Police Use of Force Databases:
Sources of Bias in Lethal Force Data Collection

Christian Andrew Walkup

Thesis submitted to the faculty of the Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of
Master of Science
In
Sociology

Ashley V. Reichelmann
Theresa Rocha Beardall
James Hawdon

April 26, 2021
Blacksburg, Virginia

Keywords: lethal force, data triangulation, bias, police, data collection, legal intervention

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ABSTRACT

Understanding police use of lethal force requires the collection of reliable data. Due to bias present in police-use-of-lethal-force databases, researchers typically triangulate using multiple data sources to compensate for this bias; however, triangulation is restricted when the bias present in each database is unknown. This study investigates three government-funded and three independent police-use-of-lethal-force databases to identify methodological sources of bias present in the major U.S. data-collection systems. Bias was coded based on nine categories, including misclassification bias, broad conceptualization, narrow conceptualization, overlap bias, coverage bias, voluntary response bias, observer bias, gatekeeping bias, and self-report response bias. Findings suggest that all six databases had at least three different types of methodological bias present. Generally, public, government-sponsored databases exhibit bias through data self-reporting by law enforcement and varying victim race determination methods. Private databases reveal bias through media-based reporting and the triangulation of data from multiple sources, which is further complicated by lack of transparency in the databases' design and administrative procedures. All six databases have a unique position to the State, which should also inform researcher data selection. I argue that selecting data sources that complement each other based on these identified biases will produce a more complete image of police-use-of-lethal-force and enhance finding accuracy in future research.

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GENERAL AUDIENCE ABSTRACT

Understanding incidents where a civilian dies due to the actions of police officers requires the collection of reliable data. Due to bias—flaws in the data collection methods or data presentation—which lead to varying results when using different databases, researchers typically use multiple data sources to make up for these flaws; however, this method is restricted when the bias present in each database is unknown. This study investigates three government-funded and three independent police-use-of-lethal-force databases to identify sources of bias present in the major U.S. data-collection systems. Findings suggest that all six databases had at least three different types of flaws present. Generally, public, government-sponsored databases exhibit bias through police self-reporting lethal force, where an officer's department reports the officer's actions and there is no individual or group outside of the police reporting these incidents. Additionally, there is a flaw in how police record the race of a victim, who dies through police use of lethal force; Varying procedures in how race is recorded, whether recorded based on the officer's opinion or where a victim self-reports their own race prior to death on a government data system such as the Department of Motor Vehicles, also impacts the race data included in public databases. Private databases reveal bias through collecting incident data from news reports and using data from multiple sources such as law enforcement reports, medical examiner reports, and media reports simultaneously; this is further complicated by lack of transparency in the databases' design and administrative procedures, where there are no documents detailing the steps databases take in collecting and presenting data. All six databases have a unique position to the U.S. Government, where some are funded by the Government and where some are motivated by recent high profile police killings, which should impact researcher data selection. Ideally, the databases used should hold multiple perspectives or positions to the Government to provide an more complete image of lethal force. I argue that selecting data sources that complement each other based on these identified biases will produce a more complete image of police-use-of-lethal-force and enhance finding accuracy in future research.

ACKNOWLEDGEMENTS

I would like to acknowledge the consistent hard work from my committee. Dr. Ashley Reichelmann, Dr. Theresa Rocha Beardall, and Dr. James Hawdon have been critical in the execution and completion of this thesis. Additionally, I would like to acknowledge Dr. Micah Roos for providing support in the compilation of my datasets.

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INTRODUCTION

Police use of force is inherent in the role of law enforcement, mainly, due to its ability to deliver people to legitimate forms of social coercion such as the courts (Bittner 1970). While use of force actually functions on a continuum – ranging from police presence and verbal commands and extending to lethal force – the most prominent questions about use of force have often centered around its disproportionate use on African Americans. Within the United States, ongoing racial disparities in many aspects of life present the question of how use of force varies by the civilian's race. In order to answer this question, we must first collect and disseminate reliable data regarding police use of force. With persisting high-profile police killings of Black Americans, researchers have experienced a dilemma with the lack of available or reliable data when trying to determine if and to what extent race impacts police use of force. While a single source of reliable data would be ideal, researchers use triangulation to develop a comprehensive image of lethal force. In order to aid in this triangulation, I will identify the different sources of bias present in current data collection programs to allow future end-users to more efficiently triangulate data in a way that minimizes the effects of bias.

This manuscript will address methodological components of police use of lethal force data collection. Due to the wide range of actions that could fall under the use of force continuum as well as the pertinent discussion about lethal force, I will limit the scope of this manuscript to only analyze lethal use of force data collection. My primary research question is what types of biases are present in different databases that claim to track lethal force used by police officers. In order to highlight the impacts of these biases, I will use count data to show the differences in raw numbers of lethal force incidents as well as the percentage of African American victims

accounted for by the differing datasets. Then, I will define the range of bias potentially present in databases, before itemizing those present within each database.

The main takeaways and value-added component of this manuscript will be a comprehensive chart of the potential sources of bias in lethal force datasets and how they relate to the current public and private lethal force databases commonly used to assess the levels of lethal force; this will provide researchers with a reference to aid in the triangulation of accurate counts of police use of lethal force. The ability for researchers to have reliable data through triangulation will provide more accurate and defendable data. This data will increase the strength of data-driven arguments that are used in addressing systemic racial disparities in police use of lethal force and, therefore, aid in reducing these disparities. This manuscript will provide a starting point in thinking about an effective data collection method for police use of lethal force by identifying sources of bias across the current widely used data collection programs.

BACKGROUND LITERATURE

Police Use of Force:

Use of force is an integral part of law enforcement, and could be described as the "amount of effort required by police to compel compliance from an unwilling subject" (IACP 2001). In order to compel compliance with normative expectations of society, the government has limited forceful compliance to police officers – mainly, as a feature of an arrest, where force is used to subdue someone in order to deliver that person to a legitimate form of social coercion such as the courts (Bittner 1970). Many law enforcement agencies implement use of force as a continuum – a series of escalating actions used by law enforcement officers to resolve a situation. A typically structured use of force continuum would escalate in this fashion: 1) officer presence, 2) verbalization, where force is not physical, 3) empty-hand control, which could consist of "soft touch" to include grabs, holds, or joint locks, or "hard touch" to include strikes, punches, or kicks, and 4) intermediate weapons which could include impact weapons such as batons, chemical weapons such as oleoresin capsicum spray (OC or pepper spray), and conducted energy devices (CEDs) such as Tasers. The most extreme point on the use of force continuum is lethal force (NIJ 2009).

Lethal or "deadly" force is any "force which a reasonable person would consider likely to cause death or serious bodily harm" (Use of Deadly Force 2016). Lethal force is often thought to be limited to the use of firearms, but could also include other implements of force such as high risk choke holds or intermediate weapons targeted at critical areas like the head or neck. Lethal force expands the scope of tools that law enforcement can use to legitimately compel individuals to comply with normative expectations of society. However, in the instance of lethal force, the role of force is not to aid in arrest and the delivery of law breakers to the court system. Given the

expectation of death when using lethal force, there is no expectation that a law breaker will ever be delivered to the courts. Police have been tasked with serving as legitimate enforcers of social norms in the most extreme and permanent way.

While these are general descriptions of use of force and the use of force continuum, the decentralized structure of policing in the US means that the approximate 18,000 individual law enforcement agencies (as of 2016) have some role in determining their own use of force policies and practices (Banks et al. 2016a). The decentralized nature of policing impacts the ability to collect consistent data on the issue, a point I will discuss in the following sections.

Race and Use of Force:

As with many aspects in the administration of justice, there is an assumption of equal treatment and protection under the law. Police use of force is no different. Within the United States, this equal execution of policing has been called into question by outcries from both media coverage of police brutality on Black bodies and a well-documented body of research attesting to a racial disparity in police-caused homicides (Harris 2020; Januta et al. 2020; Laughland 2020; Thompson 2021). Drowos, Hennekens and Levine (2015) found that rates of police-caused homicide were higher among Black or African American people with a rate of .24 per 100,000 compared to White people who experience a rate of .11 per 100,000. Similarly, another study found that victims of death due to lethal force by law enforcement were majority White persons (52%) but disproportionately Black persons (32%), who had a fatality rate 2.8 times higher than Whites (DeGue, Fowler and Calkins 2016). Additionally, Edwards, Hedwig and Esposito's work (2019) supported this assertion, finding that Black men were roughly 2.5 times more likely to be killed by police over the life course than White men.

