Targeting Crash and Crime Hot Spots in Baltimore County

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For many years, law enforcement officials have recognized the connection between traffic law enforcement and the detection of criminal activity. Since the mass production of the automobile began in the early 1900s, many criminals have found that roadways provide easy and accessible ways to travel to and from the locations of their crimes and to transport weapons and contraband. In addition to their primary purpose of reducing crashes and promoting compliance with motor vehicle laws, traffic stops have always been an effective way to interdict guns, drugs, and wanted criminals. What has not been examined, however, is the possibility of a correlation between the areas where crimes and traffic crashes occur. In 2007, the Baltimore County, Maryland, Police Department (BCOPD) began designing its own study of data relevant to this correlation. The following year, the Data-Driven Approaches to Crime and Traffic Safety (DDACTS) model was introduced by the U.S. National Highway Traffic Safety Administration (NHTSA) in conjunction with the Bureau of Justice Assistance and the National Institute of Justice (see the article starting on page 18 for details). The BCOPD was selected as one of the demonstration sites for this approach and has been implementing the model since early last year.

Baltimore County is a jurisdiction of approximately 800,000 citizens in an area of 610 square miles that almost completely surrounds the city of Baltimore. The county has over 3,000 miles of roadways, and approximately 8.3 billion vehicle miles are traveled there per year. The BCOPD comprises over 1,900 sworn personnel and 600 nonsworn professional staff. For operational purposes, it is divided into 10 precincts. The department responds to over 16,000 reportable crashes (those that cause death or injury or require towing) and 29,000 nonreportable crashes (where drivers need only exchange information) each year. These crashes result in thousands of injuries and millions of dollars in property damage. The department also investigates approximately 32,000 U.S. Federal Bureau of Investigation Uniform Crime Report Part I and 38,000 Part II crimes. Maximizing the efficient use of resources to address crash and crime problems is critical for police effectiveness.

Tying Crash and Crime Data Together

In late 2007, members of the Operational Services Section began to review the use of highway safety grant funds in an effort to ensure that they were directed to the areas with the most significant problems. At the same time, the Maryland Highway Safety Office (MHSO) was launching its “Traffic Safety Is Public Safety” program, which is designed to motivate police personnel to participate actively in traffic enforcement activities. This occasion provided an opportunity to tie together crash problems to crime issues in areas that were experiencing both.

Data Analysis

The BCOPD Crime Analysis Section was asked to identify roadways in the county that were experiencing significant levels of both traffic crashes and criminal incidents. This analysis included personal-injury crashes, robberies, and burglaries for a three-year period. Crime incident information was obtained from the Regional Crime Analysis Geographic Information System (RCAGIS), and crash data were obtained from the InPursuit Records Management System. Crime Stat 3.1 software was used to identify overlapping crime and crash areas through the use of Nearest Neighbor Hierarchical Spatial Clustering. This routine uses a minimum number of points specified by the user and identifies clusters representing groups of points that are closer together than would occur in a random distribution. The results showed that ellipses constructed for robbery, burglary, and crashes overlapped on a number of highly traveled corridors around the county (see figure 1).

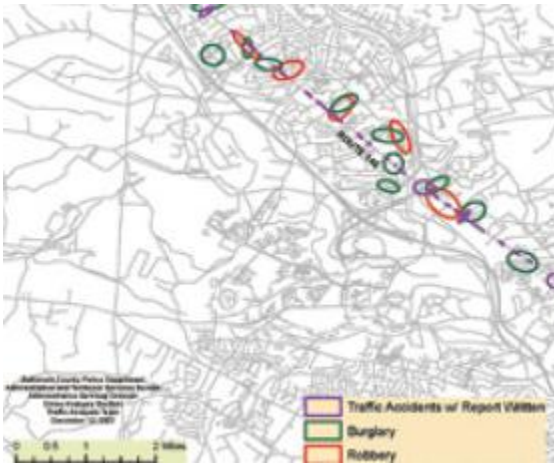

FIGURE 1: Map showing overlapping crime and crash ellipses along Reisterstown Road for Crash-Crime Project
Map courtesy of the BCOPD AnalysisSection

The results of the analysis were so significant that the decision was made to implement the 2008 Crash-Crime Project as an operational priority of the department. The purpose was to provide strategically targeted enforcement along the designated corridors to maximize the impact of traffic enforcement on road safety for the motoring public and to reduce the incidence of crime. Six of the most significant corridors were selected; they involved all of the 10 precincts. Each of the corridors was divided into three segments for operational purposes. A set of overall objectives and action steps was created and disseminated. The objectives included reduction of crashes, robberies, and burglaries in the target areas by 5 percent (as compared with three-year data) as well as speed reduction and an increase in seat belt use. The primary countermeasure was self-initiated traffic enforcement activity, although additional efforts related to engineering, education, and training were also undertaken.

