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Sarah DeGue

Centers for Disease Control and Prevention,

Katherine A. Fowler

Centers for Disease Control and Prevention

Cynthia Calkins

CUNY John Jay College

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Deaths Due to Use of Lethal Force by Law Enforcement



Findings From the National Violent Death Reporting System, 17 U.S. States, 2009–2012

Sarah DeGue, PhD,¹ Katherine A. Fowler, PhD,¹ Cynthia Calkins, PhD²

Introduction: Several high-profile cases in the U.S. have drawn public attention to the use of lethal force by law enforcement (LE), yet research on such fatalities is limited. Using data from a public health surveillance system, this study examined the characteristics and circumstances of these violent deaths to inform prevention.

Methods: All fatalities (N=812) resulting from use of lethal force by on-duty LE from 2009 to 2012 in 17 U.S. states were examined using National Violent Death Reporting System data. Case narratives were coded for additional incident circumstances.

Results: Victims were majority white (52%) but disproportionately black (32%) with a fatality rate 2.8 times higher among blacks than whites. Most victims were reported to be armed (83%); however, black victims were more likely to be unarmed (14.8%) than white (9.4%) or Hispanic (5.8%) victims. Fatality rates among military veterans/active duty service members were 1.4 times greater than among their civilian counterparts. Four case subtypes were examined based on themes that emerged in incident narratives: about 22% of cases were mental health related; 18% were suspected “suicide by cop” incidents, with white victims more likely than black or Hispanic victims to die in these circumstances; 14% involved intimate partner violence; and about 6% were unintentional deaths due to LE action. Another 53% of cases were unclassified and did not fall into a coded subtype. Regression analyses identified victim and incident characteristics associated with each case subtype and unclassified cases.

Conclusions: Knowledge about circumstances of deaths due to the use of lethal force can inform the development of prevention strategies, improve risk assessment, and modify LE response to increase the safety of communities and officers and prevent fatalities associated with LE intervention.

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Introduction

Public attention on the use of lethal force by law enforcement (LE), particularly within minority communities, has surged in recent years following

From the ¹Division of Violence Prevention, Centers for Disease Control and Prevention, Atlanta, Georgia; and ²Department of Psychology, John Jay College of Criminal Justice, City University of New York, New York, New York

Address correspondence to: Sarah DeGue, PhD, Division of Violence Prevention, Centers for Disease Control and Prevention, 4770 Buford Highway NE, MS-F64, Atlanta GA 30341. E-mail: sdegue@cdc.gov.

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multiple high-profile cases involving the killings of unarmed black men and youth by police.^{1–3} Concern over these cases fueled nationwide protests in 2015, including some incidents of civil unrest^{4,5} and the rise of the Black Lives Matter movement.⁶ Major acts of civil disobedience and unrest have arisen throughout U.S. history in response to concerns about police use of force, often with long-term health and economic consequences for affected communities.⁷ In addition to issues of racial and social inequality, concerns about the risk to vulnerable populations—including individuals with mental illness—have also been raised.^{8–11}

Fatalities resulting from the use of lethal force by LE agents while on duty (referred to here and elsewhere^{12,13}

as *legal intervention deaths*, consistent with the ICD-10 category for deaths resulting from LE action without regard to intent or legality¹⁴) account for approximately 1% of all violent deaths in the U.S. each year^{a,12,15} and 4% of all homicides.¹⁵ However, these cases have profound consequences that extend beyond the direct impact on victims and their families.⁷ The estimated lifetime medical costs for injuries and fatalities related to LE action totaled \$231 million in 2012.¹⁶

Recent analyses¹⁷ suggest that legal intervention deaths increased 45% (from 0.11 to 0.16/100,000) between 1999 and 2013, with higher rates among blacks (0.24); American Indian/Alaska Natives (0.20); and Hispanic whites (0.17) compared with non-Hispanic whites (0.09) and Asian/Pacific Islanders (0.05).¹⁷ An examination of data from 1960 to 2010 also indicated consistently higher rates among black men compared with white men, with rate ratios ranging from 2.6 to 10.1.³ Estimates also suggest that 25% to more than 50% of fatal encounters with LE involve individuals with mental illness.^{8–11} Concerns over the use of lethal force, including links to racial and social inequities and use of force against mentally ill people, have resulted in calls for increased attention to this issue within public health.^{4–6,8,18} Yet, research examining the circumstances of such cases remains limited.

The use of lethal force, in many cases, reflects the risks inherent in policing and the duty to mitigate immediate danger to the public and police personnel.¹⁹ However, there is increasing recognition that lethal force, even when ruled “justifiable” from a legal perspective, is sometimes preventable.² A 2015 report by the Police Executive Research Forum cited missed opportunities to “ratchet down” confrontations and called for improved conflict de-escalation training and cultural shifts within policing to emphasize tactics reducing the need for force.² The U.S. Department of Justice made similar recommendations following the Ferguson Police Department investigation.¹ Research suggests that organizational policies and training can safely reduce the use of deadly force.²⁰ Similar training approaches have been used successfully by several LE agencies to increase use of de-escalation strategies in situations involving individuals with severe mental illness, owing to long-standing community concerns about use of force against this population.²¹

^aData from the National Vital Statistics System available through the Centers for Disease Control and Prevention’s Web-based Injury Statistics Query and Reporting System identified 785,875 total violent deaths from 1999 to 2013; 6,338 of these were legal intervention deaths (0.8%). National Violent Death Reporting System data available through the Web-based Injury Statistics Query and Reporting System identified 174,502 violent deaths from 2003 to 2013; 1,493 of these were legal intervention deaths (1%).

Two national data reporting systems collect information on legal intervention deaths in the U.S. The Federal Bureau of Investigation’s (FBI’s) Uniform Crime Reporting Program collects data directly from more than 18,000 LE agencies nationwide. The National Vital Statistics System (NVSS), operated by the Centers for Disease Control and Prevention’s (CDC’s) National Center for Health Statistics, collects death certificate data for all U.S. states and territories. Prior studies suggest that both systems may undercount these fatalities for different reasons.⁷ NVSS tends to misclassify cases as homicides when information about police involvement is not mentioned by death certifiers, whereas the Uniform Crime Reporting Program most often misses cases due to data omission or failure to report by some jurisdictions, as participation is voluntary.⁷ Media accounts suggest that the total number of legal intervention deaths in the U.S. may be much higher than that captured by official records.²² The FBI announced plans in 2015 to improve and expand data collection on injuries and deaths resulting from LE use of force.²³

A third federal data source, CDC’s National Violent Death Reporting System (NVDRS), is a state-based active surveillance system of all violent deaths in participating states,^b including legal intervention deaths.²⁴ Although NVDRS does not currently collect data in all states and, thus, cannot provide national estimates, the system triangulates data from multiple sources—death certificates, coroner/medical examiner reports, and LE reports—to provide the most complete and detailed data available for included states.²⁵ A recent analysis²⁵ found that NVDRS captures more than twice the number of legal intervention death cases relative to the FBI’s Supplemental Homicide Report and 71% more than NVSS.

Understanding the circumstances of legal intervention deaths is critical to informing risk assessment, training, and policies that can eliminate preventable fatalities due to LE action.^{12,17} The current study uses NVDRS data to describe the nature and characteristics of incidents resulting in these deaths, including data on victim and officer demographic characteristics, victim’s mental health, and types of criminal activity occurring in the incident. Racial/ethnic differences in incident characteristics are also examined given prior evidence of, and current concern in communities about, potential inequities.^{3–6,17}

^bParticipation in NVDRS is voluntary with federal funding provided through a competitive process based on current budgetary allocations. The number of states funded by CDC was expanded to 32 in 2014, and was further expanded to 42 states in 2016 (www.cdc.gov/violenceprevention/nvdrs).

Methods

The National Violent Death Reporting System

NVDRS is a state-based surveillance system that links data on violent deaths (e.g., suicide, homicide, legal intervention) from death certificates; coroner/medical examiner reports; and LE reports in an incident-based, confidential data set.^{24,26} Legal intervention deaths, as defined within NVDRS, are fatalities where the victim is killed by a LE officer acting while on duty.^c Fatalities resulting from LE action are included without regard to whether the death was intentional or legally justifiable. Data abstractors in each participating state review investigative findings from each data source and abstract information on incident circumstances and characteristics of victims and officers using standardized coding guidance.²⁶ NVDRS also includes two narratives generated by the state abstractor containing a brief description of the incident based on information from the coroner/medical examiner and LE reports.