However, these findings differ slightly and use different datasets pooled across different

years, which reasserts the question: Is this due to the difference in data collection methods? With recent high profile use of lethal force incidents on Black bodies such as George Floyd (2020) and Breonna Taylor (2020), researchers must ask how and why there appears to be a disparity in lethal force. To answer this question, researchers must have reliable data. Reliable data collection and analysis are fundamental to understand racial disparities in police use of lethal force, measure levels with respect to race, and provide accurate recommendations in addressing these injustices.

Use of Lethal Force Data Collection:

Traditionally, use of force research has relied on publicly funded, government facilitated data sources. Three commonly used sources are the Supplemental Homicide Reports (SHR) from the FBI's Uniform Crime Report, the CDC's National Vital Statistics System (NVSS), and the CDC's National Violent Death Reporting System (NVDRS). The two available public national reporting systems with publicly accessible data– the SHR and the NVSS – have been shown to underreport the number of police-caused homicides. SHR has been shown to underreport through agency nonresponse when agencies fail to file the forms, as well as through improper or incomplete information when agencies do file reports (Loftin et al. 2003). The NVSS's underreporting has been attributed to certifiers failing to indicate police involvement on the death certificate; with no mention of police involvement, the death is attributed to homicide (Loftin et al. 2003). While the NVDRS was not implemented on a national level prior to 2018, it has shown promise in delivering a more accurate count of lethal force incidents (Barber et al. 2016). A previous study found that the NVDRS records identify over twice the amount of lethal force incidents that the SHRs do and identify 71% more incidents than the NVSS (Barber et al. 2016). This is likely because the NVDRS triangulates data from multiple sources to include death

certificates, coroner/medical examiner reports, and law enforcement reports, which provide more accurate data for participating states (DeGue, Fowler and Calkins 2016).

In addition to these functioning data collection programs, the FBI began national use of force data collection from law enforcement agencies in 2019. Due to a lack of voluntary participation by law enforcement agencies, aggregate data has not yet been published. While this program may assist in reliable data collection, the prospect of using this data in the near future appears to be bleak: the FBI requires data from agencies to represent 80 percent or more of the total officer population in order to release this aggregate data (FBI 2020). Voluntary agency participation in FBI data collection has been shown to be a major source of underreporting in what could be considered the United States' "official," State-funded, law enforcement data collection program. The decentralized structure of policing in America allows for individual agencies to decide if they wish to report, and presents a barrier in determining reliable measures for police use of lethal force with respect to race.

Due to concerns in underreporting and difficulty in accessing official lethal force incident data, there has been a move towards privately funded and organized data collection. Databases such as Fatal Encounters (FE), the Mapping Police Violence Project (MPV), and the Washington Post's Fatal Force (FF) collect data on police-involved deaths through public records and media coverage that are then confirmed by independent researchers. The Bureau of Justice Statistics has endorsed this collection method as providing reliable data on police-involved mortality and has proposed a redesign of the Arrest-Related Deaths Program in line with this method (Banks et al. 2016b). Using one of these non-traditional data sources, a previous study found that 8% of all homicides with adult male victims were attributed to police-caused homicide, instead of the 4% attributed using official public data (Edwards, Esposito and Hedwig 2018).

Multiple Measures & Triangulation:

When improving a singular measure is not feasible, the use of multiple measures can decrease the amount of error that masks the true image of what is occurring. By comparing and contrasting multiple measures, a more comprehensive image of what is occurring is possible (Garner and Maxwell 2006).

For example, the U.S. Department of Justice uses two data collection programs to measure crime in the U.S.: the FBI's Uniform Crime Reporting Program (UCR) and the Bureau of Justice Statistic's National Crime Victimization Survey (NCVS). The UCR compiles data on crime counts, trends, persons arrested and their demographics, law enforcement personnel, and the characteristics of homicides (Planty and Langton 2014). Prior to the creation of the National Crime Survey (NCS) in 1973, which was redesigned and relabeled as the NCVS in 1992, the UCR had a substantial flaw: the dark figure of crime. The dark figure of crime, first coined by Adolphe Quetelet in 1832, refers to crime that is not reported or recorded by law enforcement agencies (Berlinski 2009). The UCR relies on reports from law enforcement agencies and cannot account for unreported crime. The NCVS filled UCR's underreporting gap caused by its method of data collection. The NCVS supplemented understandings and estimates of crime in the United States through victimization surveys, which can capture unreported incidents. This is shown with 2015 data, where the UCR showed "forcible rape" rising 6%, while the NCVS showed an increase in "rape/sexual assault" by an estimated 52% (NCJRS 2017); while the definitions for these categories may vary, this shows that the NCVS provides supplemental information that is not included in the UCR, because it is not captured by its data collection method. It is important to note that while this is one example of multiple measures' ability to produce a more comprehensive image, this example is by no means supposed to be comprehensive in explaining

why the UCR underreports crime and does not presume that the NCVS is a cure-all and has accounted for all nonreported crime and victimization.

Founded on the laws of trigonometry, triangulation is a method to determine a fixed point when other points are known (UNAIDS 2010). In the 1970s, triangulation was adopted into the context of sociology, where Norman Denzin identified four types of triangulation: (1) data triangulation, (2) investigator triangulation, (3) theory triangulation, and (4) methodological triangulation (Denzin 1973). Data triangulation is the use of more than one data source, where findings can be corroborated and data weaknesses can be compensated for by the strengths of other data. Investigator triangulation is the use of more than one investigator, researcher, or, in this case, database facilitators. Investigator triangulation is critical in decreasing bias in the gathering of data. Theory triangulation is the use of more than one theory to explain a phenomenon. Methodological triangulation is the use of multiple methods to study a situation. This is similar to the use of mixed methods in social science, where qualitative and quantitative may be used together in a way where one method may clarify and enhance the results of the other and vice-versa (UNAIDS 2010).

In the context of triangulation of police use of lethal force data, data and investigator triangulation are the most relevant areas this manuscript will address. By identifying bias in data sources, researchers will more effectively be able to choose multiple data sources that complement others and supplement areas where bias leads to the misrepresentation of the true levels through under- or over-counting. Investigator triangulation is relevant when we treat the administrators of the data collection programs as the investigators. By using data compiled through different investigators, this allows us to decrease bias associated with the incentives and restrictions that motivate their data collection design and implementation.

METHODS

Data Sources:

The three main public use of lethal force data sources are the Federal Bureau of Investigation's Supplemental Homicide Reports (SHR), the Center for Disease Control's National Vital Statistics System (NVSS), and the Center for Disease Control's National Violent Death Reporting System (NVDRS). The FBI's Supplemental homicide reports collect additional details for homicides known to law enforcement. As part of the Uniform Crime Reporting (UCR) program, data is collected nationally on a voluntary and annual basis. Publicly available and accessible data sets are available from 1985-2019. The SHR collects data that provides age, sex, race, and ethnicity of the victim and offender; the type of weapon used; the relationship of the victim to offender; and the circumstance surrounding the incident. Pertinent to the topic of this manuscript, the SHR includes information about justifiable homicides, which are defined as "the killing of a felon by a peace officer in the line of duty" or "during the commission of a felony, by a private citizen" (FBI 2020b).

The Center for Disease Control's National Vital Statistics System collects national data on provisional birth, death, marriage, and divorce statistics (CDC 2020). The NVSS houses the "Mortality Multiple Cause Files," which include data for police killings. These files began in 1982 and are currently available through 2019. Lethal force incidents are captured through death certificate classifications, which are codified into the NVSS by the National Center for Health Statistics. The NVSS classifies lethal force incidents as "legal intervention," which is defined by the International Classification of Diseases 10th Revision as "injuries inflicted by the police or other law-enforcing agents, including military on duty, in the course of arresting or attempting to arrest lawbreakers, suppressing disturbances, maintaining order, and other legal action" (WHO

2004).

The Center for Disease Control's National Violent Death Reporting System is a state-based violent death surveillance program and has full-year, publicly accessible data available through the CDC's WISQARS query system from 2003 through 2017. The comprehensiveness of NVDRS data varies depending on year since not all states participated every year prior to 2018. In 2018, the CDC announced expanded funding that would include funding reports from all 50 states, Washington, D.C., and Puerto Rico (CDC 2018). States that receive funding for NVDRS are required to submit de-identified data to the CDC. The NVDRS claims to provide a more detailed image of the circumstances of violent deaths by gathering information from several sources including law enforcement, medical examiners and coroners, toxicology, and death certificates (CDC 2019). The NVDRS classifies lethal force incidents in a similar way to the NVSS by using the "legal intervention" designation.

