

Trends in Emergency Department Visits for Intentional Injury at Virginia Commonwealth University's Medical Center, 2003-2016

Background

The Clark-Hill Institute for Positive Youth Development regularly examines trends of youth violence in Richmond City. This factsheet examines trends of intentional injury emergency room visits at Virginia Commonwealth University Medical Center's Emergency Department (VCU ED) from July 2002 through June 2016 among 10-24 year-old Richmond City residents. The VCU ED is the only level one trauma center in Central Virginia and is estimated to serve approximately three-quarters of Richmond City's trauma patients.

Data are analyzed in fiscal years, starting July 1st and ending June 30th. To determine injury groupings, the CDC-recommended frameworks for categorizing external cause of injury was used¹. Specifically, data from 2003-2015 was coded using ICD-9 codes. In October 2015, ICD-10 codes were implemented in the VCU Health System, thus the 2016 fiscal year injury groupings were coded using ICD-9 and ICD-10 codes. This change may impact how injuries were coded by ED staff and subsequently rates by injury groupings may be affected. Caution should be exercised when interpreting changes observed after implementation of ICD-10. The injury groupings included external injury, assault, abuse, suicide and firearm injury. A composite variable for intentional injuries was created for this analysis where a visit for assault, abuse, or suicide injuries was defined as an intentional injury. Patients' residential addresses were geocoded using ArcGIS software and examined at the Census tract level. Rates for intentional injury visits to the VCUEd were calculated using U.S. Census Bureau population data.

Rates of Youth Injury Visits

In 2016, nearly 4 per 1,000 VCU ED visits were due to intentional injury (including assault, firearm, abuse, or suicide-related visits) (Figure 1). Overall, this rate is lower than previous years and follows a decline observed that began in 2014. The rate for intentional injury was highest in 2006 at 13.9 per 1,000 youth. This peak was followed by a 3-year decline to 8.5 per 1,000 in 2009. The rate of injury visits fluctuated but gradually declined to its lowest level in 2016. The corresponding numbers (frequency counts) for intentional injury and all injury visits are shown in Table 1.

