

Assault Injury and Homicide Death Profile in Rhode Island, 2004–2014

YONGWEN JIANG, PhD; MEGAN L. RANNEY, MD, MPH; JORDAN SEABERRY, BFA; LYNNE-MARIE SHEA, BA;
BRIAN SULLIVAN, MS; SAMARA VINER-BROWN, MS

ABSTRACT

Community violence, including assault and homicide, is a public health problem. We provide a profile of assault-related injury and homicide death in Rhode Island to better understand assault/homicide. The 2014 emergency department (ED) visit data, hospital discharge (HD) data, and 2004–2014 Rhode Island Violent Death Reporting System (RIVDRS) data were used for this study. Most assault injuries and homicide deaths were among persons who were 25–44 years old, male, black and Hispanic, living in urban regions, self-pay or public insurance user, and never married. Almost 63% of the homicide decedents tested positive for some illicit substance. Precipitating circumstances include a preceding argument or a conflict, another crime, intimate partner violence, and drug involvement. RIVDRS did not provide an estimate for mental illness related homicides (e.g. command hallucinations). ED, HD, and RIVDRS data can provide a profile of assault injury and homicide death for public health authorities in RI. Interventions need to focus on high-risk populations and areas to effectively prevent assault-related injury and homicide.

KEYWORDS: assault; emergency department visit data; homicide; hospital discharge data; Rhode Island Violent Death Reporting System (RIVDRS)

INTRODUCTION

Community violence, including assault and homicide, is a public health problem.¹ Over 1.5 million people visited emergency departments for assault-related injuries in the United States in 2014, and more than 157,000 of them were admitted to the same hospitals or transferred to other hospitals for additional care.² Over 16,000 homicide deaths occurred in the U.S. in 2014.³ Across the U.S., homicide rates vary by age, gender, and race/ethnicity.^{4,5} U.S. homicide rates are highest for adolescents and young adults, males, blacks and Hispanics.^{5,6} In 2014, the U.S. age-adjusted homicide rate was 5.1 per 100,000 population, but rates vary by race/ethnicity: non-Hispanic blacks were 18.2, Hispanics 4.5, and non-Hispanic whites 2.4.⁵ Homicide age-adjusted rates were highest among non-Hispanic black males (32.3/100,000) and Hispanic males (7.2/100,000).⁵

Healthy People 2020, established by the U.S. Department of Health and Human Services, includes an objective of reducing homicides deaths in the U.S. by 10%.^{2,7} Others have shown that healthcare and public health professionals, law enforcement, community organizations, etc. can work together to decrease assault/homicide to improve the nation's health.⁸ The first step in such collaboration is to describe the current epidemiology of violence-related morbidity and mortality. In this analysis, using the 2014 Rhode Island emergency department (ED) visit data and hospital discharge (HD) data and the 2004–2014 Rhode Island Violent Death Reporting System (RIVDRS) as proxies for assault injury and homicide death, we provide a description of the demographic and geographic characteristics of assault-related injury and homicide death in RI.

METHODS

Data source

Under licensure regulations, the 11 acute-care general hospitals and 3 specialty facilities in RI report to the RI Department of Health (RIDOH) a defined set of data items on each ED visit and every inpatient discharged. The data reported includes patient-level demographic and clinical information. RI hospitals use the standard uniform billing form (UB-04) as the basis for the ED and HD database. As most payers require a single bill for patients during a single visit/stay, ED visits in our study include only those who are discharged, transferred, or died; ED patients that are admitted to the same hospital are excluded by definition. This analysis used 2014 data just from the 11 acute-care hospitals because 3 specialty hospitals (2 psychiatric hospitals and 1 rehab) did not have any visits for acute assault. Eligible visits were defined by assault-related ED visits and hospitalizations with ICD-9-CM E-codes: E960–E969 (Injury purposely inflicted by other persons).²

The National Violent Death Reporting System (NVDRS) is a state-based active surveillance system for monitoring the characteristics, trends, and magnitude of violent death and is funded by the Center for Injury Prevention and Control (CDC).^{4,9} RI began collecting data in 2004.⁴ RIVDRS combines information across multiple data sources including death certificates, medical examiner reports, law enforcement reports, and secondary sources (e.g., crime laboratory, uniform crime reporting, child fatality review team, and

hospital data). "Homicide is defined as a death resulting from the intentional use of force or power, threatened or actual, against another person, group, or community."⁹ RIVDRS classifies deaths using abstractor-assigned manners of death. We combined 2004–2014 data, per NVDRS guidelines given the small sample size each year, to avoid disclosing sensitive data and to increase analytic power.