Three main private databases that capture use of lethal force data are the Fatal Encounters, Mapping Police Violence, and the Washington Post's Fatal Force Database. Fatal Encounters full-year data is available from 2000 through 2020. The database specifically collects occurrences of people who are killed through interactions with police. Fatal Encounters collects data in three ways, listed in order by number of contributions to the database: paid researchers, public records requests, and crowdsourced data. The victim information includes name, age, gender, and race, while the dataset also captures situational information including location, involved law enforcement agency, cause of death, intended use of force, and a media summary of the incident (FE 2019).

Mapping Police Violence data is available from 2013 through 2020. The Mapping Police Violence Project sources information from three crowdsourced databases on police killings: the

previously mentioned, Fatal Encounters database, U.S. Police Shootings Database, and KilledbyPolice.net. After compiling data from these three sources, Mapping Police Violence conducts further research to improve the validity of the data by searching through social media, obituaries, criminal records databases, and police reports. Mapping Police Violence defines a police killing as: "A case where a person dies as a result of being shot, beaten, restrained, intentionally hit by a police vehicle, pepper sprayed, tasered, or otherwise harmed by police officers, whether on-duty or off-duty" (MPV 2020).

The Washington Post's Fatal Force database compiles fatal shooting events in the United States by a police officer in the line of duty. Full-year data is available from 2015 through 2020. In 2015, the Post tracked incident information to include race of the victim, circumstances of the incident, whether the victim was armed, and whether a victim was experiencing a mental health crisis; this information was acquired through news reports, law enforcement websites, and social media, as well as other databases such as Killed by Police and Fatal Encounters. Beginning in 2016, the Post began including the officer's name by successfully submitting Freedom of Information Act requests to police departments. The Fatal Force database limits its collection to shootings in which a police officer shoots and kills a civilian in the line of duty; this requirement was motivated by capturing incidents that resemble the circumstances of the 2014 killing of Michael Brown in Ferguson, Missouri (Tate et al. 2016).

Sample:

The primary sample that will be used to evaluate the presence of biases will be the previously described databases: the FBI's SHR, the CDC's NVSS and NVDRS, Fatal Encounters, the Mapping Police Violence Project, and the Washington Post's Fatal Force. These databases will be used in both a quantitative and qualitative analysis.

Analytic Process:

The quantitative analysis will demonstrate differences in lethal force counts between the databases. To do so, I will utilize three analytical strategies. First, I will determine if the states included in the NVDRS are significantly different than states that are not included. To do this, I will calculate the average rate of lethal force among states included and not included in the NVDRS for the five national databases: SHR, NVSS, FE, MPV, and FF. These rates will be the average of the number of lethal force incidents divided by state population; Census 2017 state population estimates data will be used to account for population. The 36 states included in the 2017 NVDRS are Alaska, Arizona, California, Colorado, Connecticut, Washington D.C., Delaware, Georgia, Iowa, Illinois, Indiana, Kansas, Kentucky, Massachusetts, Maryland, Maine, Michigan, Minnesota, North Carolina, New Hampshire, New Jersey, New Mexico, Nevada, New York, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Utah, Virginia, Vermont, Washington, Wisconsin, and West Virginia. The sample size for NVSS will be less than the other databases as individual state counts were suppressed by the CDC when reporting counts of less than 10; There are 21 states that are not suppressed in the public-use, unrestricted NVSS data that will be used. In order to measure if average rate differences are significant, a two-sample t-test will be conducted for each of the five databases with one sample as states included in the NVDRS and the second as states not included in the NVDRS. The ability to determine the significance of the rate of lethal force in states included and not included in the NVDRS will allow for a justification of why NVDRS data, while failing to have national coverage in 2017, should or should not be compared to national lethal force databases.

A second comparison will use total counts of NVDRS-included states for each database. Using the six databases, this count will show if there are discrepancies between the databases in

levels of lethal force. Additionally, since the primary focus of lethal force outcries have called attention to lethal force disparities among African Americans, I will include the percent of the count that involve an African American victim. This percentage will draw attention to issues of quality rather than quantity in recording race data. A ratio is also calculated by dividing the percentage of African American victims by the percentage of African Americans in the national population. Identifying discrepancies in racial composition will inform a discussion about how race is captured in each of the databases.

A third comparison will use total counts of the five databases with 2017 national coverage: SHR, NVSS, FE, MPV, and FF. This will aid in identifying the scope of discrepancies in lethal force counts on a larger scale. This comparison will exclude the NVDRS as the NVDRS was not conducted in all states in 2017. Finally, if the two-sample t-test shows no significant difference between the mean lethal force rates in the NVDRS and non-NVDRS sample, a rate of lethal force counts based on population will be used for all databases. The rate for SHR, NVSS, FE, MPV, and FF will be calculated by using United States population data, while the NVDRS will use the sum of participating states' population estimates from the 2017 Census population estimates data.

The qualitative analysis will be the primary focus of this manuscript. With the key task of identifying the presence of bias in these databases, I will evaluate the impact of seven types of methodological bias on each database's current methods: misclassification bias, broad conceptualization, narrow conceptualization, double-count bias, coverage bias, observer bias, and gatekeeping bias. The description and method of operationalization of these biases are shown in Table 1.

Table 1: Methodological Bias Descriptions & Operationalizations

Type of methodological bias	*Description*	*Operationalization*
Misclassification bias	This occurs when a database relies on an administrative classification from another organization or party outside of law enforcement to capture an incident such as a police killing.	Is reporting dependent on administrative classifications that rely on information such as death certificate descriptions that note police involvement in death?*
Broad conceptualization	This occurs when a database defines police killings under an umbrella category that could include incidents outside the scope of police killings.	Does the database categorize incidents in a way that includes other actions than police killings such as suicide in the presence of the police and lacks a way to specify the incident as a police killing?*
Narrow conceptualization	This occurs when a database captures police killings in a way that excludes at least some incidents where the outcome was the death of a victim via force from a law enforcement entity.	Are there definition-based restrictions that exclude at least some police killings from being included in the database such as cases that exclude implements of force beside firearms?*
Double-count bias	This occurs when a database records an incident more than once.	Does the database rely on multiple sources that could include the same incidents? If so, do the database administrators have a procedure in place to avoid counting an incident more than once?
Coverage bias	Coverage bias occurs when a database's sources are not composed of data from the entire population. With private actors, this can be when media outlets fail to report incidents in situations where these incidents lack consumer interest or are not covered due to geographical constraints like in rural areas where coverage is sparse. With state actors, this can be when an agency or state fails to report. This could be from a lack of mandatory reporting requirements. This bias produces a sample that is not representative of the population.	Private actors: Is reporting dependent on media outlets identifying and publishing news about lethal force incidents? State actors: Are there non-reporting agencies or states? *Underreporting that is captured by other bias categories are not included. For example, nonrepresentative data due to narrow conceptualization of incidents included does not count towards coverage bias.*
Observer bias	A bias caused by the investigator's subjective perspective, which may influence the objectivity of the data.	What incentives/decentives does the database administrator have in the process of lethal force data collection and where are they placed with respect to the State?*
Gatekeeping bias	This occurs when an organization controls reporting based on ideological grounds or grounds of self-interest. This occurs one level down from observer bias. In the context of media-sourced data, this occurs when data could be unrepresentative due to individuals or entities selecting which stories to report based on the ability to sell a story or control a narrative that aligns with their ideology and self-interest. This is also referred to as agenda bias, where political leaning could impact selection of stories. In law enforcement reporting, this occurs when agencies fail to report due to a lack of incentive and a possibility of increased oversight, repercussions, and liability.	Private actors: Is the database composed of media-sourced data that could be influenced by political or other ideological motivations? State actors: Are database sources self-reporting their own lethal force data or is a third party reporting these incidents?

*Applies to both private and State actors.

FINDINGS

COUNT-DATA COMPARISON:

Table 2 presents a two-sample t-test for the SHR, NVSS, FE, MPV, and FF using a sample of NVDRS reporting states and a sample of states that do not report to the NVDRS. In the public-use NVSS data used, the CDC suppressed counts for 30 states through the Wonder query system to abide by National Center for Health Statistics data use restrictions as these states reported less than ten people (CDC 2021b); Therefore, the total number of states included in the NVSS analysis was 21: 17 NVDRS-included states and four states not-included in the NVDRS. As Table 2 shows, the SHR, NVSS, FE, MPV, and FF showed no significant difference in mean rates of lethal force between states included and not included in NVDRS. Therefore, it is reasonable to compare the NVDRS to databases with national coverage for 2017.

