

Temporal Trends and Racial/Ethnic Inequalities for Legal Intervention Injuries Treated in Emergency Departments: US Men and Women Age 15–34, 2001–2014

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INTRODUCTION

In the USA, public health and medical professional associations have identified police violence as an issue of concern, calling for better monitoring of injuries caused by use of force and more research about the health consequences of police practices.^{1–3} A number of recent papers by public health scholars have addressed these issues: Some have examined the ways in which racially discriminatory policing influences health and community cohesion.^{4,5} Others have explored various options for using public health monitoring systems to provide better data to epidemiologists and the public on police-related fatalities and gunshot injuries.^{6–8} Still, others have produced analyses of existing injury and mortality data derived from hospital records and death certificates.^{9–11}

Researchers have yet to answer basic epidemiological questions about police violence, however, such as whether the incidence rate of injuries caused by US police has changed over time, or the degree to which these injuries are properly coded as “legal intervention” (i.e., those caused by law enforcement, as per the International Classification of Diseases (ICD)) and are therefore identifiable in statistical analyses of hospital data. Additionally, little attention has been paid to the role of private security guards in use-of-force incidents, even as the private security industry has grown steadily since 2001, and the number of private guards in the USA has come to be roughly equal to the number of police officers.^{12,13} The ICD definition of legal intervention refers to injuries inflicted by “police or other law-enforcing agents,” and does not make explicit mention of private security guards.¹⁴

This study adds to a growing literature on legal intervention injuries by analyzing nationally representative US data on injuries inflicted by police and private security and treated in hospital emergency departments (EDs). We aim to determine how numerous these injuries are, whether incidence rates have changed over time, and whether these rates vary by race/ethnicity.

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METHODS

We analyzed data from the National Electronic Injury Surveillance System—All Injuries Program (NEISS-AIP), which is administered by the US Consumer Product Safety Commission and collects data on all initial visits of patients treated for injuries in a nationally representative sample of 66 US hospital EDs.¹⁵ Health care providers reported patient gender (male, female, or unknown), age (continuous), and race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic/Latino, or other persons of color—i.e., American Indians/Alaska Natives, Asian/Pacific Islanders, and persons identifying as more than one race). Trained coders located at each hospital reviewed patient medical records, placing an injury into one of four mutually exclusive intent categories (unintentional injury, assault, self-inflicted, and legal intervention). Coders categorized an ED visit as resulting from legal intervention when a medical record indicated that the injury was inflicted by police or other legal authorities, including private security guards, during law enforcement activities (this differs from the ICD definition of legal intervention, which does not explicitly include private security guards). Under NEISS-AIP, the category of legal intervention includes “injuries and poisonings (mace, pepper spray) inflicted during legal action or execution, or while attempting to enforce the law such as arrest or restraint of arrested persons.”¹⁶

We accessed NEISS-AIP data on legal intervention injuries and assault-related injuries from the Centers for Disease Control and Prevention’s Web-based Injury Statistics Query and Reporting System (WISQARS) for nonfatal injuries, whose coverage period spans 2001–2014.¹⁷ WISQARS results account for NEISS-AIP’s sampling weights and survey design to provide nationally representative estimates of the number of injuries for a given query, a standard error for the estimate, and—based on US census data—the size of the corresponding at-risk population group. We restricted our queries to persons age 15–34, the highest risk group, accounting for 61.1 % of all legal intervention injuries over the study period.

We then employed Stata 13 to perform secondary analyses of the WISQARS data. We used inverse variance-weighted linear regression to test for trends in the annual rates of legal intervention ED visits per 100,000 population. We also computed rate ratios (RRs) and rate differences comparing black, Hispanic, and other persons of color to the white reference group. Due to a high level of missing data for patient race/ethnicity (20.7 % of cases, weighted), we conducted five sets of analyses, each with a different missingness assumption. For our primary analyses, we assumed race/ethnicity was missing at random (MAR) within years, and, for sensitivity analyses, we considered four scenarios, in which all missing were re-categorized as follows: (i) white, (ii) black, (iii) Hispanic, or (iv) other persons of color, thereby reflecting the extreme bounds for race/ethnicity missingness.¹⁸

We conducted all analyses, both for racial/ethnic inequalities and temporal trends, first for the entire population age 15–34, then stratified by gender (for men and women; no data existed to identify cases among transgender persons).

