Christopher W. Bruce
301 Newbury Street, Box 141
Danvers, MA 01923
978-853-3502 ● cwbruce@gmail.com

A One-Year Evaluation of DDACTS in the Shawnee, Kansas Police Department

October 4, 2011

The following is an analysis of Shawnee's successful implementation of DDACTS during the period of July 6, 2010 to July 5, 2011.

Summary

- In its first year, Shawnee's DDACTS program has been successful, producing statistically significant decreases in total collisions and many crime categories inside the 75th Street Corridor.
- The most significant decreases occurred in auto theft (-61%), total property crimes (-25%), total target crimes (-23%), total collisions (-21%), collisions without injury (-19%), residential burglary (-20%), and auto burglary (-19%).
- Although Shawnee experienced a citywide decrease in crime during the target period, collisions without injury, total collisions, auto burglary, residential burglary, auto theft, and total property crime showed significantly greater decreases inside the target zone than outside.
- The number of hours of enforcement in the target zone, the number of contacts made, the number of arrests made, and the number of citations written were all highly correlated to decreases in collisions.
- Although many crimes decreased, these decreases were not correlated with the intensity of the enforcement. The most likely explanation is that only a certain threshold of visible enforcement was necessary to suppress criminal activity and additional enforcement beyond that amount did not have an additional effect.

Background

The Shawnee Police Department hosted the first DDACTS Implementation Workshop in June 2010, and they were the first police agency to implement DDACTS after the series of workshops began. Their implementation was swift, starting less than a month after the workshop on July 6, 2010.

The Shawnee Police identified a target area known as the "75th Street Corridor," an area of roughly one linear mile covering slightly less than one square mile. This area, representing about 2% of the geographic area of the city, has 15% of the city's crimes against persons, 17% of its crimes against property, and 13% of its motor vehicle collisions.