Table 2: Significance test of mean rate of lethal force in SHR, NVSS, FE, MPV, and FF between states included and not included in the NVDRS

Database	Sample	n	Mean rate of lethal force (per 100,000)	SD	DF	t	p
Supplemental Homicide Reports							
	NVDRS	36	.324	.496	49	-1.236	.222
	Non-NVDRS	15	.159	.215			
National Vital Statistics System							
	NVDRS	17	.276	.190	19	-0.935	.362
	Non-NVDRS	4	.184	.072			
Fatal Encounters							
	NVDRS	36	.621	.371	49	0.145	.885
	Non-NVDRS	15	.635	.217			
Mapping Police Violence Project							
	NVDRS	36	.383	.264	49	0.026	.980
	Non-NVDRS	15	.385	.153			
Fatal Force							
	NVDRS	36	.354	.248	49	0.054	.957
	Non-NVDRS	15	.358	.158			

Although the differences in the SHR and NVSS were not statistically significant at a .05 alpha level, the substantive difference in means indicates that we should still pay attention to these important differences. While the alpha levels for the two public, nationally conducted databases, the SHR and NVSS, were greater than a .05 significance level, it should be recognized that p-values are directly related to sample sizes. If we consider the effect size, it is noticeable. That is, the mean rate of lethal force in the 36 NVDRS was approximately twice that found in the non-NVDRS states (.324 vs, .159, respectively). Therefore, despite the p-value not reaching significance, the relatively large difference in means suggests there may actually be substantive differences in reported rates of lethal force between NVDRS and non-NVDRS states in the SHR. The mean difference between these states is less pronounced in the NVSS data, but still more pronounced than in any of the private databases.

Table 3 shows the following: 1) total lethal force counts and the percentage of African American victims for NVDRS-reporting states in the SHR, NVDRS, FE, MPV, and FF; 2) total U.S. lethal force counts in the SHR, NVSS, FE, MPV, and FF; 3) the ratio of percent African American victims in NVDRS-included states to percent African Americans in the national population; and 4) lethal force rates based on the U.S. population for SHR, NVSS, FE, MPV, and FF, and for the NVDRS using the sum of NVDRS-participating state populations. NVSS was excluded from the NVDRS sample counts due to CDC data suppression. The NVDRS was excluded from the total U.S. count as it did not have national coverage in 2017.

Table 3: Lethal force counts & percent African American victims

Database	NVDRS sample: Total Count	NVDRS sample: % African American	NVDRS sample: % African American victim / % African American in national population (.133)	United States: Total count	Lethal force rate (per 100,000)
Supplemental Homicide Reports	562	7.8%	.586	682	.210
National Vital Statistics System	*	*	*	589	.181
National Violent Death Reporting System	557	24.6%	1.850	**	.233
Fatal Encounters	1283	23.1%	1.737	1766	.543
Mapping Police Violence Project	782	23.7%	1.782	1091	.336
Fatal Force	706	22.2%	1.669	986	.303

***:** Data suppressed by CDC due to too few case count
**: Unavailable as NVDRS was not conducted nationally in 2017

There was a 726 count difference between the highest reporting database (FE) and the lowest reporting database (NVDRS) in the NVDRS sample (36 states previously mentioned). There was a 16.8% difference in percentage of African American victims in the NVDRS sample with the highest percentage found in NVDRS and the lowest percentage found in SHR. Ratios of percent African American victims to percent African Americans in the national population range from 1.669 in FF and 1.850 in the NVDRS with the exception of SHR at .586. The SHR data supports that African Americans are underrepresented in lethal force incidents, where the remaining databases support that Africans Americans are overrepresented in lethal force incidents. In total U.S. lethal force counts, there was a 1,117 count difference between the highest reporting database (FE) and the lowest reporting database (NVSS). In lethal force rates, there was a .362 per 100,000 difference between the highest reporting database (FE) and the lowest reporting database (NVSS). These findings demonstrate varying levels of captured police

use of lethal force between SHR, NVSS, NVDRS, FE, MPV, and FF and support the need to understand how methodological bias impacts these levels.

METHODOLOGICAL BIAS:

Table 4 presents the biases that are present in each database. Following Table 4 is a detailed explanation of these findings separated by bias category, and then the findings on the quality of data on race collected by each database. Specifically, I explore how race is captured in each database and how race is determined during initial reporting to the databases.

Table 4: Methodological bias present in SHR, NVSS, NVDRS, FE, MPV, & FF

	Misclass-ification bias	Broad Conceptual-ization	Narrow Conceptual-ization	Double-count bias	Coverage bias	Observer bias	Gatekeep-ing bias
Supplemental Homicide Reports				X	X	X	X
National Vital Statistics System	X	X				X	
National Violent Death Reporting System					X	X	X
Fatal Encounters				X	X	X	X
Mapping Police Violence Project				*	X	X	X
Fatal Force			X	*	X	X	X

X: Bias is present
*: Unable to determine based on lack of available information
Note: Fewer types of bias present within a database does not indicate a database is more accurate or reliable. This table does not indicate how great of an impact each bias has within a database.

Misclassification bias:

Misclassification bias occurs when a database relies on an administrative classification from another organization or party outside of law enforcement to capture an incident such as a police killing.

Misclassification bias is present only in the NVSS. The NVSS captures mortality data, which is derived from death certificates. The coroner or medical examiner populates the death certificate with manner and causes of death for the jurisdiction in which an incident occurs. Then, the funeral director completes the demographic section before it is filed with local health officials and the state vital statistics registry. The state registry forwards the data to the National Center for Health Statistics, where cause of death is coded as "legal intervention." Legal intervention can only be assigned if police involvement is explicitly mentioned on the death certificate. While a coroner or medical examiner report will typically mention police-involvement, this information is not always mentioned on the death certificate and can lead to a misclassification as homicide, rather than legal intervention (Barber et al. 2016).

This issue is resolved in the other public-health oriented database, the NVDRS, because state-level abstractors code information using not only the death certificate, but also the coroner or medical examiner's report and the police report (Barber et al. 2016).

The other databases do not have misclassification bias. SHR do not rely on a third-party administrative classification of the incident. SHR are classified internally by police departments prior to submitting to the FBI. FE, MPV, and FF do not solely rely on any one reporting method, which limits the effect that misclassification by a third party could have on the data.

Broad conceptualization:

Broad conceptualization occurs when a database defines police killings under a category that could include incidents outside the scope of police killings. Specifically, when a definition of lethal force includes actions other than police killings and where the database does not have a way for researchers to specify incidents to only include police killings.

Broad conceptualization is found primarily in the NVSS. Legal intervention is defined as "any injury sustained as a result of an encounter with any law enforcement official, serving in any capacity at the time of the encounter, whether on-duty or off-duty" and includes injury to law enforcement officials, suspects, and bystanders. While this blanket definition may be useful in some research projects, the inability to specify the circumstances of the incident, outside of the specific implement of force, presents a barrier to researchers focusing on questions of police use of force. For example, the definition for legal intervention includes incidents where a law enforcement official is on- or off-duty and includes when the person sustaining the injury, is the suspect or bystander, but also includes when the injury-sustaining person is another law enforcement official in cases of fratricide (WHO 2004). The inability for the data to provide detailed answers to the specificity of if the death was a result of force highly restricts its usefulness.

Broad conceptualization is also found to some extent in an initial review of the NVDRS and SHR's general definitions, but variables within these datasets allow for clarification and distinguishment of incident details. For example, even the public-use NVDRS data through the WISQARS query system allows researchers to "specify relationship of victim to suspect" by restricting the search to "victim injured by law enforcement officer" (CDC 2021b). The NVDRS also specified its use of legal intervention to "a death in which the decedent was killed by a law enforcement officer or other peace officer (persons with specified legal authority to use deadly force), including military law enforcement, acting in the line of duty" (CDC 2015). Additionally, the SHR allows for justifiable homicide to be separated into two categories: 1. "Felon killed by private citizen" 2. "Felon killed by police" (FBI 1990). SHR defines justifiable homicide committed by police as "the killing of a felon by a peace officer in the line of duty" (FBI 2021b).