Case Identification and Narrative Coding

Cases in the current study originated from statewide data for the 17 states^d participating in NVDRS during the study period. All cases classified in NVDRS as legal intervention deaths or homicides in which the perpetrator was an LE officer were selected and narratives were reviewed to ensure they met the NVDRS case definition for legal intervention deaths. In addition to analysis of existing NVDRS variables, case narratives were reviewed and coded by the authors for an additional ten variables developed for the current study. These included:

1. number of civilians killed by victim^e in the 24 hours preceding their death;
2. number of officers killed by victim;
3. number of other people killed by officers in the incident;
4. whether officers were injured (by the victim or others involved in the incident);
5. whether the victim had a weapon (including objects used as weapons, such as vehicles, or perceived as weapons, such as toy guns); and
6. whether the victim posed an immediate threat (perceived or actual) to LE or civilians (defined by verbal death threats while armed, use of a weapon against or physical assault of LE/civilian, or physical expression of threats, such as pointing a firearm).

These also included four case subtypes suggested by prior research^{27–30} that emerged as themes during the authors' initial review of the narratives (Tables 1 and 2):

7. unintentional death;
8. circumstances/evidence suggesting that the victim engaged in life-threatening or criminal behavior directed at LE to elicit use

^aIncludes other peace officers (including military police) and excludes legal executions.

^dData were available for Alaska; Colorado; Georgia; Kentucky; Maryland; Massachusetts; New Jersey; New Mexico; North Carolina; Oklahoma; Oregon; Rhode Island; South Carolina; Utah; Virginia; Wisconsin (2009–2012); and Ohio (2011–2012 only).

^eThe decedent of the legal intervention death.

of lethal force (referred to here and in other research^{30–35} as “suicide by cop”);

9. police contact/incident directly related to concerns about the victim's current psychological functioning; and
10. LE contact or legal intervention involved intimate partner violence (IPV).

All narrative coding was completed by the authors. A randomly selected sample of 75 cases (9.3%) were coded in pairs. Inter-rater agreement ranged from 87.8% to 100% (κ range, 0.70–1.0); all discrepancies were discussed and coded to consensus. The remaining cases were coded independently with group discussion as needed.

Descriptive analyses were conducted to examine characteristics of the incidents, victims, and involved officers. Bridged-race population data and American Community Survey data from the U.S. Census Bureau were used to calculate crude rates per 100,000. All reported rates represent annualized averages across the 4 data years (2009–2012). Differences in incident characteristics by race/ethnicity were examined using chi-square analyses with post hoc pairwise comparisons of significant results. Logistic regression analyses were also used to further examine victim and incident characteristics associated with each coded case subtype and unclassified cases.

Results

There were 812 legal intervention deaths identified by NVDRS in 17 participating states from 2009 to 2012. Characteristics and circumstances of these cases are presented in Tables 3–6.

The vast majority (93.6%) of fatal injuries were inflicted by firearms. Incidents occurred most often in a home (44.6%) or on a public street/sidewalk (22.4%), with about one third of fatal injuries occurring in the victim's own residence. Most injuries occurred in the evening (43.2%) or afternoon (34.5%) hours. Fatal injuries of individuals currently in public custody (e.g., under arrest, incarcerated, hospitalized) were not common (6.3%). In 82.6% of cases, the victim was reportedly armed (or assumed armed, e.g., unloaded/toy firearm) with a deadly weapon. In 87.7% of cases, there was evidence of an immediate threat (perceived or actual) posed by the victim toward LE or civilians. LE officers were injured or killed in 9% and 1.7% of incidents, respectively. Incidents in which the victim killed another civilian during the incident (5%) or with multiple legal intervention deaths in the same incident (2.1%) were uncommon.

Contact with LE was typically precipitated by alleged/suspected criminal activity (80.5%), with police responding to an assault, homicide, or other violent crime in more than half of these cases. About 11% of these cases involved only a non-specified (“other”) crime. An additional 19.5% were not precipitated by any known criminal behavior. To further examine the circumstances precipitating LE contact in these cases, the “other crime”

Table 1. Selected Case Subtypes Coded From Case Narratives: NVDRS, 17 U.S. States, 2009–2012

Case subtype ^a (N=812)	n (%)	Summary of case definition
Unintentional (total)	50 (6.2)	Death occurred as a result of (a) injuries sustained while in custody, (b) LE use of force to restrain/capture, (c) accidental injury/death while the victim was fleeing crime scene or arrest, or (d) victim was an innocent bystander killed by LE. Fatalities resulting from use of force were not intentional.
Fatal injury while in custody	17 (2.1)	
Fatal injury from capture/restraint	16 (2.0)	
Accidental death while fleeing	12 (1.5)	
Innocent bystander	5 (0.6)	
“Suicide by cop”	145 (17.9)	Evidence from witness/LE accounts suggests that victim was actively suicidal and engaged in life-threatening or criminal behavior directed at LE to elicit use of lethal force. Evidence of suicidal intent could include: suicidal behavior/threats during incident, suicide note, prior expression of intent/desire to be killed by LE reported by an informant, taunting/asking LE to kill them during the incident.
IPV-related	113 (13.9)	LE contact was initiated as a result of IPV complaints or IPV occurred during the incident (e.g., threats toward/assault of partner on scene).
Mental health or substance-induced disruptive behaviors (total)	176 (21.7)	Incident was directly related to concerns about victim’s mental health or substance-induced disruptive behaviors, including cases in which LE contact was initiated as a result of mental health concerns about the victim or in which evidence suggested that mental illness accounted for the victim’s behavior and/or the circumstances that resulted in use of force. When dangerous or erratic behavior was attributed primarily to substance use rather than mental illness, cases were identified as substance-induced.
Mental illness-related	120 (14.7)	
Substance-induced	56 (6.9)	

^aCoded based on information provided in case narratives; categories are not mutually exclusive.

IPV, intimate partner violence; LE, law enforcement; MH, mental health; NVDRS, National Violent Death Reporting System; PTSD, post-traumatic stress disorder.

case narratives and narratives of cases with no precipitating crime that were also not classified as belonging to any other subtype were examined in supplemental

Table 2. Victim Mental Health History in Mental Health/Substance Abuse–Related Cases Only: NVDRS, 17 U.S. States, 2009–2012

Victim MH history ^a (N=176)	n (%)
Ever treated for MH problem	76 (43.2)
Current treatment for MH problem	59 (33.5)
Current MH problem	83 (47.2)
Current alcohol dependence/problem	40 (22.7)
Current drug abuse problem	47 (26.7)
Psychiatric diagnosis	
Depressive disorder	24 (13.6)
Schizophrenia	25 (14.2)
Bipolar disorder	18 (10.2)
PTSD	10 (5.6)
Anxiety disorder	9 (5.1)
Other	6 (3.4)

^aVictim MH history only described for cases identified as related to mental health or substance-induced disruptive behaviors; findings reflect only information known to law enforcement based on witness (e.g., family) interviews and may be underestimates.

MH, mental health; NVDRS, National Violent Death Reporting System; PTSD, post-traumatic stress disorder.

analyses and coded using an adapted version of a coding scheme developed by Gill and Pasquale-Styles.³⁴ This additional review revealed that the reason for LE presence (based on 143 cases with sufficient information) involved responding to calls for domestic disturbance (11%), brandishing a weapon in public (7%), or shots fired (9%); traffic stop (20%); serving an arrest warrant (14%); responding to a crime (other than NVDRS categories, e.g., kidnapping, vandalism, taking hostages; 14%); encounter during routine patrol (6%); a well-being check (2%); undercover surveillance (1%), or other/unknown reasons (16%).

Victims were predominantly male (96.1%) with a mean age of 36.7 years. Although a majority were white, black victims were over-represented (32.4%) relative to the U.S. population.³⁶ Blacks had 2.8 times the rate of legal intervention death compared with whites; rates among whites and Hispanics were similar. Most victims were U.S. born (92.1%). Unmarried/separated individuals had rates 2.9 times greater than those currently married, and rates among military veterans/active duty service members were 1.4 times the rates of their civilian counterparts. A small percentage (1.7%) were known to be currently homeless.

Looking at the data on officers who used lethal force, 82% of cases had data on the sex of the officer, whereas

³⁶The 2010 U.S. population was 13% black and 72% white. Supplemental analyses of 2010 Census data indicated that the combined population of the 17 states included in this study was 15% black and 74% white, thus not substantially different from the total U.S. population.

only 34% had data on race/ethnicity and 23% had data on age of the officer. The results that follow are based on the data that were available. Officers were predominantly male (97.4%) with a mean age of 35.6 years. About 12% of LE officers in the U.S. are women; thus, male officers were over-represented.³⁷ The mean number of officers involved (i.e., suspected of inflicting the fatal injuries) per incident was 1.3. In most cases, at least one involved officer was white (84.3%), with fewer cases involving a black officer (13.6%) or an officer of another race/ethnicity. Very few cases (1.6%) involved officers that were working in private security rather than public LE.

