Data Driven Approach To Crime And Traffic Enforcement
Rachele' Davis, Crime Analyst

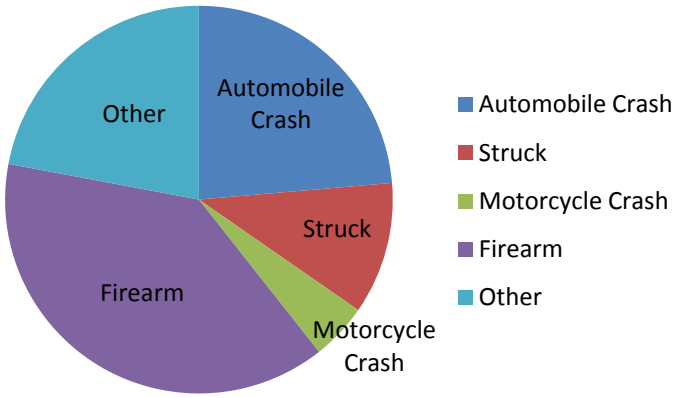
**Law Enforcement Line-of-Duty Deaths**

Preliminary data from the National Law Enforcement Officers Memorial Fund (NLEOMF) indicate a 15% decrease in raw numbers of officers killed in traffic-related incidents during 2012 (52 in 2012 compared to 61 in 2011) but a 3% increase when comparing traffic deaths to the total death ratio. Traffic-related incidents include automobile, motorcycle, and train crashes as well as officers struck while outside their vehicles. In 2011, for the first time in 14 years, more officers died from firearms-related incidents than traffic-related incidents. The number of officers killed by firearms has risen in each of the previous three years until 2012 when it went back down to the same number it had been in 2009. The most recent ten year period is broken down in the chart below.

| Year | Total Officer Line-of-Duty Deaths | Total Traffic Line-of-Duty Deaths | % Traffic-Related Line-of-Duty Deaths |
|---|---|---|---|
| 2003 | 149 | 77 | 52% |
| 2004 | 165 | 74 | 45% |
| 2005 | 162 | 65 | 40% |
| 2006 | 156 | 73 | 47% |
| 2007 | 190 | 85 | 45% |
| 2008 | 141 | 72 | 51% |
| 2009 | 122 | 52 | 43% |
| 2010 | 154 | 70 | 45% |
| 2011 | 165 | 61 | 37% |
| 2012 | 129 | 52 | 40% |

The year 2008 marked only the second time in United States history that more than 50% of officer fatalities in a single year involved traffic-related incidents. The numbers for 2012 are encouraging at 40%, the second lowest percentage in the last seven years. The last time the United States saw 40% was in 2005. The following graph shows the various causes of law enforcement officer deaths for 2012.

**Law Enforcement Officer Deaths: 2012**



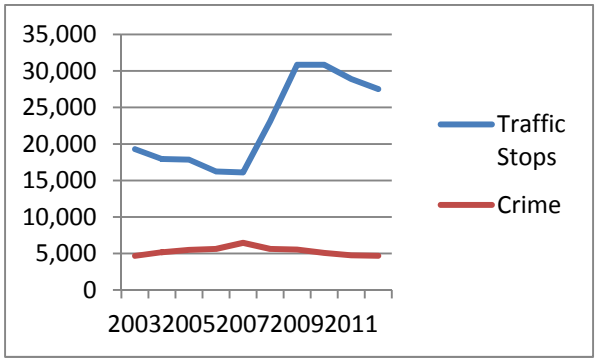

In the history of Joplin Police Department, three of the 19 police officer deaths have been traffic-related, which makes up 16% of total deaths. The State of Missouri has seen a total of 652 police officer deaths in the line-of-duty. Of those, 157 have been traffic-related, which equates to 24%. Nationally, including the very first police officer death that was ever recorded (1791) through 2012, more than 19,600 police officers have fallen in the line-of-duty. Of those, the total number of traffic-related deaths has not been found.

**Relationship Between Traffic Enforcement and Crime**

As is shown in the previous section, traffic enforcement is one of the more dangerous aspects of law enforcement. The following two graphs depict the relationship between the amount of traffic enforcement conducted and the crime rate. It can be seen that, generally, as traffic stops increase, crime decreases.

| Year | Traffic Stops | % Inc/Dec Stops | Crime | % Inc/Dec Crime |
|---|---|---|---|---|
| 2003 | 19,291 | - | 4,672 | - |
| 2004 | 17,941 | -7% | 5,181 | +11% |
| 2005 | 17,859 | -0.5% | 5,495 | +6% |
| 2006 | 16,228 | -9% | 5,626 | +2% |
| 2007 | 16,098 | -1% | 6,453 | +15% |
| 2008 | 23,093 | +43% | 5,620 | -13% |
| 2009 | 30,846 | +34% | 5,540 | -1% |
| 2010 | 30,841 | -0.02% | 5,078 | -8% |
| 2011 | 28,907 | -6% | 4,746 | -7% |
| 2012 | 27,510 | -5% | 4,679 | -1% |