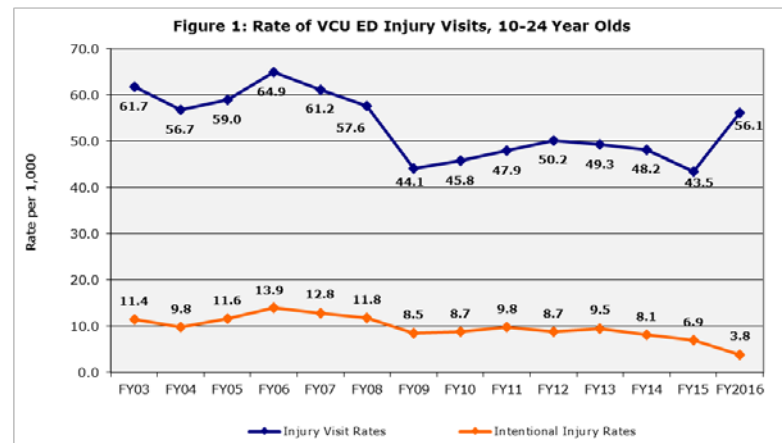


Table 1: Visits to the VCU ED, 10-24 Years

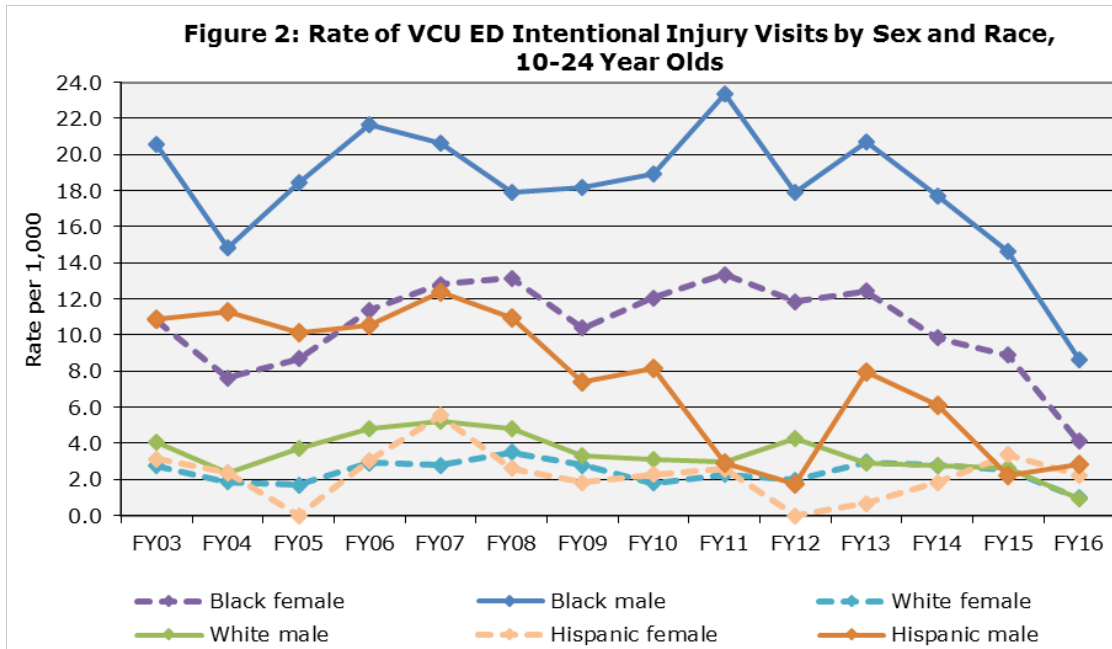
	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	Total
Intentional Injury Visits (%)	501 (18.5)	424 (7.3)	498 (19.6)	593 (21.4)	548 (20.9)	508 (20.6)	440 (19.2)	453 (19.1)	509 (20.5)	437 (17.4)	476 (19.3)	393 (16.8)	336 (15.9)	176 (6.8)	6,291 18.1%
All Injury Visits	2,709	2,455	2,543	2,767	2,618	2,471	2,286	2,372	2,481	2,508	2,463	2,338	2,112	2,581	34,706

Note: (%) indicates the percent of intentional injury visits among all injury visits.

Demographic Characteristics

Black males had the highest rates of intentional injury visits (Figure 2). Overall, rates fluctuated year to year. However, between 2013 and 2016, the rate declined steadily among black males, black females, Hispanic males, and white males. During the same time period, rates increased for Hispanic females, and remained stable among white females. Across all years, the average age of youth visiting the ED for intentional injuries was between 18 and 19 years (not shown).

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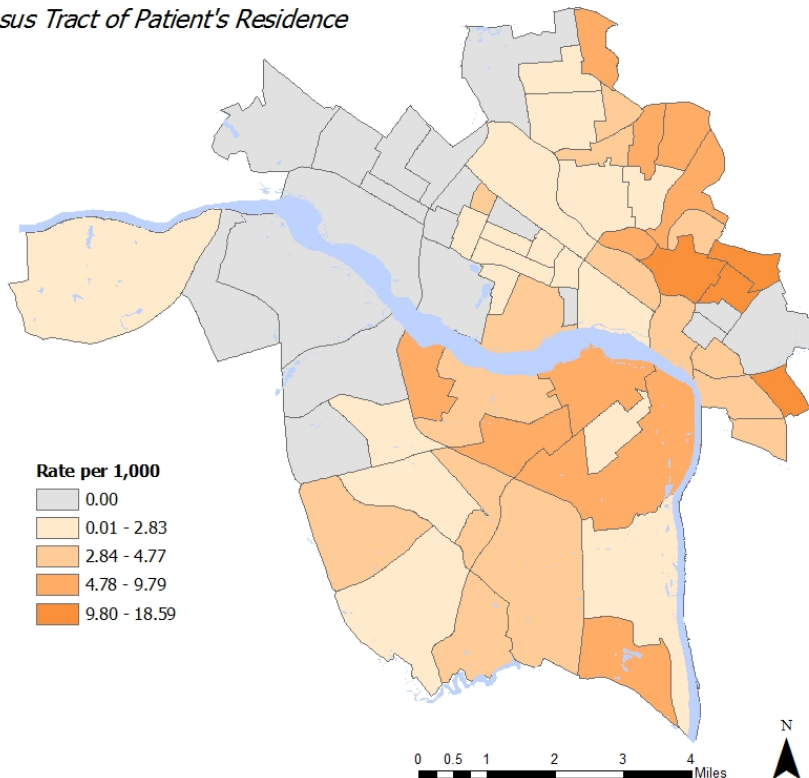


Note: Between FY2003 and FY2010, patient race and ethnicity were not captured independently; however, starting in FY2011, ethnicity was collected separately from race, thus race and ethnicity data from FY2011 forward are not comparable to previous years.