Four case subtypes were coded based on a review of incident narratives (Tables 1 and 2). To further examine victim and incident characteristics associated with each case subtype, logistic regression analyses were run predicting subtype membership (Table 7). Fifty legal intervention fatalities (6.2%) were identified as unintentional with injuries occurring while in custody, during capture/restraint, while fleeing, or involving an innocent bystander. Unintentional cases were significantly less likely than other cases to involve a threat to LE, an armed victim, or evidence of alcohol use by the victim. Another 17.9% of cases were identified as potential “suicide by cop” incidents based on evidence (e.g., suicidal behavior/threats during incident, suicide note, prior expression of intent/desire to be killed by LE reported by an informant, taunting/asking LE to kill them during the incident) that the victim was suicidal and engaged in behavior to elicit the use of lethal force. “Suicide by cop” cases were significantly more likely than other cases to occur in a home rather than in public, involve victim alcohol intoxication, involve a white than black victim, and almost eight times more likely to involve an armed victim. IPV-related incidents, in which officers responded to an IPV complaint or a partner was threatened/assaulted during the event, accounted for 13.9% of cases. IPV-related cases were 3.8 times more likely to occur in a home and 2.8 times more likely to involve a threat to a civilian. In 21.7% of fatalities, there was evidence that the victim’s mental/behavioral health, including behavior attributed to mental illness or substance use, was directly related to LE contact or use of force. Cases related to the victim’s mental/behavioral health were significantly more likely to occur in a home, less likely to be precipitated by an alleged crime, less likely to involve injuries to LE officers, less likely to involve civilians killed by the victim before or during the incident, and less likely to involve a black than white victim. Additional information regarding the mental health/substance abuse history of these victims is included in Tables 1 and 2 but is limited by the

Table 3. Characteristics/Circumstances of Deaths Due to Use of Lethal Force in 17 NVDRS States, 2009–2012 (N=812 cases^a)

Incident characteristics/Circumstances	n (%) ^b
Autopsy performed	797 (98.2)
Primary cause of fatal injury	
Firearm	760 (93.6)
Motor vehicle	11 (1.4)
Personal weapons (e.g., fist)	10 (1.2)
Blunt/sharp instrument	9 (1.1)
Suffocation/strangulation	3 (0.4)
Fall	2 (0.3)
Other/unknown	16 (2.0)
No. of bullet wounds ^c (n=625), median (IQR, range)	2 (3, 1–40)
Location type of fatal injury	
Home/dwelling	362 (44.6)
Street/sidewalk	182 (22.4)
Motor vehicle	51 (6.3)
Parking lot/garage	47 (5.8)
Natural area (e.g., field, beach)	33 (4.1)
Other commercial establishment (e.g., store)	28 (3.4)
Highway/freeway	18 (2.2)
Bar/nightclub	11 (1.4)
Hospital/medical facility	10 (1.2)
Hotel/motel	9 (1.1)
Jail/prison/detention facility	7 (0.9)
Sports/athletic area	6 (0.7)
Other/unknown	48 (5.9)
Victim injured at own residence	263 (32.4)
Victim in LE custody when injured	
Not in custody	433 (53.3)
Injured prior to arrest	314 (38.7)
Jail/prison	34 (4.2)
Under arrest but not in jail	13 (1.6)
Other (e.g., state institution, house arrest)	4 (.5)
Unknown	14 (1.7)
Time of day when injury occurred (n=679)	
Morning (4AM–11:59AM)	152 (22.4)
Afternoon (12NOON–7:59PM)	234 (34.5)

(continued on next page)

Table 3. Characteristics/Circumstances of Deaths Due to Use of Lethal Force in 17 NVDRS States, 2009–2012 (N=812 cases^a) (continued)

Incident characteristics/Circumstances	n (%) ^b
Evening (8PM–3:59AM)	293 (43.2)
Time of year when injury occurred	
Spring (March–May)	215 (26.9)
Summer (June–August)	209 (26.2)
Fall (September–November)	184 (23)
Winter (December–February)	191 (23.9)
Precipitated by alleged/suspected crime ^d	
Any precipitating crime	654 (80.5)
Assault/homicide	417 (51.3)
Other violent	98 (12.1)
Property, non-violent	85 (10.5)
Drug trade	18 (2.2)
“Other” crime(s) only	90 (11.1)
No precipitating crime specified/unknown	158 (19.5)
Circumstances coded from case narratives	
Victim reportedly armed with deadly weapon ^e	
Victim armed	671 (82.6)
Victim unarmed	90 (11.1)
Unknown/not enough information	51 (6.3)
Immediate threat posed to LE or civilians ^f	
Threat to LEO only	547 (67.4)
Threat to civilians only	47 (5.8)
Threat to LEO and civilians	118 (14.5)
No evidence of immediate threat posed	44 (5.4)
Unknown/not enough information	56 (6.9)
Any LEO injured during incident	73 (9.0)
Any LEO killed during incident	14 (1.7)
Any civilians killed by the victim during/preceding incident ^g	43 (5.3)
Any other victims killed by LEO during same incident	17 (2.1)

Note: Deaths due to the use of lethal force are also referred to as *legal intervention deaths*, consistent with the ICD-10 category for deaths resulting from law enforcement action without regard to intent or legality.

^aExcept where subsample with available data noted in parentheses.

^bValues other than n (%) are indicated as applicable.

^cAmong those fatally injured by firearms with available data on bullet wounds.

^dNot mutually exclusive; could be precipitated by more than one crime. Some NVDRS crime categories were collapsed; for example, “Other Violent” includes all types of violent crime (e.g., robbery, rape) coded by NVDRS other than assault and homicide.

^eVictim was reportedly in possession of a potentially deadly weapon, including objects being actively used as a weapon (e.g., vehicle) and apparent weapons later determined to be fake or unloaded.

^fVictim was reported to pose an immediate (perceived or actual) threat/danger to law enforcement and/or civilians as indicated by verbal threats to harm while armed, use of weapon, physical assault, hostage-taking, physical expression of intent to harm (e.g., pointing firearm).

^gCivilians killed by victim in the same incident (within <24 hours) prior to the fatal injury due to legal intervention.

NVDRS, National Violent Death Reporting System; IPV, intimate partner violence; IQR, interquartile range; LE, law enforcement; LEO, Law enforcement officer(s).

information available to investigators. Forty-seven percent of cases fell into one of these subtypes. Unclassified cases (53%) were more likely to occur in public than in a home and less likely to involve victim alcohol intoxication; they were also three times more likely to involve injuries to law enforcement and an armed victim and 2.6 times more likely to involve a black than white victim. As noted above, these subtype groups were not mutually exclusive or exhaustive; other case types may exist that were not identified and coded in this study. For example, of those cases identified as potential “suicide by cop” incidents, more than half (55%), but not all, were also identified as mental/behavioral health related.

Given racial disparities in victimization identified in the full sample, additional analyses were conducted to examine differences in selected incident characteristics by race for cases involving white, black, and Hispanic victims^h (Table 8). Black victims were significantly more likely to be unarmed than white or Hispanic victims. Black victims were also significantly less likely than whites to have posed an immediate threat to LE. White victims were significantly more likely than black victims to be killed in incidents related to mental health or substance-induced disruptive behaviors and more likely than black or Hispanic victims to be involved in potential “suicide by cop” incidents. Hispanic victims were also more likely than black victims to be involved in a potential “suicide by cop” incident. Incidents involving black and Hispanic victims were more likely than those involving white victims to have at least one black LE officer involved in the fatal injury.

Discussion

Use of lethal force by LE is an issue of urgent concern to those with a shared interest in protecting all communities while eliminating preventable fatalities. Previous research

^hOther racial/ethnic groups were excluded from these analyses owing to small sample sizes.

Table 4. Victim Characteristics of Deaths Due to Use of Lethal Force in 17 NVDRS States, 2009–2012 (N=812 cases)

Victim characteristics	n (%)	Rate per 100,000 ^a	Rate ratio ^b
Sex			
Male	780 (96.1)	0.4	
Female	32 (3.9)	— ^c	
Age (M 36.7, range 13–86)			
0–14	1	— ^c	
15–24	180	0.4	
25–34	223	0.5	
35–44	179	0.4	
45–54	132	0.3	
55–64	67	0.2	
≥ 65	30	0.1	
Race/ethnicity^d			
White (ref)	424 (52.2)	0.2	
Black	263 (32.4)	0.5	2.8
Hispanic	86 (10.6)	0.2	1.1
American Indian/Alaska native	11 (1.4)	— ^c	
Asian/Pacific Islander	5 (0.6)	— ^c	
Multiracial	21 (2.6)	— ^c	
Unknown	2 (0.2)	— ^c	
Nativity			
Born in U.S. (ref)	748 (92.1)	0.2	
Foreign-born	64 (7.9)	— ^c	
Marital status			
Married (ref)	200 (24.6)	0.1	
Unmarried/separated	593 (73)	0.4	2.9
Never married	410 (50.5)		
Divorced	156 (19.2)		
Widowed	14 (1.7)		
Separated	7 (0.9)		
Single, not otherwise specified	6 (0.8)		
Unknown	19 (2.4)		
Military service^e			
No military service (ref)	723 (89.1)	0.2	
Veteran/active duty	89 (10.9)	0.4	1.4
Currently homeless	14 (1.7)	— ^f	— ^f

^aRates reported are crude rates per 100,000 averaged across the 4 data years (2009–2012).