Data analyses

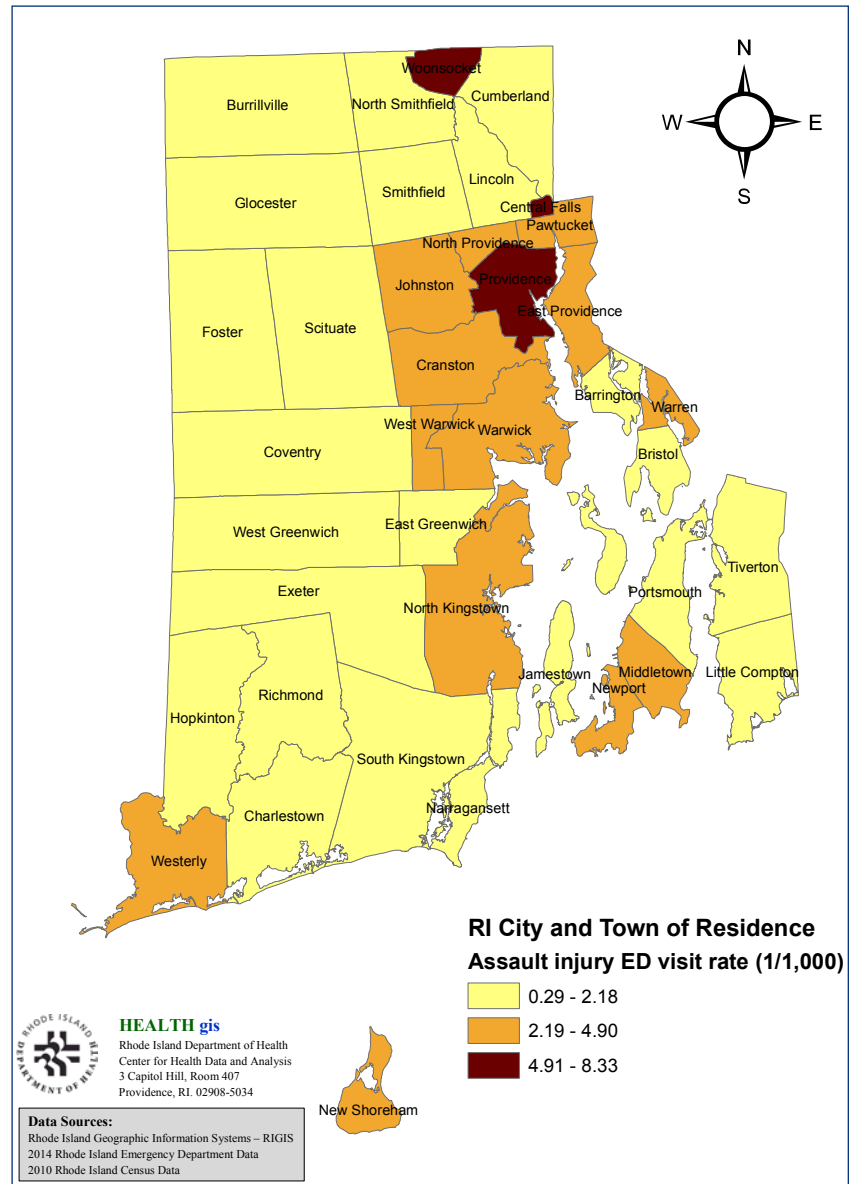
For each eligible encounter in the 2014 ED and HD data, age group, sex, race/ethnicity, city/town of residence, insurance, and patient status were obtained. RI's 2010 census city/town populations were used for computing the assault-related ED visit rate. RIVDRS variables analyzed included age group, sex, race/ethnicity, marital status, city/town of residence, injury location, whether injury occurred at the victim's home, weapon type, toxicology tests, and circumstances preceding deaths. All analyses were conducted with SAS version 9.4 (SAS Institute, Inc. Cary, NY). We used ArcGIS 10.2 (Environmental Systems Research Institute, Inc., Redlands, CA) to map ED visit rate by cities and towns of residence. The Jenks Natural Breaks Classification method was used to create the value ranges of ED visit rate depicted on the GIS maps.

RESULTS

Woonsocket(8.3/1000), Providence(8.1/1000), and Central Falls (6.1/1000) had the highest rates of residents with assault-related ED visits (**Figure 1**).

