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Implementing Gang & Gun Violence Reduction Strategies in Las Vegas, Nevada: Hot Spots Evaluation Results

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**Implementing Gang & Gun Violence Reduction Strategies in
Las Vegas, Nevada: Hot Spots Evaluation Results**



December 2019

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EXECUTIVE SUMMARY

The gang and gun violence reduction project implemented in Las Vegas consisted of three components: hot spots deployment, focused deterrence, and place network investigations. This report focuses on the development, implementation, and evaluation of the hot spots strategy.

The hot spots strategy involved the strategic deployment of additional saturation police patrols in high-crime locations. Specifically, to address violent street crime, the LVMPD engaged in a 6-month (Nov 1, 2018 to Apr 30, 2019) cluster randomized controlled trial (RCT) design of street segments receiving additional hot spots deployment (saturation patrols) and streets receiving patrol as usual (control segments). All potential street segments were identified from an analysis of persistent violent crime hot spots (where intensive police focus has been paid by the violent crime unit officers since January of 2018). Researchers stratified highest risk and independent segments within chronic and persistent hot spot locations. Specifically, 22 treatment segments and 22 control segments were selected to form the evaluation. No treatment segment was within a block or intersection of another treatment or control segment to reduce potential contamination of findings.

Deployment of officers to the treatment hot spots occurred via calls for service every day, randomly for a total of two hours of exposure at each hot spot. Officers were instructed to remain at the hot spot for a total of 15 minutes, which is the optimum time for deployment to achieve effects as identified by researchers (Koper, 1995). When reaching the hot spot, officers were also randomly instructed to either stay in their vehicle with the lights on, or patrol the segment on foot. Interviews with arrestees have shown police presence is understood and alters criminal behaviors in patrolled areas (Golub et al., 2003). However, hot spot patrols such as walking are likely to go unnoticed by ordinary citizens (Weisburd, Hinkle, Fameaga, & Ready, 2011). Therefore, using both treatment types (stationary with lights and foot patrol) likely leads to increased awareness of police, thereby reducing criminal activity. The control treatment was for business to occur as usual at the control street segments.

Center researchers conducted fidelity assessments during the project implementation phase, in order to ensure that the strategy was being implemented properly. These assessments indicated a strong adherence to the research design. Specifically, the research design called for a total of 2 hours of saturation patrol (in 15-minute increments) each day. Analysis of all hot spot patrols revealed that approximately 1.5 hours of additional patrol was observed each day for 90% of all hot spots. A total of 2 hours of additional patrol as observed for 55% of all hot spots. These findings demonstrate that the LVMPD carried out the hot spots strategy as designed.

Research Questions

In addition to reducing violent crime, this experiment was designed to address the following three related key research questions:

- 1) **Threshold effect.** What is the impact of hot spots policing on crime within street segments that are bound within chronically persistent high crime areas? While most hot

spots experiments have focused on the collective impact on crime in the highest risk hot spots distributed citywide, this initiative examines the impact on the highest risk hot spots within bound high-risk areas. Is it possible to have additional hot spots policing impact above and beyond the reductions experienced from pre-existing strategic deployed to these areas?

- 2) **Police activity in hot spots.** What is the impact of different types of police patrol dosage treatments, and do different treatment types correlate with differential changes in crime reduction? In short, what is the most effective activity for police to perform during additional patrols? Patrol officers have long used police vehicle lights to reduce speeding (e.g., in work zones), as well as proactive patrols (e.g., walking foot patrols) to reduce crime risk in high-crime areas. By randomly assigning different types of treatment to the different hot spots, we assess whether treatment type corresponds with differential changes in crime outcomes.
- 3) **Displacement.** Does crime remain stable in non-treated (control) areas that were geographically close to treated areas? We examine the potential for crime displacement consistent with prior research by focusing on crime changes in street segments and intersections immediately adjacent to the treatment segments, as well as in similar street segments that were ‘down the street’ within the persistent crime hot spots.

