Examining Fluctuations in Rochester Homicides and Shootings from 2000 to 2016

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Introduction

This paper examines yearly homicide and shooting trends in Rochester, NY from 2000 to 2016. The objective of this paper is to address three questions. First, as measured by homicide and shooting victimization, how has the number of violence victims changed between 2000 and 2016? Second, how have assault shooting rates and homicide rates changed from 2000 to 2016? Third, what is the average year-to-year fluctuation in homicide and shooting victimization? Homicide and shooting figures were provided by the Rochester Police Department and the FBI. Census data were used to estimate the yearly population of Rochester for calculation of rates. As will be shown below, although yearly fluctuations in homicides and shootings can sometimes be large, when viewed in totality, homicide and gun violence levels have remained relatively stable in the City of Rochester over the last 16 years. The implications of these findings are discussed below.

Number of Shooting and Homicide Victims from 2000 to 2016

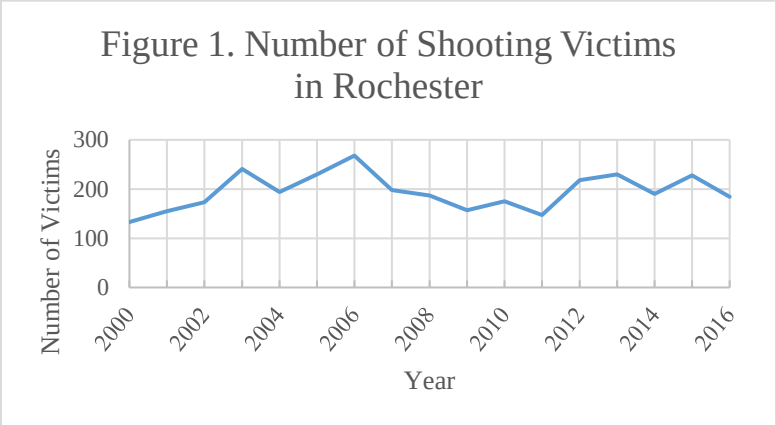


Figure 1 shows the number of shooting victims in Rochester from 2000 to 2016. This number fluctuates from year to year, with a general trend of increasing from 2000 to 2006, decreasing between 2006 and 2010, and fluctuating thereafter. On average, there were 194

assault shootings per year during that period. The highest number of shooting victims was recorded in 2006 (268), while the lowest number was recorded in 2000 (133).

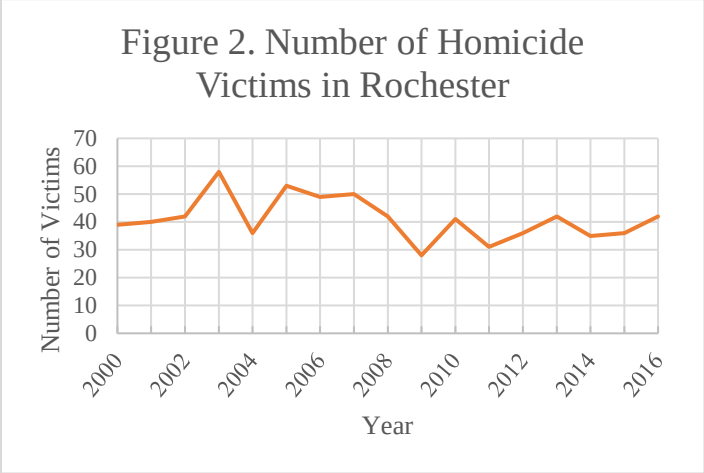
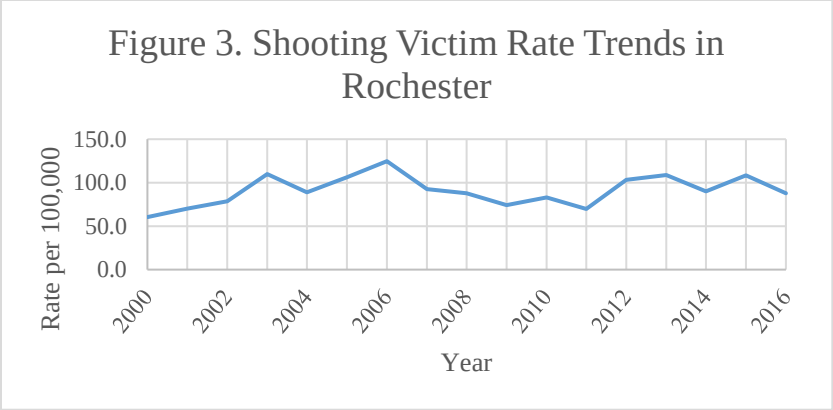


