Towards a National Definition and Database for Nonfatal Shooting Incidents

Natalie Kroovand Hipple

Abstract After a decades-long decline, criminal gun violence has increased dramatically in many parts of the USA. Most victims survive their gunshot wounds; however, research and data collection focus primarily on fatal events. In fact, there is no official national definition of a nonfatal shooting incident, nor a repository of these data. This definitional oversight inhibits data-informed policy and practice. The current study involves two data sources: fatal and nonfatal shooting incidents recorded in an internal metropolitan police database and official Uniform Crime Reporting (UCR) violent crime data. Shooting incidents in the police database were matched to incidents in the UCR data to determine how they were officially categorized and reported to the FBI. The majority (82.0%) of nonfatal shooting incidents in the UCR data were recorded as Aggravated Assault—Gun, while 16.5% were classified as a violent crime other than an Aggravated Assault—Gun. The UCR data were missing 1.5% of the nonfatal shooting incidents documented by the police database. Almost four-fifths (79.7%) of all Aggravated Assault—Gun incidents in the UCR data did not meet the suggested definition of a nonfatal shooting incident. Overall, official crime statistics are not a good data source for nonfatal shooting incidents. A holistic response to criminal gun violence requires comprehensive, valid, and reliable data collection on all shooting incidents, especially those incidents in which a person is injured by gunfire. Establishing a national definition for a nonfatal shooting incident is the first important step toward effective gun violence prevention and reduction.

Keywords Nonfatal shooting · Gun violence · Firearm violence · Data sources

Background

Many American cities are experiencing an increase in violent crime rates after a decades-long decline. Federal Bureau of Investigation (FBI) data for 2020 indicate the largest single-year increase in homicides since record keeping began in 1960 ($n = 4901$). More than three-quarters (76.7%) of all homicides in 2020 were committed with a firearm.[1] The Centers for Disease Control and Prevention (CDC) National Center for Health Statistics has released provisional figures showing an increase in the homicide rate from 5.8 per 100,000 people in 2019 to 7.5 per 100,000 in 2020 [1]. However, gun violence data are persistently deficient in accuracy and reliability. According to a recent NORC report, "the current firearms data

N. K. Hipple (✉)
Department of Criminal Justice, Indiana University, 1033 East Third Street, 309 Sycamore Hall, Bloomington, IN 47405, USA
e-mail: nkroovan@indiana.edu

environment is disordered and highly segmented" [2, 3]. That is, there is no single source for gun violence data, making empirical research difficult and susceptible to error.

Comprehensive responses to gun violence require detailed data on all shooting incidents—something current systems are unable to provide [4]. There are efforts underway to strengthen criminal justice data sourced from law enforcement by retiring the FBI Uniform Crime Reporting (UCR) Program's Summary Reporting System to transition to the National Incident-Based Reporting System (NIBRS). However, NIBRS does not completely alleviate some of the definitional issues with the UCR related to gun violence, and importantly, agencies are slow to adopt reporting to NIBRS.[2] These facts leave end-users with two discrete systems that do not capture the nuances of gun violence and therefore do not meet their needs.

Available Gun Violence Data Sources

A 2020 report by Roman identifies six categories of data sources: national crime and justice databases, public health databases, population-level survey data, federal justice system survey data, nonprofit and private policy data, and integrated data. Each has limitations. For example, medically sourced datasets maintained by federal agencies are not linked to each other, such as the Nationwide Emergency Department Sample (NEDS),[3] the Nationwide (Nationwide) Inpatient Sample,[4] and the CDC's Web-based Injury Statistics Query and Reporting System (WISQARS).[5] Moreover, the reliability of WISQARS data has been challenged in recent years, particularly the national nonfatal gun injury estimate [5]. In fact, the CDC [6] reports that these data are one of several categories that are potentially unreliable and unstable, in part because of small sample sizes and/or coefficients of variation larger than 30%.

Another problematic example is the gun violence data gathered by independent advocacy groups like the Gun Violence Archive, which collects and validates data mainly from open sources, providing links to each incident source.[6] These data are updated daily but the representativeness of the data is unknown [2]. While crime, particularly homicide, is a routinely newsworthy topic, the extralegal incident characteristics are what drive newsworthiness or elevate certain incidents into the media spotlight. These characteristics include the number of victims and the victim demographics, including race and gender intersections. For example, incidents involving multiple victims, younger victims, and victims and offenders of different genders receive more news coverage [7].

Finally, reliability is also at issue in national crime databases, most of which are populated by local law enforcement agencies. These databases include the FBI UCR, begun in 1930, and its recent successor, the NIBRS.[7] The FBI UCR is the most widely used and cited database for crime statistics, including gun-related crimes. Law enforcement agencies voluntarily collect and report UCR data either directly to the FBI or through their state's UCR program.[8] These data systems are supposed to contain all crimes known to law enforcement, rather than a sample. Yet there is no category for nonfatal shootings in the UCR. The missing category does not mean nonfatal shootings are omitted from the UCR; they are just difficult to disentangle. At this writing, law enforcement agencies should be transitioning to the NIBRS; however, nonfatal shootings are still *not* considered a crime category in this new system, nor is there a validated way to extract nonfatal shooting incidents from the data. While the NIBRS provides more comprehensive documentation of all incidents involving a firearm, it is unclear whether it is accounting of nonfatal shooting incidents and victims will prove to be more reliable than the UCR's data.

