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Police Quarterly 2013 16: 287
DOI: 10.1177/1098611113497044

Article

Police Quarterly
16(3) 287–304

DOI: 10.1177/1098611113497044
pqx.sagepub.com

Operation LASER and the Effectiveness of Hotspot Patrol: A Panel Analysis

Craig D. Uchida[1] and Marc L. Swatt[2]

Abstract

Operation LASER (Los Angeles' Strategic Extraction and Restoration program) is a program conducted by the Los Angeles Police Department Newton Division to reduce gun violence as part of the Smart Policing Initiative. There are two components to this operation: a chronic offender component and a chronic location component. In the current study, the effectiveness of Operation LASER was assessed at the reporting district (RD) level using a panel design. Initial results indicated that there was a significant reduction in gun crime in RDs in Newton compared to RDs from other divisions. The treatment effect was decomposed into RDs that received both the chronic offender and chronic location components and that received only the chronic offender component. Results suggested that the reduction in gun crime was only observed in those RDs receiving both the chronic offender and location components. Implications of the current study for policy are then discussed.

Keywords

police effectiveness, crime hotspots, problem-oriented policing, smart policing

Introduction

Like most law enforcement agencies in the country, the Los Angeles Police Department (LAPD) has experienced a lengthy period where crime has decreased. From 1992 to 2012, the number of Part 1 crimes has gone down by

[1]Justice & Security Strategies, Inc., Silver Spring, MD, USA
[2]Justice & Security Strategies, Inc., Omaha, NE, USA

Corresponding author:
Craig D. Uchida, Justice & Security Strategies, Inc., PO Box 6188, Silver Spring, MD 20916, USA.
Email: cduchida@jssinc.org

almost 70%, with violent crime decreasing by 78%. Homicides, for example, have decreased citywide from 1,092 in 1992 to 298 in 2012, a decrease of nearly 73%. Nationally, the decline is less steep but nonetheless noteworthy. Cooper and Smith (2011) indicate that the homicide rate declined from 9.3 homicides per 100,000 in 1992 to 4.8 homicides per 100,000 in 2010.

These unprecedented declines have led to speculation that increased incarceration, proactive policing, the improved economy, and more cops on the street are the forces behind the crime drop. While these declines cannot be attributed to a single cause, there are interventions that have had impacts on violence reduction. Notably, in Boston, Indianapolis, Lowell, and elsewhere, "lever pulling" has reduced homicide and gang-related violence (Braga, Kennedy, Waring, & Piehl, 2001; Braga, Pierce, McDevitt, Bond, & Cronin, 2008; McGarrell, Chermak, Wilson, & Cosaro, 2006). Similarly, agencies that have focused on hotspots or chronic locations have also seen a decline in violence (Braga, 2010; Braga, Papachristos, & Hureau, 2012).

These two strategies—focusing on offenders and focusing on locations—are the mainstays for a program in Los Angeles known as Operation LASER (Los Angeles' Strategic Extraction and Restoration). This program, funded through the Bureau of Justice Assistance, U.S. Department of Justice, was part of the Smart Policing Initiative, a national effort to enhance problem-solving methods, use data and analysis, and evaluate the interventions. The LAPD engaged in both approaches in one division using a problem-oriented policing approach. This article describes Operation LASER, its theoretical and research base, and its implementation and effects on violent crime in one division of the LAPD.

Background

The LAPD consists of nearly 10,000 officers and 3,500 civilians covering 469 square miles and more than 3.8 million people. To police this large and diverse city, the department is decentralized into four bureaus—Central, South, Valley, and West. Within the four bureaus are 21 areas or divisions with captains who have administrative and strategic control over patrol, investigations, gang units, parole compliance units, crime analysts, records, and other functions. At the division level, the areas are divided into reporting districts (RDs), which are similar to geographic police beats. In the LAPD, the 21 divisions include 1,135 RDs or on average about 54 RDs per division. At the department level, other Divisions support, assist, and enhance the decentralized divisions. For example, the Real-time Analysis Critical Response Division (RACR) houses state-of-the-art technology and operates as a 24/7 emergency operations center where resources, situation status of the city, and developing tactical incidents are tracked. Additionally, RACR personnel are responsible for Compstat and data analysis.