This implies that justifiable homicides categorized by "felon killed by police" only includes instances where an officer was acting in the line of duty.

FE and MPV also capture a broad range of incidents, but enable people to specify their searches through the inclusion of descriptions of the incidents. Fatal Encounters collects data on "all deaths that happen when police are present or that are caused by police: on-duty, off-duty, criminal, line-of-duty, local, federal, intentional" as well as accidental deaths (FE 2020). MPV classifies a police killing as "a case where a person dies as a result of being shot, beaten, restrained, intentionally hit by a police vehicle, pepper sprayed, tasered, or otherwise harmed by police officers, whether on or off duty" (MPV 2021). FE and MPV include a written description of the incident, which allows researchers to categorize incidents depending on their needs such as whether an officer was on- or off-duty and whether the suspect died from physical force or suicide. This description does allow for specification, but would require researchers to perform additional work, such as creating new variables from qualitative data to specify components of an incident.

FF does not experience broad conceptualization as it is limited to incidents, where "a police officer, in the line of duty, shoots and kills a civilian – the circumstances that most closely parallel the 2014 killing of Michael Brown in Ferguson, Mo." (Tate et al. 2016).

Narrow conceptualization:

Narrow conceptualization occurs when a database captures police killings in a way that excludes at least some incidents where the outcome was death of a victim via force from a law enforcement entity.

Narrow conceptualization is found only in the Washington Post's Fatal Force database. FF only documents incidents, where "a police officer, in the line of duty, shoots and kills a civilian – the circumstances that most closely parallel the 2014 killing of Michael Brown in Ferguson, Mo." (Tate et al. 2016). This specification restricts researchers in evaluating use of lethal force, as lethal force is not dependent on the use of a firearm, but can include other means such as high-risk choke holds or intermediate weapons. The narrow conceptualization of police use of lethal force in this database excludes lethal force outside of the use of firearms and likely results in underreporting of total lethal force counts. While this is noted in the methods component of the database, it is critical to be aware of this prior to the selection of data sources as this will present a major gap in accuracy of results.

NVSS, NVDRS, SHR, FE, and MPV do not experience narrow conceptualization. The NVSS does not experience narrow conceptualization due to its other bias of broad conceptualization. NVDRS, SHR, FE, and MPV do not experience narrow conceptualization since their data is conceptualized broadly and then allows for specification using variables within the databases.

Double-count bias:

Double count bias occurs when a database records one incident multiple times. This likely occurs when a database receives reports from multiple sources and fails to have a reliable procedure to confirm these incidents.

Double-count bias is present in the FBI's Supplemental Homicide Reports. The SHR can double-count incidents when multiple jurisdictions record and report the same incident. To quantify this, a previous study matched SHR data with NVDRS data. If a homicide is double-

counted in the SHR, the research team linked only one of the duplicate reports to a NVDRS reported incident. The team also retained cases, where only a NVDRS incident was reported and the SHR did not report the incident. Using these methods in the context of 2004 Maryland data, the SHR reported 521 homicides, where the NVDRS only recorded 505 homicides. This led the team to suggest that the SHR may be double-counting homicides in Maryland (Shield & Ward 2008). This finding is reinforced when considering the effect of SHR underreporting discussed in the coverage bias section below; if some data is underreported, the amount of double-counting that would result in a higher count when compared to a database such as the NVDRS would be much greater than would appear.

It is unlikely that the NVSS and NVDRS experience double-counting as their data is linked to a death certificate, as described earlier (Barber et al. 2016). While the NVDRS also compiles information from other sources, the death certificate is one of the mandated reporting documents submitted as part of the NVDRS.

Fatal Encounters has a non-automated protocol in place to avoid double-counting. FE's primary method of identifying duplicate incidents is a visual check along with a search for first and last name of the victim. Following this initial review, an Excel conditional search is performed several times a year, where words can be searched and highlighted simultaneously to identify matches. As researchers and volunteers continue to build the database to capture more data points, less-obvious double-counted incidents are found. An example of this circumstance provided by Fatal Encounter's founder and executive director, D. Brian Burghart, is when "a person might have been recorded as 'Name withheld by police,' but a later report has the name, and due to inaccuracies in media reports, including addresses, dates, or even sometimes cities," the double-counted incident is not recognized during initial searches (D. B. Burghart, personal

communication, March 9, 2021). The last step in avoiding double-counting for FE is cooperation with researchers, where researchers using the data can report possible duplicate incidents they discover while using the data. While FE does not have a formal changelog documenting duplicate incident discoveries and removals, Burghart estimates "far less than 100" duplicate incidents have been identified (D. B. Burghart, personal communication, March 9, 2021). This must be taken into context with the total incident count of the database – 29,725 as of March 23, 2021 – and, while this is minimal in the context of the size of the database, it is still critical to note as a researcher when potentially using this data source.

With a lack of publicly available information, it is unclear if MPV and FF experience double-count bias. Neither database has a detailed document describing their methodologies. After failing to find any information that would determine the presence of double-counting, I contacted both database collectors. FF was contacted via phone and email with no response in return. MPV was contacted via email and social media, which were the only two linked ways to contact MPV on their website, and they did not respond.

Coverage bias:

Coverage bias occurs when a database's sources are not composed of data from the entire population. This can occur in private databases as a result of relying on media sources to identify and publish news about lethal force incidents which could be limited to geographic coverage, as well as in public databases when agencies and states voluntarily do not report. Coverage bias occurs in all databases except for the NVSS. The NVSS is linked to death certificates. With mandated reporting from death certificates, there is not underreporting from voluntary response. There is bias that comes from the misclassification of incidents using death certificates, which

was detailed as misclassification bias above. The SHR, NVDRS, FE, MPV, and FF all experience coverage bias albeit in different ways.

The SHR experiences coverage bias as an effect of voluntary reporting, where reporting is not a legal or institutional mandate. Therefore, some law enforcement agencies do not report SHR, which results in undercounting. For example, a previous study found that some agencies including the majority of all federal agencies do not participate in the UCR system; among these is Florida, which the SHRs show zero homicides by police for 1997-2012, but the NVSS shows consistent numbers above zero for this time period. It is also important to note that this study found that SHR public-use files do not allow one to separate a true zero report from a failure to file (Loftin et al. 2017).

When taking into account the previously-described double-counting in the SHR, we would likely expect higher levels of true underreporting in studies that fail to recognize double-count bias. For example, a database could identify 200 incidents of lethal force when there are 250 incidents that actually occurred, resulting in an identified discrepancy of 50 if undercounting occurred in the absence of double-counting; but, for example, 20 of the 200 were double-counted, giving a true capture level of 180 and discrepancy of 70. In this case, the amount of undercounting appears to be less than it actually is without considering double-count bias.

Coverage bias is found in the NVDRS prior to its national coverage in 2018. This is important to note since public-use data available through the CDC's WISQARS query system is currently only available through 2017. Hopefully, in following years, researchers will have access to nationally representative data through the NVDRS with the benefit of reporting being mandatory when a state receives funding from the CDC for the NVDRS (CDC 2019).

FE, MPV, and FF experience coverage bias as a result of relying in part on media-sourced data. While these databases incorporate triangulation into their collection design, more complete data would be found if there was equal coverage regardless of geographic location. The decline of local news media and concentration of reporting in digital reporting hubs such as New York City and Washington D.C. (Bucay et al. 2017; Benton 2016) have resulted in, what has been coined, "news deserts" – areas with limited access to "credible and comprehensive news and information" (UNC 2019). While this alone is not sufficient in discrediting media-sourced data, researchers must consider its impact when selecting sources and how it has implications on the later discussion of a unified official data collection program.

Observer bias:

Observer bias is caused when the investigator's subjective perspective may influence the objectivity of the data. Observer bias occurs at the level of the database administrator – a level up from the reporting party.

Observer bias is present in all of the databases in the sample. However, it is difficult to quantify what effect this has on the levels of lethal force – specifically, the count. The observer's (i.e. the database administrator or collecting organization) subjective perspective and respective incentives can shape what information is collected for these incidents. In what follows, I will describe where these databases are placed with respect to the U.S. Government (i.e. the State) and how this impacts their motivations in data collection.