^bRate ratios for marital status, military service, and nativity were calculated using population data (for the included states and years) from the American Community Survey (ACS) (<http://factfinder.census.gov/faces/nav/jsf/pages/programs.xhtml?program=acs>). Population data for race/ethnicity calculations were obtained from WISQARS and rely on estimates produced for NCHS by the U.S. Census Bureau (www.cdc.gov/injury/wisqars/fatal_help/data_sources.html). Rates were calculated for each year of data (2009–2012), and rates were averaged to create an annualized average rate. Ohio data/rates were included only for years 2011–2012. Because of at least one cell size <20, rates for Hispanics in 2009 and military service in 2011 were not included in the overall average rates. Rate ratios not calculated for age because of a lack of a logical reference group.

^cRates are considered unstable for counts under 20 and are not reported.

^dData on race and ethnicity were collapsed to create a single variable. Non-Hispanic victims/officers with a known race were categorized by race. Hispanic victims/officers, regardless of race, were categorized as Hispanic. Victims/officers with known race but unknown ethnicity were categorized by race only.

^eDenominator data for veteran and active duty military rates comes from the ACS and non-military population numbers were calculated by subtracting veteran counts from civilian counts in ACS employment data.

^fPopulation data unavailable; rates cannot be calculated.

NCHS, National Center for Health Statistics; NVDRS, National Violent Death Reporting System; WISQARS, Web-based Injury Statistics Query and Reporting System.

using public health surveillance data has reported on demographic trends in^{3,12,16,17} and specific subtypes of^{32,38} legal intervention deaths. This study is the first to broadly examine the characteristics and detailed circumstances of fatalities resulting from the use of lethal force by LE using data from a multistate public health surveillance system. These data are critical to informing strategies to prevent these deaths and improve public health and safety for all people. Several key findings with implications for prevention are highlighted below.

The Role of Mental Illness and Suicide in Deaths Due to the Use of Lethal Force

Agencies of LE frequently serve as first-line responders to mental health emergencies, including crises involving violence.^{28,39} Officers in a study of three U.S. cities reported responding to an average of 6.4 calls/month involving mental health crises.⁴⁰ About 20% of people hospitalized for severe mental illness, in another study, had been arrested or picked up by police for a suspected crime in the prior 4-month period.²⁹ Indeed, two decades of research have documented high rates of LE contact, arrest, and incarceration rates for individuals with mental illness.^{41–44} Officers often report feeling inadequately trained to assess and respond effectively as gatekeepers for both the criminal justice and mental health systems, and community leaders have raised concerns for many

Table 5. Victim Toxicology Results for Deaths Due to Use of Lethal Force in 17 NVDRS States, 2009–2012 (N=812 Cases)

Victim toxicology results	Tested, n (%)	Positive, n (% of tested)
Alcohol	675 (83.1)	284 (42.1)
Marijuana	432 (53.2)	124 (28.7)
Opiates	575 (70.8)	98 (17.0)
Cocaine	589 (72.5)	70 (11.9)
Amphetamines	540 (66.5)	72 (13.3)
Antidepressants	413 (50.8)	57 (13.8)

NVDRS, National Violent Death Reporting System.

Table 6. Officer Characteristics of Deaths Due to Use of Lethal Force in 17 NVDRS States, 2009–2012 (N=812 Cases^a)

Officer characteristics ^b	n (%) ^c
Sex, male (n=685 officers with known sex)	667 (97.4)
Age (n=189 officers with age reported), M (SD, range)	35.6 (7.9, 22–61)
Race/ethnicity, when known (n=273 incidents) ^d	
Any white	230 (84.3)
Any black	37 (13.6)
Any Hispanic	11 (4)
Any American Indian/Alaska native	1 (0.4)
Any Asian/Pacific Islander	3 (1.1)
Any multiracial	2 (0.7)
No. of officers involved in injury, median (IQR, range)	1 (1, 1–5)
Officer(s) were security guards	13 (1.6)

^aExcept where subsample with available data noted in parentheses.
^bIncludes only officers suspected of inflicting the fatal injury; does not include other officers on scene. Demographic/descriptive data can be entered for up to 3 officers per incident in NVDRS; three cases in the current sample involved >3 officers meeting this criterion and do not have data for those additional officers. Because of substantial missing data for officer characteristics, the number of cases with available data (n) is noted in parentheses; data were missing for the remaining cases.
^cValues other than n (%) are indicated as applicable.
^dData on race and ethnicity were collapsed to create a single variable. Non-Hispanic victims/officers with a known race were categorized by race. Hispanic victims/officers, regardless of race, were categorized as Hispanic. Officers with known race but unknown ethnicity were categorized by race only; n = number of incidents in which at least one officer was identified in the racial/ethnic group. Some incidents involved officers of more than one racial/ethnic group; thus, numbers do not sum to 273 incidents. In most cases (539/812), officer race/ethnicity was not reported in NVDRS.

NVDRS, National Violent Death Reporting System.

years about the safety of citizens with mental health crises who often encounter, and rely on, LE.^{8,28,45,46}

The findings indicate that one in five (21.7%) legal intervention deaths were directly related to issues with the victim’s mental health or substance-induced disruptive behaviors. These include incidents in which LE contact was initiated in response to a call from someone concerned about the victim’s safety or behavior due to mental illness or situations in which dangerous/erratic behavior by the victim during a police encounter was attributed to mental illness or acute substance use. Although individuals with mental illness are far more likely to be victims of violent crime than perpetrators,^{47,48} severe behavioral or cognitive impairment might increase the risk for escalation and use of force in some interactions with police.²¹

Related incidents in which the victim engaged in life-threatening or criminal behavior to provoke the use of lethal force by police—widely referred to as “suicide by cop”—have also been recognized by LE and criminal justice researchers for several decades as a unique challenge.³² In the current study, 17.9% of fatalities due to the use of force were identified as potential “suicide by cop” incidents,^h a number within range of prior estimates.^{30,32}

Among those who died by legal intervention, this study found that the percentage of incidents involving mental health or substance-induced disruptive behaviors was three times higher for whites than blacks, and that the percentage of “suicide by cop” cases was almost seven times higher for whites than blacks (and almost twice as high as that of Hispanics). These findings may reflect, in part, significantly higher rates of suicide among white men nationally.^{49,50} Whites may also be more likely to contact police seeking help for themselves or a family member in crisis owing to racial differences in trust and perceptions of police.⁵¹

Incidents Involving Intimate Partner Violence

Long-held concerns within LE that IPV situations are among the most dangerous for officers generally have not been well supported by research.^{27,52,53} A study of police calls found that domestic disturbance calls ranked fourth and fifth in the ratio of calls to assaults and injuries of officers, respectively.⁵⁴ The current study found that 13.9% of legal intervention fatalities (about one in seven) were IPV-related, paralleling estimates of the proportion of officers killed on duty (14%) related to an IPV incident.²⁷ Although IPV is not a prevalent risk

^hAs noted elsewhere, cases involving mental health or substance-induced disruptive behaviors health concerns and “suicide by cop” were not mutually exclusive.

