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# Disparity Does Not Mean Bias: Making Sense of Observed Racial Disparities in Fatal Officer-Involved Shootings with Multiple Benchmarks

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**Abstract**

Racial disparities in officer-involved shootings have dominated the national discourse recently. Unfortunately, we have yet to identify an appropriate benchmark, or at-risk population, to put these observed racial disparities into context. In this article, we use seven benchmarks – based on population data from the US Census, police-citizen interaction data from the Police-Public Contact Survey, and arrest data from the Uniform Crime Report – to compare OIS fatality rates for black and white citizens from 2015 to 2017. Using population, police-citizen interactions, or total arrests as a benchmark, we observe that black citizens appear more likely than white citizens to be fatally shot by police officers in both years. Using violent crime arrests or weapons offense arrests, we observe that black citizens appear less likely to be fatally shot by police officers. We discuss why population data is a fundamentally flawed benchmark, and elaborate the strengths and weaknesses of using police-citizen interaction or arrest benchmarks.

*Keywords*: policing, deadly force, race, bias, Black Lives Matter

Word count: 8,398 (including references, table, and figure)

**Disparity Does Not Mean Bias: Making Sense of Observed Racial Disparities in Fatal Officer-Involved Shootings with Multiple Benchmarks**

Officer-involved shootings (OIS), and specifically whether or not black citizens are more likely than whites to be shot by police, have dominated news cycles in recent years (Weitzer, 2017). A string of high-profile incidents caught on video beginning in 2014 has changed the way people think about OIS – they are no longer viewed as isolated incidents, but rather, signs of a national problem (Morin et al., 2017; Zimring, 2017). Unfortunately, the federal government has failed to maintain a reliable, comprehensive database of OIS, in spite of social scientists imploring them to compile better criminal justice data for decades (H. Alpert, 1948; G. Alpert, 2015; Fyfe, 2002). The absence of such data has precluded our ability to answer basic questions, including whether there are racial disparities among those who are shot. Because of the government failure, in 2015, *The Washington Post* began compiling a publicly available database of fatal OIS using crowd sourced information, local news stories, public records, and investigative reporting. Thanks to their efforts, we now know that police officers shoot and kill just under 1,000 people each year. Approximately 25% of those killed are black, and approximately 48% are white. Before we turn to the specific issues in OIS, it is important to introduce the role of the denominator in research.

In social science and epidemiological research designed to understand rates, there are numerators and denominators. For example, studies concerned with health issues investigate those who have developed a disease or symptom and compare them with those who are *at risk* for the disease or symptom. On the one hand, defining and measuring the numerator (in this case the disease) is relatively simple. On the other hand, identifying and measuring the denominator (population at risk for the disease) is complex and challenging. Without proper measures of both, research findings are questionable as the measures used to compute them are inadequate. The

history of social science and epidemiology is rife with examples of this dilemma. Schlaud and colleagues (1998) discuss the "iceberg phenomenon," which explains the denominator problem as lurking unseen, and masked by untested assumptions. They point out the complexities of the denominator for health research but warn us all about the problems with identifying the proper at-risk population for any study. Social science and criminological research, including the explanation of OIS, faces the same challenges as identified by Schlaud et al. (1998).

Knowing how many people officers fatally shoot each year, as well as their respective races, is important. However, we are faced with a fundamental but critical question: *what does it all mean?* On its own, *The Washington Post's* data cannot tell us whether black citizens are more likely to be fatally shot than white citizens, or vice versa. In order to put the data in context, a benchmark, or denominator, is necessary. In other words, if we want to make sense of observed differences in who is fatally shot by the police, we must also know who is at risk of being fatally shot, but not. If we think of our understanding of OIS as an iceberg, the at-risk population is the part that lurks unseen. For example, well-meaning journalists often use US census data as evidence of racial bias – pointing out that black citizens account for roughly twice as many OIS fatalities as we might expect based on their population (see e.g., Swaine & McCarthy, 2017). Yet, benchmarking OIS with census data is flawed because it assumes everyone in the population has an equal likelihood of coming into contact with a police officer. Numerous studies refute that assumption, finding that black citizens are more likely to be stopped (Epp, Maynard-Moody, & Haider-Markel, 2014; Gelman, Fagan, & Kiss, 2007; Smith, Rojek, Petrocelli, & Withrow, 2017) and arrested (Kochel, Wilson, & Mastrofski, 2011). By way of being stopped more often by police officers, black citizens' risk of being involved in an OIS are inflated. A proper benchmark must account for this reality.

In the present study, we utilize several different benchmarks to contextualize *The Washington Post's* fatal OIS data – while acknowledging the strengths and weaknesses of each. Specifically, we utilize population data (from the US Census), police-citizen interaction data (from the Police-Public Contact Survey), and arrest data (from the Uniform Crime Report). Using each benchmark, we report the odds of black citizens being fatally shot, relative to white citizens, from 2015 to 2017. Our results demonstrate the importance of identifying an appropriate benchmark, and suggest a need for improved national data regarding police-citizen interactions, especially those that involve lethal force.

