Trends in Emergency Department Visits for Intentional Injury at Virginia Commonwealth University Medical Center Among 10 - 24 Year Olds, 2003-2018

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 2018 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 were analyzed in fiscal years, starting July 1st and ending June 30th. To determine injury groupings, the CDC-recommended framework for categorizing external cause of injury was used. Specifically, data from 2003-2015 were 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 both ICD-9 and ICD-10 codes, and 2017 used ICD-10 codes only. 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 across multiple ICD coding systems. 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 VCU ED were calculated by dividing the number of visits by population estimates derived from the U.S. Census Bureau’s American Community Survey 5-year population data.

Rates of Injury Visits

In 2018, the VCU ED intentional injury rate for 10-24 year olds was 4.0 per 1,000. Intentional injuries included assault, firearm, abuse, or suicide-related visits (Figure 1). While this rate is the same as 2017 and is slightly higher than in 2016, it is lower than in previous years. 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.

Demographic Characteristics

Overall, rates of intentional injury fluctuated from year to year (Figure 2). Black males had the highest rates of intentional injury visits; however, between 2013 and 2018, the rate declined steadily and stabilized among black males as well as among white females. For black females and white males, the rates between 2013 and 2016 declined and were followed by fluctuations in 2017 and 2018. The rates increased through 2017 and then decreased in 2018 among Hispanic males and during the same time period, rates increased through 2017 and subsequently declined in 2018 for Hispanic females. Across all years, the average age of youth visiting the ED for intentional injuries was between 18 and 19 years (not shown).
Geographic Distribution

Rates of intentional injury visits among 10-24 year olds by census tract of residence are shown for 2015 through 2018 in Figures 3 – 6. Rates were slightly higher in 2015 with an overall average of 6.9 per 1,000 across all the tracts compared to the stabilized rates ranging from 3.4 to 4.1 per 1,000 between 2016 and 2018. During these four years, as well as between 2011 and 2015 (not shown), the rates of intentional injury visits had similar geographic distributions with the highest rates observed in the north, north eastern and south eastern areas of the city.

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.
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Figure 3: Intentional Injury Visits to the VCU ED Among Richmond City Youth 10-24 years, By Census Tract of Patient’s Residence
Assault-Related Injury Visits

Overall, the VCU ED visit rate due to assaults among 10 to 24 year-olds was lowest among whites and has shown a gradual decline since 2009 (Figure 4). The highest rate of assault-related injury visits occurred in 2006 (11.1 per 1,000) then subsequently declined to 2.6 per 1,000 in 2016 and stabilized through 2018 at 2.4 per 1,000. Rates were consistently higher among black youth; rates peaked in 2005 at 16.7 per 1,000, gradually declined to 4.3 per 1,000 in 2016, and generally were stable through 2018 (3.8 per 1,000). The rate of youth violence among Hispanics showed a steep decline between 2003 and 2012, was followed by slight increases in 2013 and 2014, and then a subsequent decline through 2018 to 1.3 per 1,000. While the rate of assault injury was persistently higher among males compared to females, the trend during the 16 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 and general stabilization in subsequent years to the lowest rates observed during this 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.

Firearm-Related Injuries

The number of firearms-related injury visits decreased overall between 2003 and 2018 (Table 2). Males accounted for the majority of firearm-related injury visits to the VCU ED, however, in 2017 the proportion of females was highest in this 16-year period at 21% (Figure 9). Table 3 shows the average age of firearms-related injury 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).
Suicide-Related Injuries

The rate of overall suicide-related injury visits ranged between 0.3 and 1.4 per 1,000 between 2004 and 2018, with stable rates between 2004-06 and 2010-12, followed by an increase in 2013-15 and decrease in 2016-18 (note: rates are calculated for combined 3-year periods). Rates were higher among females compared to their male counterparts (Figure 10). 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; however in 2018 this difference was statistically significant ($t(17)=2.70$, $p=0.015$) (Table 5).

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

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

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We want to acknowledge the contributions of Saba W. Masho, MD, MPH, DrPH to this project. Although no longer with us, she continues to serve as an inspiration based on the example she set, her passion for this project, and dedication to the Richmond community she served. Without her leadership and guidance, this work would not have been possible.

The VCU Clark-Hill Institute for Positive Youth Development is a National Academic Center of Excellence for Youth Violence Prevention and is funded by the Centers for Disease Control and Prevention (CDC). For more information contact: Derek Chapman, PhD at derek.chapman@vcuhealth.org or Diane Bishop at diane.bishop@vcuhealth.org