Geographic Distribution

In 2016, the highest rates of intentional injury visits among 10-24 year olds were in the north, north eastern and south central areas of the city. This pattern is similar to previous years (not shown). Rates in Census tracts ranged from 0.5 to 18.6 per 1,000; with an average of 3.5 per 1,000.

Figure 3: Intentional Injury Visits to the VCU ED Among Richmond City Youth, FY2016
By Census Tract of Patient's Residence

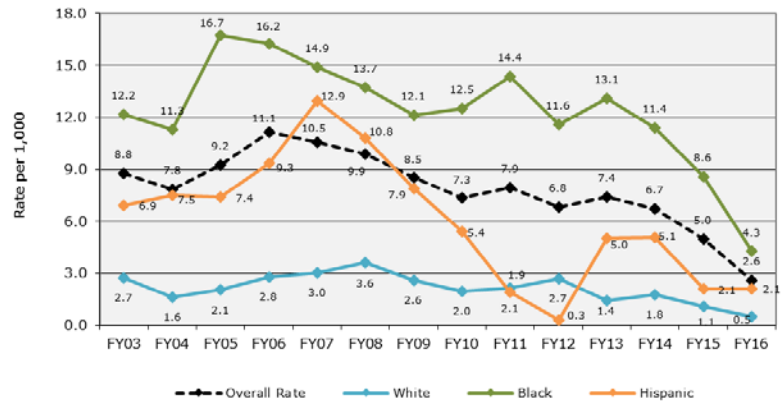


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Assault-Related Injury Visits

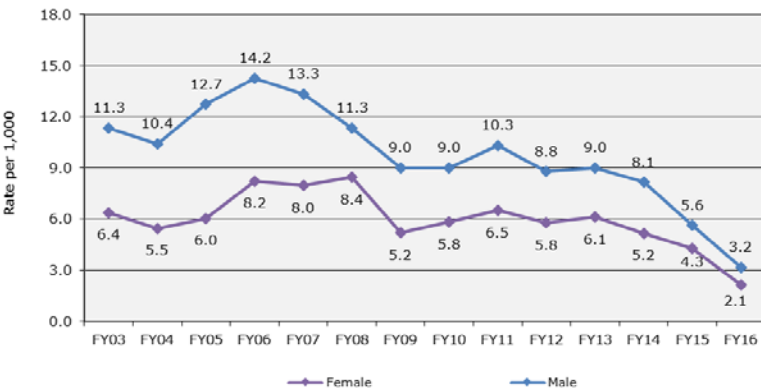
The highest rate of assault-related injury visits among youth 10 to 24 years occurred in 2006 (11.1 per 1,000). The rate has gradually declined to 2.6 per 1,000 in 2016. Rates were consistently higher among black youth and peaked in 2005 at 16.7 per 1,000 and gradually declined to 4.3 per 1,000 in 2016. The rate of youth violence among Hispanics has shown steep decline until 2012 followed by a slight increase in 2013 and 2014. In 2015 and 2016, the rate has declined and stabilized at 2.1 per 1,000 youths. Overall, the assault rate is lowest among whites and has shown a gradual decline since 2009. (Figure 4).

Figure 4: Rate of VCU ED Assault Visits by Race



While the rate of assault injury was persistently higher among males compared to females, the trend during the 12 year period was similar among males and females (Figure 5). The rate peaked for males and females in 2006 at 14.2 and 8.2 per 1,000, respectively. In 2007, the rate among males decreased steadily until 2009; however, the rate for females remained stable through 2008 and decreased sharply in 2009. For both sexes, the rate increased through 2011 and demonstrated an overall decline in the subsequent five years to the lowest rates observed during the 13 year time period. The average age for males and females was between 18 and 19 years of age and there were no statistically significant age differences by sex.

Figure 5: Rate of VCU ED Assault Visits by Sex, 10-24 Year Olds



Firearm-Related Injuries

The number of visits decreased by nearly half between 2013 and 2014, but subsequently increased in 2015 and slightly declined in 2016 (Table 2). Males accounted for the majority of firearm-related injury visits to the VCU ED (Figure 6). Table 3 shows the average age of homicide victims. Overall, the mean age for males and females ranged from 18 to 21 years with the exception of 2009, when females on average were 15.5 years of age (Table 3).