In 2014, there were 4,098 assault-related injury ED visits resulting in discharge, transfer, or death, and 390 assault-related injury hospitalizations in RI (**Table 1**). Most ED discharges and hospital admissions were among patients who were 25–44 years old, males, blacks and Hispanics. It should be noted that blacks only account for 5.7% of the Rhode Island population and those of Hispanic ethnicity represent 12.4% of the state population based on 2010 census data. Half of the assault injury ED visits and hospitalizations occurred among those living in the four core cities, which represents 29.4% of the state's population. The core cities are those 25% or more of children living below the federal poverty level. Almost three quarters of ED discharges/transfers were among these insured through Medicaid, Medicare, and those who were classified as "self-pay." The majority of assault injury patients were discharged to home. Only 1.1% were

Figure 1. Emergency Department Visit Rate of Assault Injury by Rhode Island Cities and Towns of Residence, 2014..



seen in the ED for a firearm injury (E965 code).

During 2004–2014, 342 Rhode Islanders died of homicide (**Table 2**). The majority of homicide decedents were aged 18–44 years old, male, black and Hispanic, never married, and had lived in urban regions. Most were injured in a house/apartment, but not at the victim's residence. The top two methods of injury were firearms and sharp instruments.

In terms of substance use, 31% of decedents tested positive for alcohol, 30% for marijuana, and a total of 62.6% for any illicit substance (excluding anti-depressants and amphetamines) (**Table 3**). Precipitating circumstances included a preceding argument or a conflict (31%); another crime (16%); intimate partner violence (14%); and drug involvement (including drug dealing, drug trade, or drug use) (12%).

Table 1. Characteristics of Assault Injuries Using the 2014 Rhode Island ED and HD Data

Characteristic of Assault Injury	% ^a	
	ED Visit (N=4,098) ^b	Hospital Discharge (N=390)
Age group		
Less than 18 years	9.4	12.1
18-24 years	28.0	20.0
25-44 years	44.3	37.4
45-64 years	17.1	26.7
65 years and older	1.2	3.9
Sex		
Male	59.1	78.0
Female	40.9	22.1
Race/Ethnicity		
Non-Hispanic white	58.8	51.3
Non-Hispanic black	16.6	23.9
Hispanic	21.3	21.0
Other	3.2	3.9
City/Town of Residence		
Urban(core cities) ^c	53.2	48.7
Sub-urban regions	35.4	34.4
Non-metro/Rural areas	6.7	7.4
Out of state	4.7	9.5
Insurance		
Self-pay	20.9	9.0
Medicare	7.8	17.2
Medicaid	40.3	47.7
Private	26.1	25.1
Other	5.0	1.0
Patient Status		
Discharged to home/Self-care (routine discharge)	94.1	65.9
Discharged/Transferred to home under care of organized home health service organization in anticipation of covered skill care	0.0	13.1
Transferred to skilled nursing facility with Medicare certification in anticipation of covered skilled care	0.0	7.2
Left against medical advice or discontinued care	1.4	4.6
Transferred to psychiatric hospital/partial unit of a hospital	0.2	3.6
Other (including death)	4.3	5.6
E-code (external causes of injury)		
E960:Fight, brawl, and rape	43.9	18.0
E961:Assault by corrosive or caustic substance, except poisoning	0.1	0.0
E963:Assault by hanging and strangulation	0.3	0.3
E965:Assault by firearms and explosives	1.1	9.5
E966:Assault by cutting and piercing instrument	6.4	24.6
E967:Child and adult battering and other maltreatment	5.5	12.8
E968:Assault by other and unspecified means	41.4	25.6
E969:Late effects of injury purposely inflicted by other person	1.3	9.2

ED, Emergency Department; HDD, hospital discharge.

^a Percentages might not total 100% because of rounding.

^b ED visits exclude those subsequent admissions to the same hospital.

^c Core-cities: Central Falls, Pawtucket, Providence, and Woonsocket.

However, circumstances were not available for 87 homicide cases (26.1%).

In 2014, the total charges associated with the 4,098 assault-related ED discharges/transfers were \$15.2 million, and 390 assault injury hospitalizations were charged nearly \$17.5 million by hospitals. The total length of stay for assault-related hospitalizations was 2,527 days, and the overall cost was nearly \$6 million paid by insurance companies (data not shown).

DISCUSSION

This analysis demonstrates the high burden of injury and death due to assault in RI. In accordance with national data, young minority men living in core cities are most likely to be seen in the ED, admitted to the hospital, or die from assault-related injury.^{2, 4, 6} Assault injury is tremendously expensive to our state, with the majority of costs being born by Medicaid and Medicare. Our data also highlight some unique geographic characteristics of assault-related injury, where the highest ED visit rates occurred among residents of Woonsocket, Providence, and Central Falls, and the lowest rates among those in non-metro areas.