Table 7. Logistic Regression Analyses Predicting Case Subtype^a by Victim and Incident Characteristics

Characteristic ^b (yes/no, unless noted)	Unintentional <i>n</i> =50		"Suicide by cop" <i>n</i> =145		IPV-related <i>n</i> =113		MH-related <i>n</i> =176		Unclassified ^c <i>n</i> =431	
	β (SE)	OR	β (SE)	OR	β (SE)	OR	β (SE)	OR	β (SE)	OR
Fatal injury occurred in a home (ref=public location)	-0.96 (0.54)	0.38	0.62** (0.22)	1.20	1.33** (0.26)	3.78	0.66** (0.21)	1.93	-1.13** (0.18)	0.32
Precipitated by any alleged/suspected crime	-0.75 (0.54)	0.47	-0.22 (0.28)	0.81	0.47 (0.36)	1.59	-0.52* (0.25)	0.60	0.22 (0.24)	1.24
Victim in LE custody when injured	1.21 (0.84)	3.34	0.23 (0.53)	1.26	0.44 (0.60)	1.55	-0.07 (0.50)	0.93	-0.55 (0.44)	0.58
Immediate threat posed to LE	-1.60** (0.53)	0.20	0.18 (0.54)	1.20	0.56 (0.48)	1.75	-0.43 (0.36)	0.65	0.59 (0.33)	1.81
Immediate threat posed to civilians	-0.09 (0.74)	0.91	-0.48 (0.30)	0.62	1.01** (0.27)	2.75	0.33 (0.26)	1.39	-0.12 (0.23)	0.89
Any LEO injured during incident	— ^d	— ^d	-0.70 (0.42)	0.50	-0.06 (0.39)	0.94	-1.35** (0.49)	0.26	1.12** (0.33)	3.06
Any civilians killed by the victim	0.05 (1.29)	1.05	-0.58 (0.65)	0.56	0.45 (0.44)	1.57	-1.91* (0.77)	0.15	0.38 (0.41)	1.46
Victim reportedly armed with deadly weapon	-3.62** (0.53)	0.03	2.06** (0.76)	7.88	0.67 (0.56)	1.95	-0.50 (0.34)	0.61	1.16** (0.33)	3.20
Victim race/ethnicity (ref=white victim)										
Black victim	-0.89 (0.53)	0.41	-1.82** (0.35)	0.16	0.18 (0.28)	1.20	-1.32** (0.27)	0.27	0.95** (0.20)	2.58
Hispanic victim	0.11 (0.81)	1.12	-0.48 (0.35)	0.62	0.04 (0.42)	1.05	-0.31 (0.32)	0.74	0.34 (0.29)	1.41
Alcohol toxicology, positive (ref=untested/negative)	-1.23* (0.65)	0.29	0.50* (0.22)	1.65	0.43 (0.24)	1.53	0.32 (0.21)	1.38	-0.39* (0.18)	0.68
χ ² (df)	152.93** (10,802)		97.94** (11,801)		59.32** (11,801)		82.56** (11,801)		118.74** (11,801)	

Note: Boldface indicates ORs with significant *p*-values (**p* < 0.05; ***p* < 0.001).

^aDependent variable for each regression model is dichotomous; all cases meeting that subtype definition versus all other cases. Subtypes are not mutually exclusive.

^bIncluded variables had low levels of missing data (range = 0%–7.6%).

^cUnclassified cases include those cases that were not classified into any of the four selected case subtypes coded from incident narratives.

^dVariable excluded from the model because of insufficient variance (i.e., no officers were injured in cases classified as unintentional).

IPV, intimate partner violence; LE, law enforcement; LEO, law enforcement officer(s); MH, mental health.

Table 8. Incident Characteristics of Deaths Due to the Use of Lethal Force by Victim Race/Ethnicity: NVDRS, 17 U.S. States, 2009–2012

Incident characteristics	n (%) ^d			χ^2
	White	Black	Hispanic	
Subsample	424 (52.2)	263 (32.4)	86 (10.6)	
Unarmed victim	40 (9.4) ^a	39 (14.8) ^b	5 (5.8) ^a	8.5*
Threat to law enforcement	362 (85.4) ^a	199 (75.6) ^b	74 (86.1)	8.3*
Threat to civilians	81 (19.1)	55 (20.1)	19 (22.1)	0.7
Any LEO injured during incident	33 (7.8)	32 (12.2)	5 (5.8)	5.0
Any LEO killed during incident	7 (1.6)	4 (1.6)	1 (1.2)	— ^f
Any other victims killed by LEO during same incident	6 (1.4)	6 (2.3)	3 (3.5)	— ^f
Any civilians killed by the victim during/preceding incident	21 (5.0)	22 (8.4)	3 (3.5)	— ^f
Precipitated by alleged/suspected crime				13.3
Assault/homicide	161 (38)	97 (36.9)	35 (40.7)	
Other violent	33 (7.8)	39 (14.8)	9 (10.5)	
Property, non-violent	38 (9)	21 (8)	7 (8.1)	
Drug trade	3 (0.7)	2 (0.8)	1 (1.2)	
Other crime	91 (21.5)	40 (15.2)	19 (22.1)	
No precipitating crime specified	98 (23.1)	64 (24.3)	15 (17.4)	
Selected case subtypes				
Mental health/substance abuse-related	127 (29.9) ^a	26 (9.9) ^b	16 (18.6)	38.2**
“Suicide by cop”	115 (27.1) ^a	11 (4.2) ^b	14 (16.3) ^c	58.3**
IPV-related	67 (15.8)	29 (11)	11 (12.8)	2.9
Unintentional, any type	24 (5.7)	16 (6.1)	5 (5.8)	0.09
Officer race/ethnicity, when known (n=273 incidents) ^e				
Any white	124 (29.2)	68 (26.1)	28 (32.6)	1.7
Any black	7 (1.6) ^a	24 (9.1) ^b	5 (5.8) ^c	20.7**
Any Hispanic	7 (1.7)	2 (0.8)	1 (1.1)	— ^f

Note: Boldface indicates significant *p*-values (**p* < 0.05; ***p* < 0.001). Tables 1–6 provide additional information regarding the variables included in these analyses. Deaths due to the use of lethal force by law enforcement are also referred to as *legal intervention deaths*, consistent with the ICD-10 category for deaths resulting from law enforcement action without regard to intent or legality.

^{a-c}Different superscripts in race/ethnicity columns indicate significant differences (*p* < 0.05) in post hoc pairwise comparisons completed following significant omnibus chi-square tests.

^dN=773; excludes 39 cases in which the victim had another or unknown race/ethnicity.

^eOfficer race/ethnicity data were available for 32% of white victims, 35% of black victims, and 39% of Hispanic victims.

^fPearson chi-square test could not be calculated because of ≥ 1 expected cell sizes under *n*=5.

IPV, intimate partner violence; LEO, law enforcement officer; NVDRS, National Violent Death Reporting System.

circumstance for lethal force incidents, specific approaches to conflict de-escalation in these situations may reduce risks to both IPV perpetrators and officers.

Racial Inequities in Deaths Due to the Use of Lethal Force

Recent public discourse has focused on racial disparities in legal intervention deaths. The current study found

that, consistent with prior research,^{3,12,16,17,55} black victims were substantially over-represented relative to the U.S. population, comprising 34% of victims but only 13% of Americans,^{36,56} and with legal intervention death rates 2.8 times higher than those among whites. Black victims were also more likely to be unarmed than whites or Hispanics, and less likely than whites to have evidence suggesting an immediate threat to LE. Incidents

involving black and Hispanic victims were more likely to involve at least one black LE officer, potentially because of greater racial diversity in police departments located in areas with larger minority populations.

It has been suggested elsewhere^{12,16} that higher rates of deaths due to lethal force against blacks may be accounted for by differences in the frequency of police contact. Recent national data identified few differences between blacks and whites in the frequency of most forms of police contact, including requests for police assistance, reporting of crime or neighborhood disturbances, and involuntary street stops.^{57,58} However, data from the U.S. Department of Justice^{57,58} found that black and Hispanic drivers were more likely than whites to be pulled over and searched or ticketed during a traffic stop. Blacks also experience disproportionately higher rates of arrest than whites; in 2011, 69.2% of all arrested individuals in the U.S. were white and 28.4% were black.⁵⁹ Further, although force was employed in fewer than 4% of contacts for all racial/ethnic groups in 2008, blacks were nearly three times more likely than whites to experience any use of force during an LE encounter.⁶⁰ Similarly, a recent study¹⁶ using FBI arrest and NVSS injury data found higher arrest/stop rates and higher rates of legal intervention deaths among blacks than whites. However, the authors found no differences in rates of injury or death per 10,000 stops/arrests by race—that is, blacks and whites were equally likely to be injured or killed during a stop/arrest incident. These findings—from one study—suggest that disparities in fatality rates by race may be accounted for, in part, by differential rates of police contact through stops or arrests.¹⁶ More research is needed to examine this important research question with clear implications for policy and practice.