Baseline data for speed and seat belt use were collected along all of the target roadways. The Auxiliary Police Team conducted seat belt surveys on 13 of the 18 road segments. Initial speed surveys were conducted internally; however, the MHSO worked with the Baltimore Metropolitan Council (BMC) to contract for professional speed studies. Surveys were conducted at the beginning and after the end of the project.

Changes in Enforcement

The majority of enforcement was deployed at the precinct level. Each of the target roadways was examined to determine the number of patrol, traffic, and business patrol posts that were assigned to the area. On this basis, benchmarks for weekly enforcement hours were developed and were supplemented by personnel from support units and grant-funded overtime. By using existing resources, the department was able to assign 1,005 hours of on-duty enforcement time to these areas on a weekly basis. During the course of the project, over 51,000 hours of on-duty enforcement was conducted, which was 118 percent of the established benchmark. All personnel working in the target areas were required to submit activity sheets documenting the hours they were assigned and the enforcement actions they initiated. These were entered into a database to track activity.

The level of enforcement conducted during this program was significant. Over 65,000 enforcement contacts were made, resulting in 1,169 arrests ranging from impaired driving and other traffic violations to robbery, weapons, drugs, and outstanding warrants. Whereas traffic stops increased throughout the department by about 15 percent as compared with 2007, they increased in the target areas by 83 percent.

Each year, the BCOPD receives funding from the MHSO for overtime traffic enforcement to supplement on-duty enforcement efforts addressing impaired driving, pedestrians, and aggressive driving enforcement. During the annual “Smooth Operator” program, a regional campaign targeting aggressive driving, enforcement teams were deployed during the morning and afternoon rush hours. In total, over 4,000 overtime hours were used, which

resulted in an additional 10,000 contacts and 75 arrests.

Other Activities

In addition to enforcement, several other efforts were undertaken to promote the project:

- The MHSO supported the project with paid media related to the “Smooth Operator” program, including billboards, transit bus advertising, and radio advertising. Additionally, signage warning of increased enforcement was posted along each of the corridors.
- Roadway safety audits were coordinated by the Maryland State Highway Administration along three of the corridors.

- In coordinating a focus group of police personnel to gain feedback related to the program, the MHSO received a number of suggestions and identified several issues in a neutral environment.

- Over 100 BCOPD personnel participated in “It All Starts with a Traffic Stop,” a training program developed by the MHSO, NHTSA Region III, and Maryland law enforcement officers to provide techniques for identifying criminal activity during traffic stops.

- The MHSO provided funding to develop a recognition program for both operational and administrative personnel involved in the Crash-Crime Project.

Results

Throughout the course of the project, incident and crash data were monitored along all 18 road segments. From March through December 2008, crashes along 13 of the 18 targeted road segments declined. The overall reduction (all 18 segments) was 6 percent compared with the past three-year average. Personal-injury crashes declined on 13 road segments, with an overall reduction of 14.7 percent during the 10-month study period compared with the same period of the prior year. Robberies declined by 13.6 percent overall, with reductions documented on 13 of the 18 road segments as compared with the past three-year average. The decreases reported for robbery and crashes exceeded the target reductions of 5 percent. Unfortunately, burglaries along nine of the road segments increased by 2.4 percent.

At the conclusion of the project, analysts conducted significance tests using interrupted time series analysis and other tests of variance. Based on the results of this analysis, they were able to conclude that the reductions in overall crashes and injury crashes are statistically significant.

Seat belt use results were inconclusive because of inconsistent data collection. Whereas the internal speed surveys suffered from a lack of automation, the results collected electronically along two segments showed double-digit reductions in 85th-percentile speeds. Additionally, the more sophisticated surveys contracted by the BMC on a total of 36 data points along six roadways indicated reductions in 85th-percentile speeds at 22 data points and decreases in the percentage of vehicles exceeding the posted speed limit at 27 of the data points.

Other Outcomes

In addition to the overall enforcement output and the reduction in incidents, other outcomes and needs for future adjustment were identified.

The use of on-duty patrol time is a very significant positive outcome. Over 51,000 hours of uncommitted patrol time was dedicated to enforcement on the target roads. These efforts accounted for almost all of the 14.7 percent increase in departmental traffic stops and demonstrated that patrol time can be used for targeted enforcement activities.