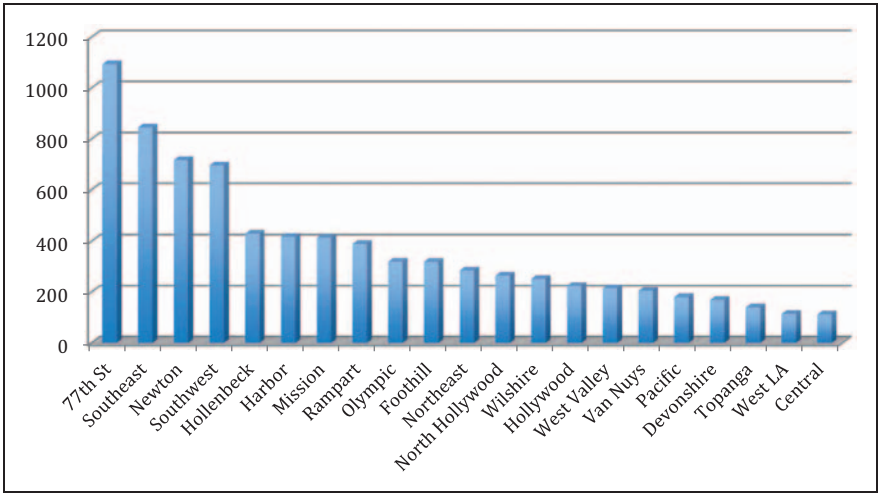

Figure 1. Number of gun-related crimes, LAPD divisions, 2011.

Operation LASER

In 2011, there were 7,794 gun-related crimes throughout the City of Los Angeles. Figure 1 shows the top generators of gun violence across the city. Four administrative divisions—77th Street, Southeast, Newton, and Southwest accounted for 43% of gun crimes in 2011. Additional analysis demonstrated that gun crimes were concentrated in a small number of RDs. About 6% of these RDs accounted for 30% of the gun-related crimes in the city, and a number of these violent RDs were concentrated in and around the four divisions of 77th Street, Southeast, Newton, and Southwest.

The Newton Division, which has a population of about 150,000 and covers 9 square miles, experienced the third highest number of gun crimes among the 21 LAPD divisions. In addition to experiencing a disproportionate number of gun crimes, Newton was selected as the Smart Policing site because of the prevalence of gang activity in the division. Gangs have been active in the area for more than 40 years, beginning with the Crips and Bloods in the 1970s and continuing with Hispanic gangs such as Primera Flats, 38th Street, Playboys, and others. In 2011, the LAPD documented 44 active gangs in the Newton Division. Last, Newton was selected because the area had been given little research attention in the past and because the recently promoted captain was receptive to using data to drive decision making.

Scanning and Analysis. In order to identify specific areas for intervention, LAPD crime analysts in Newton and RACR, along with the research partner, analyzed

crime data to identify the top locations of gun violence in Newton Division. Analysts examined crime incident and arrest data, as well as calls for police service, over a 6-year period (2006–2011). Specifically, the team focused on any Part I or Part II crime and arrest that involved a firearm including drive-by shootings, shots fired, robberies, aggravated assaults, homicides, gang-related crime (with a firearm), drug offenses with a gun, vandalism with a gun, and so on. For calls for service, the team developed a rigorous protocol that flagged calls for crimes as well as incident code descriptions that included "shot" or "gun" in the text fields.

The team of analysts then used spatial analysis (in ESRI's ArcView) to create hotspot/density maps of the locations of gun crimes for each year. The 6-year location-based analysis resulted in the identification of five large "hot corridors," shown in Figure 2 (the four narrow rectangular boxed areas and the wider rectangular boxed area).[1] From left to right, the first four hot corridors are business corridors along major arteries in Newton: Broadway, Main, Avalon, and Central Avenues. The fifth, larger hot corridor is designated as a Community Law Enforcement and Recovery Program or "CLEAR" area. In 1995, the city of Los Angeles identified a total of nine CLEAR sites based on the level of gang activity, and since that time, these areas have received additional community and law enforcement resources. In order to leverage existing resources, the team decided to adopt the already identified CLEAR boundary for the fifth hot corridor.

Response—Operation LASER. Once the scanning and analysis phases were completed, the team designed and implemented their response called Los Angeles' Strategic Extraction and Restoration Program, or Operation LASER. Operation LASER has five primary goals:

- Extract offenders from specific neighborhoods and areas
- Restore peace to neighborhoods and communities
- Remove the anonymity of gun offenders
- Remove the anonymity of gang members
- Reduce gun and gang-related crime in Newton Division

LASER is grounded in situational and environmental theories of crime (see, e.g., Brantingham & Brantingham, 1999; Cohen & Felson, 1979; Felson, 2002). The basic premise is to target violent repeat offenders and gang members who commit crimes in the specific target areas with "laser-like precision," analogous to laser surgery, where a trained medical doctor uses modern technology to remove tumors or improve eyesight. First, the area is carefully diagnosed—who are the offenders, and where and when are they involved in criminal activity? Plans are then developed to remove offenders, from an area, while minimizing the disruption and harm to the larger community. Extraction of offenders takes