At the onset, we wish to be clear about what our analyses can and cannot accomplish. First, our focus is on the national level, so our conclusions cannot be generalized to individual departments, officers, or interactions. As but one example, the extent of racial disparity in fatal OIS at the national level tells us little to nothing about whether the shooting of Tamir Rice was racially biased. Second, we consider one specific type of police use of force: fatal shootings. Our analyses cannot speak to whether there are racial disparities in police use of nonlethal force, which occurs far more frequently (see Fryer, 2018; Goff et al., 2016). Finally, and most importantly, we cannot determine the extent – if at all – that bias is the driving force behind any uncovered racial disparities.[1]

## Identifying the At-Risk Population: Lessons from the Racial Profiling Literature

Explanations for observed racial disparities in fatal OIS should be guided by methodologies used to understand racial profiling in traffic stops (Alpert, Dunham, & Smith, 2007; Farrell, Rumminger, & McDevitt, 2005; Walker, 2001). Researchers found it was easy to

[1] We thank an anonymous reviewer for suggesting we clarify these points.

determine a numerator, or who is pulled over by police officers, as departments log and maintain this information. However, knowing who is stopped means very little without also knowing who is driving, and therefore at risk of being stopped. Using census data as a benchmark for the driving population is inappropriate because not everyone drives. Using the 16 or older population from the census gets us closer to the driving population, but remains flawed, as not everyone in the driving-eligible population drives, and those who do not are never at risk of being stopped. Yet, even if researchers could accurately identify the driving population, the benchmark would likely remain flawed due to differences in driving behavior therein. For example, younger people may drive more often and commit traffic violations more frequently. In addition, poorer citizens are more likely to have physical problems with their vehicle (e.g., broken tail light), resulting in a greater likelihood of being stopped by officers (Engel & Calnon, 2004; Epp et al., 2014).

Ultimately, researchers were forced to come up with more creative measures to estimate the driving population. For example, traffic safety engineers use not-at-fault drivers in two car collisions as a proxy for a random sample of the driving population (Alpert, Smith, & Dunham, 2004). Others have observed and recorded driver race (or perceived color) at busy intersections (Alpert et al., 2007) and on roadways (Lamberth, 1997). Grogger and Ridgeway (2006) compared the race distribution of stops made during daylight and nighttime hours under the “veil of darkness,” arguing that if profiling is occurring, minorities will comprise a greater percentage of daylight stops, since officers are more likely to discern a driver’s race before initiating a stop (see also Taniguchi et al., 2017; Worden, McLean, & Wheeler, 2012). Still another approach is to observe and assess traffic violating behavior, because if such behavior varies by race (or any other demographic), a proper benchmark must account for that variation (Engel & Calnon, 2004). The takeaway from the racial profiling literature is that finding the appropriate

denominator is very difficult, but critically important. OIS research now faces the same challenge. We must identify the population that has contact with police, thereby exposing them to the risk of being fatally shot.

## Recent Research on Race and Officer-Involved Shootings

Recent agency-level studies concerning the relationship between citizen race and OIS suggest black citizens are not more likely than white citizens to be shot by police officers. For example, Worrall et al. (2018) compiled a dataset of 100 OIS and 201 instances in which officers from a southwestern police department pointed their firearm at a suspect but did not shoot. In this case, their benchmark (or population at risk of being shot) was citizens who had firearms pointed at them by officers. They found that within this sample of incidents, officers were significantly *less* likely to pull the trigger on black citizens. That is, the odds of black citizens being shot were approximately one-third the odds of others being shot. Wheeler et al. (2018) performed a similar analysis of 207 OIS by the Dallas Police Department, relative to 1,702 instances in which officers pointed their firearms but did not shoot. The best predictors of whether the officer shot was if the suspect was armed or the officer had been injured – suspect race was not statistically significant. In Houston, Fryer (2018) compiled a dataset of OIS along with a random sample of interactions in which citizens faced a reasonable risk of being shot (i.e., attempted capital murder of a public safety officer, aggravated assault on a public safety officer, resisting arrest, evading arrest, and interfering in arrest). Within this sample of interactions, he found that black citizens were 27.4 percent less likely than non-black, non-Hispanics to be shot at by police while controlling for possession of a weapon and other encounter characteristics. Finally, in a laboratory setting, James et al. (2016) found that Spokane police officers were more hesitant to shoot black suspects than white suspects during video simulations, despite showing

moderate to strong signs of implicitly bias attitudes (based on the race/weapons version of Harvard's Implicit Association Test).

National studies are harder to come by due to the limitations of available data. Nevertheless, a few recent studies offer some insight. Miller et al. (2016) calculated injury and fatality rates per 10,000 stops or arrests and concluded that while black citizens were more likely to be stopped or arrested than white citizens, they were not more likely to be injured or killed during those stops. Similarly, Cesario, Johnson, and Terrill (2018) benchmarked fatal OIS documented by *The Guardian* in 2015-16 against 16 measures of criminal activity and found virtually no evidence of anti-black disparity – in fact, most of their benchmarks indicated white citizens were more likely to be shot by police. However, Ross (2015, p. 1) performed a county-level analysis of OIS using Kyle Wagner's US Police Shooting Database, and found "the probability of being {black, unarmed, and shot by police} is about 3.49 times the probability of being {white, unarmed, and shot by police} on average." Nix et al. (2017) sidestepped the benchmark problem and focused only on the universe fatal shootings to determine whether black citizens were more likely to have been unarmed when fatally shot. Their study suggested that black citizens were over twice as likely as white citizens to have been unarmed when fatally shot, while controlling for whether they posed an imminent threat to officers or others.