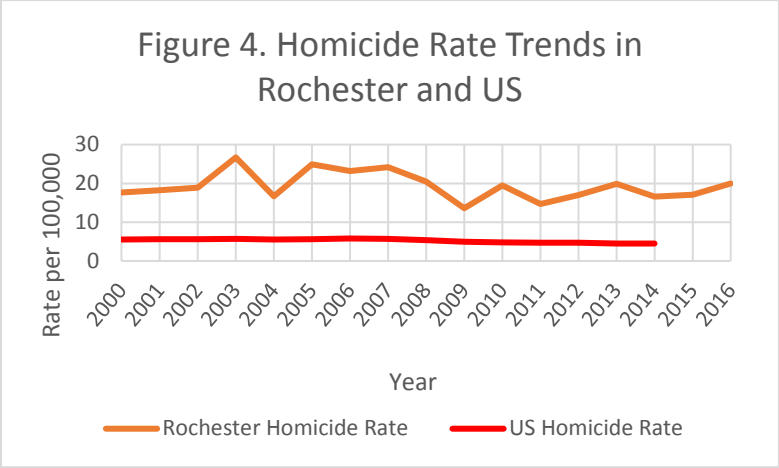
Figure 2 shows the number of homicide victims in Rochester from 2000 to 2016. The number of homicide victims appears to fluctuate in a remarkably consistent fashion over time. On average, there were 41 homicides a year during that period. The highest number of homicide victimizations occurred in 2003 (58), while the lowest number occurred in 2009 (28). In spite of the yearly fluctuations, the number of homicide victims in 2000 (39) and the number of homicide victims in 2016 (42) was relatively the same.

Shooting and Homicide Rates from 2000 to 2016

Figures 3 and 4 reveal the shooting and homicide rates from 2000 to 2016, respectively. Examining rates helps us control for the effect of population change on levels of violence. As shown below, Figure 3 reveals that the shooting victim rate generally rose from 2000 to 2006, generally decreased from 2006 to 2011, and fluctuated thereafter. The shooting victimization rate was 60.5 per 100,000 residents in 2000 and 87.7 per 100,000 residents in 2016.



An examination of the three-year average[1] rate suggests that although there are general fluctuations between 2010 and 2016, there has been a gradual upward trend in shooting the victimization rate over that period (see Figure 7). The three year average for the shooting rate was 95.5 per 100,000 residents for 2014 to 2016, compared to 76.3 per 100,000 residents for 2009-2011, and 108.2 per 100,000 residents between 2004 and 2006.[2]



[1]The overall trends in shooting and homicide victimization rates are somewhat masked by yearly fluctuations. To control for this, we calculated trends in three-year average rates of both homicides and shootings from 2000 to 2015. This is a common approach taken in criminological research. The results of this analysis are shown in the Appendix.

[2] One way to further illustrate this point is by dividing the last 15 years of data into 5 year periods. Doing that, we find that the shooting rate for 2012-2016 was 99.72, while the rate for 2007-2011 was 83.18, and the rate for 2002- 2006 was 102.7.

Figure 4 shows that from 2000 to 2016, the homicide rate also fluctuated, similar to the shooting rate. The rate in 2000 was 17.7 per 100,000 residents and the rate in 2016 was 20.0 per 100,000 residents, with the rate fluctuating between those years. For reference, the US homicide rate from 2000 to 2014 was added to this chart.[3] Between the year 2000 and 2016, the homicide rate in Rochester was, on average, about 3 to 4 times higher than the national rate. There is one important difference between recent trends in the shooting and homicide rates. When looking at the 3-year average (see Figure 8 in the Appendix), the homicide rate has remained relatively stable over the last 5-years.[4]