Researchers have identified several threats to the reliability of UCR data. The UCR counts one offense type per incident according to the Hierarchy Rule,

---

2 https://crime-data-explorer.app.cloud.gov/pages/home
3 https://www.hcup-us.ahrq.gov/nedsoverview.jsp
4 https://www.hcup-us.ahrq.gov/news/exhibit_booth/nis_brochure.jsp
5 https://www.cdc.gov/injury/wisqars/index.html

6 https://www.gunviolencearchive.org/methodology
7 Without belaboring the drawbacks of the UCR (see Strom & Smith, 8), it is enough to say that the FBI created the NIBRS to address the weaknesses of the UCR. In 2016, the FBI announced that it would sunset the UCR Summary Reporting System on January 1, 2021, and transition to the exclusive use of the NIBRS.
8 https://www.fbi.gov/services/cjis/ucr

which means that many offenses and/or victims are undocumented in official crime statistics. For example, a robbery incident in which someone is robbed of their wallet and shot—and their car stolen—is reported to the UCR as a Robbery, the highest offense in the Hierarchy. At the same time, the Aggravated Assault and Vehicle Theft, both ranked lower in the Hierarchy, are not recorded at all. The NIBRS, on the other hand, allows for multiple offenses per incident, which means that all three offenses are reported and recorded. Nonetheless, the nation's law enforcement agencies have been slow to transition from the UCR to the NIBRS [9, 10] for many reasons.

Definitional Issues

The criminal justice system has focused on intentional acts of gun violence.[9] However, for a more holistic understanding of gun violence, Hipple, Huebner, Lentz, McGarrell, O'Brien [11] suggest a taxonomy of criminal gun violence that is organized according to the severity of the injury: from homicides at one end of the spectrum to aggravated assaults with a gun (without injury) at the other. Most extant research centers on homicide incidents only. The documentation of gun homicide is rendered reliable and valid by the use of clear definitions categorizing the killing of one person by another and the community's willingness to report such incidents [12–14]. Still, homicides are rare [15], and recent work suggests that most firearm assaults are nonfatal [11, 16–18].

Definitional issues are further compounded by the absence of a single valid and reliable data source for gun violence [11, 19]. Recent work by Booty, O'Dwyer, Webster, McCourt, Crifasi [19] notes the lack of a single database for mass shootings: The authors call on researchers to advocate for a single clear and consistent definition for a mass shooting so that the phenomenon can be accurately and reliably examined in the broader context of gun violence.

Scholars have proposed a definition of a nonfatal shooting incident that includes two key components: (1) the fact of the injury; and (2) the source or cause

of the injury [17, 20, 21]. That is, a nonfatal shooting incident must first result in an injury to a person—a wound caused by a firearm. Nonfatal shooting incidents that do not result in a gunshot wound injury (i.e., shoot and miss or "shots fired") are excluded from the definition. Absent widespread acoustic gunfire detection systems, a reliable measure of such instances would be difficult. For example, research in high crime areas of St. Louis revealed that community members only reported gunfire incidents to law enforcement less than one-third of the time [22]. Second, a gunshot wound is defined as a penetrating injury caused by a projectile from a weapon with a powder discharge or explosive [23]. The federal criminal code (18 U.S. Code § 921(a)(3)) informs the definition of a firearm. These firearms, as defined, are crime drivers, cause the most harm, and are subject to the most state and federal regulations. Within this definition of a nonfatal shooting incident, there should be subcategories for criminal and noncriminal shootings as determined by the presence or absence of intent.

Criminal shootings require the intent to harm another person and are the focus of law enforcement. Both the UCR and the NIBRS define an aggravated assault "as an unlawful attack by one person upon another for the purpose of inflicting severe or aggravated bodily injury" [24, 25]. Self-inflicted and accidental nonfatal shootings do not meet this definition due to the lack of intent to harm another. Similarly, shootings ruled to occur in self-defense are not unlawful (i.e., not criminal). While nonfatal gun violence drives violent crime in the majority of urban jurisdictions [11, 16], noncriminal nonfatal shootings are overwhelmingly the result of poor gun handling practices [26].

In summary, current gun violence measurement systems are limited. Public health data focus on outcomes related to morbidity and mortality, but these data are siloed and difficult to link to each other or to criminal justice data. They are also, typically, not comprehensive; rather, they are samples or designed for public health surveillance. Criminal justice data sources, by contrast, provide important contextual information not available in public health data, but are not designed for research purposes [27]. These limitations are compounded by the lack of a valid and reliable definition of a nonfatal shooting incident. Without a specific crime category for a nonfatal shooting that

---

[9] While death by suicide and suicide attempts are classified as gun violence, they are not considered criminal incidents. So they are not the focus of the criminal justice system. No valuation in this manuscript of the importance of one type of gun violence over another should be implied.

includes the definition of a nonfatal shooting injury, data end-users (researchers, policymakers, practitioners, etc.) are forced to rely on the official UCR category Aggravated Assault-Gun (along with Homicide) to create a complete accounting of shooting victims. The reliability and validity of this category as a measure of nonfatal shootings are unknown.

The goal of this exploratory study was to examine the similarities and differences in the categorization of criminal nonfatal shooting incidents as they appear in two datasets: (1) an internal police database of nonfatal shooting incidents maintained by the Indianapolis Metropolitan Police Department (IMPD); and (2) official UCR-classified violent crime incidents. It is important to examine the comparative overlap of the two datasets and document the potential missingness.