Racial inequities in legal intervention fatalities may reflect differences in the way that some LE officers or agencies perceive and interact with black community members and suspects.^{12,61} Studies have shown that most people hold culturally derived “implicit biases”—automatic, unconscious stereotypes that favor some groups and disfavor others.⁶² Research on implicit race bias in the U.S. consistently demonstrates a tendency to associate more-favorable concepts with whites and less-favorable concepts with blacks across racial/ethnic groups, although these biases are less common among blacks.⁶² These biases can impact behavior, even among trained professionals such as physicians.⁶³ Among LE, such biases may be further shaped by the nature of experiences on the job.^{64,65} For example, based in social-psychological theory, Smith et al.⁶⁴ argue that disproportionate contact with minority offenders in some communities may lead officers to overestimate the prevalence of negative behaviors among minority group members. Relatedly, studies of “shooter

bias” have found that both civilians and LE officers showed a greater tendency to shoot unarmed black men than white men in computer simulations.^{66–68} Notably, in one study, officers were able to substantially reduce shooter bias with repeated practice.⁶⁷ Social-psychological factors are only one piece of a more complex causal web accounting for racial inequalities in use of force by police. Holmes and Smith⁶⁵ posit that ordinary social-psychological processes, like ingroup–outgroup biases, social norms, and stereotyping, may interact with characteristics of neighborhoods and individuals to result in a disproportionate use of force by LE against minorities. More research is needed to translate theory and a growing knowledge base into opportunities for prevention.

Eliminating Preventable Deaths Due to the Use of Lethal Force

The need for effective strategies to reduce preventable legal intervention fatalities has resulted in numerous recommendations from policing organizations, policy-makers, federal and state agencies, researchers, and concerned communities. One recommendation has been to increase training in tactical disengagement and conflict de-escalation.^{2,58} Recent reports have called for restructuring police culture around the core principle of sanctity of all human life, emphasizing the need to “slow the situation down” or tactically disengage as an alternative to the current model of “never back down, move in and take charge.”^{2,58} Several police departments around the U.S. are currently implementing training in tactical disengagement, de-escalation, and preservation of life, some modeled on programs in other countries like the United Kingdom, that have successfully reduced their use of force.^{2,19} Related approaches may include changes to training or policy on use of less than lethal force technologies, such as chemical sprays or conducted energy devices, to control or incapacitate combative individuals, with some evidence suggesting decreased officer and civilian injuries associated with agency adoption of these tools.^{32,69–71} Further research is needed to assess the effectiveness of these approaches in reducing both civilian and LE injuries.

Many departments have also implemented training programs to assist officers in identifying and managing situations involving acute mental health crises using de-escalation and other tactics to reduce the risk for violence and use of force.^{72,73} Crisis intervention teams and mobile mental health units have been employed in some jurisdictions to improve police response by involving mental health professionals or specially trained police officers at the scene.^{39,73} In addition to crisis response, these teams can engage at-risk community members to

provide support, connection to services, and prevent future incidents and escalation.^{74–76} These approaches have demonstrated some evidence of success in reducing arrest rates in this population and may also decrease the risk for violent escalation in some encounters.^{76,77}

Several recommendations have also been offered to counteract serious concerns about racial bias in policing, including recruiting and hiring a diverse workforce^{69,78,79}; implementation of an evidence-based training curriculum to help officers understand and counteract potential bias^{78–80}; supervision focused on eliminating discriminatory behavior⁷⁸; and community policing strategies to increase positive interactions between police and community members and build trust (rather than restricting police contact to conflict-oriented interactions).^{69,79,81}

Re-establishing or reinforcing trust between LE and many communities was identified as a core focus of the 2015 President's Task Force on 21st Century Policing.⁶⁹ Recommendations centered around approaches to improve procedural justice by acknowledging past injustices, increasing transparency and accountability, proactively engaging communities in positive interactions, and increasing workforce diversity.⁶⁹ Public distrust of LE in the wake of legal intervention deaths is also fueled by the infrequency with which officers are sanctioned for wrongful action: A recent study found that among thousands of cases of fatal shootings by LE over the past decade, only 54 officers were charged and most were cleared or acquitted.⁸² Policies mandating independent investigation and prosecution have been recommended to increase transparency and trust in these investigations.⁶⁹

Limitations

This study has several limitations. First, NVDRS is not nationally representative; information is only available for the 17 states funded at the time. Second, NVDRS represents only mortality data; information about non-fatal injuries resulting from LE encounters is not included. It is unknown whether included incidents differ from LE encounters involving non-lethal or no force. Third, NVDRS relies solely on investigative information available from medical examiner and LE reports. These cases are unique because officers both inflict the fatal violence and are the key (and sometimes only) witnesses. The potential impact of this on investigative reports is unclear (e.g., difficulties validating the information, redaction of information because of legal concerns). These concerns are mitigated somewhat by inclusion of independent medical examiner reports that can provide information that either supports or

contradicts LE accounts (e.g., autopsies suggesting evidence of excessive force). Review of narrative information revealed some instances in which officers were portrayed as legally culpable, but these instances were few and may not fully represent the number of unlawful LE actions in the sample. Fourth, information about officer characteristics is limited. Substantial missing data were noted even for basic demographics, perhaps because this information is considered less relevant to investigators than in a typical homicide where information is provided on suspected perpetrators. The reasons for the extent of missing data and the implications for potential bias are unclear. Reasons for police initial contact were only coded here for a subset of cases to examine the circumstances of those with “other” or no precipitating crimes; future research examining reasons for initial police contact in these cases could be informative. Additional information about the characteristics of officers involved, such as years of experience, previous perpetration of violence, or mental health—which could suggest potential risk factors—is not available in this data set. However, recent research highlights the need to examine such factors—using other data sources—to understand differential officer response and risk. Ridgeway⁸³ compared shooting and non-shooting officers at the same scene (using data from 106 officer-involved shootings in New York City) and found that black officers and those with rapidly accumulating negative marks in their files were more likely to shoot, whereas officers who started their policing careers later in life were less likely to shoot. Additional research in other jurisdictions is needed to better understand variations in officer response and identify hiring, management, or training policies that might reduce shooting risk. Finally, the current study utilizes data from 2009 to 2012 from 17 states; the findings may not represent the patterns or circumstances of deaths in more-recent years or nationally.

Conclusions

This study is one of the first to examine the nature and circumstances of deaths due to the use of lethal force by LE in the U.S. using data from a multistate public health surveillance system. Findings reinforce concerns about racial/ethnic inequities in these cases and identify incident characteristics and scenarios with important implications for prevention. Future analyses should further examine the possibility of statistically distinct subtypes of legal intervention cases, compare mortality data with nonfatal injuries, and examine the sequence of events within the incident in more detail (e.g., how many began with a traffic stop or other routine event and then escalated versus police contact initiated directly because

of a more serious index event). Further research is also needed to examine the effectiveness of training programs and policy initiatives aimed at reducing the use of lethal force while maintaining the health and safety of officers and communities.