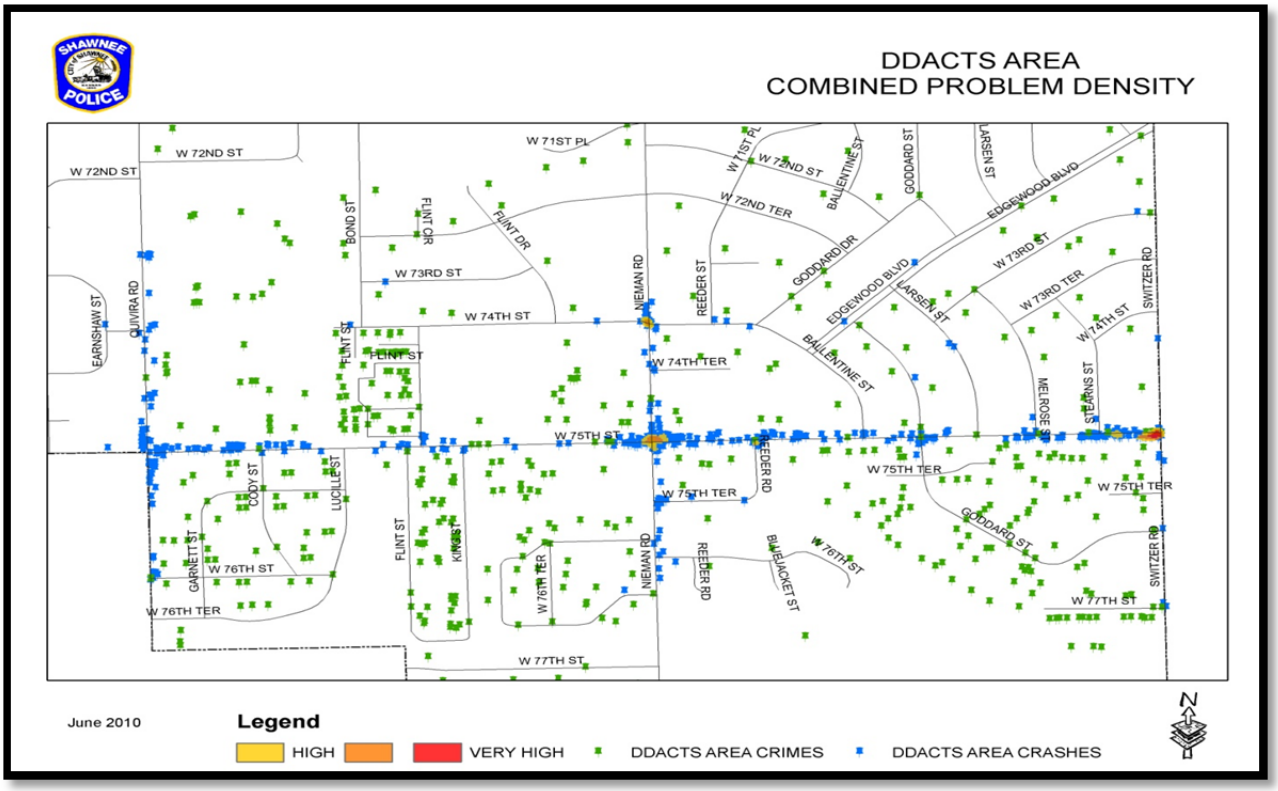


Figure 1: The 75th Street Corridor with five years of crime and collision data.

The agency's response began on Tuesday, July 6, 2010, with all available departmental personnel—including patrol, traffic, and special investigative units, as well as the agency's command staff—performing highly visible enforcement in the area between 18:00 and midnight. On this opening night, they made 70 contacts (primarily with motorists), resulting in 51 citations, 16 written warnings, and 3 arrests. For the following year, the department set a goal of dedicating a minimum of two hours per day in the target zone during the target hours of 18:00–00:00, Thursday through Sunday. The goal works out to 416 hours for the year which they slightly exceeded (426). Moreover, the agency spent another 793 enforcement hours in this zone outside the designated "target times." In total, the 75th Street Corridor received 1,219 hours of enforcement during the year, resulting in 3,222 contacts, 151 arrests, 2,691 citations, 922 warnings, and 153 field interview cards.

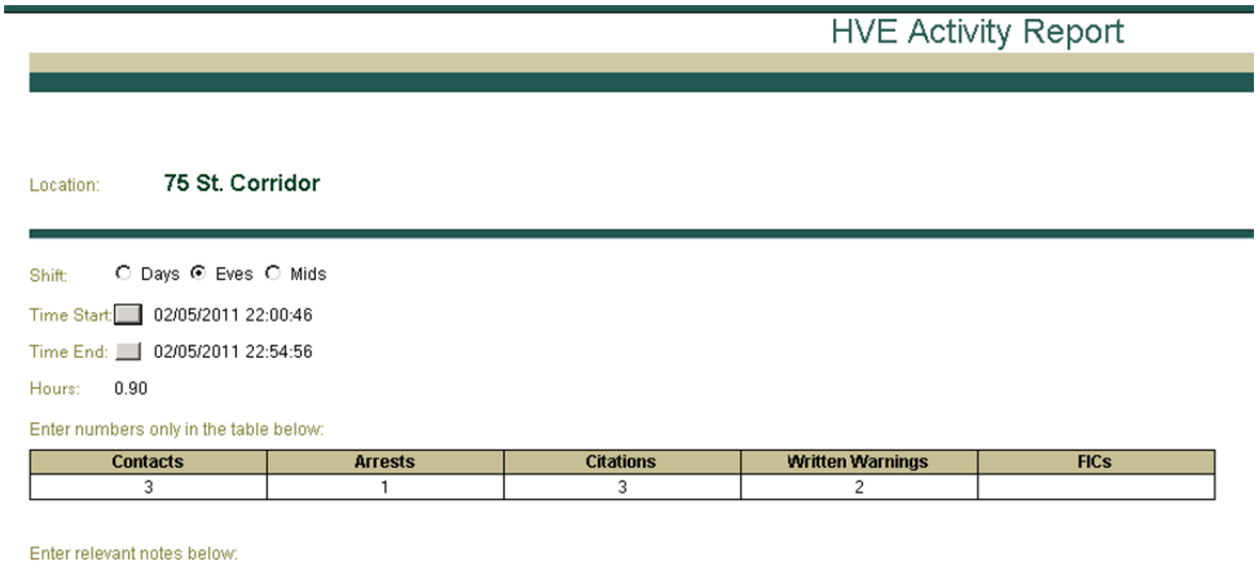
The response itself was almost entirely limited to highly visible traffic enforcement; almost all of the contacts listed above resulted from a motor vehicle stop.

