

# Effect of race on suspect injuries during encounters with police

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## ABSTRACT

**Objectives** To estimate the effects of race and ethnicity on suspect injuries during use of force encounters with police in Tucson, Arizona.

**Methods** Data on all use of force cases recorded by the Tucson Police Department from January 2018 to March 2020 were analysed. Logistic regression was used to estimate the effects of race and ethnicity on the likelihood of suspect injuries controlling for a variety of other factors.

**Results** Overall, 28.5% of people who had force used against them by Tucson police were injured. Multivariate analyses reveal that among those who had force used against them, African-American suspects were significantly less likely than white suspects to be injured. The risk of injury for other racial and ethnic groups is about the same as the risk for white suspects. Resisting arrest and seeking to escape from police custody do not increase the risk of injury among suspects, but assaulting officers or other individuals does increase the risk of injury. Certain types of force, such as canines, firearms and TASERS, are associated with significantly elevated risks of injury among suspects.

**Conclusions** Numerous interest groups have raised concerns about the police use of force against minorities. Using publicly available data, this analysis examined the effects of race and ethnicity on risk of injury during the use of force encounters with police in Tucson. The findings reveal that minorities are not injured at elevated rates relative to whites. To the contrary, African-American suspects are less likely to be injured than white suspects are.

## BACKGROUND

Police use of force in the USA is now considered a key public health issue, particularly among marginalised populations. The American Public Health Association has called for governments at all levels to ‘eliminate policies and practices that facilitate disproportionate violence against specific populations’.<sup>1</sup> Similarly, the American Medical Association has urged Congress to enact policing reforms ‘to end discriminatory practices and unnecessary or excessive use of force’.<sup>2</sup> A major obstacle to progress in preventing inequitable police use of force is a lack of knowledge about where, when, with whom and under what conditions it occurs. Empirical research on the risk factors for excessive and inequitable uses of force is vital for designing effective prevention efforts.

Police use of force against minorities has received significant attention from the media and the public in recent years. The death of Michael Brown in

Ferguson, Missouri, and several other police-involved deaths of minorities fuelled the growth of the Black Lives Matter movement. The death of George Floyd under the knee of a Minneapolis police officer further inflamed public sentiment and led to a wave of protests and riots throughout the USA and elsewhere in the world. Although certain politicians have expressed doubt about the disparities underlying these racial tensions, research has demonstrated clear racial inequities in the extent to which police stop,<sup>3,4</sup> arrest<sup>5</sup> and use force<sup>6–8</sup> against minorities. At the same time, findings regarding racial disparities in policing vary widely and often depend on where, when and how the research was conducted.<sup>9</sup>

These racial disparities have harmful effects on those who are stopped or arrested or who have force used against them.<sup>10–13</sup> However, a growing body of research is also beginning to unravel the vicarious consequences of these disparities for minority communities more generally. For instance, research in Milwaukee found that a highly publicised instance of police use of force against an unarmed black man resulted in a significant decrease among black residents in willingness to report crime.<sup>14</sup> Other studies have identified deleterious physiological and psychological consequences of living in communities where police are perceived as hostile or violent toward racial and ethnic minorities.<sup>15–19</sup>

One question that is not yet well understood is the extent to which race influences whether suspects are injured during use of force encounters with police. Recent public policy debates suggest that African-Americans and other minorities are not only subject to more *frequent* use of force, but also more *severe* uses of force that increases the likelihood of injury. The research evidence on this issue is not yet well-developed, but the evidence currently available suggests that racial and ethnic minorities are *not* injured at higher rates than whites are. For instance, a national study in the USA found that ‘34 people were killed or medically treated for injury by law enforcement per 10 000 stops/arrests’ and that this ratio is ‘surprisingly consistent by race/ethnicity’.<sup>20</sup> A study of 13 US police departments found that white suspects were more likely to be injured and to require medical attention than non-white suspects were. No racial differences were found for receiving serious injuries or requiring hospitalisation due to injuries sustained during an encounter.<sup>21</sup> Another study of 12 US police departments found that white suspects were significantly more likely than non-white suspects were to be injured during encounters in which police used force.<sup>22</sup> Finally, a study in the Los Angeles Police Department (LAPD) found that



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black suspects were less likely to be bitten by police canines than white suspects were, even though the LAPD ‘deployed its dogs disproportionately to African-American neighbourhoods’.<sup>23</sup> Although research evidence has identified racial disparities at many points in the criminal justice process, the evidence suggests that once involved in a use of force encounter with police, minorities may not be at greater risk of sustaining injuries than whites.