Methods

The IMPD established a definition for a nonfatal shooting incident in 2014 as part of an effort to build its organizational capacity to analyze and respond to firearm violence. As previously noted, a nonfatal shooting incident must involve at least one person who is intentionally shot by another person and who receives and survives a penetrating gunshot wound.[10] Using this definitional framework for shooting incidents, the IMPD began maintaining an internal nonfatal shooting database in 2014 capturing detailed incident and victim information in collaboration with the author as a research partner. Using data sourced from internal police documents and official crime data, I examined discrepancies in the recording of nonfatal shooting incidents in Indianapolis, Indiana, in an attempt to determine the reliability and validity of the official source.

The Site

Indianapolis is an appropriate site for this research: Both the historic and the current rates of homicides and violent crime are higher than the national average [28]. The homicide rate in Indianapolis is consistently higher than the national average, with between 17 and 18 homicides per 100,000 people since 2015, increasing significantly in 2020 to 24 homicides per 100,000 people. By contrast, the national average has hovered at around five homicides per 100,000 people since 2015 [28],[11]. Indianapolis also experienced a record-high number of criminal homicides (i.e., murders) in 2020 ($n = 214$), more than 90% of them committed with a firearm. Recent work shows that gun crime is most prevalent in Indianapolis in areas of concentrated disadvantage [11, 21, 29] The IMPD—the largest law enforcement agency in the State of Indiana—is authorized to employ 1743 sworn officers. However, like most law enforcement agencies across the nation, they have not been fully staffed with sworn officers for many years.

Data Sources

The IMPD collaborates with a research partner to capture data surrounding all nonfatal shooting incidents that meet its established definition, maintaining the data in an internal database, herein called the IMPD Shooting Database.[12] The IMPD data collection process involves three steps.

First, the police are notified that a shooting has occurred. Nonfatal shooting incidents come to the attention of the IMPD in one of two ways: (1) when a community member calls 911 for assistance; or (2) when a healthcare worker notifies the police. Like most states, Indiana requires physicians or health care facilities to report injuries by a weapon (e.g., gunshot wounds) to local law enforcement [30]. In this way, the police should be notified about a shooting victim in Indianapolis in

---

[10] For this study, each nonfatal shooting victim was still alive when the data were extracted and analyzed. UCR and NIBRS classification policy dictates that incidents in which the victim initially survives but later dies from gunshot wound-related injuries should be reclassified from the original crime type to a homicide. This reclassification can occur days, weeks, or years after the original incident date. Homicides are recorded as occurring on the date of death.

[11] The 2020 national homicide rate was not available as of this writing. As suggested by the provisional number given above, however, it is expected to increase to more than six per 100,000 people.

[12] This data collection is distinct from the federally required UCR/NIBRS crime reporting process.

Fig. 1 Total gun homicide and nonfatal shooting incidents by year and type
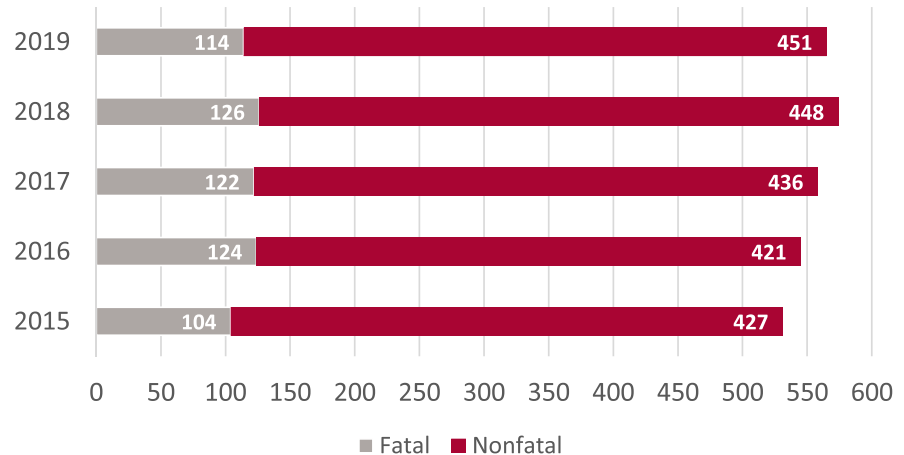
most instances, even if the victim or bystanders choose not to call 911.[13]

Second, after the reporting officer confirms that a person has been shot, an aggravated assault detective is dispatched to take over the investigation. IMPD Investigations Division procedures dictate that the lead detective must complete an internal document with incident and victim details, along with a short narrative describing the incident. The data collected from these internal documents populate the IMPD Shooting Database.

Third, the research partner reads each document and enters all relevant data into the IMPD Shooting Database. The IMPD and the research partner conduct monthly audits, looking for missing or misclassified incidents and victims. To ensure statistical accuracy surrounding all criminal shooting incidents in which a person is shot, homicides in which the mechanism of death is a firearm are also entered into the IMPD Shooting Database, as reported to the research partner by an IMPD Homicide Unit supervisor.