Data

This analysis is based on data provided by the Shawnee Police Department in August 2011. It consists of:

- **Crime data** extracted from the Shawnee crime analyst's ATAC database, a value-added database in which the crime analyst cleans and edits information from the police department records management system

- **Collision data** obtained from Shawnee Department of Public Works Traffic Division accident database. Like the crime data, the collision data is high-quality; the Public Works division manually assigns a GIS point location for each collision, and the attribute data is then joined to the police accident report via the accident number.
- **Enforcement data** obtained from the police department's "HVE Activity Report," a tracking system that allows officers to enter their start and end times in the target area, and how many contacts, arrests, citations, warnings, and field interviews they made during this time.



HVE Activity Report

Location: **75 St. Corridor**

Shift: ○ Days ◉ Eves ○ Mids

Time Start: 02/05/2011 22:00:46

Time End: 02/05/2011 22:54:56

Hours: 0.90

Enter numbers only in the table below:

Contacts	Arrests	Citations	Written Warnings	FICs
3	1	3	2	

Enter relevant notes below:

Figure 2: A screenshot of the HVE Activity Report, used by officers to log their time and results during DDACTS enforcement.

The crime and collision data extended back to July 6, 2005, allowing for the calculation of a five-year baseline average. The DDACTS implementation period was July 6, 2010 to July 5, 2011.

I scanned all three datasets and found no obvious data quality issues. The Shawnee Police Department's crime analyst has almost 20 years of experience in the field and is known for her analytical expertise. Her datasets are extremely well maintained.

Evaluation

My evaluation of Shawnee's DDACTS implementation sought to answer three questions:

1. Did the Shawnee Police Department see significant reductions in crime and collisions within the 75th Street Corridor?

2. Were these reductions significantly different from those seen in the rest of Shawnee?

3. Did these reductions correlate with the overall intensity of the enforcement in the area?

I answer these questions one by one below.

Was there a significant decrease in crime and collisions within the 75th Street corridor during this time period?

To answer this question, I calculated the mean number of incidents for each one-year period ending July 5, calculated the standard deviation of these incidents, and compared the results to the number observed in the DDACTS period. The results are summarized in Table 1.

All offenses that had an average of at least 10 incidents per year reported decreases from the average. The figures for auto theft, collisions without injury, total collisions, total property crimes, and total target crimes were significant at less than the 0.05 level (suggesting that there is less than a 5% chance that these incident types decreased only due to random fluctuations).

Table 1: Observed Changes in DDACTS Target Zone
The "DDACTS Year" is July 6, 2010 to July 5, 2011. Calculations for the five-year average are based on the same time period going back to July 6, 2005.

Category	5-Year Average	Standard Dev.	DDACTS Year	% Change	Z-Score	Significance
Collisions with Injury	15.80	5.08	10	-37%	-1.14	0.13
Collisions without Injury	90.80	8.91	74	-19%	-1.89	0.03
Total Collisions	106.60	11.67	84	-21%	-1.94	0.03
Auto Burglary	40.80	13.93	33	-19%	-0.56	0.29
Residential Burglary	32.40	7.36	26	-20%	-0.87	0.19
Auto Theft	41.20	7.19	16	-61%	-3.50	0.00
Theft	67.00	11.40	56	-16%	-0.97	0.17
Vandalism	39.20	7.19	33	-16%	-0.86	0.19
Persons Crimes	26.20	5.49	24	-8%	-0.40	0.34
Property Crimes	230.60	19.19	174	-25%	-2.95	0.00
All Target Crimes	256.80	24.29	198	-23%	-2.42	0.01

Decreases in persons crime were less stark. There was a slight (-8%) decrease, which was not significant enough to rule out a simple random fluctuation. Nor were the decreases in auto burglary, residential burglary, general theft, or vandalism statistically significant *when compared to the past*, although they did decrease and some are significant when compared to the rest of Shawnee (see below).