The SHR has some clear areas that could be affected by observer bias. The SHR is a program run by the FBI. The FBI is a federal law enforcement agency tied directly to the State. The focus of the UCR program, which the SHR falls under, is crime. It is critical to understand the SHR as a crime data collection program and not a program designed primarily to collect

lethal force data. Researchers cannot detach the SHR from its position to the State. It is a conflict of interest that a federal law enforcement agency collects data that could indicate police-misconduct or disparities in use of lethal force, but the implications of this will be discussed further at a later point.

The NVSS and NVDRS are both filtered through the CDC. These data collection efforts are public health oriented and are not recording data that is a result from their own practices. In other words, the CDC does not have a direct stake in understanding police use of force as the CDC does not employ law enforcement and add to the legal intervention count. While this is beneficial and reduces conflicts of interest in data collection, we cannot separate the CDC from the umbrella of the State. The CDC is a major component of the U.S. Department of Health and Human Services. As part of the government, the CDC's management and interests are directly affected by varying politics and State interests. For example, the Dickey Amendment, led in congress by Representative Jay Dickey of Arkansas and supported by the NRA, was included in CDC spending bills. It barred the use of the funds to be used to advocate or promote gun control starting in 1996 and was renewed annually until 2018 (Rostron 2018). Political influence in CDC data collection such as cases like the Dickey Amendment prevents us from separating the CDC from the State and CDC data from observer bias.

As private databases, the FE, MPV, and FF are distinguished from the public datasets. They are primarily motivated by social justice and were started in part due to the failure of the State to provide accurate data. For example, examine a section from fatalencounters.org:

> "If this dataset falls short of your expectations in any way, contact your representatives. Local, state and federal agencies don't require collection of complete data regarding the numbers and characteristics of people their employees kill because they don't want citizens to have access to transparent and verifiable data. The State's reasons for this are more opaque…This site is founded upon the premise that Americans should have the ability to track that act" (FE 2020).

This makes the purpose of Fatal Encounters clear – to hold law enforcement accountable for lethal force. These motivations are heightened when considering recent high-profile police killings, which are shown in the following sections from MPV and FF:

> "We hope these data will be used to provide greater transparency and accountability for police departments as part of the ongoing campaign to end police violence in our communities" (MPV 2020).
>
> "The Post is documenting only those shootings in which a police officer, in the line of duty, shoots and kills a civilian – the circumstances that most closely parallel the 2014 killing of Michael Brown in Ferguson, Mo., which began the protest movement culminating in Black Lives Matter and an increased focus on police accountability nationwide" (Tate et al. 2016).

These statements emphasize the impact of heightened awareness from high-profile police killings on Black bodies. While this is not intended to discredit the validity of their observations, this context should matter when considering the data that researchers choose to utilize.

Gatekeeping bias:

Gatekeeping bias occurs when an organization controls reporting based on ideological grounds or grounds of self-interest. Gatekeeping can occur in private sources when media data is reported based on ideological or political influence and in public sources when data is self-reported and influenced by self-interest. Gatekeeping occurs at the reporting level, unlike observer bias which occurs at the collection level. Gatekeeping bias is found in all databases from the sample, except for the NVSS. The NVSS relies solely on information reported on death certificates. Death certificate data is populated by a coroner or medical examiner and funeral director and eliminates the self-interest that accompanies self-reported data.

The SHR is subject to gatekeeping bias in a closely-related process to how the SHR experiences coverage bias. While reporting is voluntary, it is also self-reported. With control over when and what to report, gatekeeping bias is found in the lack of incentives for agencies to report to the SHR, possibly driven by concerns of liability, increased oversight, and possible repercussions. For example, reporting relatively high lethal force levels could result in an investigation similar to the Department of Justice's investigation of the Ferguson Police Department in 2015, which vastly impacted agency policies and practices as well as officer oversight (US DOJ 2015).

The NVDRS, unlike the NVSS, relies in part on police reports. These reports are again influenced by incentives similar to those that drive a lack of self-reporting in SHR, but in a slightly different context. While reporting is mandatory for states receiving funding, the specific law enforcement reports are still composed of the account from the police. There is concern that police reports would favor the side of law enforcement, rather than the victim, and exclude details that may be necessary to answer researchers' questions. For example, in the case of the 2014 shooting of Laquan McDonald, a 2016 Inspector General report found that Chicago police officer, Jason Van Dyke "filed a false Tactical Response Report (TRR) and a false Officer's Battery Report (OBR) regarding his encounter with McDonald" which "exaggerate(d) the threat McDonald posed" (Office of Inspector General 2016). This example shows the ability for law enforcement to produce reports that act in their self-interest.

FE, MPV, and FF experience gatekeeping bias in two ways: public records requests and media-sourced data. The first of these, public records requests, again shows the side of law enforcement and may exclude key details that researchers are interested in due to the legal ability to restrict the name of the personnel who were involved in an incident. Second, media-sourced

data is influenced by story selection. In this context, gatekeeping could be comprised in part by agenda bias, where political affiliation or leaning of news organizations, editors, and journalists impacts which stories are published and which are not. Story selection may highlight stories that coincide with an actor's own political leaning (whereas stories that do not are not published) as well as stories that hold greater market value. Story selection tells the story of some, but not all. For example, one study on media coverage of Black female homicide victims found that, in the Detroit metropolitan area, "almost all murders of white females were reported in the *Detroit Free Press* newspaper while only a portion of homicides of black females were reported" (Neely 2015). The bias created by the media story selection could result in underreporting for databases that use these methods.

QUALITY OF CAPTURED RACE DATA

While the previously detailed biases affect the levels of lethal force recorded, a database can capture more incidents than another, but still fail to collect key details that allow researchers to answer pressing questions. Regardless of the quantity of incident data, researchers require quality data in order to construct compelling arguments and answer complicated questions. This is especially true with respect to race. After examining each database on their method for collecting victim race data, I found the following concerning the procedures for ensuring quality data on race:

First, the SHR collects race in five categories: White (includes Mexican-Americans), Black, American Indian/Alaskan Native, Asian or Pacific Islander, and unknown. Ethnicity is recorded in three categories: Hispanic origin, not of Hispanic origin, and unknown (FBI 1990). The SHR data is submitted by law enforcement and race/ethnicity data is recorded by the agency

responding to the initial incident. The method for law enforcement to designate race for the victim varies based on agency discretion and results in inconsistent and problematic data collection at the agency level; this issue will be addressed in the following discussion.

U.S. NVSS, excluding U.S. territories, reported data includes seven categorizes for race: White, Black, American Indian (includes Aleuts and Eskimos), Chinese, Japanese, Hawaiian (includes Part-Hawaiian), and Filipino. Some areas report more specific data to include additional categories of "Asian Indian, Korean, Samoan, Vietnamese, Guamanian, and Other Asian or Pacific Islander." For areas that do not report these additional categories, a category of "Combined other Asian or Pacific Islander" is reported (CDC 2021). These categories are the reported race for states that report a single race or are the bridged race for states that report multiple races. In short, states that report multiple races for individuals use bridged race categories which consolidate 31 categories used in Census 2000 and 2010 from 1997 Office of Management and Budget (OMB) standards to four categories: "American Indian or Alaskan Native," "Asian or Pacific Islander," "Black," and "White" (CDC 2019b). These four categories are compliant with 1977 OMB standards (CDC 2019c).[1] The NVSS imputes race for the "all other races" category for consistency with Census race categories. The NVSS collects ethnicity data with respect to Hispanic origin in twelve categories: "Non-Hispanic," "Spaniard," "Mexican," "Puerto Rican," "Cuban," "Dominican," "Central and South American," "Central American," "South American," "Latin American," "Other Hispanic," and "Unknown" (CDC 2019b). As previously mentioned, this data is compiled through information provided on death certificates. A previous study found that race and ethnicity reporting on death certificates was highly accurate for some categories, but not others; White and Black populations were highly

[1] A detailed methodological description of the bridged race categories process can be found elsewhere (Ingram et al. 2003).

accurate, while misclassification for the American Indian or Alaska Native population was close to 40%. The study compared vital statistics mortality data against National Longitudinal Mortality Study data, which included Current Population Survey cohorts, where respondents had self-identified race and ethnicity prior to death (Arias et al. 2016).

The NVDRS classifies race into six categories: White, Black or African American, Asian, Native Hawaiian or other Pacific Islander, American Indian or Alaska Native, and Unspecified. Unspecified applies when a person's ethnicity is provided in place of their race or no other valid race value is given. A category of "other" was removed as a response choice in 2015. NVDRS collects multi-racial categories as well. For example, if a source document indicates "Mulatto," both "white" and "black are entered. Additionally, in cases where "Asian/Pacific Islander" is indicated, both "Asian" and "Pacific island" are noted. These standards are a result of the 2000 U.S. Census precedent. Ethnicity is categorized under three categories: "not Hispanic or Latino," "Hispanic or Latino," and Unknown. The NVDRS uses a primacy rule for race data that assigns confidence in descending order from death certificates, coroner/medical examiner reports, SHR, and police reports (CDC 2015).