While designing this hot spot experiment, several operational constraints and other contextual/organizational parameters occurred that created the following experimental conditions:

- The identified hot spot street segments assigned to both treatment and control conditions had to be located within the chronically persistent high-crime areas previously identified by LVMPD to ensure sufficient patrol dosage response during the experiment.
- The hot spot street segments within these chronically persistent high crime areas would likely have strong dosage compliance because the violent crime unit officers would devote their energies to fulfilling the requirements of the experimental conditions.
- Within each chronically persistent high-crime area, the same criteria for inclusion was used in this study as prior research (Sherman and Weisburd, 1995). That is, no hot spot was larger than one standard linear street block, did not extend for more than one half block from either side of an intersection, and was not within one standard linear block of another hot spot.¹

¹ In circumstances where two standard linear street segments abutted one another, we randomly removed one of them from the potential pool prior to randomizing to ensure this criterion was met.

- These parameters resulted in a designation of 44 hot spots (i.e., street segments) that were allocated to treatment (N = 22) and control (N = 22) conditions.²

Statistical Analyses

To evaluate the impact of hot spots patrols, we collected primary outcome measures from the LVMPD official reported data. Specifically, we were provided access to LVMPD calls for service data, which included all citizen-generated calls to 911 and patrol dispatch. In addition, we examined LVMPD reported crime incidents, which included all Part I crime incidents based on the UCR classification of serious crimes (i.e., homicide, robbery, burglary, auto theft, aggravated assault, and larceny), and Part II crimes (less serious criminal incidents that are usually related to disorder – e.g. public drunkenness, trespassing, and vandalism) as well as misdemeanor assault. Reported crime incidents were further divided into violent and property crime categories for analysis. In sum, the following dependent variables were examined:

- Total crime incidents
 - Total calls for service
 - Violent crime incidents
 - Violent crime calls for service
 - Property crime incidents
 - Property crime calls for service
- 1) The primary outcome of interest was the change between the experimental period (Nov 1, 2018 – Apr 30, 2019) and the same time period in the treatment versus the control hot spots the year prior (Nov 1, 2017 – Apr 30, 2018). A series of statistical analyses were conducted on each dependent variable:
 - 2) Percentage change estimates comparing the experimental (treatment) areas to the control hot spots during the 6-month intervention period in 2018–2019, relative to the same period in 2017–2018 are estimated; consistent with a difference-in-difference as the primary counterfactual analysis.
 - 3) Bivariate analyses are extended by examining mean-differences via paired sample t-test statistics.
 - 4) Supplemental regression-based analyses provide further context regarding the change in the various outcomes in the targeted hot spots.

² Of the 44 hot spot segments that comprised the treatment and control conditions, the distribution was as follows: 8 in Bolden; 6 in Downtown; 8 in Northeast; 8 in Southeast; 6 in Spring Valley, and 6 in the remaining command districts.

The findings demonstrate:

- Total crime counts in the target area hot spots were roughly 10.8% lower in the intervention period compared to same 6-month time period in the prior year; conversely, the control area hot spots experienced a 15.6% increase over this same period.
- The total calls for service (CFS) counts in the target area hot spots declined by 14.5% during the experimental period relative to the prior year's counts. Comparatively, the control area hot spots experienced an 18.7% increase during this same experimental period.
- Violent crime counts in the target area hot spots were roughly 4.6% lower in the intervention period than the prior year during the same period. However, the control area hot spots experienced a sizable 20.8% increase over this same period.
- Violent crime calls for service in the target area hot spots were 28.3% lower in the intervention period relative to the prior year. The control area hot spots experienced a 13.0% increase over the same comparative period.
- Property crime counts in the target area hot spots reduced from 362 total offenses to 304 total offenses, or a 16.0% in the intervention period relative to the prior year during the same period. The control area hot spots experienced a rise from 333 to 364 total calls for service, or a 9.3% increase over this same period.
- Property crime calls for service increased in both treatment and control areas during the intervention period relative to the same time the prior year. In the treatment areas, property crime calls for service rose from 244 to 266 (9.0% increase) while in the control areas calls for service increased from 226 to 294 (30.0% increase).