Here we draw on newly available data from the Tucson Police Department in Arizona to estimate the effects of race and ethnicity on the likelihood of suspect injury during use of force encounters with police. The Tucson police have been accused of engaging in ‘anti-black policing’ by the American Civil Liberties Union.<sup>24</sup> While addressing that sweeping criticism is beyond the scope of this paper, the analysis presented here examines one type of racial disparity: the extent to which minorities and non-minorities are injured at similar rates once involved in a police use of force incident. The analysis does *not* examine the causal factors that influence whether force was used in the first place.

## METHODS

This study is based on 2119 police use of force cases documented by the Tucson Police Department from 1 January 2018 to 31 March 2020. The publicly available data set contains information on the nature of the encounter, the race and sex of the suspect, the type of force used and whether the suspect was injured. The dependent variable in this analysis is whether the suspect was injured (1=injured, 0=not injured). No data were available on the nature or severity of injuries sustained by suspects.

The independent variables in this analysis fall into three categories. The first category focusses on the demographic characteristics of the suspect. I included four dichotomous variables to measure the race/ethnicity of the suspect (Native American, African-American, Hispanic and unknown/other), with white excluded as the reference category. I also included one dichotomous variable for the sex of the suspect (1=male, 0=other). The second category focusses on the suspect’s behaviour. I included two dichotomous variables, one to capture those instances in which the suspect assaulted an officer or another individual during the encounter, and another to capture when the suspect passively resisted arrest or sought to escape. Both variables represent resistance to police authority. Here I separated them into two variables to determine whether aggressive forms of resistance (involving a suspect committing assault) are more likely to result in suspect injuries than passive forms of resistance. The reference group for these two variables included instances in which force was used because the individual was a crime suspect (56.7% of all cases), was a danger to self or others (6.6%) or verbally threatened the officer (1.7%).

The third category of independent variables focusses on the type of force used by police against the suspect. This category includes eight dichotomous variables. These include one for the use of firearms (pistols and rifles), one that combines the use of three types of less lethal impact munitions (ARWEN, flex baton, and pepperballs) into a single variable and six that capture the use of other forms of less lethal force (hands-on tactics, baton/flashlight, OC spray, TASER, canine and CS gas). The reference category for these eight dichotomous variables is all other types of force, which include 1357 ‘shows of force’ (in which a weapon was displayed but not used), and 75 miscellaneous uses of force that did not fit any of the variables included here.

**Table 1** Descriptive statistics for all use of force cases

Variable	Number	Per cent
Suspect injured	604	28.5
Suspect race/ethnicity: Native American	83	3.9
Suspect race/ethnicity: African-American	354	16.7
Suspect race/ethnicity: Hispanic/Latino	1006	47.5
Suspect race/ethnicity: Unknown/other*	248	11.7
Suspect sex: Male	1961	92.5
Suspect behaviour: Assaulting officers or others	215	10.1
Suspect behaviour: Resisting arrest or seeking to escape	526	24.8
Force type: Firearm (pistol/rifle)	20	1.0
Force type: Less lethal impact munition	81	3.8
Force type: Hands-on tactics	670	31.6
Force type: Impact weapon (baton/flashlight)	9	0.4
Force type: OC spray	19	0.9
Force type: TASER	112	5.3
Force type: Canine	77	3.6
Force type: CS gas	9	0.4

\*Incidents that included one or more white suspects, which comprise 37.3% of the sample, serve as the reference category for the suspect race variables. The percentages of the race categories add up to more than 100% because some incidents featured two or more suspects with different races.

## Patient and public involvement

This study was carried out using secondary data available from the Tucson Police Department. Patients or the public were not involved in the design, conduct, reporting or dissemination plans of the research.

## RESULTS

Table 1 presents descriptive statistics for all variables included in the model, including the dependent variable and the three categories of independent variables. Out of 2119 use of force incidents, suspects were injured in 604 incidents (28.5%). Incidents included in the database involved suspects with the following racial and ethnic distribution: Native American (3.9%), African-American (16.7%), Hispanic or Latino (47.5%) and unknown/other (11.7%). White suspects were involved in 37.3% of the incidents in the database. Incidents involving one or more white suspects serve as the reference category for the race variables in the multivariate analyses that follow. The overwhelming majority of incidents involved male suspects (92.5%). In terms of behaviour, suspects were coded as assaulting the officer or another person during the encounter in 10.3% of the cases and resisting the officer or trying to escape in 24.8% of the cases.

Table 1 shows that the most commonly employed use of force by police was ‘hands-on’ tactics (31.6%). This category includes the use of hands, feet, knees and legs against the suspect. The second most commonly employed use of force was the TASER (5.3%). None of the six remaining types of force included in the multivariate model was used in more than 5% of cases.