The first dataset includes all criminal nonfatal ($n=1913$) and criminal fatal ($n=511$) shooting incidents occurring between January 1, 2015, and May 31, 2019, and recorded in the IMPD Shooting Database ($N=2424$).[14] Multiple victim (i.e., offense) incidents

that include both nonfatal and fatal victims (offenses) are included twice—once for each type of incident. Nonfatal shooting incidents consistently occur between three and five times more often than fatal shooting incidents. During the study period, there were nearly four nonfatal shooting incidents, on average, for every fatal shooting incident (mean=3.7 to 1). Figure 1 displays total gun homicide and nonfatal shooting incidents by year for 2015 through 2019.[15]

The second dataset includes violent crime incidents occurring from January 1, 2015, through May 31, 2019, that were released to the FBI (for UCR data) as official statistics. These include Murder, Rape, Robbery, and Aggravated Assault. UCR data are sourced from IMPD incident reports as follows. The reporting officer designates the initial crime category. Incident reports are then reviewed by IMPD UCR Unit officers, who examine the report narratives and case management notes for each incident, as well as other parts of the report, to affirm the accuracy of the crime category selected by the reporting officer. The UCR Unit will reclassify incidents that do not follow the specific guidelines for each crime category as set forth by the *Uniform Crime Reporting Handbook*.[16] UCR data submitted to the FBI are deemed the most reliable entries possible based upon the information available in the case reports at the time they were reviewed. These data include unique

---

[13] While most gunshot wounds are serious wounds and require medical attention, it is possible that an individual may not seek formal medical attention for a minor gunshot wound; therefore, the IMPD would not be aware of the incident.

[14] IMPD changed its records management system in June 2019. This change affected how official crime statistics were captured and reported to the FBI going forward. The reliability of data before and after the change could not be determined, thereby limiting the data source to a less traditional time construct.

[15] This figure includes the full-year data for 2019. The analysis included incidents through May 31, 2019, only.

[16] https://ucr.fbi.gov/additional-ucr-publications/ucr_handbook.pdf

Table 1 Violent crimes by year reported to the FBI

Violent crime	2015		2016		2017		2018		2019*		Total
	n	%	n	%	n	%	n	%	n	%	N
Murder	135	1.1	150	1.2	146	1.2	155	1.3	49	1.2	635
Robbery	3350	27.3	3539	27.9	3122	25.5	2700	22.9	1012	24.6	13,723
Rape	665	5.4	654	5.2	659	5.4	679	5.8	256	6.2	2913
Aggravated Assault	6125	49.8	6314	49.8	6297	51.4	6238	52.9	2803	68.0	27,777
Total	12,290	100.0	12,673	100.0	12,241	100.0	11,790	100.0	4120	100.0	45,048

*January 1 through May 31

Table 2 Aggravated assault by weapon type and year reported to the FBI

Aggravated assault	2015		2016		2017		2018		2019*		Total
	n	%	n	%	n	%	n	%	n	%	N
Gun	1613	19.8	1748	21.0	1692	20.4	1733	21.0	942	33.6	7728
Hands, fists	1493	18.3	1565	18.8	1697	20.4	1614	19.5	594	21.2	6963
Knife	735	9.0	757	9.1	740	8.9	686	8.3	286	10.2	3,204
Other Weapon	2284	28.1	2244	26.9	2168	26.1	2205	26.7	981	35.0	9882
Total	8140	100.0	8330	100.0	8314	100.0	9256	100.0	2803	100.0	27,777

*January 1 through May 31

case numbers that can be matched against data from the IMPD Shooting Database. Table 1 displays the aggregate violent crime categories and corresponding frequencies by year for the UCR data. Aggravated assaults (i.e., all types) comprised the majority of violent crime incidents (61.7%) during the study period. Table 2 displays all the specific aggravated assault categories during the study period. The most common kind of aggravated assault involved "other weapons." Aggravated assaults involving a gun accounted for almost 28% of all aggravated assaults.

Analytic Strategy

The goal of the analysis was to examine all incidents that met the IMPD-designated definition for a nonfatal shooting incident and determine how those incidents were classified in official UCR data. To begin with, all shooting incidents in the IMPD Shooting Database, nonfatal and fatal, were linked to UCR incidents using the police incident report case number. The IMPD Shooting Database file was used as the primary file. All case numbers in the IMPD Shooting Database were matched to case numbers in the UCR dataset, creating a single dataset. The next

step was to determine how many cases matched and how they were classified in the UCR file. Additionally, cases from the IMPD Shooting Database that showed no matches in the UCR file were examined.

Results

As previously mentioned, homicide statistics are one of the most valid and reliable crime measurements (Loftin et al., 32). Thus, I began with an initial check for data reliability and validity using gun homicide incidents from the IMPD Shooting Database and found substantial congruence in the UCR data. There were six (1.2%) fatal shooting incidents, or homicides, in the IMPD Shooting Database that could not be immediately matched to the UCR data.[17]

[17] One of these turned out to have a case number with transposed digits, the result of a clerical error. Three others were found to be artifacts of the reporting methodology. That is, these are cases in which the victim did not die on the same day the incident occurred and/or the incident was ruled a homicide at a later date (see footnote i). The IMPD Shooting Database is continually updated; however, once UCR data are reported, they are not updated. The remaining two incidents (0.4% of fatal shooting incidents) were missing from the UCR file.