RESULTS

For the period 2001–2014, 683,033 (95 % confidence interval (CI): 524,102, 841,963) legal intervention injuries treated in EDs occurred for US persons age 15–34 (Table 1). Of these cases, 14.3 %, or 97,881 (95 % CI 79,814, 115,948) were women patients. The remaining 85.6 % of cases were men (585,012; 95 % CI: 441,854, 728,170). A small

TABLE 1 Racial/ethnic comparisons for legal intervention-related injuries treated in hospital emergency departments—nationally representative estimates for US men and women ages 15–34, 2001–2014

Gender	Missingness assumption for race/ethnicity ^a	Race/ethnicity	Total number of ED visits		% of ED visits	% of US population	ED visit rate (per 100,000)		Rate ratio		Rate difference (per 100,000)	
			Estimate	95 % CI			Estimate	95 % CI	Estimate	95 % CI	Estimate	95 % CI
All	None	All	683,033	(524,102, 841,963)	100.0	100.0						
		White	194,331	(144,197, 244,465)	35.9	59.7						
		Black	241,394	(129,014, 353,774)	44.6	14.1						
		Latino ^b	85,497	(26,034, 144,960)	15.8	19.4						
		Other persons of color ^{bc}	20,424	(0, 41,727)	3.8	6.7						
		Missing ^d	141,387	(79,924, 202,850)	20.7							
	Missing at random	White (referent)	245,058	(182,857, 307,258)	35.9	59.7	35.2	(26.2, 44.1)	1.00		0.00	
		Black	304,406	(184,769, 424,043)	44.6	14.1	172.4	(104.7, 240.2)	4.90	(3.07, 7.83)	137.26	(68.91, 205.62)
		Latino ^b	107,815	(43,533, 172,096)	15.8	19.4	50.1	(20.2, 79.9)	1.42	(0.74, 2.72)	14.91	(-16.25, 46.07)
		Other persons of color ^{bc}	25,755	(1337, 50,174)	3.8	6.7	32.7	(1.7, 63.7)	0.93	(0.35, 2.48)	-2.47	(-34.72, 29.78)
	All missing are white	White (referent)	335,718	(256,400, 415,036)	49.2	59.7	48.2	(36.8, 59.6)	1.00		0.00	
		Black	241,394	(129,014, 353,774)	35.3	14.1	136.7	(73.1, 200.4)	2.84	(1.68, 4.78)	88.60	(23.90, 153.23)
		Latino ^b	85,497	(26,034, 144,960)	12.5	19.4	39.7	(12.1, 67.3)	0.82	(0.40, 1.24)	-8.47	(-38.34, 21.40)