The only crimes to increase in the target zone during this period were commercial burglary (+3%) and sex crimes (+169%). Both suffered from very low numbers (an average of 7.8 and 2.6, respectively) and thus could not reasonably have been affected through a DDACTS approach.

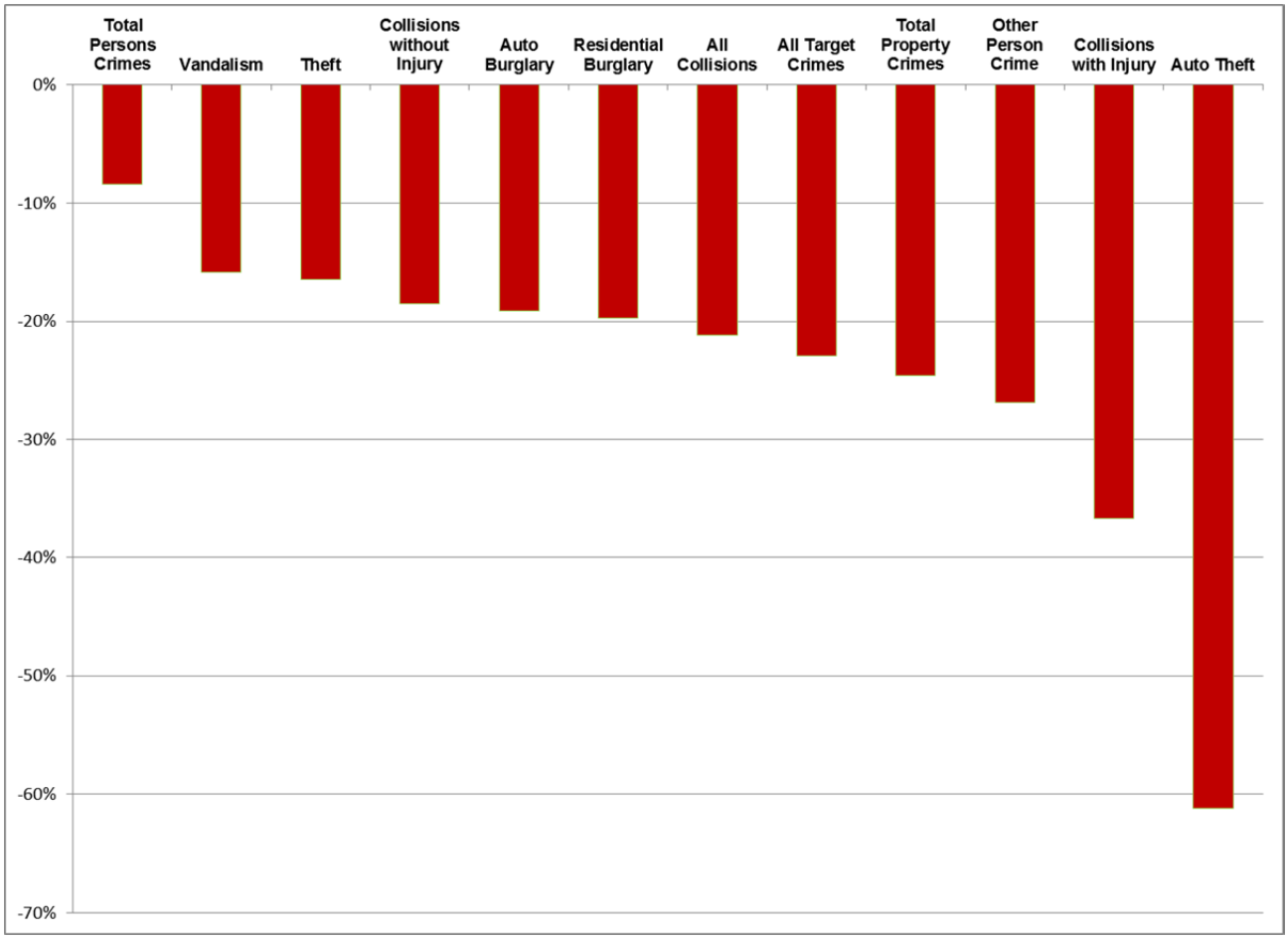


Figure 3: Observed reductions in various incident types in the DDACTS target zone; includes all incident types with a yearly average of at least 10.