To test the effect of race and ethnicity on suspect injury, I estimated a binary logistic regression model that assessed the effect of all independent variables on the odds that a suspect was injured during a police use-of-force encounter. The analysis was carried out using SPSS V.26 and the results are shown in table 2. An omnibus test revealed that the full model containing all independent variables is a significant improvement over a model containing only a constant ( $\chi^2=1163.91$ ,  $df=15$ ,  $p<0.001$ ).

**Table 2** Logistic regression results for suspect injuries

Variable	B	SE	P value	OR
Suspect race/ethnicity: Native American	0.052	0.312	0.868	1.05
Suspect race/ethnicity: African-American	-0.708	0.208	0.001	0.49
Suspect race/Ethnicity: Hispanic/Latino	-0.123	0.148	0.406	0.88
Suspect race/ethnicity: Unknown/other*	-0.078	0.218	0.719	0.93
Suspect sex: Male	-0.058	0.252	0.818	0.94
Suspect behaviour: Assaulting officers or others	0.761	0.217	0.000	2.14
Suspect behaviour: Resisting arrest or seeking to escape	0.265	0.164	0.105	1.30
Force type: Firearm (pistol/rifle)	4.535	0.807	0.000	93.22
Force type: Less lethal impact munition	2.246	0.316	0.000	9.45
Force type: Hands-on tactics	3.460	0.180	0.000	31.81
Force type: Impact weapon (baton/flashlight)	0.848	1.044	0.417	2.34
Force type: OC spray	1.237	0.680	0.069	3.44
Force type: TASER	2.621	0.298	0.000	13.75
Force type: Canine	7.359	1.020	0.000	1569.58
Force type: CS gas	-1.061	1.209	0.380	0.35
Constant	-3.076	0.282	0.000	0.046

\*Incidents that included at least one white suspect serve as the reference category for the suspect race variables.

Regression diagnostics revealed that the largest variance inflation factor was 1.4, well below the ordinary thresholds for inferring a problem with multicollinearity.<sup>25</sup>

In terms of race and ethnicity, the most striking finding in table 2 is that during a use of force encounter with police, African-Americans are significantly *less* likely to be injured than whites are. The OR for African-American suspects is 0.49, which means when involved in a use of force incident with police, their odds of being injured are about half those of white suspects. None of the other race and ethnicity variables is statistically significant. Put differently, when involved in a police use of force incident, other minority suspects have approximately the same odds of being injured as white suspects.

In terms of suspect behaviour, the findings in table 2 show that when suspects were engaged in assaulting either the officer or another individual during the encounter, they were significantly more likely to have been injured. The OR of 2.14 suggests that the odds of being injured are more than twice as high for those suspects who were engaged in assault compared with those who were not. When suspects resist arrest or seek to escape, their odds of being injured are not significantly different than those of suspects who do not engage in this type of behaviour (recall that the reference category for the suspect behaviour variables includes those who had force used against them because they were crime suspects, were considered a danger to themselves or others, or verbally threatened the officer).

In terms of the types of force used by officers, certain types are associated with significantly greater risk of injury to suspects. In descending order of risk (with ORs shown in parentheses), the types of force associated with significant increases in the risk of suspect injuries are canines (1569.6), firearms (93.2), hands-on tactics (31.8), TASERs (13.8) and less lethal impact munitions (9.5). The other types of force shown in table 2 do not have

statistically significant effects on the odds of the suspect being injured. An alternative specification of the model that included a variable to account for the use of multiple types of force during a single encounter did not alter any of the substantive findings, including the significant negative coefficient for whether the suspect was African-American.

## DISCUSSION

This article examined the effect of race and ethnicity on injuries to suspects in police use-of-force cases in Tucson, Arizona. Using publicly available data released by the Tucson Police Department, the analyses presented here found that among people involved in a use of force encounter with police, racial minorities were *not* more likely to be injured than whites were. The risk of injury for African-American suspects was about half the risk faced by white suspects. The risk of injury for other minority suspects was about the same as for whites. These findings are consistent with those from earlier research on the effect of race on suspect injuries during encounters with police.<sup>20–23</sup>

Numerous studies have documented disparate treatment of African-Americans and other racial and ethnic minorities at various stages of the criminal justice process in the USA.<sup>26–28</sup> In policing, research has found inequalities in the decisions to stop, arrest and use force against minorities.<sup>1–6</sup> These issues have led to a massive wave of civil unrest throughout the USA as Americans fight for fairer and more equitable policing practices that result in less collateral damage to minority communities.<sup>29</sup>

In Tucson, police have been accused of engaging in racially disproportionate policing, particularly against blacks and Hispanics.<sup>24–30</sup> This study examines only one of many outcomes in the criminal justice process: the likelihood of injury during a police use of force encounter. However, the findings reveal no evidence of disparate treatment of minorities relative to whites. To the contrary, the findings show that during police use of force encounters in Tucson, the odds of being injured are twice as high for whites than for African-Americans. For Hispanics, the odds of being injured are about the same as those for whites. This study cannot be used as evidence in favour of or against the idea of racial disparity in other police-related outcomes, including whether minorities are stopped, searched, arrested or subjected to force at greater rates than non-minorities. The findings reported here provide no evidence of racial disparity among blacks and Hispanics (relative to whites) with regard to one outcome—suspect injuries—during encounters in which police use force.