Our analysis highlights potential avenues for prevention. In RI, 62.6% of those tested for toxicology results had an illicit substance in their system at the time of death. Although the ED and HD databases did not have information on toxicology tests for non-decedents, other RI and national data confirm that alcohol and/or substance use are common precedents to assault.¹⁰⁻¹³ Others have found that interventions focused on alcohol and/or drug use among perpetrators or victims of violence, including in the ED setting, are effective at reducing future victimization and perpetration of violence.¹⁴ Identification of areas with high concentrations of alcohol outlets can reduce violence by improving policing efforts.^{15, 16} Alcohol and drug control policies should be added to prevention programs by law enforcement officers, public health professionals, and policy makers.¹⁷

Given the high rate of assault-related

Table 2. Characteristics of Homicide Deaths Using the 2004–2014 RIVDRS Data (N=342)

Characteristic of Homicide Death	n	% ^a
Age group (mean: 33.5 years)		
Less than 18 years	33	9.7
18-24 years	103	30.2
25-44 years	125	36.7
45-64 years	59	17.3
65 years and over	21	6.2
Sex		
Male	251	73.4
Female	91	26.6
Race/Ethnicity		
Non-Hispanic white	129	37.8
Non-Hispanic black	91	26.7
Hispanic	107	31.4
Other	14	4.1
Marital Status		
Never married	224	65.5
Married/civil union/domestic partnership	64	18.7
Divorced/married, but separated	37	10.8
Single, not otherwise specified/widowed	17	5.0
City/Town of Residence		
Urban(core cities) ^b	210	62.3
Sub-urban regions	84	24.9
Non-metro/Rural areas	11	3.3
Out of state	32	9.5
Injury Location		
House or apartment	178	53.0
Street/highway	87	25.9
Parking lot/public garage/public transport	17	5.1
Bar/nightclub/commercial/retail area	15	4.5
Natural area/park/playground/public use area	14	4.2
Motor vehicle	12	3.6
Other	13	3.9
Injured at Victim Home		
Yes	125	37.5
No	208	62.5
Weapon Type		
Firearm	179	53.3
Sharp instrument	58	17.3
Blunt instrument	26	7.8
Personal weapons	25	7.4
Hanging, strangulation, suffocation	22	6.6
Motor vehicle including buses, motorcycle	14	4.2
Other	12	3.6

a Percentages might not total 100% because of rounding.
 b Core-cities: Central Falls, Pawtucket, Providence, and Woonsocket.

Table 3. Toxicology Tests and Circumstances of Homicide Deaths Using the 2004–2014 RIVDRS Data (N=342)^{a,b}

Toxicology Test and Circumstance	n	%
Tested	329	96.2
Toxicology test positive		
Any toxicology	218	66.3
Any illicit substance	206	62.6
Alcohol	102	31.2
BAC<0.08 g/dl	34 (33.3%)	
BAC≥0.08 g/dl	68 (66.7%)	
Marijuana	96	29.7
Opiates	45	13.8
Cocaine	35	10.7
Antidepressants	22	6.8
Amphetamine	11	3.4
Life stressor circumstance		
Argument or conflict	105	31.4
Physical fight (two people, not a brawl)	11	3.3
Crisis within previous or upcoming 2 weeks	8	2.4
Crime and criminal activity circumstance		
Precipitated by another crime ^c	53	15.9
Drug trade	22 (41.5%)	
Robbery	18 (34.0%)	
Assault	6 (11.3%)	
Arson	6 (11.3%)	
Other (specify in narrative)	12 (22.6%)	
Drug involvement	39	11.7
Crime in progress	31	9.3
Gang related	8	2.5
Interpersonal circumstance		
Intimate partner violence-related	46	13.8
Jealousy (lovers' triangle)	20	6.0
Intimate partner problem	15	4.5
Other relationship problem (non-intimate)	11	3.3
Victim of interpersonal violence within past month	8	2.4
Homicide event circumstance		
Drive-by shooting	15	4.5
Victim was a bystander	11	3.3
Caretaker abuse/neglect led to death	6	1.8
Victim was an intervener assisting a crime victim	5	1.5
Random violence	5	1.5
Walk-by assault	5	1.5
Circumstance Not Reported	87	26.1

a Subcategories do not sum to 100% because test results of victims can be positive for alcohol or multi-drugs.
 b Percentages might exceed 100% because multiple circumstances might have been coded.
 c Number will not equal the sum of the column because a death could have been precipitated by more than one other crime.

injury in core cities, focused neighborhood-based interventions on these areas may be effective.⁶ In other municipalities, area-based interventions, such as greening of vacant lots, have effectively decreased incidence of violent crime.¹⁸ Future research needs to focus on the characteristics of suspects including mental health status, history of violence, alcohol/drug abuse, and relationships with victims to improve homicide intervention.