Were these reductions significant when compared to the rest of Shawnee?

The area of Shawnee outside the DDACTS zone had a 14% decrease in target crimes (when compared to the average), but in almost all crimes, the decreases inside Shawnee were more pronounced.

Table 2: Changes in the Target Zone Compared to Outside the Target Zone

Changes compare July 6, 2010-July 5, 2011 to the average of the five previous years.

Category	% Change in Zone	% Change Outside	Z-Score in Zone	Z-Score Outside
Collisions with Injury	-29%	-19%	-1.14	-3.81
Collisions without Injury	-22%	+3%	-1.89	+0.25
Total Collisions	-23%	-1%	-1.94	-0.07
Auto Burglary	-19%	+16%	-0.56	+1.05
Residential Burglary	-20%	+2%	-0.87	+0.18
Auto Theft	-61%	-24%	-3.50	-0.94

Theft	-16%	-23%	-0.97	-1.26
Vandalism	-16%	-19%	-0.86	-1.23
Persons Crimes	-8%	-11%	-0.40	-1.51
Property Crimes	-25%	-15%	-2.95	-2.58
All Target Crimes	-23%	-14%	-2.42	-2.72

Although auto burglary and residential burglary had not decreased significantly in the target zone when compared to previous years, they *did* decrease significantly when compared to the rest of the city. Moreover, the decreases in total collisions, collisions without injury, auto theft, and total property crimes were all more pronounced in the target zone than outside.

In the crimes of general theft, vandalism, and persons crimes, however, the rest of Shawnee outperformed the DDACTS target zone in reductions. Our hypothesis is that the nature of these crimes in Shawnee makes them unresponsive to the types of enforcement conducted by Shawnee in its DDACTS implementation, but we would need to perform a more thorough quantitative analysis to be sure.