In summary, the most powerful statistical analyses – difference-in-difference count regression estimates – highlight that the treatment hot spots experienced a marginally significant decline in all criminal offenses, and a statistically significant decline in the total calls for service. When we disaggregate the impact of the experimental condition on specific outcomes, it is apparent that for criminal offenses, the treatment effects of hot spots patrol were equally likely to impact property and violent crimes, but neither alone. For citizen generated calls for service, the sweeping and statistically significant impact of the additional patrol saturation in the hot spots was observed for violent crime calls for service, with a 36.5% decline that is likely attributable to the experimental conditions.

A series of analyses examining the difference in police activity (or treatment type) within the hot spots demonstrates treatment type within the hot spots resulted in differential impacts depending on the type of outcome: criminal offenses and calls for service. Specifically, the bivariate t-test analyses indicate that patrol car lighting was associated with a statistically significant decline in violent calls for service (i.e., violence) whereas patrol officer walking had no significant

association with violent calls for service. Thus, for violence, patrol lighting had the most salient impact. Comparatively, patrol officer walking was associated with a statistically significant reduction in property offenses while lighting had no association with property offenses. Thus, for property crime, patrol officers walking had the most salient impact.

Following prior research on displacement and diffusion of crime control benefits, pre/post comparisons of the immediately adjacent street segments and immediate intersections that abut the treatment segments in each direction are conducted. Our findings illustrate crime did not displace around the corner – because there were non-significant changes in each of the outcomes in the immediately adjacent street segments to the treatment segments. We conducted additional analyses to further examine the possibility of displacement. Collectively two key findings emerged: 1) total crime and violent crime calls for service in the treatment hot spots declined above and beyond any of the changes experienced in the top-10 hot spots outside of the experimental areas; 2) only the control hot spots experienced any sort of increase in criminal offenses when compared to the rest of the city. Thus, there may be some lingering and very modest evidence of potential crime displacement (but not calls for service) to the control areas.

Key Findings Summary

Overall, our interpretation of the findings of this study can best be summarized as follows:

- LVMPD was highly compliant and committed to the desired dosage levels of intensive hot spots policing across the city. Roughly 55% of all units received 2 hours of dosage per day, on average, while over 90% of the hot spots received 1.5 hours of dosage per day, on average. The LVMPD district commanders and officers assigned to the hot spots worked diligently to achieve their desired level of patrol commitment.
- We are confident that the treatment hot spots experienced statistically significant reductions in total crimes and calls for service during the experimental period. The most consistent reductions are seen in violence, and in particular violent crime calls for police service as well as suggestive evidence of a reduction in violent criminal offenses. There was also a more moderate and marginal reduction in property crime during the intervention period.
- We are moderately confident that crime did not displace in the immediate, abutting segments or intersections. Rather, the crime patterns and calls for service in these areas mirrored (to a lesser degree) the changes witnessed in the treatment areas. Combined the results suggest crime went down in the treatment areas, as well as (though less in terms of magnitude), in the areas immediately adjacent to the treatment areas.
- There is some, though less clear and limited, evidence of minor displacement of crime into the control street segments, which under the conditions of this experiment were geographically proximate to the treatment areas. The treatment and control segments here were both bound to the broader chronically persistent high-crime areas (where specialized officers were tactically placed to address persistent crime problems as they

emerge). It is possible that geographically close and similar street segments may experience some modest increases in crime during intense saturation periods since; in this case, the treatment-to-control assignment was not completely spatially independent. Thus, when additional saturation patrol is bound to very specific street segments, it is worth examining whether any changes in crime occur in very similar segments that are close (but not necessarily immediately adjacent) to the treatment segments.

- The types of treatment randomly assigned to the different treatment hot spots indicated a more sizable reduction in violence (in particular violent calls for service) for stationary patrol lights. There was also evidence of a more sizable reduction in property offenses where officers proactively walked the hot spot segments. While these findings about treatment type on specific outcomes is suggestive of some impact, low statistical power inhibits conclusive interpretation of these results. A more comprehensive conclusion to the treatment type findings requires more units of treatment (either over multiple ways of experimentation or across more diverse settings). However, the bivariate patterns seen in this study – showing police car lights had greater reductions of violent crime, while walking patrol had greater reductions of property crime offenses – suggest further implementation and additional research in this area is indeed warranted.