FE collects race using different procedures, as their data is pooled from a variety of sources. Fatal Encounters includes a race variable that uses the following method:

> "Race is usually reported based on visual evidence or official reports. Visual evidence includes images in news stories, obituaries, or body camera or other surveillance videos. Sometimes race is disclosed in a news article as an identifying characteristic of who was killed, particularly when police are withholding a name. Occasionally, FE researchers will contact a family to determine the race. Sometimes race is determined by language or a photo on a tombstone" (FE 2021).

Along with this process, a linked image is included in the database if it was used to determine race. Fatal Encounters includes an additional variable that records subject's race with imputations, which is a combined column with both non-imputed race, which is obtained through

the previous methods, as well as imputed race. Along with the imputed race variable, Fatal Encounters includes a variable that "shows whether a race was imputed or not" and "the probability of accuracy" in the imputed races for each case (FE 2021).

MPV collects race in six categories: Asian, Black, Hispanic, Native American, Pacific Islander, and White. MPV is currently developing a variable that records race of the officers as well (MPV 2021). Ethnicity is not captured in the MPV outside of the Hispanic race variable. Similar to the issue of determining double-count bias, MPV does not have publicly available documents that detail their methodology in recording race. This prevents the ability to determine the quality of the race data and what perspective it originates from.

FF collects race and ethnicity data with one variable in six categories: White-non-Hispanic, Black-non-Hispanic, Asian, Native American, Hispanic, and Other (Washington Post 2021). Again, FF does not have publicly available documents that detail their methodology in recording race and ethnicity, which prevents the ability to determine the quality of this data.

DISCUSSION

Based on these findings, there are several key points to be discussed. The first area discussed is overall issues with public, State-sponsored databases. Secondly, overall issues with privately-funded and operated databases are discussed. Next, the feasibility of a single lethal force database and triangulation are covered. Finally, there is a discussion regarding implications of these bias in the context of non-lethal force.

First, the validity of law enforcement data collection will be considered. One concern with law enforcement data collection is the SHR being collected by the FBI. Why should a law enforcement agency be responsible to collect data that could be used to hold other agencies accountable? A possible explanation is that legal intervention is not the focus of the SHR, but is instead an afterthought to categorize these incidents as to not skew the counts for the primary focus of the UCR – crime data that is not committed by law enforcement. Using these crime data, law enforcement can redirect resources and justify law enforcement campaigns and the associated budgets. I would argue that the SHR is not a tool for police accountability, as much as it is a justification for law enforcement budgets and operation. While this argument would require further research, at a minimum, researchers must question the validity and implications of law enforcement collected data.

An additional concern is how race and ethnicity are determined by law enforcement agencies prior to entering a data system. This again falls on agency discretion. Let's examine a few instances of what this process could look like by using data collection redesigns that track racial profiling by police for the San Jose Police Department (SJPD), San Diego Police Department (SDPD), North Carolina Highway Patrol (NCHP), and New Jersey State Police (NJSP). In designing a way to track racial profiling during traffic stops, SJPD and NJSP

determined that officer perception of race was sufficient in data recording; this was justified through the logic that profiling and disproportionate racial targeting would be dependent on the responding officer's perception of race. SDPD also allowed officers to ask the suspect if race was unknown. NCHP allowed for officer perception, asking the suspect to identify if unknown, and also the use of backup information collected by the Bureau of Motor Vehicles (Ramirez et al. 2012). This method to determine suspect race could not be directly applied to instances of lethal force, notably a suspect could not self-identify race, but this does demonstrate flaws in the varying ways police determine race.

On initial review, the justification for officer perception of suspect's race appears to be valid. However, there are potential issues. Thinking back to the identified issues of self-reporting data such as underreporting to avoid scrutiny and oversight, it would not be unreasonable to imagine officers "playing it safe" and reporting their perceived race cautiously as to not alert to disparities in use of lethal force. While this hypothetical technique of misreporting race is an explicit act, this could apply to cases of explicit and implicit bias in the use of lethal force; Regardless of the overt-intention to use a higher degree of force based on race, this hypothetical reasoning would apply in order to avoid increased oversight. One solution would be to establish a self-identified race and ethnicity category on drivers' licenses or government issued forms of identification that could be tracked by data systems, as well as continue to report perceived race as to not exclude the potential of this data.

Second, private databases have conflicting issues with validity as well. These issues are caused by the lack of official data-collection methods documentation availability and transparency, as well as sourcing from media-reports and triangulating data from multiple sources. A main issue for this project was finding easily-accessible information that provided

detailed descriptions of these databases' methodological processes. For example, Fatal Encounters and the Washington Post's Fatal Force provided a "readme" page that explained each variable, but still lacked information such as a change log to examine the effects of double-counting. Additionally, all private databases lacked an official codebook, where all public databases provided a publicly accessible codebook. For researchers, this presents a barrier in using the data effectively and in a defendable way.

Another issue is the validity of media reports. With noted inaccuracies in media reports from Fatal Encounters in the double-count bias section, it is critical that private databases have designated procedures to address these inaccuracies. While all private databases provided a description that stated their in-house researchers verified the data, there were not publicly available documents to describe the process.

Additionally, there is an issue with data quality and consistency that accompanies databases using multiple sources, specifically in the context of race and ethnicity data. This issue results from compiling data from different sources with different methods for how race is originally reported and how race is coded by any previous source databases. The validity of the final recorded race in databases that triangulate data is a concern, where not all race recordings used the same procedures of determination during the creation and transfer of data that followed a police killing. This was shown in the Fatal Encounters findings of how race is recorded in many different ways without a way to easily identify which method was used in the dataset.

With these noted issues of validity, it informs our understanding of public and private motivations for lethal force data collection and forces researchers to question if we would rather under- or over-count the data. Public, State-sponsored programs have issues of validity resulting from a lack of data, where private databases have issues of validity originating from a surplus of

data. Researchers must decide which error they should favor. I would argue that favoring private data with a larger count would help to counter previous estimates made by using data with the documented undercounting shown throughout this manuscript. This being said, the ability to defend the use of a specific data source is critical and, at this time, private lethal force databases are not making this an easy task.

At the start of this manuscript, I noted that a single reliable data source would be ideal. While this would still be ideal and aid researchers, is this feasible? After the analysis of this data, I would argue that it is not. My findings suggest there will always be bias present in data collection. Specifically, a database will always have a position with respect to the State. Despite this reality, my research suggests that data collection infrastructures that are aligned with that State, specifically public health surveillance systems such as CDC data collection, are not inherently detrimental to reliable data collection. Importantly, targeted improvements such as independent budgetary authority could be made to increase confidence in these infrastructures. Utilizing preexisting public health surveillance systems operating under independent budgetary authority would decrease the impact of political variation in other divisions of government and translate to a more independent and unbiased data collection. Until an improvement such as this is made, researcher triangulation is critical. Yet, even if such improvements are made, triangulation would still be advised because of the methodological advantages associated with it. One way forward is to consider how to leverage existing federal infrastructure to triangulate and catalogue officer use of lethal force. For example, the CDC already does X and the SHR conducts Z and the Department of Justice handles Y. Taken together, these agencies create an infrastructure that may open up A and B with C implications for more accurately measuring police use of lethal force.

While there is bias present in each of the database's collection methods, triangulation can be used to minimize their effect. Triangulation allows researchers to ascend the restrictions and limitations of a single database in order to more accurately answer important research questions. With this manuscript, researchers can use the identified biases of each database and build a sample where sources complement each other and reduce their associated bias.

While all researchers will have data that is best suited for their project and, even when triangulating data, choosing datasets may vary based on the needs of a project, there are some general pairings to be considered. First, there should be at least one dataset from a public- and a private-source; This pairing will reduce the effect of observer bias and equalize the relationship a database has to the State. Second, for instances where a database is narrowly conceptualized, an additional database that is not should be used; For instance, projects using FF should also add an additional private database such as FE or MPV that is not narrowly conceptualized. Third, for additional forms of bias that appear in different ways, researchers should use databases that overcome or account for those bias. For example, coverage bias from media reports is different from that of law enforcement reported data. It would be advantageous to use both of these sources, where missing cases and additional cases are accounted for by the use of both databases.