Fig. 2 IMPD shooting database incidents matched to the UCR file

- Aggravated Assault – Gun
- Other Crime Type
- Missing

1,569
82%

315
16.5%

29
1.5%

N = 1,913 Incidents
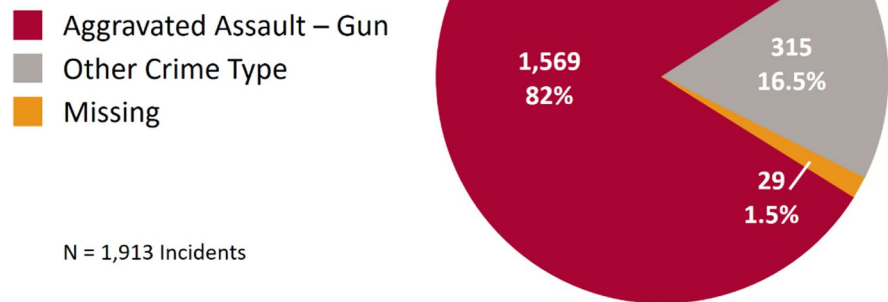
Next, I compared the nonfatal shooting incidents from the IMPD Shooting Database to the UCR file that included Aggravated Assault—Gun as a specific subcategory of aggravated assaults.[18] The Aggravated Assault—Gun category is commonly used to measure the incidence of criminal gun violence because these data are easily retrievable and can be used for comparison across different cities. This category can include a wide variety of incidents—the requirement for inclusion in this category is the use or implied use of a firearm. ("Use" of a firearm does not mean that the firearm has been discharged, only that the firearm is present.)

A total of 7728 Aggravated Assaults—Gun (Table 2) in the UCR file, which constitutes 27.8% of all aggravated assaults, were reported to the FBI during the study period. More than 79% ($n = 6159$) of the incidents recorded in the UCR file as an Aggravated Assault—Gun did not match incidents in the IMPD Shooting Database—that is, they did not meet the proposed definition (i.e., that used by IMPD) of a nonfatal shooting incident. This finding most likely means that, while a gun was present during the assault, the victim did not sustain a penetrating injury caused by a firearm. Examples include someone who was shot at, but not hit; a victim who was

pistol-whipped[19]; an incident in which a firearm was aimed but not fired; or an injury that was caused by something else, like flying glass or other debris. It is also possible that the gun was a BB gun or a flare gun and therefore did not meet the federal definition of a firearm. The finding that more than 79% of the UCR incidents were not considered nonfatal shooting incidents according to the IMPD Shooting Database illustrates the definitional differences between the two data files—not issues with data collection or reliability. The UCR definition of an Aggravated Assault—Gun casts a wide net for incidents that should be reported in that category; therefore, the IMPD collects those data as guided by the definition and the reporting handbook.

The last step was to determine in what category the 1913 nonfatal shootings in the IMPD Shooting Database were classified in the UCR file. Figure 2 displays how the incidents from the IMPD Shooting Database matched the UCR file. The majority of the 1913 nonfatal shooting incidents in the IMPD Shooting Database—82.0% ($n = 1569$)—were classified as an Aggravated Assault—Gun. Twenty-nine incidents (1.5%) were missing from the UCR file. Therefore, 315 (16.5%) nonfatal shooting incidents were classified as some other type of violent crime.

Figure 3 displays how the incidents that did not match as an Aggravated Assault—Gun ($n = 315$) were classified. A total of 278 incidents, or 14.5% of

---

[18] Nineteen incidents in the IMPD Shooting Database had duplicate records in the UCR file. In each instance, there was a correct classification of the incident according to the Hierarchy Rule and a second, incorrect classification of the incident. The incorrect duplicate entries were excluded from the analysis.

[19] To pistol-whip is to hit or strike someone with a firearm, i.e., use a firearm as a blunt object rather than fire it.

Fig. 3 Nonfatal shooting incidents not matching to aggravated assault—gun
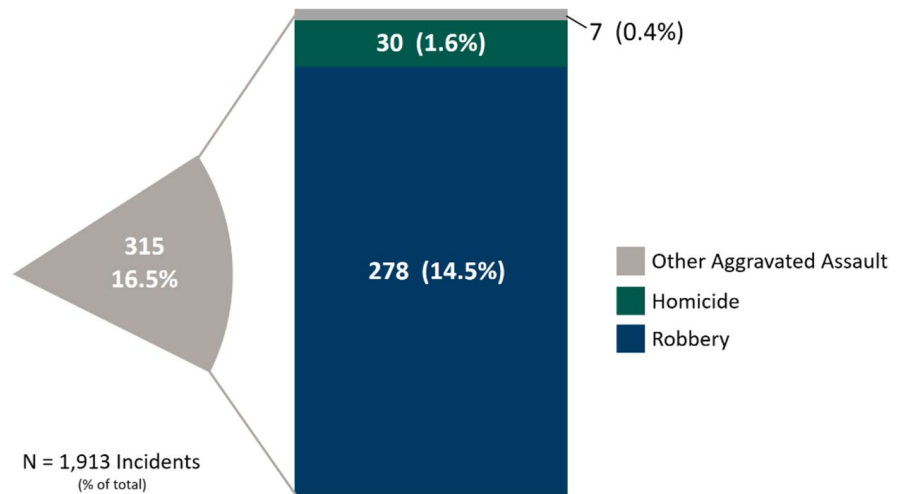
all nonfatal shooting incidents, were categorized as a Robbery.[20] This classification would indicate that someone was shot during the course of a robbery—for example, when someone shoots a cashier while robbing a convenience store. These incidents are indeed categorized correctly according to the Hierarchy Rule: a robbery is a more serious offense type than an aggravated assault; therefore only the robbery is recorded. Nearly 15% of all nonfatal shooting incidents occur during a robbery—they are not simply shooting incidents. The 30 incidents (1.6%) that were classified as homicides involved at least one fatal and one nonfatal victim.[21] Here again, the UCR dictates that only one crime type, the most serious crime type, be recorded for each incident.