**Traffic Stops and Crime**

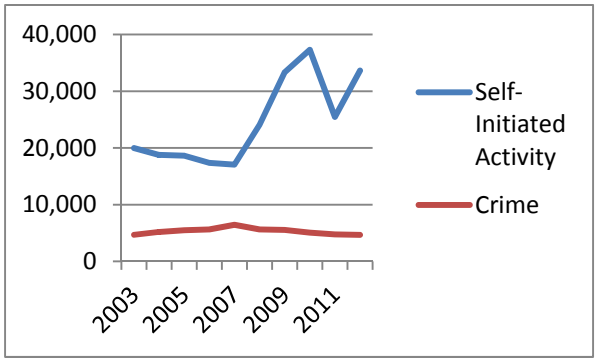



## Relationship Between Self-Initiated Activity and Crime

As before, this section shows the relationship between two variables. In the previous section, an inverse relationship was established between traffic enforcement and crime. In this section, the two variables being compared are the more specific police officer self-initiated activity, which is primarily traffic, and the crime rate. For the purposes of this report, officer self-initiated activity includes car stops, follow-ups, and pedestrian checks. Both variables are shown in the graph below and indicate an inverse relationship as well.

| Year | Self-Initiated Activity | % Inc/Dec Self-Initiated Activity | Crime | % Inc/Dec Crime |
|---|---|---|---|---|
| 2003 | 19,963 | - | 4,672 | - |
| 2004 | 18,764 | -6% | 5,181 | +11% |
| 2005 | 18,630 | -1% | 5,495 | +6% |
| 2006 | 17,355 | -7% | 5,626 | +2% |
| 2007 | 17,052 | -2% | 6,453 | +15% |
| 2008 | 24,087 | +41% | 5,620 | -13% |
| 2009 | 33,316 | +38% | 5,540 | -1% |
| 2010 | 37,303 | +12% | 5,078 | -8% |
| 2011 | 35,458 | -5% | 4,746 | -7% |
| 2012 | 33,635 | -5% | 4,679 | -1% |

**Self-Initiated Activity and Crime**



**Explaining the Relationship**

To more clearly express the relationships between crime and traffic stops and crime and self-initiated activity, an average ratio of 4 to 1 can be established over the last ten years. This means as traffic stops increase incrementally by four, crime inversely reduces by approximately one increment. Or as traffic stops decrease incrementally by four, crime inversely increases by approximately one increment. The ratio is the same for self-initiated activity and crime. When there is an increase in self-initiated activities incrementally by four, crime decreases incrementally by one incident. Reciprocally, as there is an incremental decrease in self-initiated activity by four, crime increases incrementally by one incident.

So ideally, as traffic stops and self-initiated activities increase, crime should decrease. This is clearly indicated in the two previous tables that show the relationships between stops and crime and self-initiated activity and crime. Every year the number of car stops decreased, crime increased, or as stops increased, crime decreased (with the exception of the last two years, which will be addressed below). So the goal for law enforcement is to increase car stops and self-initiated activity in order to further reduce crime.

As mentioned in the previous paragraph, the years 2011-2012 are the clear exception. This report is predicated on historical data that has consistently shown an inverse relationship between traffic stops/self-initiated activity and crime. In 2011-2012, both traffic stops and self-initiated activity declined without an expected commensurate increase in crime. While the tornado reduced time for officers to engage in traffic stops and self-initiated activities, hundreds of officers from other jurisdictions aided Joplin in tornado recovery efforts. Therefore, the continued decrease in crime, despite reduction in traffic and self-initiated activity, was likely influenced by the presence of these additional officers. More than anything else, this is yet another example of the benefits Joplin realized from the many organizations that came to our aid during this tragic event. Although the tornado occurred in May 2011, the residual long-term effects likely had an impact well into 2012 as well. The effects of the tornado show a statistical anomaly that will require ongoing analysis of these changes.

**Recommendations**

The number of officers in an agency will not, by itself, create a reduction in crime. However, it is important to maintain an adequate officer-to-population ratio. The recommended ratio is 1.5 to 2.0 officers per 1,000 residents (*Crime Analysis: From First Report to Final Arrest by Steven Gottlieb, Sheldon Arenberg, and Raj Singh)*. This would mean that an adequate number of officers for Joplin would be 75 to 100. (This number does not take into account Joplin's disproportionate daytime population). Joplin currently employs 111 police officers and three reserve officers. So in showing that Joplin Police Department has an adequate officer-to-population ratio, the next area to look into is the aforementioned increase in traffic stops and self-initiated activities in order to reduce crime levels.