This being said, triangulation must be done carefully. As seen with private databases, triangulation can lead to a greater number of cases, but decrease validity in these cases at the same time. However, researcher level triangulation does have the benefit of control. Researchers determine how to link data and have direct knowledge of their process to defend their methods. Triangulation is a powerful tool when researching the social world, where data collection is subjected to a wide-array of bias, but its utility is controlled by the ability for researchers to explain their methods.

These findings have implications for data collection that extend beyond lethal force incidents and are relevant in a larger discussion of use of force data collection. One critique of lethal force research is that it is a relatively rare event in relation to non-lethal force. The biases discussed in this manuscript are also relevant to non-lethal force data collection as well. Furthermore, their impact could be greater in non-lethal force data collection. This increased impact could be due to a lack of documentation outside of law enforcement, where there is no third-party documentation. Additionally, this could be due to greater discretion reporting these incidents within law enforcement at the officer level, and risk of reporting abuse at the victim level.

For example, consider an instance of an officer making an arrest, placing a suspect in restraints, and moving a suspect into their vehicle. During the movement of the suspect into their vehicle, the suspect suffered a head wound from the frame of the vehicle's door. The suspect claims that the officer forcibly pushed the suspect's head into the door frame for no apparent reason. The officer claims that the suspect intentionally self-injured themselves while getting into the vehicle with the intention to discredit the officer's arrest.

The first issue to discuss is the actual sequence of events. Did the officer push the victim into the door frame or did the victim self-inflict their wounds? In the context of the example, take an instance where an agency chooses to side with the officer: the suspect self-inflicted their injury and the officer did not use force. No use of force report is filed. Unlike the use of lethal force, there is no dead civilian, there is no death certificate, and there is no third-party organization responsible for documenting the incident. With no death certificate, there is greater argument over the actual events with non-lethal force – it is much easier to discredit claims of non-lethal force when compared to lethal force, where it is generally hard to argue the presence

of a dead civilian. The argument of lethal force is often an argument of justification, rather than a question that force even occurred such as cases of non-lethal force.

The second issue is reporting policies among law enforcement agencies. In the example, if there is a conclusion that the officer used force and pushed the suspect into the door frame, will the agency report this incident? Does the agency participate in a use of force data collection program? Does the agency keep a use of force reports internal to their agency and not report to a larger data collection program? This is based on agency discretion. In some cases, this incident would be reported, but, in some instances, it would not. Outside of this example, when considering the continuum of force, use of force can vary greatly and agencies determine, whether officially or unofficially, when to report and when not to report. For example, officer presence and verbal commands are lower levels of force on the continuum, but would normally not solicit a use of force report. In cases without a formal policy, officer discretion could be used in determining what to report and when, which leads to inconsistent reporting of similar events that occur throughout the country.

Third, non-lethal force incidents are subjected to victim underreporting unlike lethal force incidents. In the context of the example, consider the suspect suffering this injury, but knowing the officer from previous interactions. Consider if the officer is one of several officers responsible for policing the area where the suspect and their family lives. In this case, even when an officer uses force intentionally (the officer pushed the suspect into the door frame), the suspect chooses not to report as they and their family would receive increased attention and harassment, and decreased discretion in ignoring minor criminal activity in the future; For example, the suspect chooses not to report and hopefully the officer will look the other way in a future incident, where the officer discovers the suspect has a small amount of marijuana on their

person. Especially in close communities policed by a limited number of officers, individuals experiencing unjust use of force could be disincentivized to report or challenge use of force due to fear of retaliation or possible increased attention from law enforcement.

CONCLUSION

Lethal force databases experience methodological bias through their means of data collection. Among the bias present in lethal force databases are misclassification bias, broad conceptualization, narrow conceptualization, double-count bias, coverage bias, observer bias, and gatekeeping bias. While public databases generally underreport data, fail to capture quality, detailed information, and are influenced by their position within the State, these databases offer the best documentation of their methods. Private databases are at risk of over capturing incidents through the use of multiple reporting sources without documenting their specific collection methodologies. This limits the ability of researchers to use their data in a defendable way. The use of multiple sources and triangulation in private databases offers the potential for capturing a more complete image of lethal force, but is limited by a failure to provide documentation of their methods.

While triangulation at one level can lead to data validity issues among databases that do not provide researchers with the tools to defend their data, triangulation at another level is a critical tool in understanding the social world, where one source of data is insufficient. Researcher-level triangulation entails researchers taking a stake in the data collection process and allows researchers to be fully transparent in how they merged data from multiple sources to achieve a more comprehensive image of lethal force. The biases identified in this manuscript can serve as a tool in researcher-level triangulation. The consideration of these biases in the use of multiple sources allows for researchers to reduce bias in their data by selecting complimentary data sources and supports researchers in answering questions about lethal force. Specifically, with more reliable data through triangulation, researchers will be able to answer pressing questions about the relationship between lethal force and victim race. The ability to identify a

racial disparity in lethal force through the identified biases discussed in this manuscript allows researchers to recommend solutions to resolve racial disparities in lethal force. Researchers acknowledging the issues in lethal force data collection presented here have a starting point in thinking of ways to reduce bias in reporting, conduct more high-quality statistical analysis of police violence, and subsequently, make recommendations to reduce the number of deaths by police.

There are some pertinent limitations and identified issues with this manuscript that require future research. First, the relationship between suicide and lethal force must be discussed. I did not exclude suicide in the FE and MPV databases during the quantitative section and did not note in the findings that databases which failed to include suicide in the presence of law enforcement were narrowly conceptualized. Lethal force was operationalized as a police killing in narrow and broad conceptualization bias. At the start of this project, police killings appeared to be a basic concept: a death resulting from force used by a law enforcement officer. I described that lethal force did not need to be restricted to the use of firearms, but subtly assumed force would be at least physical. The inclusion of suicide in FE and MPV highlighted the issue of whether suicide when a law enforcement officer is present should count. As noted in the literature review, the use of force continuum begins with officer presence, which poses the question: should a death from suicide when an officer is present be attributed to the officer's presence? This is more a theoretical issue of what we consider to be force. If suicide should count, an argument could be made that a civilian who commits suicide in the presence of a law enforcement officer was motivated and directly-enabled by the police officer's presence. If suicide should not count, an argument could be made that presence did not enable the victim, but instead that law enforcement officers often respond to incidents of mental distress and crisis,

which would explain suicide as an event independent of officer presence. While this manuscript does not take a stance on the issue, suicide does impact the way lethal force is conceptualized. With this, there needs to be future research and debate to decide if suicide should count – without this, there will continue to be inconsistent levels of recorded use of lethal force outside of the effects of methodological bias in data collection.

Second, this manuscript did not seek to quantify the effect of each individual bias. The quantitative analysis simply sought to demonstrate discrepancies among lethal force databases. It corroborated prior research, but was not intended to quantify the amount that each individual bias impacted the level of lethal force captured. It is unclear the extent to which observer bias or coverage bias influences the data. Future research should continue to quantify the effect of these biases in data collection.

Third, private databases should provide full transparency in their collection methods. With a lower sense of established validity in private data collection, there is an increased need to explain a detailed methodology that will allow researchers to use data in a defendable way. Fourth, the quality of race and ethnicity data should be improved. Discretion in police determination of race results in varying procedures with varying results. Racial categorization of victims should be self-identified prior to a lethal force incident in addition to recorded by the officer's perceived race of the victim. A possible solution would be a self-identified race category on government forms of identification.

Finally, this research should be extended to non-lethal force. I would suspect that these biases are more prevalent among non-lethal force incidents, which occur more often and are not as easily identifiable as incidents concluding with the death of a victim. Future research should

consider how these biases unfold in non-lethal force data collection and identify different types of bias if present.

There is a concern that African Americans experience increased levels of lethal force in the United States. The ability to investigate these concerns is limited by the lack of reliable and consistent data. Understanding the biases presented in this manuscript allows researchers to triangulate data from multiple sources and reduce the impact of these biases. With an increased awareness of these biases, researchers are able to compile more accurate lethal force data and reliably document disparities in lethal force. The ability to document these disparities in a defendable manner will allow researchers to inform policy and practices to reduce disparities in police use of lethal force. Increased confidence in the data is the first step in responding to outcries of unjust and unequal use of lethal force on Black bodies.

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