In trying to understand whether there are racial disparities in OIS in the United States, we face a conundrum. Agency-level OIS studies typically allow researchers to control for other important factors such as citizen resistance or the presence of a weapon, but the generalizability of findings beyond the agency in question is unknown. Moreover, piecing each of these studies together to draw inferences about OIS more generally is difficult due to different benchmarks being used and variables included (or not included) in statistical models (Fridell, 2017).

National-level studies typically offer less model precision and may suffer from aggregation bias (i.e., officers working in different neighborhoods or agencies may behave differently for a variety of reasons), but they provide the overview of the issue that we need perhaps now more than ever. Indeed, *The Washington Post* has at last provided us with a reliable estimate of fatal OIS, but unfortunately, journalists and protestors are drawing conclusions based on this numerator that are misinformed and misleading (see e.g., Boren & Bogage, 2018; Murdock, 2018; Swaine & McCarthy, 2017). It is incumbent upon researchers to provide proper context and make the best sense of these data that we can.

## Data and Methods

*The Washington Post's* data provide us with the numerator that we can use to make sense of racial disparities in fatal OIS, provided we use an appropriate denominator, or benchmark. The purpose of our study is to develop a better understanding of whether black citizens were overrepresented in fatal OIS from 2015 to 2017, relative to white citizens. To do so, we utilize seven different benchmarks.

### *Numerator: Fatal OIS*

*The Washington Post* determined that police fatally shot 995 people in 2015, of whom 497 (49.9%) were white and 259 (26.0%) were black. In 2016, police fatally shot 963 people. Of them, 466 (48.4%) were white and 234 (24.3%) were black. Finally, in 2017, police fatally shot 987 people – 458 (46.4%) of whom were white and 223 (22.6%) of whom were black.[2] We use these figures as our numerators in the analyses that follow.

[2] See https://github.com/washingtonpost/data-police-shootings/blob/master/fatal-police-shootings-data.csv.

### ***Benchmarks***

#### *Population*

We obtained 2015 and 2016 population figures from the US Census Bureau's American Community Survey's (ACS) 5-year estimates. In 2015, the estimated US population was 316,515,021. Those who identified as "one race, white" totaled 232,943,055 (73.6% of the population), whereas those who identified as "one race, black or African American" totaled 39,908,095 (12.6% of the population). In 2016, the estimated US population was 318,558,162. Of those, 233,657,078 (73.3% of the population) identified as "one race, white" and 40,241,818 (12.6% of the population) identified as "one race, black or African American." For 2017, we used ACS 1-year estimates.[3] Of the estimated 325,719,178 citizens residing in the US, 235,494,966 (72.3%) were "one race, white" and 41,366,336 (12.7%) were "one race, black or African American."

#### *Police-citizen interactions*

A more precise benchmark for fatal OIS is the number of citizens who are stopped, and therefore exposed to the risk (however small) of being fatally shot by an officer. After all, barring a non-purposeful shooting or ricochet fire (which are very rare), one must encounter a police officer in order to be fatally shot by a police officer. The Bureau of Justice Statistics' Police Public Contact Survey (PPCS), a supplement to the National Crime Victimization Survey carried out triennially, provides the best available national estimate of police-citizen interactions. The PPCS is a nationally representative survey of US residents age 16 or older that provides an

[3] At the time of our study, ACS 5-year estimates for 2017 had not yet been released. We acknowledge that 1-year estimates are only collected for areas with populations of 65,000 or more, and are therefore less reliable than 5-year estimates. Nevertheless, they are the most up-to-date figures available from the US Census Bureau, and provide us with reasonable estimates of the white and black populations, respectively.

estimate of how many persons had one or more involuntary interactions with police during the previous year (e.g., traffic or non-traffic street stop). The most recent data available are from 2011, so we used the average number of interactions reported over the last four waves of the survey (2002, 2005, 2008, and 2011; see Hyland, Langton, & Davis, 2015, p. 4).

We developed three benchmarks from the PPCS: *police-initiated contacts, traffic stops* (whether the citizen was a driver or passenger), and *street stops* (i.e., the police were investigating a crime or suspected the citizen of wrongdoing). On average, it is estimated that 16,642,200 police-citizen interactions involve a white citizen annually – 13,997,700 of which are traffic stops and 2,644,500 of which are street stops. During the same period, the PPCS suggests that annually, 2,542,400 police-citizen interactions involve a black citizen – 2,001,000 of which are traffic stops and 541,400 of which are street stops.

*Arrests*

Arrest data may constitute a more reasonable benchmark for fatal OIS, as they are the subsample of police-citizen interactions that involves the greatest likelihood of citizen resistance. Additionally, studies have shown that officers are more likely to use force when there is evidence a crime has been committed (McCluskey & Terrill, 2005; Paoline & Terrill, 2007). Our arrest data come from Table 43A of the FBI's 2015 Uniform Crime Report (UCR), Table 21A of the 2016 UCR, and Table 43A of the 2017 UCR.[4] We developed three benchmarks from these data: *total arrests, arrests for violent crime,* and *arrests for weapons offenses.*

[4] See <https://ucr.fbi.gov/crime-in-the-u.s/2015/crime-in-the-u.s.-2015/tables/table-43>, <https://ucr.fbi.gov/crime-in-the-u.s/2016/crime-in-the-u.s.-2016/tables/table-21>, and <https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/tables/table-43>.