Implications for Policy and Practice

Finally, a series of policy implications are identified. The results of this study were presented by members of the research team to the LVMPD command staff in November 2019. Several research and policy implications were discussed at this meeting. These issues are relevant for both LVMPD officials and the larger law enforcement field.

First, LVMPD officials sought to better understand the actual number of crimes reduced through additional saturation patrols. The underlying question is regarding return on investment: Are the resources needed to sustain additional patrols worth the amount of crime reduced? To answer this question, we examined the raw counts of both reported crimes and calls for service. First, examining the total number of combined offenses (violent and property), a marginally statistically significant decline from 5.74 total offenses per hot spot, per month, to 4.43 total offenses per month, per hot spot was observed, or 188 fewer reported offenses in the treatment areas relative to the control areas over a six-month period (1.31 offenses x 24 hot spots x 6 months).

Likewise, examining the total number of combined calls for service (violent and property) showed a significant decline from 5.47 total calls for service to 3.93 total calls for service per hot spot, per month. This equates to 221 fewer calls for service in the treatment areas relative to the control areas during the 6-month experimental period (1.54 calls for service x 24 hot spots x 6 months). Within calls for service, the greatest impact was a reduction in violent crime calls for service. The difference-in-difference estimate of the treatment hot spots relative to the controls equated to a decline from 3.47 violent calls for service to 2.20 violent calls for service, per hot spot, per month over the study period. On average this equated to roughly 186 fewer violent calls

for service in the treatment hot spots (1.29 x 24 hot spots x 6 months) relative to the control hot spots during the six-month period.

Given this information, LVMPD officials can begin to determine whether the reductions in reported crimes and calls for service provide sufficient return on investment to engage in future hot spot policing interventions. While the personnel costs associated with hot spot policing interventions vary across agencies based on their deployment patterns (e.g., overtime versus straight-time deployment), the LVMPD redeployed pre-existing violent crime unit officers (who were already freed from answering calls for service) to conduct saturation patrols, therefore incurring no additional personnel costs. Rather the cost for LVMPD's implementation of hot spots policing is relative to the time officers deployed to hot spots were unavailable to do alternative work. It may be possible to conduct a rudimentary cost-benefit analysis that is based on a comparison to alternative deployment allocations for these violent crime unit officers. Without this additional information, it is a judgment call whether the 188 fewer criminal offenses and 221 fewer calls for service experienced during a 6-month period is worth the investment of approximately 8,400 hours of scheduled patrol.

Second, police officials questioned the long-term impact of saturation patrols. How long will the observed crime reductions continue once the additional deployments end? This is an important question – and one that can be answered – but additional time is needed before the research team can directly assess. Pending the availability of additional funding, a follow-up examination of crime patterns in Las Vegas will be conducted by the research team in May 2020, once a full year has passed since the conclusion of the experiment.

Third, there was a robust discussion regarding the possible reasons for the differential findings regarding the impact of the type of police deployment. Why did deployment of stationary vehicles with emergency lighting have a stronger impact on calls for service and reported violent crime incidents, while foot patrol had a larger impact on reported property crime? Police officials speculated on the possible reasons, but ultimately it remains unknown. Additional research would be especially valuable to determine if this finding is unique to these circumstances and context, or can be replicated again in Las Vegas, and also in other jurisdictions.

While these and other questions remain, some policy implications are clear. Deploying additional hot spots policing patrols at street segments identified through crime analysis as high risk for violent crime can have at least a short-term, significant reduction in: 1) calls for service for violent crime, 2) reported violent offenses, and 3) reported property offenses. Further, a threshold effect has not been found – indicating that additional patrols, above and beyond deployment already focused in hot spot areas, can result in additional reductions in crime. However, hot spots policing should be combined with other moderate and long-term violence reduction interventions to have the largest overall impact.

INTRODUCTION

In spring of 2017, researchers from the *IACP/UC Center for Police Research and Policy* (the “Center”) met with the command staff from the Las Vegas Metropolitan Police Department (LVMPD) to discuss their concerns related to violent crime. After a review of LVMPD’s historical and current methods of handling violent crime, it was decided that Center researchers would design, implement, and evaluate a strategy with the LVMPD to address gun and gang member involved (GMI) violence. Specifically, a three-prong approach was developed, including: (1) hot spots policing to reduce GMI street violence; (2) focused deterrence efforts to reduce GMI offending and victimization; and (3) place-based investigations (PNI) to identify and disrupt the infrastructures that support GMI violent activities. When used in combination, these interventions work to address all three elements of the crime triangle: offenders, victims, and places.