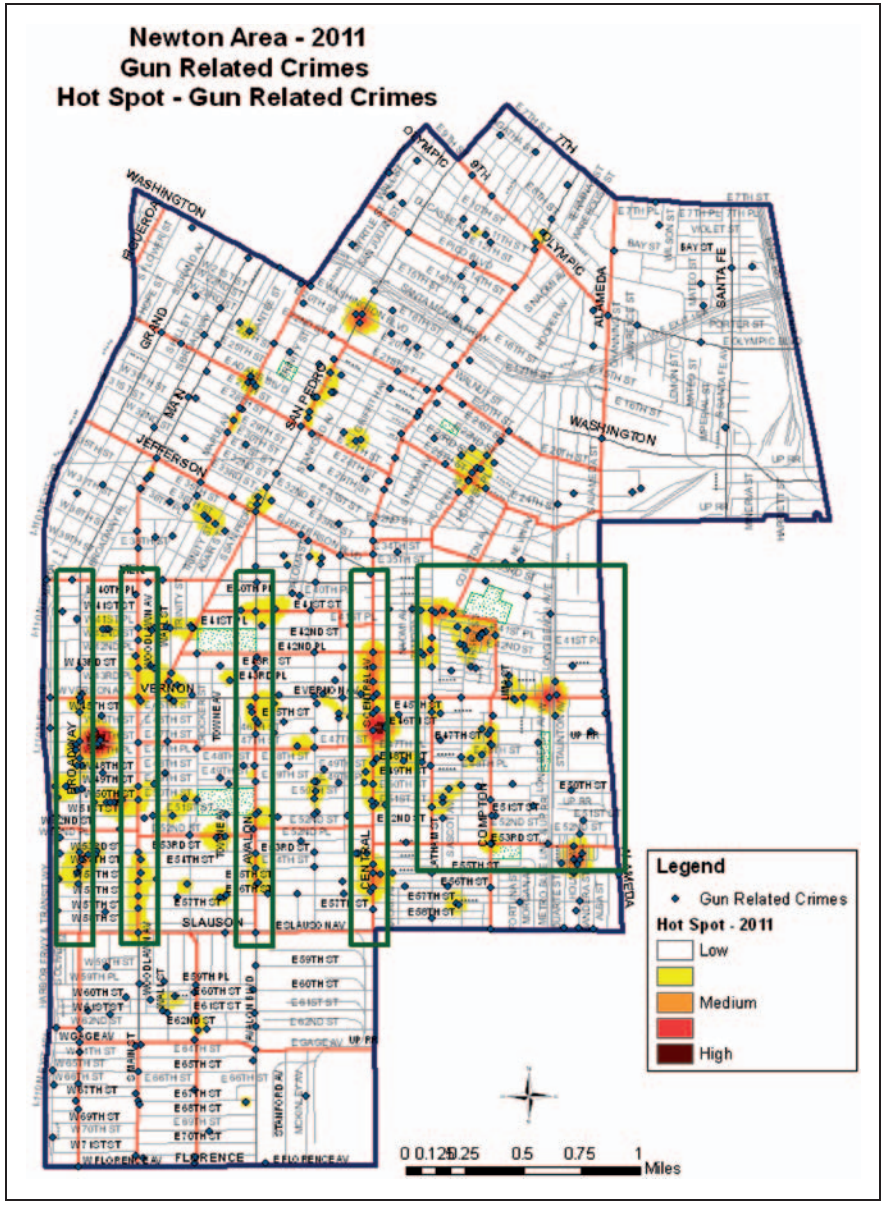

Figure 2. Newton Division hotspots of gun-related crimes, 2011.

place in a "non-invasive" manner (no task forces or saturation patrol activities), and the result produces less disruption of neighborhoods by police. Continuing with the medical analogy, by extracting offenders surgically, recovery time of the neighborhood is faster. Operation LASER, which includes both offender- and location-based strategies, was implemented in the five hot corridors identified in the Newton Division.

Offender- and Location-Based Strategies. The centerpiece of the offender-based strategies involved the creation of a crime intelligence detail (CID), composed originally of two sworn officers and one crime analyst (a third officer was added to the detail in January 2012). The CID's mission is to gather information from all available sources to produce proactive intelligence briefs called Chronic Offender Bulletins.[2] CID gathers data daily from each patrol shift in Newton, as well as the bicycle unit, foot patrol, and the parole compliance unit (PCU) at Newton. The CID also conducts daily reviews of all field identification cards (FI), citations, release from custody forms (RFC), crime reports, and arrest reports from each of these entities and selects potential "chronic offenders" based on predetermined criteria. Once CID has identified probable offenders, the detail conducts more in-depth analyses of those individuals to confirm that they have been appropriately targeted (e.g., a review of each individual's criminal histories, gang affiliation, previous detentions, and other factors).[3]

If an individual meets the criteria, CID prepares a Chronic Offender Bulletin. The bulletin contains pertinent information on each individual, such as description, physical idiosyncrasies (tattoos), gang affiliation, prior crimes committed, parole or probation status, and locations of where the individual was stopped in or near Newton Division. The bulletins are disseminated to all supervisors, officers, and detectives via an internal computer drive. Each Chronic Offender Bulletin is then placed into an online folder based on the location of where the individual was stopped (usually the RD) in Newton. The bulletins, which are updated every quarter, are accessible through the officers' patrol car computers. The bulletins are intended to assist officers in identifying crime trends and solving current investigations, and to give officers a tool for proactive police work.