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References

1. U.S. Department of Justice Civil Rights Division. Investigation of the Ferguson Police Department. www.justice.gov/sites/default/files/opa/press-releases/attachments/2015/03/04/ferguson_police_department_report.pdf. Published 2015. Accessed March 4, 2015.
2. Police Executive Research Forum. Critical issues in policing series: re-engineering training on police use of force. www.policeforum.org/assets/reengineeringtraining1.pdf. Published 2015. Accessed February 4, 2016.
3. Krieger N, Kiang MV, Chen JT, Waterman PD. Trends in U.S. deaths due to legal intervention among black and white men, age 15–34 years, by county income level: 1960–2010. *Harvard Public Health Rev.* 2015;3:1–5.
4. Wen LS, Warren KE, Tay S, Khaldun JS, O'Neill DL, Farrow OD. Public health in the unrest: Baltimore's preparedness and response after Freddie Gray's death. *Am J Public Health.* 2015;105(10):1957–1959. <http://dx.doi.org/10.2105/AJPH.2015.302838>.
5. Bylander J. Civil unrest, police use of force, and the public's health. *Health Aff (Millwood).* 2015;34(8):1264–1268. <http://dx.doi.org/10.1377/hlthaff.2015.0717>.
6. Jee-Lyn García J, Sharif MZ. Black Lives Matter: a commentary on racism and public health. *Am J Public Health.* 2015;105(8):e27–e30. <http://dx.doi.org/10.2105/AJPH.2015.302706>.
7. Loftin C, Wiersema B, McDowall D, Dobrin A. Underreporting of justifiable homicides committed by police officers in the United States, 1976–1998. *Am J Public Health.* 2003;93(7):1117–1121. <http://dx.doi.org/10.2105/AJPH.93.7.1117>.
8. Reuland M, Schwarzfeld M, Draper L. Law enforcement responses to people with mental illnesses: a guide to research-informed policy and practice. <http://csgjusticecenter.org/wp-content/uploads/2012/12/le-research.pdf>. Published 2009. Accessed February 4, 2016.
9. Mather K, Queally J. More than a third of people shot by L.A. police last year were mentally ill, LAPD report finds. *Los Angeles Times.* www.latimes.com/local/lanow/la-me-ln-lapd-use-of-force-report-20160301-story.html. Published March 1, 2016. Accessed June 27, 2016.
10. Appelbaum PS. Can the Americans With Disabilities Act reduce the death toll from police encounters with persons with mental illness? *Psychiatr Serv.* 2015;66(10):1012–1014. <http://dx.doi.org/10.1176/appi.ps.661005>.
11. Lowery W, Kindy K, Alexander K, Tate J, Jenkins J, Rich S. Distraught people, deadly results. *Washington Post.* www.washingtonpost.com/sf/investigative/2015/06/30/distraught-people-deadly-results. Published June 30, 2015. Accessed August 14, 2016.
12. Sikora AG, Mulvihill M. Trends in mortality due to legal intervention in the United States, 1979 through 1997. *Am J Public Health.* 2002;92(5):841–843. <http://dx.doi.org/10.2105/AJPH.92.5.841>.
13. Parks S, Johnson L, McDaniel D, Gladden M. Surveillance for violent deaths—National Violent Death Reporting System, 16 states, 2010. *MMWR Morb Mortal Wkly Rep.* 2014;63(SS01):1–33.
14. International Classification of Diseases, Tenth Revision. Geneva, Switzerland: World Health Organization; 1992.
15. CDC National Center for Injury Prevention and Control. Web-based Injury Statistics Query and Reporting System (WISQARS). www.cdc.gov/injury/wisqars. Published 2005. Accessed July 29, 2015.
16. Miller TR, Lawrence BA, Carlson NN, et al. Perils of police action: a cautionary tale from U.S. data sets. *Inj Prev.* In press. Online July 25, 2016. <http://dx.doi.org/10.1136/injuryprev-2016-042023>.
17. Drowos J, Hennekens CH, Levine RS. Variations in mortality from legal intervention in the United States—1999 to 2013. *Prev Med.* 2015;81:290–293. <http://dx.doi.org/10.1016/j.ypmed.2015.09.012>.
18. Krieger N. Police killings, political impunity, racism and the people's health: issues for our times. *Harvard Public Health Rev.* 2015;3:1–2.
19. Ederheimer JA, Fridell LA. *Chief Concerns: Exploring the Challenges of Police Use of Force.* Washington, DC: Police Executive Research Forum; 2005. www.policeforum.org/assets/chiefconcernsuseofforce.pdf.
20. White MD. Controlling police decisions to use deadly force: reexamining the importance of administrative policy. *Crime Delinq.* 2001;47(1):131–151. <http://dx.doi.org/10.1177/0011128701047001006>.
21. Police Executive Research Forum. *An Integrated Approach to De-escalation and Minimizing Use of Force.* Washington, DC: Police Executive Research Forum; 2012. www.policeforum.org/assets/docs/Critical_Issues_Series/an%20integrated%20approach%20to%20de-escalation%20and%20minimizing%20use%20of%20force%202012.pdf. Accessed February 4, 2016.
22. The Counted: people killed by police in the U.S. *The Guardian.* www.theguardian.com/thecounted. Accessed January 26, 2016.
23. Kindy K. FBI to sharply expand system for tracking fatal police shootings. *Washington Post.* December 8, 2015. www.washingtonpost.com/national/fbi-to-sharply-expand-system-for-tracking-fatal-police-shootings/2015/12/08/a60fbc16-9dd4-11e5-bce4-708fe33e3288_story.html.
24. Paulozzi LJ, Mercy J, Frazier L, Annett JL. CDC's National Violent Death Reporting System: background and methodology. *Inj Prev.* 2004;10(1):47–52. <http://dx.doi.org/10.1136/ip.2003.003434>.
25. Barber C, Azrael D, Cohen A, et al. Homicides by police: comparing counts from the National Violent Death Reporting System, vital statistics, and supplementary homicide reports. *Am J Public Health.* 2016;106(5):922–927. <http://dx.doi.org/10.2105/AJPH.2016.303074>.
26. CDC. National Violent Death Reporting System (NVDRS) coding manual, revised. CDC National Center for Injury Prevention and Control. www.cdc.gov/violenceprevention/nvdrs/trainingtechnicalassist.html. Published 2015. Accessed January 26, 2016.
27. Meyer S, Carroll RH. When officers die: understanding deadly domestic violence calls for service. *Police Chief.* 2011;78(5):24–27.