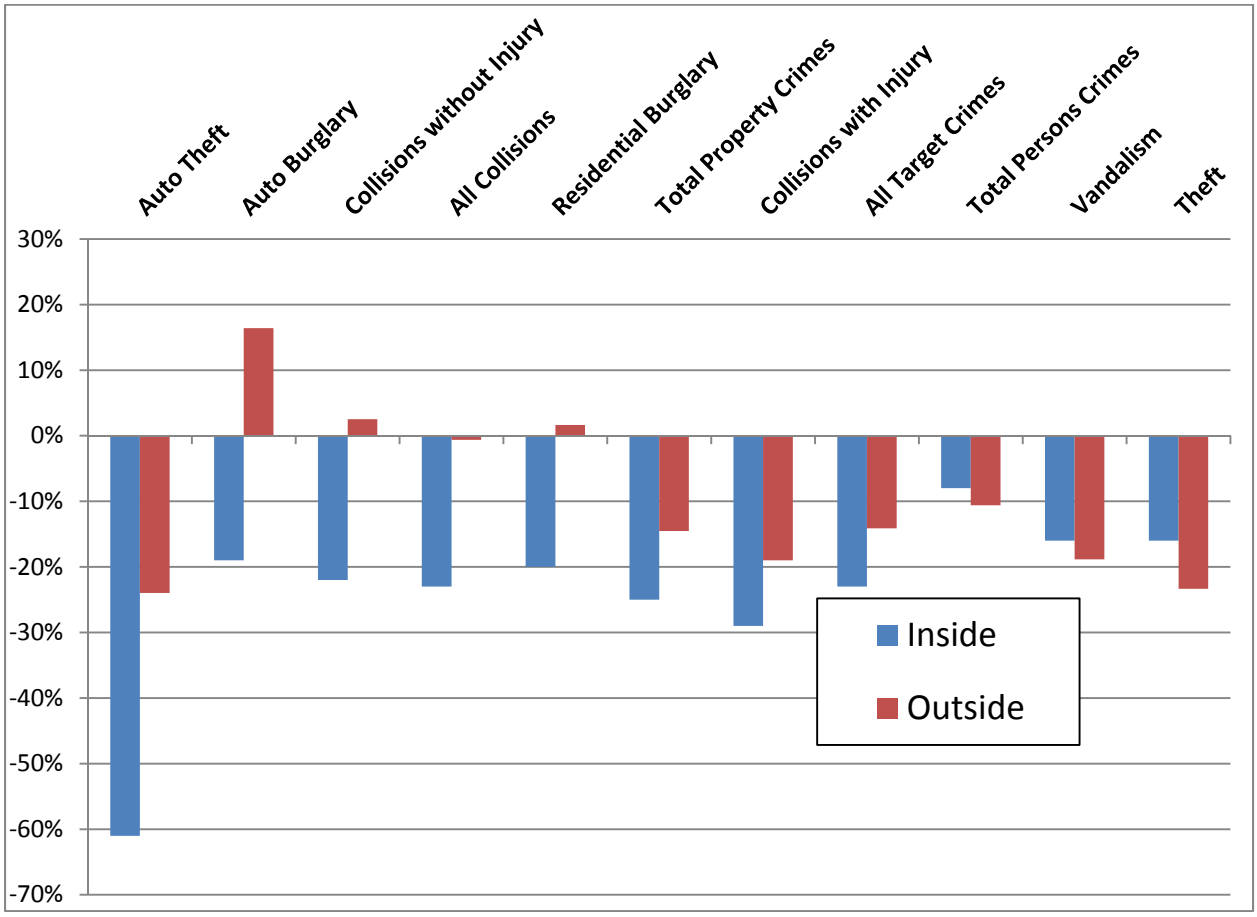


Figure 4: Comparison of changes in incident categories inside and outside DDACTS target zone.

Did these reductions correlate to the intensity of the enforcement in the target area?

As noted previously, the Shawnee Police Department spent 1219 hours of targeted enforcement in the 75th Street Corridor during the year. The number of hours per month ranged from 61 to 269.

To answer this question, I looked at the enforcement activity—hours, contacts, citations, arrests, warnings, and field interviews—on a month-to-month basis and correlated it with the z-score changes in the Corridor during the same months. Table 3 shows the resulting correlations, which work on a scale of -1 to +1. The closer the score gets to 0, the less likely that there is any relationship between the two variables. Significant relationships are highlighted.

Table 3: Correlations Between Enforcement Variables and Reductions in Crime and Collisions

Variable	Target Crimes	Collisions
Total Hours	0.10	-0.36
Total Contacts	0.04	-0.49
Arrests	0.07	-0.43
Citations	0.07	-0.59
Warnings	0.04	-0.21
Field Interviews	0.21	-0.09

The results are relatively surprising. While there is an unequivocal relationship between the intensity of the enforcement (at least for the first four variables) and the reductions in collisions, there is essentially no correlation between the intensity of the enforcement and the reductions in crime.

Target crimes, it must be said, did decrease in the target zone during the period—such is indisputable from the results of the first two questions. It simply appears that a certain level of visible enforcement in the area was suitable to drive away potential offenders, and additional enforcement did not have any additional effect. In other words, the observed reductions in crime could have been achieved with less total enforcement than the target area actually received.

With collisions, however, the effect of extra enforcement is, again, very clear. More time spent in the area, more stops made, and more citations written directly resulted in fewer collisions.

Conclusions

The Shawnee Police Department's approach to the use of highly visible enforcement in high-crime, high-collision areas serves as a model for other agencies to follow. Overall, their enforcement in the 75th Street Corridor prevented about 60 crimes and 20 collisions during the year.

The Shawnee Police Department has recently received a Smart Policing grant to evaluate its DDACTS implementation. A more thorough evaluation should take into account three things that were not possible with the limited time and data available to complete this report:

1. The relationship between enforcement and crime and collision reductions during specific times of day.

2. The possibility of displacement or diffusion of benefits in nearby areas.

3. The relationship between DDACTS enforcement and non-crime calls for service.

Nonetheless, these preliminary results highlight a successful implementation, and the Shawnee Police Department is justified in continuing the model for another year.

I would like to thank the Shawnee Police Department, including Chief Larry Larimore, Captain Bill Hisle, and crime analyst Susan Smith for providing the data and context necessary to conduct this evaluation, and for having the courage to support a thorough and unbiased evaluation of their implementation.