Initially, CID focused on individuals who committed robberies, weapons violations, burglaries, burglary from motor vehicles, and aggravated assaults related to gun and gang violence, though the primary focus soon turned to violent gun offenders. From July 2011 through June 2012, CID created 124 Chronic Offender Bulletins. Additionally, CID officers and the research partner, established consistent and uniform criteria to rank-order chronic offenders. The scheme assigns additional points based on known risk factors:

- 5 points if the individual is a gang member
- 5 points if the individual is on parole or probation
- 5 points if the individual had any prior arrests with a handgun

- 5 points if the individual had any violent crimes on his or her rap sheet
- 1 point for every quality police contact in the last two years (2009–2011)

The worst offender had 31 points and the top 10 offenders all had more than 25 points. These top chronic offenders became the primary targets for patrol and special units, who employed traditional enhanced surveillance as well as license plate readers in probable offender locations. By August 2012, 70% of the identified chronic offenders had been arrested at least once.

The Los Angeles SPI team also developed location-based strategies in each of the five identified hot corridors. The specific initiatives adopted for the location-based interventions drew from prior hotspots policing interventions and included:

- Directed patrols. Patrol officers are given "missions" to work the areas, watching for criminal activity at specific times and in specific locations
- Bike officer and foot patrol "missions" in the hot corridors
- Use of closed circuit television (CCTV) cameras

While these specific initiatives were focused on smaller areas (i.e., hotspots) within the hot corridors, the overreaching goal of this strategy was to saturate these hot corridors by effectively increasing police visibility and activity within these larger areas. All officers were asked to record the additional time they spent in the five hot corridors as a result of Operation LASER. The SPI team examined officers' reports to calculate SPI project time across 4-week periods (called deployment periods by the LAPD), from September 2011 through August 2012. During this time, officers spent an additional 8,900 to 18,000 minutes per deployment period in the five hot corridors (an average of 13,326 extra minutes per period). In other words, the hot corridors received 55.5 extra personnel-hours per week, or about 8 hours per day. When this is broken down further, each corridor on average, received about 1.6 hours per day of extra attention by patrol officers and bike and foot beat officers during their regular watches.

The current study presents results from an evaluation of the effectiveness of Operation LASER in reducing gun crime in the Newton Division for the first 10 months after the operation began. Uchida and Swatt (2012) present division-wide evidence for crime reductions in the Newton Division using an interrupted time-series (ITS) design. In contrast to this approach, the current research uses panel analysis to investigate specific declines in gun crime at the RD level of analysis, a much smaller unit of analysis. Further, because it is possible to distinguish areas receiving both the chronic offender and chronic location interventions, these analyses consider whether observed reductions are localized within the RD receiving both components of the Operation LASER intervention.

Methods

Data

The data used in this study consist of all Part I and Part II incidents reported to the LAPD where a firearm was involved from January 2006 to June 2012 (78 months). The LAPD divides the city of Los Angeles into 21 administrative divisions headed by a captain.[4] These divisions each cover several neighborhoods within its coverage area. For this study, eight LAPD divisions were examined: Newton, Central, Rampart, Hollenbeck, 77th Street, Northeast, Southeast, and Southwest. These divisions form a contiguous area in South-Central Los Angeles responsible for 58.6% of gun crimes committed in the city in 2011. The RDs represent the primary unit of analysis for this study. Fifty-five of the 389 RDs within these divisions contained between zero and 100 residents. These RDs correspond to areas where there is very little residential land use (railroad tracks, parks, industrial areas, high-density commercial areas, etc.). While crime in these areas is important, the dynamics of gun crime in these areas is likely different than areas with a reasonably sized residential population. These RDs were eliminated from the current analysis, resulting in a total of 78 observations for each of the remaining 334 RDs.

Operation LASER began in September of 2011 and continued through June 2012.[5] Given the availability of preexisting data and the unambiguous start time of the intervention, an ITS design was used for evaluating the success of LASER (see Campbell & Stanley, 1963; Cook & Campbell, 1979; Shadish, Cook, & Campbell, 2002).[6] The strength of this design is that time is the only variable governing treatment assignment. Since the threat of history is a concern for this design, RDs from the other seven divisions are used as control observations.

Offender-based interventions, including the creation of chronic offender bulletins, were implemented across the entire division. The place-based component of Operation LASER in Newton, however, was only implemented in the five previously identified historic hot corridors of gun-related crime from 2006 to 2011. Based on this implementation strategy, three separate indicators for intervention effects were created. The first indicator measured whether an RD received any intervention. The second indicator measured whether the RD received both the chronic offender and chronic location intervention. This indicator coded every Newton RD that intersected the hot corridors where the intervention was conducted (20 total corridor RDs). The third indicator measured whether only the chronic offender intervention was received. This represents all Newton RDs that did not intersect the corridors (19 total non-corridor RDs).