There were 8,248,709 *total arrests* reported to the UCR in 2015. White citizens accounted for 5,753,212 arrests (69.7%), while black citizens accounted for 2,197,140 (26.6%). In 2016, there were 8,421,481 total arrests, of which, white citizens accounted for 5,858,330 (69.6%) and black citizens accounted for 2,263,112 (26.9%). In 2017, there were 8,162,849 total arrests. White citizens accounted for 5,626,140 (68.9%) of the total, and black citizens, 2,221,697 (27.2%).

Importantly, the vast majority of arrests were for property crimes or other low-level offenses, wherein the potential need to use lethal force is likely low in most cases. In 2015, 386,467 arrests followed the commission of a violent crime (i.e., murder/nonnegligent manslaughter, rape, robbery, or aggravated assault). Among these *arrests for violent crime*, 232,180 (60.1%) offenders were white and 140,543 (36.4%) were black. In 2016, there were 408,873 violent crime arrests. Of them, 241,063 (59.0%) involved white citizens and 153,341 (37.5%) involved black citizens. In 2017, there were 404,236 violent crime arrests – 236,590 (58.5%) involving white citizens and 151,744 (37.5%) involving black citizens.

Our third arrest benchmark is arrests for weapons offenses (i.e., carrying, possessing, etc.), since officers are more likely to use lethal force in response to a deadly threat (Fyfe, 1980; Geller & Karales, 1981; White, 2006). Indeed, *The Washington Post's* data show that more than 80% of fatal OIS in 2015 involved suspects in possession of a deadly weapon (Nix et al., 2017). Of the 110,822 *arrests for weapons offenses* in 2015, 63,967 (57.7%) offenders were white and 44,284 (40.0%) were black. In 2016, there were 124,150 arrests for weapons offenses. Of them, 69,414 (55.9%) involved white citizens and 51,898 (41.8%) involved black citizens. In 2017, there were 128,009 arrests for weapons offenses – 68,787 (53.7%) involving white citizens and 56,143 (43.9%) involving black citizens.

***Analytic Strategy***

To assess whether black citizens were more likely to be fatally shot from 2015 to 2017 relative to white citizens, we calculate odds ratios using each of our seven benchmarks for each year. The odds ratio is simply the black fatality rate divided by the white fatality rate:

$$\frac{[Black\ and\ Fatally\ Shot\ \div Black\ Benchmark]}{[White\ and\ Fatally\ Shot\ \div White\ Benchmark]}$$

Odds ratios greater than 1.0 indicate that black citizens were *more likely* than white citizens to be fatally shot, based on the benchmark being used. Odds ratios less than 1.0 indicate that black citizens were *less likely* than white citizens to be fatally shot, based on the benchmark being used.

A small number of fatal OIS each year involve citizens whose race *The Washington Post* could not determine. Accordingly, we calculate confidence intervals, whereby the lower bounds assume every undetermined race was white, and upper bounds assume every undetermined race was black. In cases where the confidence interval includes values both above and below 1.0, we cannot say for sure whether black citizens are more or less likely than white citizens to be fatally shot by police officers.

## Results

The odds ratios for all fatal OIS are presented in Table 1. For ease of interpretation, we have also displayed the odds ratios and their confidence intervals graphically, in Figure 1. An initial takeaway from these analyses should be that fatal OIS are rare phenomena, regardless of the benchmark being used. For example, although police fatally shot 259 black citizens in 2015, they *did not* use lethal force in 140,543 arrests of black citizens for violent crimes. Similarly,

while police fatally shot 497 white citizens in 2015, they *did not* fatally shoot suspects during 63,967 arrests of white citizens for weapons offenses. Second, the results highlight the monumental importance of selecting an appropriate benchmark. The population benchmark gives the appearance that black citizens were roughly three times as likely as white citizens to be fatally shot by police each of the last three years (though notably, the odds ratio declined slightly each year). The problem is that most of the population (white or black) was not exposed to the risk of being fatally shot during this time; therefore, these people should be excluded from any analysis comparing racial differences in fatal OIS.

[TABLE 1 HERE]

[FIGURE 1 ABOUT HERE]

When we restricted our attention to an estimate of those who had some sort of involuntary contact with police, we found that black citizens were more than three times as likely as white citizens to be fatally shot each year. Using traffic stops as a benchmark, results suggest black citizens were over 3.5 times as likely as white citizens to be fatally shot in 2015 and 2016, and about 3.4 times as likely to be fatally shot in 2017. Using street stops, black citizens were approximately 2.5 times as likely to be fatally shot in 2015 and 2016, and about 2.4 times as likely to be fatally shot in 2017. Although police-citizen interaction data is a more appropriate benchmark than population data, it is a conservative estimate of potentially lethal interactions, since so many interactions are for minor offenses that typically end peacefully.