Figure 6: Firearm-Related Injury Visits by Sex

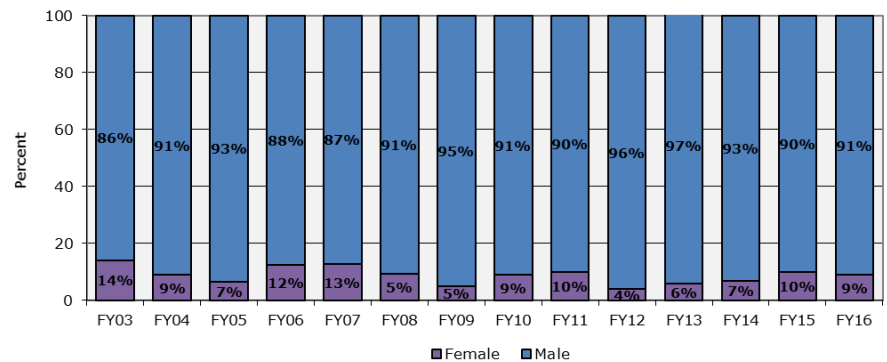


Table 2: Number of Firearm-Related Injury Visits by Sex, 10-24 Years

	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16
Female	19	11	9	18	15	9	4	7	10	3	5	3	7	6
Male	115	113	127	127	101	88	80	71	93	73	75	43	64	60
Total	134	124	136	145	116	97	84	78	103	76	80	46	71	67

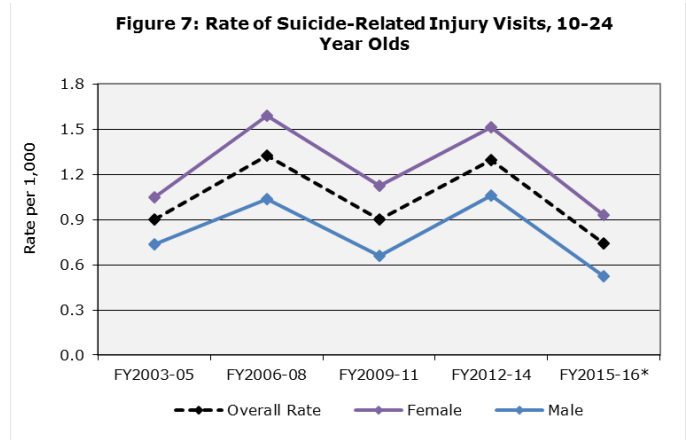
Table 3: Mean Age of Firearm-Related Injury Visits by Sex

	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16
Female	18.8	19.4	18.9	19.3	18.9	19.9	15.5	19.7	18.7	18.0	21.6	21.3	21.6	20.2
Male	18.9	20.2	19.1	18.2	19.3	20.0	18.8	19.8	20.0	20.2	20.0	20.6	20.1	19.1

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Suicide-Related Injuries

The rate of overall suicide-related injury visits ranged between 0.7 and 1.3 per 1,000 between 2003 and 2016 and fluctuated each time period (note: rates are calculated for 3-year periods with the exception of FY2015-16, a 2-year rate). Rates were higher among females compared to their male counterparts. (Figure 7). The number of visits by sex is shown in Table 4. Compared to males, females tended to be younger or similar in age when they visited the VCU ED for suicide-related injuries (Table 5).



* 2-year rate is shown for FY2015-16.

Table 4: Number of Suicide-Related Injury Visits by Sex, 10-24 Years

	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16
Female	24	26	21	37	36	33	31	21	37	34	41	40	42	3
Male	21	6	19	26	20	18	15	17	18	18	33	26	18	5
<i>Total</i>	<i>45</i>	<i>32</i>	<i>40</i>	<i>63</i>	<i>56</i>	<i>51</i>	<i>46</i>	<i>38</i>	<i>55</i>	<i>52</i>	<i>74</i>	<i>66</i>	<i>60</i>	<i>8</i>

Table 5: Mean Age of Suicide-Related Injury Visits by Sex, 10-24 Years

	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16
Female	17.8	18.8	18.4	18.7	18.7	19.7	18.3	19.4	18.7	18.8	18.5	18.5	19.5	20.0
Male	18.0	18.5	19.8	20.3	20.0	20.1	18.1	19.6	18.1	19.2	19.5	21.5	20.2	21.0

Suggested citation: Masho, SM and Bishop, DL. June 2017. Trends in Emergency Department Visits for Intentional Injury at Virginia Commonwealth University's Medical Center, 2003-2016. The VCU Clark-Hill Institute for Positive Youth Development. www.clarkhill.vcu.edu (and date accessed).

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¹ Tools for Categorizing Injuries using ICD Codes: https://www.cdc.gov/nchs/injury/injury_tools.htm