Plan of Analysis

Given the large number of RDs under consideration, a hierarchical linear modeling strategy was adopted. Crime counts for each month were nested within

each RD. This two-level strategy is similar to segmented regression in time series analysis (Ramsay, Brown, Hartman, & Davey, 2003; Shardell et al., 2007; Wagner, Soumerai, Zhang, & Ross-Degnan, 2002) as well as the hierarchical models used to study individual change (see Osgood, 2010; Raudenbush & Bryk, 2002) and provides a flexible method for estimating intervention effects. Specifically, the basic model is

$$\begin{aligned}
\text{Level 1}: \quad & \eta_{ti} = \pi_{0i} + \pi_{1i}\, Time_{ti} + \pi_{2i}\, Intervention_{ti} + \pi_{3i}\, Post\ Intervention\ Time_{ti} \\
\text{Level 2}: \quad & \pi_{0i} = \beta_{00} + \beta_{01} \ln(Population) + r_{0i} \\
& \pi_{1i} = \beta_{01} + r_{1i}
\end{aligned}$$

In this model, η_{ti} represents a transformation of the expected value of the observed count of gun crime each month for every RD. As a count variable, the Poisson distribution was specified using the logarithmic transformation of the expected value. Further, a correction for overdispersion of this count was included. $Time_{ti}$ is a variable measuring the increment in periods since the beginning of the study and captures the monthly trend in gun crime over time.[7] $Intervention_{ti}$ is a dichotomous indicator that was set equal to zero before the intervention and one after the intervention for RDs in the intervention group and captures any immediate intervention effects (i.e., a downward shift in gun crime) at the beginning of the intervention period. $Post\ Intervention\ Time_t$ is an additional time increment variable that was set equal to zero for control cases. For cases receiving the intervention, this variable was set equal to zero before the intervention, one during the period the intervention begins, and then incremented by one unit for every time increment thereafter. This variable captures the change in gun crime per month after the intervention started (i.e., a change in the trend of gun crime).

The nature of observed treatment effects depend on the type of intervention under investigation. As discussed in Uchida and Swatt (2012), gun crime was not expected to substantially decrease starting the month of the intervention, but rather to steadily decrease over time through removing high-rate offenders from the street and increasing deterrence of crime in high-crime areas. These strategies require time in order to obtain substantial gains. In a time-series analysis conducted at the division level, this type of intervention effect was observed for Operation LASER, as the coefficient for the intervention was not statistically significant for any crimes, but the coefficient for post treatment time was significant for Part I violent crime, robbery, and homicide (Uchida & Swatt, 2012).

The Level 1 intercept in this model is random to allow each RD to have a unique starting count of crime at the beginning of the study. Similar to longitudinal studies of criminal behavior, the random intercept also accounts for static characteristics that vary between RDs but remain stable over months. The natural logarithm of the 2010 Census population for each RD is included

as a Level 2 covariate in the equation for the intercept. This variable functions to control for the differential risk of crime owing to differences in the size of the residential population.[8] The coefficient for time is also random to allow for each RD to have a unique linear crime trend. This strategy also controls for static features of the RD that are correlated with crime trends.

Four additional features of the model are worth noting. First, two additional variables were included in the model listed earlier. An indicator variable for the Newton Division was included as a level 2 covariate in the equation for the intercept. While this addition is not strictly necessary, it does offer protection for the possibility that the Newton Division is somehow unique in terms of its composition or other static characteristics compared to the other comparison divisions. Second, prior analyses of these data indicated a substantial seasonal effect as gun crime rises during the summer months when school is not in session (Uchida & Swatt, 2012). For this reason, an indicator for the summer months (May, June, July, and August) was included as a Level 1 covariate. A third issue worth noting is that there is no correction for temporal autocorrelation in this model. Prior research using these data at the division level found no evidence for residual temporal autocorrelation for gun crime after the preexisting trend was controlled (see Uchida & Swatt, 2012). While it is possible that autocorrelation remains problematic, models were estimated using robust standard errors which should provide some protection against this problem as these standard errors tend to be more conservative.[9]

Fourth, coding three different intervention effects allows for assessments of the overall effect, as well as separating the effect for chronic offender intervention only and the combined chronic offender and chronic location interventions. The first model examined the overall intervention effect. In this model, the intervention variable was set to one after September 2011 for all RDs in the Newton Division and the postintervention variable measured the time increment from the starting time of the intervention for all RDs in Newton. In the second model, the overall intervention effect was decomposed into two separate intervention effects, corridors and non-corridors by using separate intervention indicators. All RDs within the Newton Division experienced the chronic offender intervention as the Chronic Offender Bulletins were distributed to officers working throughout the division. The *corridor* RDs refer to those RDs lying within the hot corridors that received both the chronic offender and chronic location interventions. The *non-corridor* RDs refer to the RDs in the Newton Division that lie outside the boundaries of the hot corridors and only receive the chronic offender intervention. Two corresponding separate posttreatment time covariates were also introduced to estimate whether observed declines in gun crime could be attributed to only the corridor RDs, the non-corridor RDs, or were common to both. In this way, it was possible to determine which aspects of the intervention are responsible for the effects observed.