28. Borum R. Improving high risk encounters between people with mental illness and police. *J Am Acad Psychiatry.* 2000;28:332–337.
29. Borum R, Swanson J, Swartz M, Hiday V. Substance abuse, violent behavior, and police encounters among persons with severe mental disorder. *J Contemp Crim Justice.* 1997;13(3):236–250. <http://dx.doi.org/10.1177/1043986297013003004>.
30. Lord VB, Sloop MW. Suicide by cop: police shooting as a method of self-harming. *J Crim Just.* 2010;38(5):889–895. <http://dx.doi.org/10.1016/j.jcrimjus.2010.06.004>.
31. Sarno M, Van Hasselt B. Suicide by cop: implications for crisis (hostage) negotiations. *J Crim Psychol.* 2014;4(2):143–154. <http://dx.doi.org/10.1108/JCP-05-2014-0009>.
32. Lord VB. Police responses in officer-involved violent deaths: comparison of suicide by cop and non-suicide by cop incidents. *Police Q.* 2014;17(1):79–100. <http://dx.doi.org/10.1177/1098611114522040>.
33. Miller L. Why cops kill: the psychology of police deadly force encounters. *Aggress Violent Behav.* 2015;22:97–111. <http://dx.doi.org/10.1016/j.avb.2015.04.007>.
34. Gill JR, Pasquale-Styles M. Firearm deaths by law enforcement. *J Forensic Sci.* 2009;54(1):185–188. <http://dx.doi.org/10.1111/j.1556-4029.2008.00678.x>.
35. Pinizzotto AJ, Davis EF, Miller CE III. *Suicide by cop.* *FBI Law Enforcement Bull.* 2005;74(2):8–20.
36. U.S. Census Bureau. United States Census, 2010. U.S. Department of Commerce; 2010. www.census.gov/2010census/. Accessed January 20, 2016.
37. Reaves B. *Local Police Departments, 2013: Personnel, Policies, and Practices.* Washington, DC: U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics; May 2015. www.bjs.gov/content/pub/pdf/lpd13ppp.pdf. Accessed January 26, 2016.
38. Lord VB. Factors influencing subjects' observed level of suicide by cop intent. *Crim Justice Behav.* 2012;39(12):1633–1646. <http://dx.doi.org/10.1177/0093854812456689>.
39. Lamb HR, Weinberger LE, DeCuir WJ. The police and mental health. *Psychiatr Serv.* 2002;53(10):1266–1271. <http://dx.doi.org/10.1176/appi.ps.53.10.1266>.
40. Borum R, Deane M, Steadman H, Morrissey J. Police perspectives on responding to mentally ill people in crisis: perceptions of program effectiveness. *Behav Sci Law.* 1998;16(4):393–405. [http://dx.doi.org/10.1002/\(SICI\)1099-0798\(199823\)16:4<393::AID-BSL317>3.0.CO;2-4](http://dx.doi.org/10.1002/(SICI)1099-0798(199823)16:4<393::AID-BSL317>3.0.CO;2-4).
41. Glaze L, James D. *Mental Health Problems of Prison And Jail Inmates.* Washington, DC: U.S. Department of Justice; 2006. www.bjs.gov/index.cfm?ty=pbdetail&iid=789. Accessed February 29, 2016.
42. Teplin LA. Criminalizing mental disorder: the comparative arrest rate of the mentally ill. *Am Psychol.* 1984;39(7):794–803. <http://dx.doi.org/10.1037/0003-066X.39.7.794>.
43. Lamb H, Weinberger L. Persons with severe mental illness in jails and prisons: a review. *Psychiatr Serv.* 1998;49(4):483–492. <http://dx.doi.org/10.1176/ps.49.4.483>.
44. Diamond PM, Wang EW, Holzer III, Thomas C. The prevalence of mental illness in prison. *Adm Policy Ment Health.* 2001;29(1):21–40. <http://dx.doi.org/10.1023/A:1013164814732>.
45. Watson AC, Corrigan PW, Ottati V. Police officers' attitudes toward and decisions about persons with mental illness. *Psychiatr Serv.* 2004;55(1):49–53. <http://dx.doi.org/10.1176/appi.ps.55.1.49>.
46. Teplin L, Pruett N. Police as streetcorner psychiatrist: managing the mentally ill. *Int J Law Psychiatry.* 1992;15(2):139–156. [http://dx.doi.org/10.1016/0160-2527\(92\)90010-X](http://dx.doi.org/10.1016/0160-2527(92)90010-X).
47. Hiroeh U, Appleby L, Mortensen PB, Dunn G. Death by homicide, suicide, and other unnatural causes in people with mental illness: a population-based study. *Lancet.* 2001;358(9299):2110–2112. [http://dx.doi.org/10.1016/S0140-6736\(01\)07216-6](http://dx.doi.org/10.1016/S0140-6736(01)07216-6).
48. Teplin LA, McClelland GM, Abram KM, Weiner DA. Crime victimization in adults with severe mental illness: comparison with the National Crime Victimization Survey. *Arch Gen Psychiatry.* 2005;62(8):911–921. <http://dx.doi.org/10.1001/archpsyc.62.8.911>.
49. Sullivan E, Annett JL, Luo F, Simon T, Dahlberg L. Suicide among adults aged 35–64 years—United States, 1999–2010. *MMWR Morb Mortal Wkly Rep.* 2013;62(17).
50. CDC. QuickStats: death rates from suicide* for persons aged 45–64 years, by black or white race and sex—United States, 1999–2008. *MMWR Morb Mortal Wkly Rep.* 2012;61(1).
51. Sharp EB, Johnson PE. Accounting for variation in distrust of local police. *Justice Q.* 2009;26(1):157–182. <http://dx.doi.org/10.1080/07418820802290496>.
52. Garner J, Clemmer E. Danger to police in domestic disturbances—a new look. U.S. Department of Justice. <http://files.eric.ed.gov/fulltext/ED295090.pdf>. Published 1986. Accessed February 4, 2016.
53. Ellis D, Choi A, Blas C. Injuries to police officers attending domestic disturbances: an empirical study. *Can J Criminol.* 1993;35:149–168.
54. Hirschel JD, Dean CW, Lumb RC. The relative contribution of domestic violence to assault and injury of police officers. *Justice Q.* 1994;11(1):99–117. <http://dx.doi.org/10.1080/07418829400092151>.
55. Anwar S, Brown S. Legal intervention deaths in Oklahoma. www.ok.gov/health2/documents/OKVDRS_Brief_Legal_Intervention_Deaths.pdf. Published June 2015.
56. Rastogi S, Johnson TD, Hoeffel EM, Drewery MF. *The Black Population: 2010.* Washington, DC: U.S. Census Bureau; 2011. www.census.gov/prod/cen2010/briefs/c2010br-06.pdf. Accessed February 4, 2016.
57. Durose M, Langton L. *Requests for Police Assistance, 2011.* Washington, DC: US Department of Justice; 2013. www.bjs.gov/index.cfm?ty=pbdetail&iid=4780. Accessed February 4, 2016.
58. Durose M, Langton L. Police Behavior during Traffic and Street Stops, 2011. Washington, DC: U.S. Department of Justice; 2013. www.bjs.gov/content/pub/pdf/pbtss11.pdf. Accessed February 4, 2016.
59. U.S. Department of Justice FBI. Crime in the United States, 2011. www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2011/crime-in-the-u.s.-2011/persons-arrested/persons-arrested. Published September 2011.
60. Eith C, Durose M. Contacts between police and the public, 2008. Washington, DC: U.S. Department of Justice; 2011. www.bjs.gov/content/pub/pdf/pbtss11.pdf. Accessed February 16, 2016.
61. Worden R. The causes of police brutality: theory and evidence on police use of force. In: Geller WA, Toch H, eds. *Police Violence: Understanding and Controlling Police Abuse of Force.* New Haven, CT: Yale University Press; 1996:23–51.
62. Greenwald AG, Krieger LH. Implicit bias: scientific foundations. *Calif Law Review.* 2006;94:5–967. <http://dx.doi.org/10.2307/20439056>.
63. Chapman EN, Kaatz A, Carnes M. Physicians and implicit bias: how doctors may unwittingly perpetuate health care disparities. *J Gen Intern Med.* 2013;28(11):1504–1510. <http://dx.doi.org/10.1007/s11606-013-2441-1>.
64. Smith MR, Alpert GP. Explaining police bias a theory of social conditioning and illusory correlation. *Crim Justice Behav.* 2007;34(10):1262–1283. <http://dx.doi.org/10.1177/0093854807304484>.
65. Holmes MD, Smith BW. Intergroup dynamics of extra-legal police aggression: an integrated theory of race and place. *Aggress Violent Behav.* 2012;17(4):344–353. <http://dx.doi.org/10.1016/j.avb.2012.03.006>.
66. Gove T. Implicit bias and law enforcement. *Police Chief.* 2011;78:44–56.
67. Plant EA, Peruche BM. The consequences of race for police officers' responses to criminal suspects. *Psychol Sci.* 2005;16(3):180–183. <http://dx.doi.org/10.1111/j.0956-7976.2005.00800.x>.
68. Correll J, Park B, Judd CM, Wittenbrink B, Sadler MS, Keesee T. Across the thin blue line: police officers and racial bias in the decision to shoot. *J Pers Soc Psychol.* 2007;92(6):1006. <http://dx.doi.org/10.1037/0022-3514.92.6.1006>.
69. President's Task Force on 21st Century Policing. Final report of the President's Task Force on 21st Century Policing. Office of Community

- Oriented Policing Services. Washington, DC; 2015. www.cops.usdoj.gov/pdf/taskforce/TaskForce_FinalReport.pdf. Accessed August 18, 2016.
70. Police Executive Research Forum. Comparing safety outcomes in police use-of-force cases for law enforcement agencies that have deployed conducted energy devices and a matched comparison group that have not: a quasi-experimental evaluation (Final report to National Institute of Justice, grant 2006-IJ-CX-0028, 13). Washington, DC: National Institute of Justice; 2009. www.policeforum.org/assets/docs/Free_Online_Documents/Use_of_Force/conducted%20energy%20devices%20matched%20agency%20study%202009.pdf. Accessed February 16, 2016.
 71. Homant RJ, Kennedy DB. Effectiveness of less than lethal force in suicide-by-cop incidents. *Police Q.* 2000;3(2):153–171. <http://dx.doi.org/10.1177/1098611100003002002>.
 72. Deane MW, Steadman HJ, Borum R, Veysey BM, Morrissey JP. Emerging partnerships between mental health and law enforcement. *Psychiatr Serv.* 1999;50(1):99–101. <http://dx.doi.org/10.1176/ps.50.1.99>.
 73. Watson AC, Morabito MS, Draine J, Ottati V. Improving police response to persons with mental illness: a multi-level conceptualization of CIT. *Intern J Law Psychiatr.* 2008;31(4):359–368. <http://dx.doi.org/10.1016/j.ijlp.2008.06.004>.
 74. Browning SL, Van Hasselt VB, Tucker AS, Vecchi GM. Dealing with individuals who have mental illness: the Crisis Intervention Team (CIT) in law enforcement. *Br J Forensic Pract.* 2011;13(4):235–243. <http://dx.doi.org/10.1108/14636641111189990>.
 75. Davidson ML. A criminal justice system-wide response to mental illness evaluating the effectiveness of the Memphis crisis intervention team training curriculum among law enforcement and correctional officers. *Crim Justice Policy Rev.* 2014;27(1):46–75. <http://dx.doi.org/10.1177/0887403414554997>.
 76. Franz S, Borum R. Crisis intervention teams may prevent arrests of people with mental illnesses. *Police Pract Res.* 2011;12(3):265–272. <http://dx.doi.org/10.1080/15614263.2010.497664>.
 77. Hails J, Borum R. Police training and specialized approaches to respond to people with mental illnesses. *Crime Delinq.* 2003;49(1):52–61. <http://dx.doi.org/10.1177/0011128702239235>.
 78. Fridell L, Scott M, Dunham R, Alpert G. *Law enforcement agency responses to racially biased policing and the perceptions of its practice. Critical Issues in Policing: Contemporary Readings.* Long Grove, IL: Waveland Press; 2005: 304–324.
 79. Fridell LA. Racially biased policing: the law enforcement response to the implicit black-crime association. In: Lynch MJ, Patterson EB, Childs KK, eds. *Racial Divide: Racial and Ethnic Bias in the Criminal Justice System.* Monsey, NY: Criminal Justice Press; 2008:39–59.
 80. Fridell L, Lazlo AT. Reducing biased policing through training. *Community Policing Dispatch.* 2009;2(2).
 81. Human Impact Partners. Stress on the Streets (SOS): race, policing, health, and increasing trust not trauma. www.trustnottrauma.org/. Published 2015. Accessed February 4, 2016.
 82. Kindy K, Kelly K. Thousands dead, few prosecuted. *Washington Post.* April 11, 2015. www.washingtonpost.com/sf/investigative/2015/04/11/thousands-dead-few-prosecuted/. Accessed December 8, 2015.
 83. Ridgeway G. Officer risk factors associated with police shootings: a matched case-control study. *Stat Public Policy (Phila).* 2016;3(1):1–6. <http://dx.doi.org/10.1080/2330443X.2015.1129918>.