TABLE 1 Continued

Gender	Missingness assumption for race/ethnicity ^a	Race/ethnicity	Total number of ED visits		% of ED visits	% of US population	ED visit rate (per 100,000)		Rate ratio		Rate difference (per 100,000)	
			Estimate	95 % CI			Estimate	95 % CI	Estimate	95 % CI	Estimate	95 % CI
		Other persons of color ^{bc}	20,424	(144,960) (0, 41,727)	3.0	6.7	25.9	(0.0, 53.0) (67.3)	0.54	(0.19, 1.57)	-22.25	(-51.59, 7.09) (21.40)
	All missing are black	White (referent)	194,331	(144,197, 244,465)	28.5	59.7	27.9	(20.7, 35.1)	1.00		0.00	
		Black	382,781	(254,691, 510,871)	56.0	14.1	216.9	(144.3, 289.4)	7.78	(5.10, 11.86)	188.94	(116.03, 261.85)
		Latino ^b	85,497	(26,034, 144,960)	12.5	19.4	39.7	(12.1, 67.3)	1.42	(0.68, 2.99)	11.82	(-16.72, 40.36)
	All missing are Latino	Other persons of color ^{bc}	20,424	(0, 41,727)	3.0	6.7	25.9	(0.0, 53.0)	0.93	(0.32, 2.72)	-1.96	(-29.94, 26.02)
		White (referent)	194,331	(144,197, 244,465)	28.5	59.7	27.9	(20.7, 35.1)	1.00		0.00	
		Black	241,394	(129,014, 353,774)	35.3	14.1	136.7	(73.1, 200.4)	4.90	(2.88, 8.35)	108.85	(44.79, 172.91)
		Latino ^b	226,884	(141,364, 312,403)	33.2	19.4	105.4	(65.7, 145.1)	3.78	(2.39, 5.97)	77.49	(37.12, 117.85)
	All missing are other persons of color	Other persons of color ^{bc}	20,424	(0, 41,727)	3.0	6.7	25.9	(0.0, 53.0)	0.93	(0.32, 2.72)	-1.96	(-29.94, 26.02)
		White (referent)	194,331	(144,197, 244,465)	28.5	59.7	27.9	(20.7, 35.1)	1.00		0.00	
		Black	241,394	(129,014, 353,774)	35.3	14.1	136.7	(73.1, 200.4)	4.90	(2.88, 8.35)	108.85	(44.79, 172.91)
		Latino ^b	85,497	(26,034, 144,960)	12.5	19.4	39.7	(12.1, 67.3)	1.42	(0.68, 2.99)	11.82	(-16.72, 40.36)
	All missing are other persons of color	Other persons of color ^{bc}	161,811	(96,760, 226,862)	23.7	6.7	205.4	(122.8, 288.0)	7.37	(4.57, 10.17)	177.51	(94.62, 260.40)

TABLE 1 Continued

Gender	Missingness assumption for race/ethnicity ^a	Race/ethnicity	Total number of ED visits		% of ED visits	% of US population	ED visit rate (per 100,000)		Rate ratio		Rate difference (per 100,000)	
			Estimate	95 % CI			Estimate	95 % CI	Estimate	95 % CI	Estimate	95 % CI
		Latino ^b	73,909	440,502 (23,648, 124,170)	12.6	19.2	64.8	508.4 (20.7, 108.9)	1.38	12.43 (0.66, 2.86)	17.76	461.94 (-28.05, 63.58)
		Other persons of color ^{bc}	17,033	(0, 34,619)	2.9	6.6	43.8	(0.0, 89.1)	0.93	(0.32, 2.71)	-3.21	(-50.16, 43.75)
	All missing are Latino	White (referent)	166,238	(121,915, 210,561)	28.4	59.6	47.0	(34.5, 59.6)	1.00		0.00	
		Black	205,398	(106,404, 304,391)	35.1	14.6	237.0	(122.8, 351.3)	5.04	(2.91, 8.74)	190.01	(75.08, 304.94)
		Latino ^b	196,344	(146,082, 246,606)	33.6	19.2	172.1	(107.6, 236.7)	3.66	(2.31, 5.80)	125.10	(59.34, 190.87)
		Other persons of color ^{bc}	17,033	(0, 34,619)	2.9	6.6	43.8	(0.0, 89.1)	0.93	(0.32, 2.71)	-3.21	(-50.16, 43.75)
	All missing are other persons of color	White (referent)	166,238	(121,915, 210,561)	28.4	59.6	47.0	(34.5, 59.6)	1.00		0.00	
		Black	205,398	(106,404, 304,391)	35.1	14.6	237.0	(122.8, 351.3)	5.04	(2.91, 8.74)	190.01	(75.08, 304.94)
		Latino ^b	73,909	(23,648, 124,170)	12.6	19.2	64.8	(0.0, 89.1)	1.38	(0.66, 2.86)	17.76	(-28.05, 63.58)
		Other persons of color ^{bc}	139,468	(121,881, 157,055)	23.8	6.6	358.8	(213.2, 504.5)	7.63	(4.70, 12.40)	311.81	(165.59, 458.03)
Women	None	All	97,881	(79,814, 115,948)	100.0	100.0						
		White	28,093	(19,388, 36,797)	35.6	57.8						
		Black	35,996	(21,690, 50,292)	45.6	14.6						