Most homicide victims died by firearms. Current RI law restricts adults with a mental illness history and a felony conviction to purchase firearms.¹⁹ However, we also need strict enforcement of laws against carrying concealed guns. Studies in other states have shown that stricter firearm permitting laws are associated with reductions in homicide rates.²⁰ Others have shown that changes in gun sales practices can reduce gun use in violent crime.²¹

The Nonviolence Streetworkers Program at the Institute for the Study and Practice of Nonviolence has been in operation for 12 years, with the impact greatly felt within the neighborhoods served throughout RI. Victims from economically challenged and under-served communities easily relate to the Nonviolence Streetworkers, who come from their neighborhoods. As a result, there is a trust factor between them which does not exist with the typical service provider, and a credibility factor that allows relationships to be easily and readily built with trust. The Streetworkers have been heavily utilized by victimized youth and their families.

The Streetworkers are available 24 hours a day and have responded to every shooting in the City of Providence since the program's inception. They offer immediate support to victims of violence and their families, providing referrals and information when appropriate. Often, they accompany the victim and family to the Emergency Room and act as liaison between staff and family. They are simultaneously working with the family and friends of the victim in a process of coming to terms with the event, to reject retaliation, and convincing the survivors of the need to live for the sake of the family.

It is the Victim Services team at the Institute for the Study and Practice of Nonviolence that interfaces with primary and secondary victims of violence after receiving the referral information from the Streetworkers after their immediate response to the incident. On a regular basis, the Victim Services interface with both primary and secondary victims of crime, offering crisis counseling, contacting clients for follow-up, assisting with filing compensation claims, accompanying and advocating within the justice system, and providing information and referral about services, jobs, and job training. Because of the Streetworkers' omnipresence throughout the Providence neighborhoods, they are able to respond to smaller fights between groups of young people, advocate for the victims, and keep it from escalating into a larger criminal act that would create more victims. The intervention this Streetworker Outreach Team provides is paramount to ending our state's generational cycles of violence.

Limitations include the following: (1) ED and HD data did not have unique identifiers, so we lacked the ability to link patient-level data. Also, there was no unique identifier for the RIVDRS/hospital data linkage; (2) toxicology and circumstance information are not included in the ED and HD datasets; and (3) circumstances surrounding a homicide death were underreported in RIVDRS for the following reasons: (a) investigators are not able to identify circumstances on unsolved homicides that occurred with no witnesses; and (b) law enforcement agencies are reluctant to give out detailed information on homicides during ongoing investigations. We usually only get the initial police report with no additional information even when the case investigation is over. However, we have made strides by requesting arrest records for suspects, which provide more information. In addition, to complement our homicide circumstances, we also receive the National Incident Based Reporting System (NIBRS) data.

In conclusion, ED, HD, and RIVDRS data can provide a profile of assault injury and homicide for public health authorities in RI. Interventions need to focus on high-risk populations and areas to effectively prevent assault-related injury and homicide.

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Authors

Yongwen Jiang, PhD, is the RIVDRS Epidemiologist, Rhode Island Department of Health, and an Assistant Professor of the Practice of Epidemiology, School of Public Health, Brown University.

Megan L. Ranney, MD, MPH, is a physician, Rhode Island Hospital; Associate Professor of Emergency Medicine, Alpert Medical School and School of Public Health, Brown University and Associate Professor of Health Services, Policy and Practice.

Jordan Seaberry, BFA, is the Director of Public Policy and Advocacy at the Institute for the Study and Practice of Nonviolence.

Lynne-Marie Shea, BA, is the Director of Victim Services at the Institute for the Study and Practice of Nonviolence.

Brian Sullivan, MS, is the Chief of Police at Lincoln Police Department and the President of the Rhode Island Police Chiefs' Association in 2015.

Samara Viner-Brown, MS, is the Chief of the Center for Health Data and Analysis at the Rhode Island Department of Health and the Principle Investigator and Program Manager of RIVDRS.

Disclaimer

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Rhode Island Department of Health, Rhode Island Hospital, Brown University, the Institute for the Study and Practice of Nonviolence, and Lincoln Police Department.

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Correspondence

Yongwen Jiang
 The Center for Health Data and Analysis
 Rhode Island Department of Health
 3 Capitol Hill
 Providence, RI 02908
 401-222-5797 Fax 401-222-4415
Yongwen.Jiang@health.ri.gov