This project supports the premise that traffic enforcement can be used as an effective countermeasure for traffic crashes and crime. Overall, robbery and crash rates decreased. In areas where very targeted enforcement efforts were undertaken, crashes, robberies, and burglaries decreased. But in specific areas, decreases in enforcement activity were followed by increased incidents. For example, along one segment where enforcement benchmarks were not achieved, robberies increased 25 percent. These examples further support this premise.

Partnerships furthered the objectives of this effort. The myriad contributions of the MHSO were most notable, but the assistance of the Maryland State Police, the BMC, and the National Study Center for Trauma and Emergency Medical Systems at the University of Maryland were invaluable.

Lessons Learned

The lessons the BCOPD learned from this project are being applied as the department implements the DDACTS model.

Although a substantial amount of enforcement was conducted, future efforts may need to be directed more specifically to achieve more significant reductions. Activity may need to be tracked at the specific times incidents occur rather than on a weekly basis, and a greater effort to link the times enforcement is undertaken to the times incidents occur may improve outcomes.

Smaller geographic areas may need to be designated, so that the lengthy corridors used during the project do not dilute the impact of enforcement in those areas where problems are most significant.

Communication needs to be improved, with greater information circulated throughout the entire organization. For example, the focus group identified the need to explain the analytic process leading to the selection of target areas as a means to generate increased understanding of and support for the project. Roll call and in-service training sessions, along with the departmental newsletter, also are being used to provide information, and Chief James W. Johnson participated in a discussion of the DDACTS model on the county's cable television network, a segment of which was posted on the BCOPD YouTube page.[1]

The collection of survey data needs to be improved to promote more precise planning and improve future outcomes. The addition of automated speed data collection should minimize this problem and permit a more focused approach to areas with documented problems.

Automated field reporting, an ongoing project, will increase the availability of timely crash data and will allow the electronic completion of most traffic enforcement paperwork (such as citations, warnings, and so on).

Transition to DDACTS

Shortly after the implementation of the Crash-Crime Project, NHTSA invited the department to participate as a demonstration site in the DDACTS program. Chief Johnson accepted the invitation. The DDACTS concept has been added to the department's strategic plan, making it a primary method of operational deployment by 2010.

To prepare for 2009, the Crime Analysis Section undertook an in-depth analysis to identify geographic areas that are experiencing significant levels of both crashes and crime, as opposed to just roadways. The incidents examined included personal injury crashes, robbery, burglary, auto theft, and theft from auto. In addition to the methods used in 2008, analysts used the kernal density method, a way of measuring the density of incidents, and a geographic information system to develop hot spot polygons. Maps depicting overlapping high crime and crash areas (see figure 2) were provided to the precinct commanders for final selection. As the target areas were selected, more detailed data tables were produced showing Part I and II crimes, calls for service, and

crash activity for the past two years.

FIGURE 2: Map showing hot spot polygons in one area of Baltimore County

Each precinct has been tasked with the responsibility of creating specific objectives for the specific problems identified in the target areas as well as action plans that use self-initiated traffic enforcement activity as a primary strategy but also include other resources and partnerships from within and outside of the department. For instance, school resource officers may target young drivers with educational efforts, and a partnership with the Division of Parole and Probation is being developed to identify criminal offenders under supervision within target areas.

Conclusion

The BCOPD believes that the DDACTS approach provides a mechanism to deploy limited resources into areas that have shown long-term traffic- and crime-related problems. The initial results from 2008 demonstrate that patrol time can be dedicated effectively to identified hot spots and that increased levels of traffic enforcement can be used to combat problems. This is an example of enforcing traffic law the right way—targeting specific areas for specific reasons. Efforts are under way to improve the availability of timely crash data and to automate traffic enforcement paperwork. These efforts should further the ability of commanders, supervisors, and line personnel to deploy limited enforcement resources effectively while making a positive impact on multiple public safety problems.

DDACTS can be applied in small as well as large agencies. The number of incidents and the amount of activity needed to effect change is very much related to geography and population. Although the BCOPD has targeted multiple areas and deployed substantial resources, this program can be scaled to fit jurisdictions of any size. For instance, a smaller agency could target a single area using the same deployment strategies and could even supplement its efforts by enlisting the support of county or state agencies or seeking traffic enforcement funding through grant opportunities. The ultimate goal is to make the best use of available resources to combat identified public safety problems within any town, city, county, or state. ■

Note:

[1] "Data Driven Policing," YouTube, http://www.youtube.com/watch?v=8YQYXXESRJ0&feature=channel_page (accessed May 19, 2009).

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