources is that offenders are more likely to be Black men rather than White males. The data available in NIBRS show an important difference between the official location of mass murder events and media portrayals of these incidents as well. More than 60% of the mass murders occurring between 2001 and 2010 were located at residences distantly followed by those taking place on highways, roads, or alleys.

The primary limitations for this study are related to available data sets. NIBRS data are limited to those states and jurisdictions that report using this system. As shown, however, NIBRS data on offenders and victims that are available are not significantly different from SHR data that covers the vast majority of the U.S. population. Thus, to more completely cover the United States, we have employed the Brady Campaign data set to add qualitative descriptions of mass murder incidents that occurred from 2005 onward, and the SHR to double check the comprehensiveness of the NIBRS data. None of these databases appear to add cases if more people die after the initial incident, thus, existing data provide a conservative estimate of mass murder incidents, defined as events resulting in four or more deaths. Also note that the Brady Campaign database includes only those mass murders resulting from shootings. Mass murders caused by explosives, fire, and so on are not available from this source.

While we argue that the level of detail provided by NIBRS makes it the preferred choice for mass murder data from law enforcement sources, we also need to supplement it with media accounts to gain a more complete understanding of these tragic events. No existing databases provide information on the perpetrator's motivation or background, their family and occupational status, or recent losses, for example, job termination, academic failure, divorce, which may trigger a mass killing. Many of these pieces of information are more likely to be included in law enforcement case files that, unfortunately, have not generally been accessible to researchers. The greater geographical coverage provided by the SHR offers an advantage over NIBRS, but its serious data limitations pertaining to weapons and locations limit its relevance for understanding the parameters of mass murders as well as for contributing to current debates over firearms. SHR does provide a useful resource for identifying mass murders not found in NIBRS, but media information will be required to fill the gaps. Unfortunately, as noted above, media coverage of mass murders often is contradictory and inaccurate. The gradual expansion of the NIBRS system to cover a greater percentage of the population would offer a long-term solution for this problem.

If NIBRS coverage of the population were 100%, there still would be considerable gaps in our understanding of mass murders. Published law enforcement data provide answers concerning some questions including who—the race, gender, age, and number of victims and offenders; how—the weapons used in these murders; when—the

date and time of the killings; and where—the location(s) of the offense(s). They do not include antecedent data about the trajectories that lead some individuals to purposely take the lives of several individuals, in many cases persons who were unknown to them. Of particular relevance would be knowledge of triggering events that lead some individuals to purposefully take the lives of several people. Similarly, the targets for some types of mass murderers, family annihilators for example, may be expected, but others choose public locations, for example, shopping malls, movie theaters, schools. Among a multitude of these locations in most communities, understanding why one is chosen over others is elusive. Yet, increasing our understanding of triggering events, target selection, and other elements of mass murders will be required for further prevention and risk mitigation efforts that should be the ultimate goal of research.

Detailed information pertaining to mass murders that possibly may be used to develop prevention programs is in many cases available only in the investigative and prosecutorial files for specific mass murders. Again, law enforcement agencies often have been hesitant to provide access to these files to non-law enforcement personnel. Similarly, the medical community has been reticent to share information about patients' mental health histories. Although some researchers have been pessimistic about the possibility of identifying likely perpetrators before an event (Duwe, 2007), the analysis of detailed data from multiple sources may lead to the development of improved risk assessment procedures for identifying those individuals who are potential candidates for committing mass murder from the vast majority of people who experience setbacks and crises but are able to cope without resorting to violence. Considering the rarity of these events and their dispersal over a wide geographical area involving numerous jurisdictions, systematic access to these files probably could only be obtained through the auspices of a national effort, such as one led by the Department of Justice or the Department of Homeland Security. Calls for this level of cooperation have been made by others (Dowden, 2005), and the development of evidence-based programs to reduce the incidence of mass murders will require the development and continuation of this type of collaborative relationship between national-level law enforcement agencies and researchers.

Possible interventions expected from the analyses of mass murder events include whether there needs to be a systematic investigation into these cases at the federal level. Some cases are suspected of being related to terrorism, for example, the recent Boston bombing, one of the FBI's top priorities. Another possibility we offer is a review of the definition of mass murder. The cases included in the Brady Campaign and NYPD databases show that there are many incidents with two or three people killed and others injured, as well as other combinations of victims, that have characteristics and trajectories that are almost identical to those ending with four or more fatalities.

Building on the work of Fox and Levin (1998), future research efforts may include quantitative analyses of these data at the city or county levels to provide a better understanding of the larger context in which mass murders occur. These analyses would allow for a more detailed comparison of different types of mass murders with each other, and of mass murders with other types of homicide.

Declaration of Conflicting Interests

Funding

Notes

1. The National Summit on Mass Casualty Shootings was held in response to a series of mass murders beginning with the one in Aurora, Colorado, in August 2012. Ironically, the meeting at FLETC ended on December 13, the day before the mass shooting at Newtown, Connecticut. The killings at Sandy Hook Elementary School on December 14 became the final spark that ignited a national debate on gun control and mental health initiatives as measures with the potential to reduce the number of mass murders and/or their body counts. As of July 1, 2013, five states had passed comprehensive legislation designed to accomplish these goals.
2. The term *official data* is used to refer to criminal incidents reported to law enforcement agencies. These data are generally compiled annually and subsequently forwarded to the FBI's Uniform Crime Reporting Program for collation, tabulation, and distribution to the public. Obviously, there may be differences with other data sources including incidents that do not come to the attention of the police.
3. The UCR Summary Reporting System (commonly referred to as UCR or SRS), the SHR, and the NIBRS Program are all components of the FBI's Uniform Crime Reporting Program. Each of these reporting systems, among other topical collections, compile and report data pertaining to crimes reported to the police, but they differ in their scope and definitions of included or excluded data elements since each collection is designed for different purposes. Detailed information pertaining to both current and historical aspects of these data collection efforts are provided by the FBI (2013d). A potential source of data on mass murder external to law enforcement is the National Violent Death Reporting System (NVDRS) that allows linkage of violent deaths in the same incident and provides data on demographic characteristics of the offenders and victims as well as the victim–offender relationship. Like NIBRS, NVDRS is only available for a non-representative sample of states, but there are other limitations. NVDRS lacks detailed information on several incident characteristics available in NIBRS. Furthermore, the NVDRS has significant restrictions on it use to preserve confidentiality (Centers for Disease Control, 2013).
4. Google was used to search for media sources on each mass murder in NIBRS by entering the name of the state; the month, day, and year of the incident; and the number killed (e.g., Utah 02/12/2007 5 killed [the shootings at Trolley Square]). The words "mass murder," "shooting," and so on were then cycled into the basic entry until results were obtained.
5. Much of the data employed here were originally designed to provide information on police workloads pertaining to offenses reported and arrests made by the police; using these police data sets for more detailed research purposes was not the original intent. As such, hurdles in both measurement and analysis are inevitable when seeking answers to more detailed questions about the nuances of these crimes. See Lynch and Jarvis (2008) and Bennett and Lynch (1990) for additional discussion of this issue and similar ones pertaining to using secondary police and crime data for research purposes.

6. NIBRS indicates whether the death of the offender is the reason for a clearance by exceptional means but does not distinguish between suicide and homicide.
7. We thank an anonymous reviewer for the suggestion to examine the relationship between race of offender and location.
8. Previous studies of mass murder do not cover the same period as the current one.

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