Using arrests as a benchmark for fatal OIS requires making more assumptions (which we elaborate below), but arguably gets us closer to the universe of incidents that could reasonably require a lethal response by officers. When we benchmarked fatal OIS against arrests, the results

were more nuanced. On the one hand, using *total arrests*, we observed that black citizens were 1.37 times as likely as white citizens to be fatally shot in 2015, 1.30 times as likely to be fatally shot in 2016, and 1.23 times as likely to be fatally shot in 2017. On the other hand, using *arrests for violent crimes* and *arrests for weapons offenses*, we found that black citizens were less likely to be fatally shot than white citizens across all three years (odds ratios ranged from 0.60 to 0.86). Note, however, that 1.0 falls within the *violent crime* confidence interval in 2017. This means we cannot say with 100% certainty which group was more or less likely to be involved in fatal OIS in 2017, based on the violent crime benchmark. In any event, these disparities are less extreme than suggested by the population and police-citizen interaction benchmarks, and may in fact run in the opposite direction once we hone in on the most potentially dangerous arrest scenarios (see also Cesario et al., 2018). Such simple analyses demonstrate the importance of identifying a proper benchmark for fatal OIS. With that in mind, we turn to a discussion of the implications of our findings, as well as the limitations that accompany each of the various benchmarks we employ.

## Discussion

Throughout the fall of 2017, over 250 NFL players kneeled during the US National Anthem in protest of perceived racial injustices by the criminal justice system – particularly police shootings of black men. Their protests garnered immense coverage by the news media and were met with fierce criticism from some (most notably President Trump). While we do not dispute the existence of various racial injustices in our society, the notion that black men are disproportionately killed by police appears to be based on a fundamentally flawed benchmark. For example, on June 6, 2018, NFL player Malcolm Jenkins gave a silent interview in which he held up a sign stating that African American males make up 8% of the US population but 25% of

those fatally shot by police (Boren & Bogage, 2018). Just two weeks earlier, *The Huffington Post* published a story with the headline "Police Killed at Least 378 Black Americans from the Moment Colin Kaepernick Protested," which insinuates this is excessive (Murdock, 2018). While numerators like these are technically accurate, they fail the iceberg test. As we have argued, it is critical to use an appropriate benchmark when trying to make sense of observed racial differences in fatal OIS, and our results illustrate how population data produces flawed conclusions. The reason is that the rate at which white and black citizens encounter police officers differs substantially (Kochel et al., 2011; Smith et al., 2017), so by extension, the rate at which they are exposed to the risk of being fatally shot differs as well. The population benchmark does not take into consideration these different exposure rates.

We submit that arrest data is certainly a more appropriate benchmark for OIS than population data, since it represents the subset of the population that had interactions with police that could potentially turn deadly (Cesario et al., 2018). The key assumptions are as follows:

(1) *OIS occur in response to perceived imminently dangerous citizen behaviors*,
(2) *Criminal behavior is a reasonable proxy for imminently dangerous behavior*, and
(3) *Arrests are a reasonable proxy for criminal behavior.*

Our results indicate that when benchmarked against all arrests reported to the UCR, fatal OIS appear distributed more evenly each year in terms of race. Yet, the odds ratios ranged from 1.23 in 2017 to 1.37 in 2015, indicating black citizens were more likely to be fatally shot than white citizens each of the last three years. Of course, many arrests each year are for minor offenses (e.g., liquor laws, curfew), wherein the probability of the encounter turning deadly is low. Hickman, Piquero, and Garner (2008) estimated that police use *non-lethal* force in approximately 20% of all arrests. A better approach, then, might be to focus solely on arrests that potentially

involve greater threat to officers. When benchmarked against arrests for violent criminal activity and weapons offenses (arguably the most dangerous arrest scenarios), black citizens were slightly *less* likely to be fatally shot by police from 2015 to 2017 (although, given the confidence interval for the violent crime benchmark in 2017, we cannot be 100% certain). These findings are consistent with a recent analysis that benchmarked fatal OIS documented by *The Guardian* against various arrest and reported crime measures (Cesario et al., 2018). Yet, a few caveats are in order.

First, the UCR has well documented limitations (Lynch & Addington, 2006). It is not mandatory for police departments to participate, so each year an unknown number of arrests go unreported. In 2015, only 12,692 departments (serving an estimated 77% of the US population) submitted arrest data disaggregated by race. In 2016, 13,049 departments (serving an estimated 81% of the US population) submitted these data, and in 2017, 12,599 departments (serving an estimated 78% of the US population) submitted these data. Further complicating matters, the pattern of missing data is not random: small agencies are underrepresented in the UCR (Maltz, 2006), but they account for many fatal OIS each year (Sherman, 2018). Second, arrests are only a subset of all police-citizen interactions, all of which could potentially escalate to lethal force incidents. *The Washington Post's* data suggest that a substantial number of fatal shootings each year result from interactions that frequently do not end in arrests, such as traffic stops, domestic disturbances, suspicious person stops, and officers responding to 911 calls about mentally ill persons (see Frankham, 2018; Nix & Alpert, 2018; Pinchevsky & Nix, 2018). In other words, one need only examine the numerator (i.e., known fatal OIS) to see that a substantial portion of fatal OIS do not stem from violent criminal activity on the part of the citizen. As Zimring (2017, p. 56) argues:

> *The tendency of both police and observers to assume…police use of force is closely associated with violent crime and criminal justice should be modified in significant ways to accord for the disturbances, domestic conflicts, and emotional disruptions that frequently become the caseload of police officers.*

We agree, and urge caution when benchmarking fatal OIS against arrest data.