Discussion

Criminological and public health research demonstrates that gunshot wound victims survive more often than not [11, 17, 18, 31]. Moreover, gun crime is not random and can spread in epidemic proportions throughout populations and communities [33, 34]. It is not unusual for nonfatal shooting victims to be involved in subsequent shooting incidents as either a shooter or a victim [35–37]. These analyses document the difficulty in using official crime data as a valid and reliable source to examine the nuances of gun-involved crime incidents, particularly incidents in which a person was shot but survived. A comprehensive response to gun violence requires the collection of detailed data about all shooting incidents—not just those that result in death. Thus, the inability to isolate nonfatal shooting incident data to inform policy and practice, absent time-intensive manual procedures, hinders an effective response to gun violence—and especially prevention and intervention efforts [4].

Prior research suggests that official police data provide a more complete record of nonfatal firearm assaults than other official data sources [38–40]. However, law enforcement records management systems are designed to collect and report only those fields that are required. Law enforcement agencies should therefore be encouraged, if not mandated, to collect data specific to nonfatal shootings. Such a mandate would require a single definition for the nonfatal shooting victim, and this definition should be employed at the federal level with the NIBRS program. I suggest starting from the definition presented herein: A nonfatal shooting incident requires a surviving victim who has experienced a penetrating wound caused by a projectile from a weapon with a powder discharge or explosive as defined by federal law. This definition is clear and can be applied easily. Requiring law enforcement agencies to specify the intent of the shooting, criminal or noncriminal, is important

---

[20] Robbery includes Attempted and Armed.
[21] These incidents were classified correctly according to the UCR Hierarchy Rule.

as well because it will broaden the applicability and usefulness of the data and better inform the choice of prevention and intervention strategies.

Rather than advocating that the FBI create a new crime category, a simple solution to this challenge would be, instead, to require more injury detail for gun assaults as part of an agency's NIBRS submission. Again, the FBI is in the process of replacing the UCR system with the NIBRS. This transition, and the elimination of the Hierarchy Rule, will make the isolation of nonfatal shooting data easier within the Aggravated Assault—Gun category and should prevent nonfatal shooting incidents from "getting lost" in other crime types, most commonly Robbery and Homicide, as suggested by this work.

However, even a full transition to the NIBRS by law enforcement agencies sooner rather than later will not fully address the data issues surrounding nonfatal shooting incidents. There is no way to make historical UCR data comparable to NIBRS data. There will be no way to avoid using UCR data for trend analyses, or for example, as a counterfactual in panel studies. Additionally, like UCR data, NIBRS data still does not allow end-users to identify nonfatal shooting victims in isolation—a similar issue with mass shooting data, as noted by Booty, O'Dwyer, Webster, McCourt, Crifasi [19]. That is, the NIBRS does not specify whether the firearm was discharged during the incident and whether a victim was struck by a bullet [41]. The injury categories in the NIBRS include apparent broken bone, possible internal injury, severe laceration, apparent minor injury, other major injury, loss of teeth, and unconsciousness [25]. Multiple injuries can be reported; therefore, adding a clearly defined gunshot wound category does not seem overly burdensome. Requiring specificity about the injury and mechanism would allow data end-users to isolate nonfatal shooting data. Because the transition to the NIBRS is a slow process, now is the time to make these changes at the federal level (i.e., to the NIBRS) to minimize the additional burden on law enforcement agencies.[22]

Another suggested change relates to reporting. Currently, 47 states require medical personnel to report serious injuries to law enforcement, including gunshot injuries [30]. The remaining states—Alabama, New Mexico, and Wyoming—should consider enacting these laws. The manner of injury (accidental, intentional, or criminal) is irrelevant and would therefore capture all facets of gun violence, including suicide. Recent research suggests that some individuals do not report their shooting victimization to the police even though they have been seriously injured [21]. However, penetrating gunshot wounds are usually (but not always) traumatic physical events resulting in injuries that require medical attention [42]. This change would mean that if someone presents at an emergency department with a gunshot wound, medical personnel must call the police. The police would go to the emergency department and document the incident with a police incident report—an official record of the incident—and in most cases, a follow-up investigation minimally to determine if the patient was a crime victim. The important step of requiring medical personnel to contact police so they may investigate the root cause of the shooting injury addresses misclassification issues with surveillance data systems like the NEDS [42]. It also ensures that accidental and self-inflicted shootings are not omitted from police records as suggested by Cook (43). As a part of their response, law enforcement agencies should be required to report nonfatal shooting incidents according to the suggested definition. This process and the subsequent data submission to the NIBRS will create a *single comprehensive data source* for criminal gun violence rather than surveillance data or samples. The lack of a single data source on gun violence [2] has long frustrated researchers and practitioners. While the topic is outside the scope of this discussion, the process could also be modified so that law enforcement data are the basis for all gun violence data, including noncriminal incidents.

However, because most law enforcement agencies are not required to report a nonfatal shooting as a nonfatal shooting, they are unable to report them upon request. This fact is important because, generally speaking, the records management systems of law enforcement agencies are designed to record data they must in turn report to the federal government. Unlike many law enforcement agencies, the IMPD makes a concerted effort to document nonfatal

---

[22] In June 2021, the FBI's Criminal Justice Information Services Advisory Police Board recommended two changes to the NIBRS to facilitate capturing nonfatal shooting victims. The first would add gunshot wound as an injury category for victims; the second would capture whether a firearm was discharged and the intent of the shooter (intentional, accidental, during the commission of a crime (Parker, 2021).

shooting incidents, and while the process is time-intensive, they have developed the IMPD Shooting Database as an internal mechanism for collecting valid and reliable nonfatal shooting data. Other law enforcement agencies across the country could adopt this method or develop their own, based on a standard definition.