Results

The results for the first model are presented in Table 1. In this model, the random effect for the intercept was statistically significant and large, indicating heterogeneity between the RDs in the sample. Not surprisingly, the Level 2 log population was statistically significant as RDs with larger population have an increased risk for crime. The Level 2 Newton indicator was also statistically significant, indicating that RDs in Newton had higher rates of gun crime compared to the average rate for other RDs. The coefficient for time was small but statistically significant, suggesting that the rate of gun crime decreased on average for all RDs in the study. The random effect was also small but significant, which indicated that there was important variability in the trend of gun crime between RDs. The indicator for the summer months was also statistically significant as the rate of gun crime was higher in the summer compared to other times of the year. The coefficient for intervention indicator was not statistically significant, suggesting that there was no immediate drop in gun crime at the time the intervention began. Importantly, the coefficient for postintervention time was statistically significant and negative suggesting that the drop in gun crime accelerated after the intervention. Specifically, Operation LASER resulted in a 5.2% decrease in gun crime per month for every RD in the Newton Division.

Table 1. Model for Gun Crime in Selected Reporting Districts.

Fixed effects	*b*	Robust *SE*	Event rate ratio
Intercept			
Level 2 intercept	−3.539***	(0.491)	0.029
Level 2 Newton indicator	0.482***	(0.114)	1.620
Level 2 log population	0.456***	(0.060)	1.577
Time			
Intercept	−0.007***	(0.001)	0.993
Summer	0.107***	(0.014)	1.113
Intervention indicator	0.190	(0.138)	1.209
Postintervention time	−0.054*	(0.022)	0.948
Random effects	***SD***	**Chi-square**	
Intercept	1.018	7320.214***	
Time	0.010	1322.653***	
Level 1 error	1.217		

Note: *SE* = standard error; *SD* = standard deviation.
*$p < .05$, **$p < .01$, ***$p < .001$.

Table 2. Model for Gun Crime in Selected Reporting Districts with Disaggregated Intervention Effects.

Fixed effects	*b*	Robust *SE*	Event rate ratio
Intercept			
Level 2 intercept	−3.540***	(0.491)	0.029
Level 2 Newton indicator	0.481***	(0.113)	1.618
Level 2 log population	0.456***	(0.060)	1.578
Time			
Intercept	−0.007***	(0.001)	0.993
Summer	0.107***	(0.014)	1.113
Newton corridors indicator	0.277	(0.176)	1.319
Newton corridors postintervention time	−0.075**	(0.028)	0.928
Newton non-corridors indicator	0.027	(0.208)	1.027
Newton non-corridors postintervention time	−0.016	(0.031)	0.984
Random effects	***SD***	**Chi-square**	
Intercept	1.018	7320.199***	
Time	0.010	1325.045***	
Level 1 error	1.217		

Note: *SE* = standard error; *SD* = standard deviation.
*$p < .05$, **$p < .01$, ***$p < .001$.

Seeing that an intervention effect was observed, the second model replaced the overall intervention indicator and postintervention time variables with separate indicators and postintervention time variables for the corridor and non-corridor RDs. These results are presented in Table 2. Since the model simply involved re-specifying the intervention effect identified in the first model, the coefficients for most of the variables mirrored those identified earlier. The important difference is that this model revealed that the intervention effect is solely confined to those RDs that received both the chronic offender and the chronic location interventions. The coefficients for both the intervention indicator and postintervention time variables were not statistically significant for the non-corridor RDs. The coefficient for the intervention indicator was not statistically significant for the corridor RDs, again confirming that there was no substantial drop at the time of the intervention. The coefficient for postintervention time was negative and significant, indicating that gun crime decreased by an additional 7.2% per month in the corridor RDs as a result of the intervention.

Discussion

Operation LASER was a comprehensive intervention designed to decrease gun crime in the Newton Division in Los Angeles. This intervention included both a

chronic offender and chronic location component. The chronic offender component involved creating chronic offender bulletins and providing this additional intelligence to patrol officers working across the division. The chronic location component involved increasing patrols in primary traffic corridors within gun crime hotspots. Using a time-series design at the division level, Uchida and Swatt (2012) found that Operation LASER was successful in reducing Part I violent crime, robbery, and homicide in the Newton Division.

The current study offers further insight into the successes realized by Operation LASER in Los Angeles. Using data on both Part I and Part II gun-related crimes, this study examined the extent to which intervention effects from Operation LASER were observed at the RD level. Initial analyses confirmed that Operation LASER led to an additional decrease in gun crime of 5.2% per month across the division. To further investigate the nature of this effect, the intervention effect was disaggregated into the RDs in Newton that received only the chronic offender intervention and the RDs receiving both the chronic offender and chronic location interventions. Results from this model indicated that the intervention effect was confined to only the RDs that received both interventions. Specifically, gun crime in these RDs decreased an additional 7.2% per month after the intervention.