Even if we set these concerns aside, a lingering issue is that the arrest benchmark does not take into consideration departmental policies and/or potentially biased decision-making that may occur prior to the decision to arrest. Indeed, studies suggest officers are more likely to stop (Epp et al., 2014; Gelman et al., 2007) and search (Engel & Calnon, 2004; Engel & Johnson, 2006) black citizens than white citizens. They may also perceive black citizens as more suspicious or dangerous (Holmes & Smith, 2012; Smith & Alpert, 2007). These decisions – and perceptions – ultimately give rise to interactions that may subsequently result in the use of lethal force. For those who seek to benchmark OIS against measures of criminal activity, one way around this potential issue is to use data not generated by law enforcement, such as the National Crime Victimization Survey, or mortality data from the Centers for Disease Control and Prevention (see Cesario et al., 2018). However, it bears repeating that fatal OIS do not stem exclusively from violent crimes.

Arguably, a purer benchmark for OIS is police-citizen interactions, as it avoids some of the aforementioned pitfalls of the arrest benchmark. The PPCS provides the best national estimate of police-citizen interactions currently available, but it is not perfect. It estimates the number of persons age 16 or older who had 1 or more interactions with a police officer in the previous 12 months – but only every three years. As a result, we were forced to calculate the average number of interactions reported over the last four waves of the survey, the most recent of which was administered in 2011. Recent studies suggest that in 2015-16, officers in many cities

may have been "de-policing" (i.e., avoiding proactively stopping citizens) in response to public scrutiny in the post-Ferguson era (Nix, Wolfe, & Campbell, 2018; Morgan & Pally, 2016; Shjarback, Pyrooz, Wolfe, & Decker, 2017). Unfortunately, we are left to wonder whether such behavior was widespread enough to skew national estimates of police-citizen interactions, since the most recent PPCS available was administered seven years ago.[5] The PPCS also samples households, thereby excluding homeless individuals or those incarcerated at the time of the survey as a result of being arrested by a police officer in the previous year. Bearing these limitations in mind, we benchmarked fatal OIS from 2015-17 against estimates for the annual total of police-initiated stops, as well as broken down by traffic stops and street stops. We found that black citizens were approximately 2.4 to 3.7 times as likely as white citizens to be fatally shot (depending on the specific benchmark being used). Although we believe this benchmark is purer than the arrest benchmark (in terms of assumptions being made), the drawback is that so many police-citizen interactions never come close to requiring officers to use any level of force, let alone lethal force.

In a pair of recent agency-level studies, researchers benchmarked OIS against instances in which officers drew and pointed their firearms, but *did not shoot* (Wheeler et al., 2018; Worrall et al., 2018). Theoretically, a comparison of these two outcomes – shot vs. did not shoot – constitutes a sound benchmark because it excludes interactions where it is improbable a citizen would be shot, given officers never drew their firearms. Unfortunately, using such a benchmark for OIS in more than one city would be quite challenging. Agency policies that address the drawing and pointing of firearms, as well as if/when it must be reported, vary greatly. Consequently, officers in some departments are restricted more than others in when they can

[5] As of 9/24/2018, the results of the 2015 PPCS had yet to be published by BJS.

draw and point their firearm at a citizen. For example, the Dallas Police Department allows officers to "draw or display firearms when there is a threat or reasonable belief that there is a threat to life or they have a reasonable fear for their own safety and/or the safety of others." However, "the policy does not require an officer to report drawing a firearm if it is done when the action is consistent with normal training standards" such as building searches or felony traffic stops (Wheeler et al., 2018:70). This policy's *threat to life* language is clearer and easier to audit than traditional policies requiring only that officers fear for their safety. Of course, policy language means little if officers do not adhere to it (e.g., pointing their gun to deter suspects from fleeing).

It is unlikely such a benchmark would ever be feasible on a national scale, but we encourage researchers to utilize it in jurisdictions that collect data on when their officers point their firearms, as long as the policy is clear and available to be audited. Another consideration to bear in mind is that the decision by officers to draw and point their firearms may itself be biased. In the aforementioned southwestern agency, officers pointed their guns at four times as many black citizens as white citizens from 2013 to 2016 (Wheeler et al., 2018:59). The lingering question is whether this is a reasonable disparity. For instance, black citizens may be more likely to encounter officers since they disproportionately reside in neighborhoods that experience higher rates of crime, which are the very neighborhoods to which police devote more of their resources. It is also possible that officers are quicker to draw their firearm when they encounter black citizens because they associate them with crime and/or violence (Smith & Alpert, 2007). As Holmes and Smith (2012, p. 347) argue, in high-crime areas of the community, "apprehension, fear, and anger are always relatively close to the surface, ready to take hold of a police officer's conduct." Interestingly, then, researchers must come up with a suitable

benchmark for making sense of observed racial disparities within the universe of instances in which officers point their guns.