The other independent variables included in the multivariate model raise some interesting findings. While it is often assumed that suspect resistance will lead to more frequent and severe uses of force, and therefore more injuries among suspects, the results presented here show no significant relationship between suspect resistance and likelihood of being injured. On the other hand, suspects who assaulted officers or other individuals during the encounter had more than double the odds of being injured.

While the findings reported here are robust across various model specifications, some limitations are worthy of consideration. The data used in this study are based on administrative data collected and made available to the public by a police department. It is difficult to gauge the quality and integrity of the data set without knowing more details about how it was produced. Previous research has found that internal reporting procedures within police agencies, particularly jail intake procedures, provide a useful form of validation for suspect injury data.<sup>31</sup> As with any secondary data source, the data used here are

missing key information that would be useful to have. Additional information about the suspects, the officers and the encounters would allow for more nuanced analyses. For example, it would be useful to know the age of the suspects and the extent to which they may have been under the influence of drugs or alcohol. Given widespread concerns about police interactions with people experiencing mental health challenges, knowing more about the mental health status of the suspects would also be useful.<sup>32–33</sup> It would also be useful to know more about the nature and severity of the suspects' injuries rather than simply whether the suspect was injured or not. Moreover, while demographic information is available about the suspects in these encounters, such information is not available about the officers. Knowing more details about the contextual features of these incidents would allow for deeper understanding of the circumstances associated with suspects being injured during encounters with police. Finally, this is a single-site study using data from a police department in one US city. The findings cannot be generalised to other cities.

In spite of these limitations, the analyses reported here provide useful findings about the effects of race and ethnicity in policing during a time when these issues are highly salient, not only in Tucson but also throughout the USA. Concerns about racial inequities in policing continue to dominate both social media and conventional media. New research continues to emerge on the public health implications of police treatment of minorities, and especially the police use force.<sup>10–20</sup> Empirical research is sorely needed to examine the many claims and counter-claims that arise in the ongoing debate over these issues.<sup>34–37</sup> Qualitative interviews of people who have experienced police use of force would be useful for tapping into their feelings and perceptions about these incidents. This type of research would be especially useful for learning whether race influences the extent to which people are willing to report certain injuries (especially those that are less obvious) to the police.

## IMPLICATIONS FOR PREVENTION

Discussions about the police treatment of minorities and the police use of force often seem to operate on the assumption that racial and ethnic inequities are omnipresent in every community and at every point in the criminal justice process. Research evidence clearly points to certain types of inequities, such as the finding that even after controlling for numerous competing explanations, minorities are arrested more often than whites are.<sup>5</sup> Yet, the discovery of certain inequities should not lead to the broader conclusion that there are racial and ethnic inequalities in all police-related outcomes. The findings from this study reveal that among people involved in a police use of force encounter in Tucson, African-Americans are less likely to be injured and other minorities are equally likely to be injured when compared with whites.

These findings emerge at a time when the Tucson police have been accused of racially discriminatory policing. The findings reinforce the importance of properly diagnosing both racial disparities and injuries. This will involve using data to identify the people, places, times, situations, outcomes and types of force where racial disparities and suspect injuries may be most concentrated. As is true for other public health problems, developing proper surveillance systems for monitoring injuries and deaths is essential for identifying appropriate solutions.<sup>38–40</sup> In an era in which police are routinely subjected to criticism for a variety of perceived problems, using data to clarify the specific nature of those problems can help to identify appropriate and actionable solutions. As minority communities in the USA struggle

to address their deeply felt sense of racial trauma, developing targeted, data-informed solutions is paramount.

### What is already known on the subject

- ▶ Research has demonstrated racial inequities in criminal justice outcomes.
- ▶ Racially unjust policing has harmful effects on those who experience it directly and on minority communities more generally.

### What this study adds

- ▶ Among those who had force used against them by Tucson police, African-American suspects were significantly less likely than White suspects to be injured.
- ▶ Other minority suspects had about the same likelihood of being injured as White suspects.
- ▶ Data on criminal justice outcomes can be useful for identifying and addressing racial inequities.

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**Patient and public involvement** Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

**Patient consent for publication** Not required.

**Ethics approval** The analysis of de-identified, publicly available data does not constitute human subjects research as defined by 45 CFR 46.102.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** The data used in this study are available from the Tucson Police Department: <https://policeanalysis.tucsonaz.gov>.

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