It is every police department's mission to serve and protect the citizens of its community. A reduction in crime levels is at the forefront of that mission. So if there are an adequate number of police officers serving the community, how can the department better serve its population in its goal of reducing crime? The answer lies in the organization of the department and the management of officers' time.

Random patrol efforts produce random results. So more directed efforts should be made in order to achieve the desired results.

A police officer should ideally spend about 65%-75% of his or her time responding to calls for service and performing administrative duties such as report writing, testifying in court, eating, transporting prisoners, etc. The remaining 25%-35% should be uncommitted time (*Crime Analysis: From First Report to Final Arrest by Steven Gottlieb, Sheldon Arenberg, and Raj Singh)*. It is with this uncommitted time that officers can really make the difference in reducing crime levels and the aforementioned 4 to 1 ratio comes into play. It is also equally important administratively to distribute officers equitably among shifts and days of the week depending on the varying crime levels during these times. Beats might also need to be reconfigured based upon the percent of the total workload generated by each beat. The key is to provide discretionary time for officers to invest in the elimination of the root causes of crime.

The reconfiguring of beats actually took place in Joplin in October 2011 when, in the months following the tornado and the displacement of citizens to the north end of town, an additional beat was created to redistribute the workload. This is a prime example of good decision-making at the administrative level for the purpose of utilizing officers' time in the most effective manner.

**Quantifying Results of Traffic Stops**

The everyday traffic work that officers perform is invaluable to every police department. Their work is the heart and soul of the department. An attempt to quantify the amount of activity resulting specifically from traffic stops is shown in the table below. It should be noted that contraband includes drugs, alcohol, paraphernalia, currency, weapons, and stolen property.

| | | | | As Result of Arrests | | | | |
|---|---|---|---|---|---|---|---|---|
| Year | Total Traffic Stops | Crime | Drivers Arrested | Outstanding Warrant | Drug Violation | Offense Against Person | Property Crimes | Discovery of Contraband |
| 2003 | 19,291 | 4,672 | 1,826 | 433 | 221 | 4 | 5 | 414 |
| 2004 | 17,941 | 5,181 | 2,173 | 639 | 310 | 31 | 21 | 545 |
| 2005 | 17,859 | 5,495 | 1,977 | 544 | 286 | 47 | 25 | 501 |
| 2006 | 16,228 | 5,626 | 1,779 | 517 | 214 | 20 | 15 | 403 |
| 2007 | 16,098 | 6,453 | 1,501 | 471 | 193 | 23 | 33 | 349 |
| 2008 | 23,093 | 5,620 | 1,699 | 563 | 261 | 28 | 21 | 442 |
| 2009 | 30,846 | 5,540 | 2,217 | 740 | 310 | 19 | 25 | 537 |
| 2010 | 30,841 | 5,078 | 2,386 | 729 | 412 | 66 | 49 | 624 |
| 2011 | 28,907 | 4,746 | 2,505 | 884 | 354 | 61 | 63 | 648 |
| 2012 | 27,510 | 4,679 | 1,985 | 765 | 428 | 36 | 56 | 735 |

In the previous table, the year 2004 stands out among the rest. During this year, the amount of activity generated from traffic stops was at its highest. This could very well be the result of having more veteran officers out on the street during that year. That theory goes right along with 2008-2010, years in which many new officers were hired and, though more traffic stops were made, the amount of activity generated from those stops is lower than previous years. To correct the issue of leveraging a car stop into something more, additional training for new officers has been conducted over the last few years and the results are paying off. Since 2009, the amount of activity generated from car stops has steadily increased every year.

| Crimes | 2011 | 2012 |
|---|---|---|
| Assault | 491 | 439 |
| Homicide | 2 | 3 |
| Rape | 20 | 18 |
| Robbery | 54 | 65 |
| Arson | 11 | 23 |
| Burglary | 653 | 570 |
| Larceny | 1,754 | 2.027 |
| Theft from Vehicle | 764 | 676 |
| Vandalism | 708 | 619 |
| Vehicle Theft | 289 | 239 |
| Total All Crime | 4,746 | 4,679 |

| Traffic Crashes | 2011 | 2012 |
|---|---|---|
| Fatality | 3 | 6 |
| All Injury | 218 | 318 |
| Property Damage Only | 1,756 | 1,579 |
| Total All Crashes | 1,977 | 1,903 |