We would be remiss not to point out three limitations of our study. First, *The Washington Post's* database does not include OIS that do not result in fatalities (i.e., non-fatal wounds and misses), which also qualify as uses of lethal force (Fyfe, 1978). It remains unknown how many nonfatal OIS occur nationally each year, though they likely outnumber fatal OIS. Recently, *VICE News* obtained data on all OIS by 47 of the 50 largest jurisdictions from 2010 to 2016 and found that roughly two-thirds were nonfatal (McCann et al., 2017). Moreover, there was substantial variation across jurisdictions. In some, roughly 1 in 5 OIS were fatal (e.g., St. Louis, Chicago, Houston), whereas in others, 40-50% were fatal (e.g., Las Vegas, Los Angeles, Phoenix).[6] Consequently, we must always bear in mind that fatal OIS are not a random sample of all OIS. The fatality ratio varies across time and space (Geller & Scott, 1992; Klinger, 2012), and is likely influenced by departmental policies on rendering aid or how close the nearest trauma center is (Giacopassi, Spager, & Stein, 1992; MacKenzie et al., 2006).

A second limitation of our approach is that by analyzing national data, we lose the precision that can be achieved with single agency data. Each of these fatal OIS were complex interactions, involving multiple actors, with many important variables influencing the outcome. For example, the odds ratios we calculated do not account for citizens' level of resistance or threatening behavior (independent of whether they were armed) – which are intricately connected to the level of force officers use and may explain observed racial disparities (Alpert & Dunham, 2004; Garner, Maxwell, & Heraux, 2002; Terrill, 2003; Terrill & Mastrofski, 2002).

[6] See "Get the Data," *Vice News*, https://news.vice.com/en_us/article/a3jjpa/nonfatal-police-shootings-data.

Our intention was not to oversimplify these events. Nor do we wish to minimize concern over particularly troubling shootings like that of Walter Scott, or suggest the aforementioned NFL players' protests are entirely without merit. Indeed, the NFL and the Players Coalition recently agreed to devote approximately $90 million to help combat various social injustices, which is a noble undertaking (Maske, 2017). Our goal here was simply to demonstrate the importance of selecting an appropriate benchmark to contextualize observed racial disparities in fatal OIS.

A third noteworthy limitation of our study is the inability to benchmark the most controversial fatal shootings – those of citizens who posed no imminent threat (i.e., unarmed and not aggressing). In this case, the research question would be: *Are black citizens who pose no imminent threat more likely to be fatally shot by police than white citizens who pose no imminent threat, given each group's exposure to police contact?* In order to answer this question, we would need benchmarks that tells us how often officers interact with unarmed and non-aggressing citizens of each racial group. These data do not exist – at least on the national level. As such, we cannot get around the iceberg problem: though we might be able to identify fatal shootings of black and white citizens who posed no imminent threat in *The Washington Post's* data, we cannot adequately contextualize these numerators without appropriate denominators.

In conclusion, we echo the call for our federal government to compile a comprehensive database of *all* OIS, including those that do not result in death. Three years have passed since the FBI pledged to collect better data. Though there is speculation their new system could launch by 2019, there is apparently no set timetable, and fewer than 2,000 agencies have thus far agreed to participate (Elinson, 2018). We acknowledge it is a monumental task to collect data from over 17,000 law enforcement agencies, but it is unacceptable that we do not know how often police officers fire their guns at citizens in the United States. In the meantime, the best available data

come from *The Washington Post*. We can learn a great deal from these data (see Sherman, 2018; Zimring, 2017), as long as we acknowledge the limitations and use a meaningful benchmark to put the numbers into context. Of course, each benchmark comes with its own set of assumptions and limitations, which we must also acknowledge.

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Table 1. Odds of black citizens being fatally shot relative to white citizens, using various benchmarks, 2015-17.

| 2015 | Black Citizens | White Citizens | Odds Ratio | Confidence Interval[a] |
|---|---|---|---|---|
| Fatally Shot by Police | 259 | 497 | — | — |
| *Benchmark* | | | | |
| Population | 39,908,095 | 232,943,055 | 3.04 | (2.87, 3.38) |
| Avg. Number of Police-Initiated Contacts | 2,542,400 | 16,642,200 | 3.41 | (3.22, 3.79) |
| Avg. Number of Traffic Stops | 2,001,000 | 13,997,700 | 3.65 | (3.44, 4.05) |
| Avg. Number of Street Stops | 541,400 | 2,644,500 | 2.55 | (2.41, 2.83) |
| Total Arrests | 2,197,140 | 5,753,212 | 1.37 | (1.29, 1.52) |
| Arrests for Violent Crime | 140,543 | 232,180 | 0.86 | (0.81, 0.96) |
| Arrests for Weapons Offenses | 44,284 | 63,967 | 0.75 | (0.71, 0.84) |
| **2016** | **Black Citizens** | **White Citizens** | **Odds Ratio** | **Confidence Interval[a]** |
| Fatally Shot by Police | 234 | 466 | — | — |
| *Benchmark* | | | | |
| Population | 40,241,818 | 233,657,078 | 2.92 | (2.58, 3.68) |
| Avg. Number of Police-Initiated Contacts | 2,542,400 | 16,642,200 | 3.29 | (2.91, 4.14) |
| Avg. Number of Traffic Stops | 2,001,000 | 13,997,700 | 3.51 | (3.11, 4.43) |
| Avg. Number of Street Stops | 541,400 | 2,644,500 | 2.45 | (2.17, 3.09) |
| Total Arrests | 2,263,112 | 5,858,330 | 1.30 | (1.15, 1.64) |
| Arrests for Violent Crime | 153,341 | 241,063 | 0.79 | (0.70, 0.995) |
| Arrests for Weapons Offenses | 51,898 | 69,414 | 0.67 | (0.59, 0.85) |
| **2017** | **Black Citizens** | **White Citizens** | **Odds Ratio** | **Confidence Interval[a]** |
| Fatally Shot by Police | 223 | 458 | — | — |
| *Benchmark* | | | | |
| Population[b] | 41,366,336 | 235,494,966 | 2.77 | (2.35, 3.80) |
| Avg. Number of Police-Initiated Contacts | 2,542,400 | 16,642,200 | 3.19 | (2.70, 4.37) |
| Avg. Number of Traffic Stops | 2,001,000 | 13,997,700 | 3.41 | (2.88, 4.67) |
| Avg. Number of Street Stops | 541,400 | 2,644,500 | 2.38 | (2.01, 3.26) |
| Total Arrests | 2,221,697 | 5,626,140 | 1.23 | (1.04, 1.69) |
| Arrests for Violent Crime | 151,744 | 236,590 | 0.76 | (0.64, 1.04) |
| Arrests for Weapons Offenses | 56,143 | 68,787 | 0.60 | (0.51, 0.82) |