TABLE 1 Continued

Gender	Missingness assumption for race/ethnicity ^a	Race/ethnicity	Total number of ED visits		% of ED visits	% of US population	ED visit rate (per 100,000)		Rate ratio		Rate difference (per 100,000)	
			Estimate	95 % CI			Estimate	95 % CI	Estimate	95 % CI	Estimate	95 % CI
	are Latino	(referent)	35,996	58,965 (21,690, 50,302)	36.8	14.6	40.0	(24.1, 56.0)	4.90	(2.96, 8.10)	31.87	(15.75, 47.98)
		Black	30,401	(17,867, 42,935)	31.1	18.6	30.0	(17.6, 42.4)	3.67	(2.19, 6.14)	21.85	(9.21, 34.48)
		Latino ^b	3392	(0, 7227)	3.5	6.9	8.5	(0.0, 18.1)	1.04	(0.32, 3.36)	0.32	(-9.62, 10.26)
		Other persons of color ^{bc}	28,093	(35,127, 58,965)	28.7	57.8	8.2	(5.6, 10.7)	1.00		0.00	
All missing are other persons of color		White (referent)	35,996	(21,690, 50,302)	36.8	14.6	40.0	(24.1, 56.0)	4.90	(2.96, 8.10)	31.87	(15.75, 47.98)
		Black	11,448	(1919, 20,978)	11.7	18.6	11.3	(1.9, 20.7)	1.38	(0.57, 3.36)	3.13	(-6.62, 12.87)
		Latino ^b	22,345	(13,345, 31,345)	22.8	6.9	56.0	(33.4, 78.5)	6.84	(4.11, 11.38)	47.80	(25.11, 70.49)
		Other persons of color ^{bc}										

^aFor each missingness assumption, we reapportioned estimated ED visit counts and variances from the race/ethnicity "not stated" group to another racial/ethnic group

^bThe coefficient of variation of the estimates for Latinos and other people of color exceeded 30%. The National Electronic Injury Surveillance system considers these estimates to be potentially unstable

^cOther persons of color includes non-Hispanic persons who identify as American Indian, Alaska Native, Asian, Pacific Islander, and more than one race

^dFor missing, percent is out of the total number of ED visits. For each racial/ethnic group, percent is out of those with known race/ethnicity

number of cases, comprising <0.1 % of the total, had unknown gender (139; 95 % CI: 0, 375); we excluded these cases from gender-stratified analyses.

The incidence rate for legal intervention injuries among all persons increased annually over the period 2001–2014 by an average of 1.70 per 100,000 (95 % CI: 1.01, 2.39; Table 2). This corresponds to a 47.4 % increase over the entire 14-year period. In gender-stratified models, there was a statistically significant change in rates for both men, who experienced a 50.8 % increase over the study period, and women, who experienced a 26.2 % increase. In contrast, the change in rates for assault-related injuries among all persons was not significant (yearly change –7.93 per 100,000; 95 % CI –16.22, 0.35), nor was it significant in gender-stratified models.