There are some important caveats to this finding. First, although the ITS design with control groups offers substantial protection against threats to internal validity, it is still vulnerable to particular threats. Specifically, it remains possible that these results can be attributed to local history threats. These alternative causes would involve variables that change over time, experience substantial change around the time of the intervention, and are specifically confined to the Newton Division, and more specifically confined to the RDs in that intersect the hot corridors. One possible example of this would be a substantial population out migration occurring in these RDs starting at the time of the intervention. Although effects like this would be surprising, this design cannot fully eliminate these types of threats to validity.

Further, this analysis did not directly examine the possibility of crime displacement as a potential reason for the decline in gun crime in the hot corridors. To the extent that displacement may have occurred to the non-corridor locations in the Newton, a *positive* and statistically significant coefficient for the intervention and postintervention time coefficients should be observed for the non-corridor RDs. Since this was not the case, there is no evidence for this type of crime displacement. Further, division-wide time-series models explored in prior research (see Uchida et al., 2012) showed no significant increases in crime in nearby divisions during the period of the intervention. It remains possible, however, that crime displacement may have occurred only with RDs from other divisions, adjacent to the hot corridors at levels that did not significantly impact the level of crime in those divisions. Prior research on the effect of hotspot policing on crime suggests, however, that there is very little evidence for

crime displacement, but instead there is evidence for a diffusion of benefits from hotspot policing interventions into surrounding areas (see Braga et al., 2012). For this reason, it is unlikely that any crime displacement has occurred as a result of Operation LASER.

Another important caveat is that these findings may not be generalizable outside of the City of Los Angeles or even to other RDs outside of the Newton Division. Los Angeles is a very large city, and the LAPD is a very large police department. It remains possible that distinctive features about Los Angeles, the LAPD, or the Newton Division work in conjunction with Operation LASER to produce the observed intervention effects. As such, Operation LASER may not be effective in other locations, even including other divisions within Los Angeles. Of course, seeing that these results supports the emerging evidence about the effectiveness of intensive hot spot patrol interventions (Braga et al., 2012), it is likely that these effects can be replicated. Additional replications of this intervention should help to confirm if this is the case. To that end, work is currently being done to determine whether Operation LASER can be successfully introduced into four additional divisions in the LAPD. This research will be particularly revealing to determine whether the successes of Operation LASER are observed in these divisions as well.

It is also worth emphasizing that the current design does not specifically distinguish between the relative effectiveness of the chronic offender and chronic location interventions. That is, it is not possible to distinguish whether the location-based strategies *alone* were sufficient to result in crime reduction or whether the location-based strategies worked in concert with the Chronic Offender Bulletins. Since the chronic offender intervention was implemented across the entire division, there are no RDs that received only the chronic location intervention. Additional research using an additional intervention group (chronic location only) is needed to attempt to determine whether the key component is the chronic location intervention or whether the interaction of the two are needed to maximize reductions in gun crime. Depending on the finalized strategy for expanding Operation LASER into additional divisions within the LAPD, this might be possible at a later date.[10]

Observations and Policy Implications

Despite these caveats, the findings from this study validate the success that was achieved by Newton Division in reducing violent crime. That is, as LASER unfolded, the captain and others in the LAPD saw that crime was decreasing but at the time could not attribute the success to the chronic location strategy. Because the captain and LAPD analysts tracked crimes daily, weekly, and monthly, they knew that something "good" was happening. During the 10-month period of the intervention (September 2011 to June 2012), the captain saw a dramatic decrease in homicides, from 28 in September 2010 to

June 2011 to 15. Further, the division witnessed a drop in other violent crimes including robberies and aggravated assaults. Providing the captain and LAPD with statistically significant results showed that the interventions had "real" effects and convinced them to expand the project to four new divisions.

Why did LASER succeed and what should be replicated? From our observations, the key elements of the LASER model include four steps: (1) creating a CID, (2) focusing on chronic locations and chronic offenders, (3) directing officers to work in specific target areas every week, and (4) monitoring and evaluating the progress of LASER by the research partner (Justice & Security Strategies, Inc.). The return on the investment in forming the CID to collect, analyze, and use data routinely for strategic and tactical purposes paid off with respect to the decrease in crime. Taking two patrol officers off the street and teaming them with a crime analyst was a risky enterprise during a time when patrol resources are scarce. Nonetheless, the reduction in crime showed that the investment was worthwhile. As the research partner, the authors worked closely with the Newton CID and an analyst at RACR Division to track patrol activities, measure changes in crime, create maps using ArcGIS, and analyze data independently. The authors also worked closely with the captain and LAPD commanders to keep them apprised of findings during the intervention period.

CID continues to operate in Newton. Over the 10-month period, Newton Division command staff continually focused on chronic offenders and chronic locations. The captain directed his patrol officers and special units (bike and foot patrols) to work in specific areas every week to prevent and deter crime and criminal behavior. This relentlessness and attention to detail was an integral part of the implementation of LASER. By focusing on both chronic offenders and chronic locations, crime reduction was achieved.