[a] Each year, a small number of fatal OIS involve citizens whose race could not be determined by *The Washington Post.* This column displays the lower bound (assuming all undetermined races were white) and the upper bound (assuming all undetermined races were black) of the odds ratio. In 2015, there were 29 fatal OIS involving citizens of an undetermined race. In 2016, there were 61, and in 2017, there were 83 (figures current as of 9/24/2018).
[b] ACS 1-year estimates.
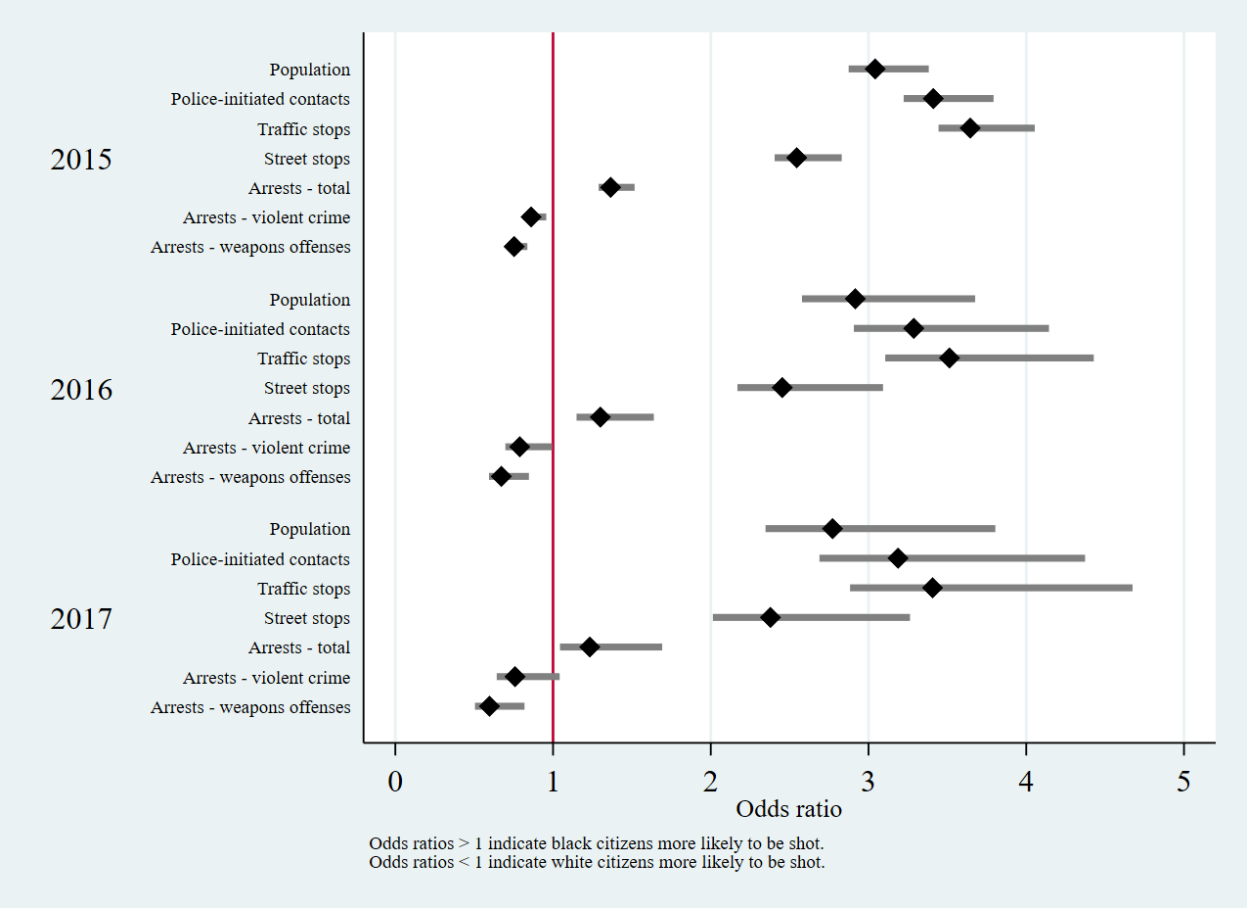
Figure 1. Boxplots displaying the odds of black citizens being fatally shot relative to white citizens, using various benchmarks, 2015-17.