Limitations

This study examined criminal nonfatal shooting incidents that occurred in a single law enforcement jurisdiction. Generalization to other law enforcement agencies and communities may not be possible. The State of Indiana requires the reporting of gunshot wound victims to law enforcement, and it is therefore likely that these data accurately represent the population of shooting incidents for the study period [39]. However, some of the nonfatal shooting victims may have chosen not to seek medical help. Other nonfatal shooting victims may have sought medical care outside of the IMPD's jurisdiction without reporting the incident location accurately—which means that the IMPD would not have been notified. Additionally, these data did not include noncriminal nonfatal shootings like accidental shootings, self-inflicted shootings, and shootings in self-defense. The IMPD Shooting Database could ultimately be an undercount of actual nonfatal shootings. Finally, as indicated by the missing homicide incidents in the UCR file, crime data can change over time. The UCR file was not updated after submission to the FBI, while the IMPD Shooting Database is continually updated and audited for accuracy, and these actions may have influenced some of the findings. Importantly, a standard definition of a nonfatal shooting would help minimize this issue. Finally, this study was limited to UCR Summary Reporting System data, a data artifact that is quite common for law enforcement agencies in 2021. While the NIBRS has existed since the early 1990s, states and law enforcement agencies have been slow to make the transition, with only 57% of agencies reporting NIBRS data as of August 2021.[23] Future research should take an approach similar to that which is presented here, examining NIBRS data to determine the ability of end-users to extract nonfatal

shooting data for incidents in which there is a surviving victim who experiences a penetrating wound caused by a projectile from a weapon with a powder discharge or explosive as defined by federal law.

Conclusion

Nonfatal shooting incidents comprise the majority of gun violence incidents. A holistic response to criminal gun violence requires comprehensive, valid, and reliable data collection for all shooting incidents, especially those in which a person is shot, as must any measurement of reduction efforts. The current data systems are deficient. These findings indicate that law enforcement has the potential to provide comprehensive, accurate, and reliable gun violence data, but the current official data environment makes it difficult for police jurisdictions to aggregate these data in a way that is appropriate and accessible for research purposes. Establishing a national definition for a nonfatal shooting incident is the first and perhaps most important step. This definition will not replace the current crime types in the NIBRS; rather, it will speak specifically to injury type and allow police, policymakers, researchers, and others to focus their efforts on the people, places, and circumstances surrounding these incidents.

References

1. Ahmad FB, Cisewski JA. *Quarterly provisional estimates for selected indicators of mortality, 2019–Quarter 1, 2021.* National Center for Health Statistics. National Vital Statistics System, Vital Statistics Rapid Release Program; 2021. https://www.cdc.gov/nchs/nvss/vsrr/mortality-dashboard.htm.
2. Roman JK. *The state of firearms data in 2019.* Chicago, IL: NORC at the University of Chicago; 2020.
3. Roman JK, Cook PJ, editors. *Improving data infrastructure to reduce firearms violence*. Chicago, IL: NORC at the University of Chicago; 2021.
4. Parker ST. Estimating nonfatal gunshot injury locations with natural language processing and machine learning models. *JAMA Netw Open*. 2020;3(10):e2020664–e2020664.
5. Campbell S, Nass D, Nguyen M. The CDC is publishing unreliable data on gun injuries. People are using it anyway. *FiveThirtyEight*. 2018;2018. https://fivethirty

eight.com/features/the-cdc-is-publishing-unreliable-data-on-gun-injuries-people-are-using-it-anyway/. Published 10/04/2018. Accessed December, 27, 2018.

6. Centers for Disease Control and Prevention. Definitions for Nonfatal Injury Reports. https://www.cdc.gov/injury/wisqars/nonfatal_help/definitions_nonfatal.html#advancedstatistics. Published 2019. Accessed June, 30, 2021.

7. Gruenewald J, Pizarro J, Chermak SM. Race, gender, and the newsworthiness of homicide incidents. *J Crim Just*. 2009;37(3):262–72.

8. Strom KJ, Smith EL. The future of crime data. *Criminol Public Policy*. 2017;16(4):1027–48.

9. McCormack PD, Pattavina A, Tracy PE. *Assessing the coverage and representativeness of the national incident-based reporting system. Crime Delinq*. 2017;63(4):493–516.

10. Parker ST. Measuring gun violence using police data. In: Roman JK, Cook PJ, editors. Improving data infrastructure to reduce firearms violence. Chicago, IL: NORC at the University of Chicago; 2021. p. 56–80.

11. Hipple NK, Huebner BM, Lentz TS, McGarrell EF, O'Brien M. The case for studying criminal nonfatal shootings: evidence from four Midwest cities. *Justice Eval J*. 2020;3(1):94–113.

12. Black DJ. Production of crime rates. In: Black DJ, editor. *The manners and customs of the police*. New York, NY: Academic Press; 1980. p. 65–84.

13. Jackson PG. Sources of data. In: Kempf K, editor. *Measurement issues in criminology*. New York, NY: Springer Publications; 1990.

14. National Research Council. *Firearms and violence: a critical review*. Washington, DC: The National Academies Press; 2005.

15. Piquero AR, MacDonald J, Dobrin A, Daigle LE, Cullen FT. Self-control, violent offending, and homicide victimization: assessing the general theory of crime. *J Quant Criminol*. 2005;21(1):55–71.

16. Cook PJ, Braga AA, Turchan BS, Barao LM. Why do gun murders have a higher clearance rate than gunshot assaults? *Criminol Publ Policy*. 2019;18(3):525–51.