Acknowledgments

The authors would like to thank LAPD Chief Charlie Beck, Police Administrator Maggie Goodrich, Captain Sean Malinowski, Captain Jorge Rodriguez, Captain Robert Lopez, Captain Edward Prokop, the Crime Intelligence Detail at Newton Division—Officers Dave Gamero, Erica Salazar, Jeanine Lopez, and Elliott King and Crime/Intelligence Analysts Nathan Ong and Rhonda Dillihunt, and the officers and staff of Newton Division.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This project was supported by Grant Number 2009-DG-BX-0118 awarded by the Bureau of Justice Assistance, Office of Justice

Programs, U.S. Department of Justice. The points of view and opinions expressed in this article are those of the authors and do not necessarily represent the official position or policies of the U.S. Department of Justice or the Los Angeles Police Department.

Notes

1. The term *hot corridor* is used for two main reasons. First, the term *hotspot* refers to a much smaller spatial area. While the specific definition of a "hotspot" differs across studies, these definitions generally refer to smaller micro-areas of crime than considered here (see Weisburd, Bushway, Lum, & Yang, 2004). In fact, several "hotspots" can be observed within the larger areas under investigation. Second, these areas were specified with reference to the street network in the Newton area. Practically, this linkage was made explicit to assist patrol officers with planning travel patterns during patrol shifts. The term *hot corridors* captures both the larger size of the areas as well as the linkage with travel patterns.
2. The Los Angeles City Attorney has approved the creation, use, and dissemination of the bulletins.
3. The Palantir platform used by LAPD allows law enforcement personnel to search multiple databases in one place. Information can be mapped, associations can be made among suspects and persons of interest, and data can be aggregated across divisions, bureaus, and department-wide. Palantir is described in greater detail in Uchida et al. (2012).
4. Prior to January 4, 2009 the LAPD was organized into 19 divisions. A number of RDs were renumbered and moved between existing and new divisions. Although this reorganization reflected a change in the administrative structure of the LAPD, it did not alter the size, shape, or location of these RDs. While it is possible that this administrative reorganization led to changes in crime rates, the timing of these changes preceded Operation LASER by 2 years. Only one of the divisions examined here, Rampart, was affected by this reorganization.
5. Operation LASER is still ongoing in the Newton Division, and the LAPD is planning to expand the program to four other divisions.
6. It is important to emphasize that ITS in this context refers to the research design and not the plan of analysis.
7. Quadratic and cubic models for time can be incorporated into the model to capture nonlinear trends. Locally weighted scatter plot smoothing (LOWESS) models conducted at the division level of analysis in a previous analysis suggested that a linear time trend sufficiently captured the preexisting trend in gun crime (see Uchida & Swatt, 2012).
8. Unfortunately, there are no available measures for the population for each month for each RD. While it might be possible to attempt to estimate this population by extrapolating from the 2000 and 2010 Census numbers, this approach likely introduces more error into the model than it would fix.
9. An attempt was made to correct for spatial autocorrelation in these models (see Verbitsky-Savitz & Raudenbush, 2009). However, in the current implementation of HLM 7.0, spatial autocorrelation can only be specified in models with a random intercept only. Since a random effect for the time coefficient was more critical for the model specification, it was decided to forego adjustments for spatial autocorrelation. Again, the more conservative robust standard errors should provide some

protection against this issue. Further, since the effects of interest are at Level 1, it is likely that spatial autocorrelation at Level 2 would have little impact on these coefficients.

10. While there are some interesting theoretical implications for crime control if the success of the intervention hinged upon the combination of chronic offender and chronic location based interventions, it would be premature to discuss these as part of the current study as it is not possible to rule out that only the chronic location intervention was sufficient to produce the observed reduction in crime. In future expansions of Operation LASER to other divisions, we are considering lagging the start of the chronic location intervention by several months and staggering the start dates across multiple divisions. This provides a strategy for disentangling the effects of the chronic offender and chronic location interventions.

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Author Biographies

Craig D. Uchida is President of Justice & Security Strategies, Inc. (JSS), a consulting firm that specializ1es in criminal justice and public policy issues. JSS is the research partner for the Los Angeles Police Department Smart Policing Initiative Project—Operation LASER. He has written numerous monographs and edited two books. His publications have appeared in *Crime and Delinquency*, the *Journal of Criminal Law and Criminology*, and the *Journal of Research in Crime and Delinquency*. His research interests include predictive policing, gangs, and violence.

Marc L. Swatt is a senior research associate and statistician with Justice & Security Strategies, Inc. His recent publications have appeared in *Justice Quarterly*, the *Journal of Quantitative Criminology*, *Crime and Delinquency*, and *Journal of Criminal Justice*. His current research interests include quantitative methods, criminological theory, neighborhoods and crime, and spatial crime analysis.