This report provides the findings specifically for the hot spots policing portion of this violence reduction project. Two additional, separate reports document the findings for the focused deterrence violence reduction intervention, and the place-based investigation (PNI) pilot-test. The hot spots strategy involved a randomized control trial design, where specific street segments received additional saturation patrols (treatment locations) while other specific street segments received normal police activity (control locations). In addition to the randomization of the location, officers who were dispatched to the treatment locations were randomly assigned to either remain stationary in their patrol vehicle with their lights on, or to get out of their vehicle and walk around the street segment on foot. This experiment occurred over a 6-month period (Nov 1, 2018 to Apr 30, 2019) for a total of 8,400 hours (175 days of additional patrol x 24 hot spots x 2 hours per hot spot per day) of requested additional saturation patrol.

The hot spots strategy was developed from a well-established evidence base which concludes that increased police patrols in high crime areas reduces overall crime. Furthermore, when these patrols are focused on a small geographic location they are even more effective. Research has also established that the optimum amount of time for these additional (saturation) patrols is to remain at a specific location between 12 to 15 minutes every two hours for the greatest effect on crime. Though there is a clear evidence base for where and how long to deploy these additional police resources, less is known about exactly *what officers should do* at these locations when deployed. Further, it is unclear whether a threshold effect exists; that is, it is unknown whether or not additional patrols beyond an already high amount of patrolling in violent crime areas works to further reduce crime. Finally, the available evidence is unclear regarding what happens to these selected locations after the additional police patrols are removed, and, if a crime reduction effect is indeed sustained, how long this sustained crime reduction will last. This research adds critical evidence on how best to employ additional hot spots deployment to effectively reduce violence.

The City of Las Vegas is the most populated city in the State of Nevada with an estimated population of 644,000 people. The city has grown by about 10% since 2010, and has an estimated median household income of \$53,000. In terms of racial/ethnic composition of the population, approximately 62.7% are White, 12.2% are Black, 6.7% are Asian and 6.2% are two

or more races or of other races; approximately 32.7% of the population are of Hispanic or Latino descent (US Census Bureau, 2019). Las Vegas is most well-known for its tourism attractions, and therefore has a fairly transient population in comparison to other large cities in the United States. The city experiences a tourist volume of approximately 42 million visitors each year (LVMPD, 2019).

The City of Las Vegas is situated within Clark County, Nevada, which has a population of approximately 2.23 million people. The county has grown by approximately 14% from 2010 to 2018, and has an estimated median household income of \$56,000. In terms of racial/ethnic composition of the population, approximately 69.9% are White, 12.8% are Black, 10.4% are Asian and 6.9% are two or more races or of other races (US Census Bureau, 2019). In addition, approximately 31.4% of the population is of Hispanic or Latino descent. Overall, the City of Las Vegas and the larger surrounding Clark County have fairly similar demographics.

The Las Vegas Metropolitan Police Department (LVMPD) provides all policing services for the City of Las Vegas and Clark County, Nevada (excluding the cities of Henderson, North Las Vegas, Boulder City, and Mesquite). The LVMPD was formed by the incorporation of separate police agencies in Clark County in July of 1973 and is led by the Sheriff of Clark County, who is publicly elected every four years. The LVMPD is the largest police department in the State of Nevada, with 3,200 sworn police officers and 1,300 civilian employees. In addition, the LVMPD has approximately 1,200 personnel devoted to detention services. According to the most recent estimates (N=5,832), approximately 33.6% of the LVMPD is comprised of female employees and 66.4% of the agency is comprised of male employees (LVMPD, 2019). In terms of the LVMPD's ethnic composition, approximately 61.5% of employees are White, 16.9% are Hispanic, 10.0% are Black, 5.7% are Asian, and 5.9% are of mixed races or of other ethnicities.