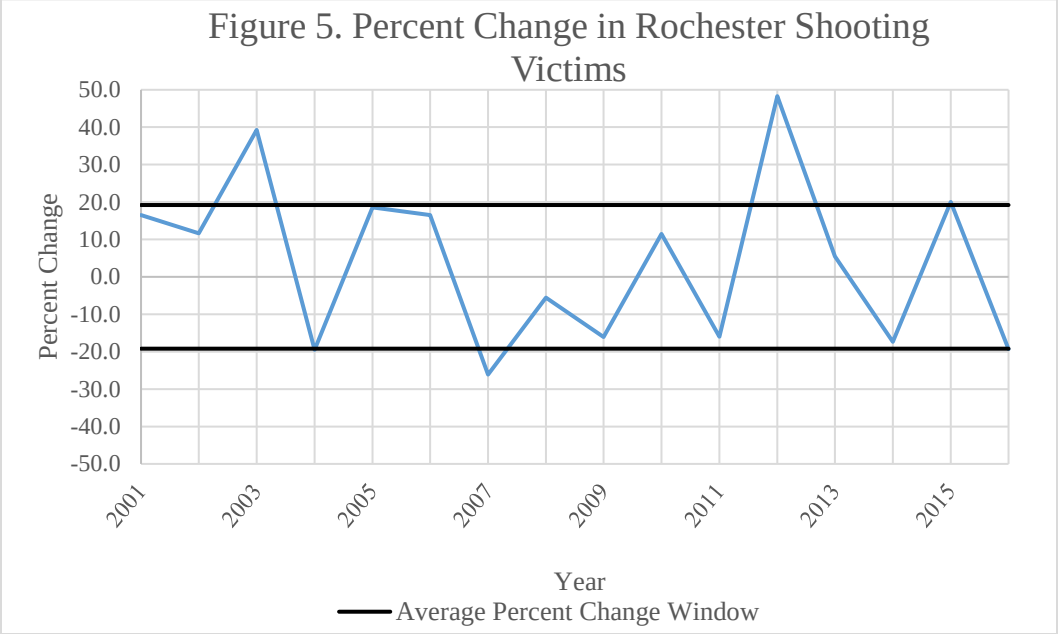
Percent Change in Number of Victims

In our social discourse there is a tendency to focus on year-to-year fluctuations in violence. Such discussions, however, often ignore an important point: yearly fluctuations are a common feature of urban violence. The failure to acknowledge this point has three important implications for how we view crime. First, focusing on year-to-year changes in violence, without understanding the larger context, may cause us to falsely conclude that things are getting better or worse. Second, not understanding the nature of yearly fluctuations may cause us to falsely conclude that an increase or decrease in crime represents a significant departure from the historical trend. Third, focusing on year-to-year changes may cause us to prematurely conclude that a newly implemented policy is successful or failing.

[3] National data for this chart were provided by the FBI and can be downloaded using the UCR data tool: https://www.ucrdatatool.gov/index.cfm. Data for 2015 and 2016 were not available.

[4] If we divide the last 15 years of Rochester homicide data into 5 year periods, we find that the homicide rate between 2012-2016 was 18.12, while the rate for 2007-2011 was 18.5, and the rate for 2002 to 2006 was 22.08

Figure 5 shows percent change in Rochester shooting victims from 2001 to 2015.[5] The average of the absolute value of percent change for shootings is 19.2%. This suggests that 15 to 20 percent year-to-year change in the number of shooting victims is a normal feature of violence in the City of Rochester. To better illustrate this point, two black lines set from -19.2% to 19.2% were added to Figure 5. There were only a few years where violence increased or decreased outside of normal "expected" boundaries.[6] The most notable change was between 2011 and 2012 when there was a 48.3% increase in the number of shooting victims. Taken together, the graph shows that in most years change in number of victims tends to lie within the window normal fluctuation.

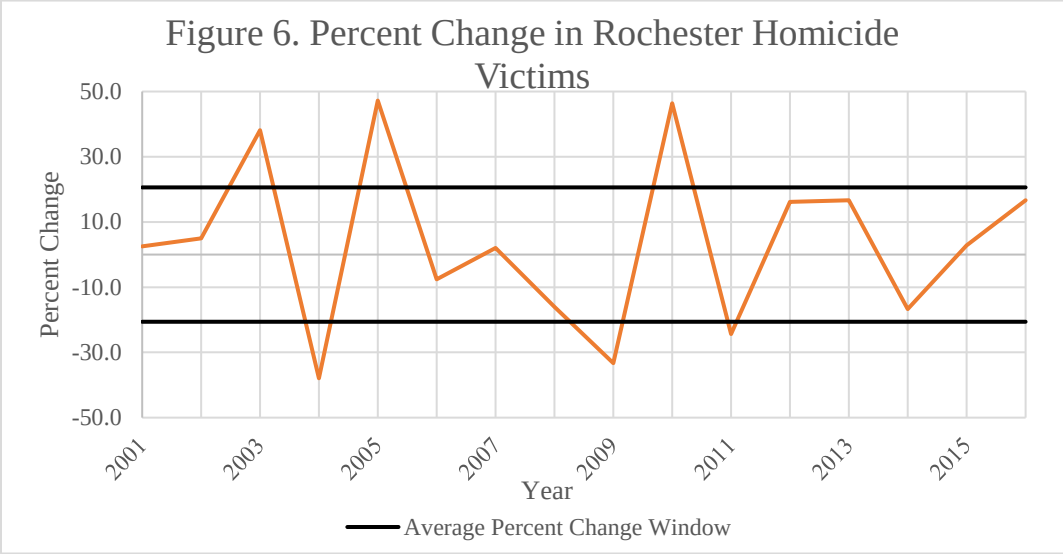


The percent change in homicide victims is shown in Figure 6. The average of the absolute values of percent change from 2000 to 2016 is 20.6%. Thus, the percent change window

[5] Percent change figures were calculated using the following formula: ((y2 - y1) / y1)*100. Because we need two years of data to calculate percent change figures, data only are presented for the years 2001 to 2015.