17. Hipple NK, Magee LA. The difference between living and dying: victim characteristics and motive among nonfatal shooting and gun homicides. *Violence Vict*. 2017;32(6):977–97.

18. Kalesan B, Adhikarla C, Pressley JC, et al. The hidden epidemic of firearm injury: increasing firearm injury rates during 2001–2013. *Am J Epidemiol*. 2017;185(7):546–53.

19. Booty M, O'Dwyer J, Webster D, McCourt A, Crifasi C. Describing a "mass shooting": the role of databases in understanding burden. *Inj Epidemiol*. 2019;6(1):47.

20. Huebner BM, Hipple NK. *A nonfatal shooting primer*. Washington DC: Police Foundation; 2018.

21. Hipple NK, Thompson KJ, Huebner BM, Magee LA. Understanding victim cooperation in cases of nonfatal gun assaults. *Crim Justice Behav*. 2019;46(12):1793–811.

22. Huebner BM, Lentz TS, Schafer JA. Heard shots—call the police? An examination of citizen responses to gunfire. *Justice Quarterly*. 2020:1–24.

23. Beaman V, Annest JL, Mercy JA, Kresnow M-J, Pollock DA. Lethality of firearm-related injuries in the United States population. *Ann Emerg Med*. 2000;35(3):258–66.

24. Federal Bureau of Investigation. Crime in the United States, 2012: aggravated assault. United States Department of Justice. https://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2012/crime-in-the-u.s.-2012/violent-crime/aggravated-assault. Published 2013. Accessed July, 3, 2019.

25. Federal Bureau of Investigation. *Criminal Justice Information Services (CJIS) Division Uniform Crime Reporting (UCR) Program National Incident-Based Reporting System (NIBRS) User Manual*. Washington, DC: U.S. Department of Justice Federal Bureau of Investigation, Criminal Justice Information Services Division; 2013.

26. Reynolds AE. *Nonfatal shootings: a comparison of unintentional and criminal incidents* [Unpublished doctoral dissertation]. In: University of Indianapolis; 2021.

27. Alison LJ, Snook B, Stein KL. Unobtrusive measurement: using police information for forensic research. *Qual Res*. 2001;1(2):241–54.

28. Federal Bureau of Investigation. Crime in the United States, 2018. United States Department of Justice. https://ucr.fbi.gov/crime-in-the-u.s/2018/crime-in-the-u.s.-2018/topic-pages/violent-crime. Published 2019. Accessed June, 21, 2021.

29. Magee LA. Community-level social processes and firearm shooting events: a multilevel analysis. *J Urban Health*. 2020.

30. Victim Rights Law Center. *Mandatory reporting of non-accidental injuries: a state-by-state guide (updated May 2014)*. Boston, MA: Victim Rights Law Center; 2014.

31. Fowler KA, Dahlberg LL, Haileyesus T, Annest JL. Firearm injuries in the United States. *Prev Med*. 2015;79:5–14.

32. Loftin C, McDowall D, Curtis K, Fetzer MD. The accuracy of supplementary homicide report rates for large US Cities. Homicide Studies. Chicago, IL: NORC at the University of Chicago, 2015;19(1):6-27.

33. Papachristos AV, Wildeman C, Roberto E. Tragic, but not random: the social contagion of nonfatal gunshot injuries. *Soc Sci Med*. 2015;125(1):139–50.

34. Zeoli AM, Pizarro JM, Grady SC, Melde C. Homicide as infectious disease: using public health methods to investigate the diffusion of homicide. *Justice Q*. 2014;31(3):609–32.

35. Berg MT, Stewart EA, Schreck CJ, Simons RL. The victim–offender overlap in context: examining the role of neighborhood street culture. *Criminology*. 2012;50(2):359–90.

36. Jennings WG, Piquero AR, Reingle JM. On the overlap between victimization and offending: a review of the literature. *Aggress Violent Beh*. 2012;17(1):16–26.

37. Fox AM, Novak KJ, Van Camp T, James C. Predicting violent victimization using social network analysis from police data. *Violence Vict*. 2021;36(3):436–54.

38. Kaufman EJ, Passman JE, Jacoby SF, et al. Making the news: victim characteristics associated with media reporting on firearm injury. *Prev Med*. 2020;141:106275.

39. Magee LA, Ranney ML, Fortenberry JD, Rosenman M, Gharbi S, Wiehe SE. Identifying nonfatal firearm assault incidents through linking police data and clinical records: cohort study in Indianapolis, Indiana, 2007–2016. *Prev Med*. 2021;149:106605.

40. Post LA, Balsen Z, Spano R, Vaca FE. Bolstering gun injury surveillance accuracy using capture–recapture methods. *J Behav Med*. 2019;42(4):674–80.

41. United States Department of Justice. *2019 national incident-based reporting system user manual.* Washington, DC: U.S. Department of Justice, Federal Bureau of Investigation, Criminal Justice Information Services Division; 2018.

42. Barber C. Improving the capacity of hospital ED data systems to track nonfatal firearm injuries. In: Roman JK, Cook PJ, editors. *Improving data infrastructure to reduce firearms violence*. Chicago, IL: NORC at the University of Chicago; 2021. p. 18–56.

43. Cook PJ. Comprehensive data on gun violence: current deficits, needed investments. In: Roman JK, Cook PJ, editors. *Improving data infrastructure to reduce firearms violence*. Chicago, IL: NORC at the University of Chicago; 2021. p. 8–17.