In total, the LVMPD serves a geographic jurisdiction of 7,500 square miles, with a population of approximately 1.6 million—more than half of the population of the state of Nevada (LVMPD, 2019). The LVMPD is divided into nine urban area commends: Bolden, Convention Center (which includes the Las Vegas Strip and Convention Center), Downtown, Northeast, Northwest, Southeast, Spring Valley, Enterprise and South Central. Additionally, the LVMPD has recentralized gang intelligence, investigations, and enforcement actions into a new bureau, the LVMPD Gang/Vice Bureau. The hot spots deployment project was specially overseen by the Law Enforcement Operations Group of the LVMPD.

HOT SPOT POLICING: A REVIEW OF THE EVIDENCE

A series of studies set the foundation for place-based crime reduction strategies, based on seminal research reporting that just three percent of addresses in Minneapolis, Minnesota accounted for 50% of calls for service in a given year (Sherman, Gartin, & Buerger, 1989). Similar findings have been produced from empirical studies across other cities, using multiple years of data, and different research methodologies. In his recent review of studies examining the criminology of place (a combined 55 years of observations from eight cities), Weisburd (2015) found between four to six percent of hot spot street segments account for 50% of total crime incidents. Collectively, this research documents what has long been known by police officials, providing substantial evidence that crime is not distributed evenly across or within jurisdictions. Instead, it is clustered at a few discrete micro places that represent “hot spots” of crime (Weisburd et al., 2012a). Further, research suggests that even the most crime-ridden neighborhoods have discrete locations that are relatively free of crime. Conversely, neighborhoods that are primarily characterized as crime-free have some hot spots of crime (Weisburd et al., 2012a). The concentration of crime is also found to be stable across time (Braga, Andresen, & Lawton, 2017; Andresen, & Malleson, 2011; Weisburd, Bushway, Lum, & Yang, 2004).

These consistent findings demonstrate that the police could be more efficient and effective in crime prevention if they focus their resources on hot spots of crime within their respective jurisdictions (Braga & Weisburd, 2010; Sherman & Weisburd, 1995; Weisburd, 1997). Indeed, the ability of police to capitalize on the high concentration of crime at micro-locations for crime reduction purposes has been demonstrated across a large number of research studies (Weisburd & Majmundar, 2018).

As a place-based violence reduction strategy, hot spots policing focuses police resources on specific high-crime micro locations (e.g., addresses, street segments, street blocks, or clusters of addresses, street segments, or street blocks). Facilitated by innovations in crime mapping, many police agencies have advanced their geographic understanding of crime within their jurisdictions for the application of hot spots policing interventions (Skogan & Frydl, 2004; Weisburd & Lum, 2005). The first documented hot spots policing intervention was implemented in Minneapolis, Minnesota from 1988-1999 (see Sherman & Weisburd, 1995). They reported that the increase in preventive patrol produced a six to thirteen percent reduction in calls for service within the treatment hot spots relative to the control hot spots. These promising findings led to a series of federal government funded studies of hot spots policing (Weisburd & Braga, 2006, 2019). Narrative reviews of the findings from these studies consistently highlight the ability of hot spots policing programs to produce meaningful reductions in crime and disorder (see Eck & Maguire, 2000; Skogan & Frydl, 2004; Telep & Weisburd, 2012; Weisburd & Eck, 2004; Weisburd & Majmundar, 2018). By 2004, a national committee convened to review research on police policy and practices concluded there is “a strong body of evidence [suggesting] that taking a focused geographic approach to crime problems can increase policing effectiveness in reducing crime and disorder” (Skogan & Frydl, 2004, p. 247).

As research in this area continued to accumulate, the promising findings led to the rapid diffusion of hot spots policing nationwide over the next two decades. In a survey of their membership, the Police Executive Research Forum (PERF, 2008) found that nearly 9 out of 10 responding agencies used hot spots policing strategies to manage violent crime.³ More recently, findings from a survey of a representative sample of police agencies in the United States presented by the National Police Research Platform reported that 75% of agencies surveyed indicated their use of hot spots policing interventions.