[6] This is not to suggest that small reductions in violence are unimportant. Nor is this an attempt to diminish the value of saving one person from being shot or murdered. Rather, our point here is that viewing year-to-year fluctuations of violence in isolation may create a skewed picture of the nature of violence in Rochester.

of -20.6% to 20.6% is depicted with two black lines. The largest change occurred between 2004 and 2005 (47.2%) and the smallest between 2006 and 2007 (2.0%). Although there are years that are better and worse than others, the overall fluctuations are relatively consistent with the normal value for percent change seen year-to-year for homicides. As with the shooting victims, most changes in homicide victims between years remain within or near the average percent change window.



Conclusions

The results from this study reveal two interesting points. First, homicide and shooting victimization, while subject to yearly fluctuation, has been relatively stable over the last 16 years in the City of Rochester. Second, up to 20% yearly fluctuations in homicide and shooting victimization is a relatively common feature of violence in Rochester. These results suggest that attempts to understand violence in the City of Rochester require us to think beyond year-to-year fluctuations in violence.

Appendix

Figure 7

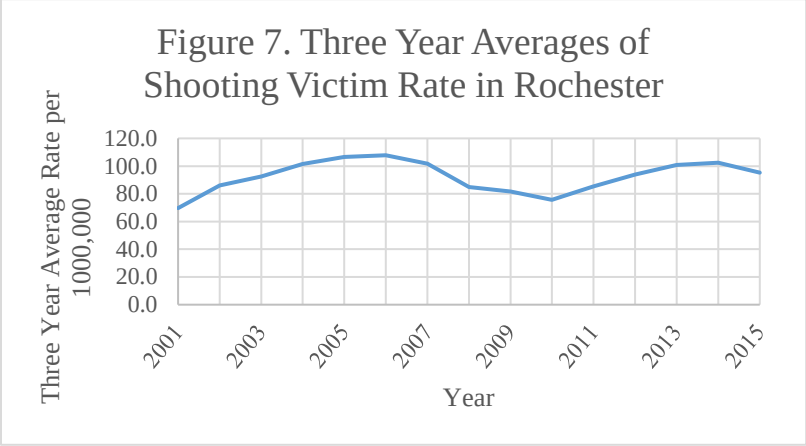


Figure 7 shows three year averages of the shooting rates in Rochester from 2000 to 2016. The three year average rates have a similar trend as the yearly rates in Figure 3. The three year shooting rate increased until about 2006, decreased until 2010, and increased again thereafter.

Figure 8

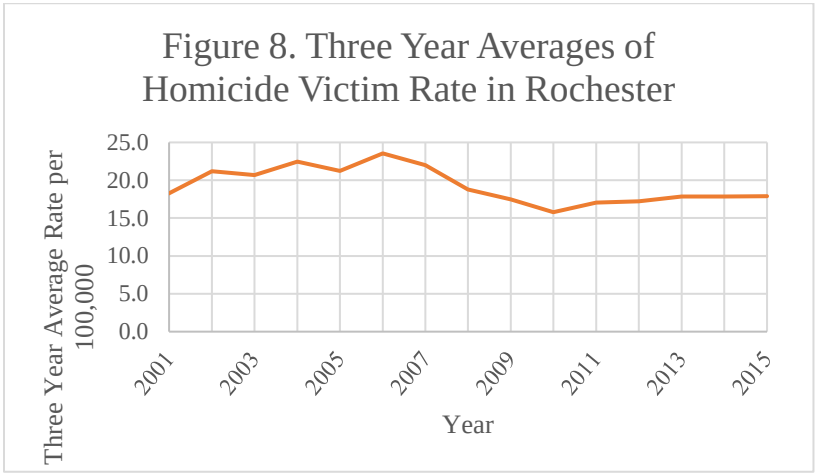


Figure 8 shows the three year averages of the homicide victim rates in Rochester from 2000 to 2016. The three year homicide victim rate remained relatively constant throughout this time period, especially in the most recent years (2011-2015).