The primary analysis of racial/ethnic inequalities found that black persons experienced legal intervention injuries at a 4.90-fold higher rate (RR 95 % CI 3.07, 7.83) relative to whites (Table 1). In gender-stratified analyses, RRs were similar for men (RR 5.04; 95 % CI 3.11, 8.16) and women (RR 4.90; 95 % CI 3.13, 7.66). Sensitivity analyses supported the finding of an elevated rate among black individuals; under the most extreme low scenario (all cases with missing race/ethnicity assigned to white), the RR for black versus white persons was 2.84 (95 % CI 1.68, 4.78). Under the most extreme high scenario (all cases with missing race/ethnicity assigned to black), the RR for black versus white persons was 8.04 (95 % CI 5.10, 11.86). The calculated rate difference in the primary analysis demonstrates that, had black persons experienced the same incidence rate as whites, there would have been 242,320 fewer legal intervention injuries over the study period (95 % CI 121,654, 363,003).

Estimates for the number of legal intervention injuries for Hispanic and other persons of color were potentially unstable by NEISS guidelines because the coefficient of variation exceeded 30 %.¹⁷ While the point estimate for Latinos of all genders suggests an elevated risk for legal intervention vis-à-vis whites (RR 1.42; 95 % CI 0.74, 2.72), this difference was not statistically significant, nor was it robust in the sensitivity analyses.

TABLE 2 Time trends for legal intervention- and assault-related injuries treated in hospital emergency departments—nationally representative estimates for US men and women ages 15–34, 2001–2014 (N = 683,033 injuries). Results from inverse variance-weighted linear regression models

Injury intent	Gender					
	All persons		Men		Women	
	Coef.	95 % CI	Coef.	95 % CI	Coef.	95 % CI
Legal intervention						
Year ^a	1.70	(1.01, 2.39)	3.03	(1.81, 4.25)	0.30	(0.48, 0.55)
Intercept ^b	46.65	(42.54, 50.76)	77.53	(70.34, 84.72)	14.86	(13.13, 16.59)
Assault						
Year ^a	–7.93	(–16.22, 0.35)	–8.73	(–20.40, 2.94)	–6.89	(–14.12, 0.34)
Intercept ^b	1206.05	(1155.82, 1256.29)	1452.88	(1382.85, 1522.91)	949.94	(903.86, 996.02)

^aCoefficient corresponds to the estimated annual injury rate increase per 100,000 population

^bCoefficient corresponds to the model-based estimate for the injury rate per 100,000 population in 2001

DISCUSSION

We found that legal intervention constituted an important contributor of visits for injuries treated in hospital EDs among persons age 15–34 and particularly among men, who experienced a majority of the cases. For men in this age group, the rate of visits for such injuries (98.7 per 100,000) was on par with that of visits for pedestrians injured by motor vehicles (101.1 per 100,000).¹⁷ Additionally, we found that the rate of visits for legal intervention injuries treated in EDs increased over the period 2001–2014, more sharply for men than for women, even as rates of injuries caused by (non-legal intervention) assault remained unchanged. Finally, our finding that black compared to white persons were 4.90 times more likely to experience legal intervention injuries is consistent with prior studies demonstrating black persons are more likely to both experience use of force by police¹⁹ and be fatally injured due to legal intervention.⁶

Strengths and Limitations

Strengths of our study include its use of nationally representative medical data and reliance on trained coders who affirmatively indicated whether the injury intent was legal intervention. Limitations include the following: (a) the high level of missing data for race/ethnicity, which we addressed via extreme bound sensitivity analyses (noting that the only other nationally representative ED dataset that records legal intervention injuries does not release race/ethnicity data²⁰), and (b) we lacked data to assess how use of ED services among persons injured by legal intervention may differ by race/ethnicity. The database also provided no information on whether the use of force was deemed legally justifiable.

CONCLUSIONS

Legal intervention injuries can harm not only the immediate targets but also their families²¹ and communities.²² It is therefore important for public health agencies to monitor the incidence of injuries resulting from actions of police and private security, as these are public health data. As we have argued regarding fatal legal intervention cases,⁶ such monitoring for accountability can provide timely and trustworthy data to the public in a way that improves understanding of the magnitude of the problem and whether it is getting worse or better over time.

COMPLIANCE WITH ETHICAL STANDARDS

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