Despite sharing a single operational goal (i.e., the focus of police resources at specific locations to reduce crime), the exact tactics used for hot spots interventions often vary among agencies (Weisburd & Majmundar, 2018). For example, PERF (2008) found that hot spots policing strategies may range from general patrol and enhanced enforcement strategies to problem-oriented strategies, community-oriented strategies, offender-oriented strategies, and general investigative tactics. The efficacy of the given tactics in the prevention and control of crime depends upon the specific type of crime and type of place that are the focus of police attention (Weisburd & Braga, 2019; Weisburd & Telep, 2014).

Most recently, an update of an ongoing systematic review and meta-analysis of the hot spots policing literature identified 65 hot spots policing interventions using experimental and quasi-experimental research designs (Braga et al., 2019). These hot spots interventions under evaluation primarily involved an increase in traditional tactics by the police (e.g., increased foot or vehicle patrol, increased enforcement activities) or the use of problem-oriented policing to reduce crime opportunities at places. A large majority of the eligible evaluations (approximately 80%) concluded that hot spots policing strategies produced significant reductions in crime.

Research has also provided some insight regarding the best “dosage” for hot spots policing interventions and the most effective strategies for crime reduction within hot spots (Koper, 1995; Koper et al., 2013). For example, Koper (1995) found that stronger dosages of police presence improved the residual deterrence – that is, the deterrence effects of the interventions after they have ended – of crime and disorder in targeted areas. Specifically, Koper (1995) found that police presence at hot spot locations must reach a threshold dosage of approximately 10 minutes to produce greater residual deterrence than that generated by officers simply driving through a hot spot. Additionally, the analysis suggested that there is little added benefit once police presence reaches 14-15 minutes, causing Koper (1995) to conclude that police can maximize crime and disorder reductions within hot spot locations by making proactive, medium length stops at those hot spots.

In addition to intervention dosage, several studies have examined the variation in effectiveness of different types of police activities at hot spots on overall reductions of crime and disorder (Braga & Bond, 2008; Groff et al., 2015; Taylor, Koper, & Woods, 2011). Generally, it has been found

³ PERF members represent a group of the largest police agencies in the United States. The survey referenced was completed by 191 PERF agencies (63% response rate).

that hot spots policing programs that implement some form of problem-oriented policing intervention produce greater reductions in crime than those programs that simply increase levels of traditional enforcement actions in crime hot spots (Braga et al., 2014b), suggesting that hot spot interventions should be produced from the careful analysis of the crime problem within the individual hot spots, with crime prevention strategies tailored to address the underlying dynamics that cause crime within those locations (Braga & Weisburd, 2010).

A primary concern for the application of hot spots policing pertains to the possibility of crime displacement (e.g., spatial displacement, temporal displacement, tactical displacement, etc.). That is, if hot spots policing strategies are simply relocating crime from one place, time, target, offense, tactic, or offender to another, the benefits of these interventions are over-stated (Guerette & Bowers, 2009; Rosenbaum, 2006, 2019). Studies of hot spots interventions have primarily focused on the examination of spatial displacement, assessing whether the interventions result in the geographical shift of crime from the hot spot locations to adjacent areas (Bowers et al., 2011). As a whole, the available research demonstrates that spatial displacement of crime is not an inevitability (Weisburd & Telep, 2014). Rather, many evaluations that examine displacement following hot spots policing interventions note a diffusion-of-crime-control benefits to areas most proximal to the hot spot treatment locations, rather than a displacement of crime (Braga et al., 2019b).

Further, there is little evidence to suggest that hot spots policing interventions have negative effects on public perceptions of police (Weisburd & Braga, 2019; Weisburd & Majmundar, 2018; Weisburd & Telep, 2014). Several studies indicate that residents of crime hot spots may welcome the concentration of police resources within high-crime places, observing higher quality of life within their neighborhoods following the intervention (see, e.g., Braga & Bond, 2009; Chermak, McGarrell, & Weiss, 2001; Brunson & Weitzer, 2009; Corsaro, Brunson, & McGarrell, 2010; Shaw 1995). For example, a recent experiment assessing the impact of hot spots policing interventions (i.e., directed patrol and problem solving in hot spots) on perceptions of police legitimacy and collective efficacy in St. Louis County, Missouri found no long-term harm to public perceptions of police from implementing problem-solving hot spots interventions or temporarily implementing directed patrol within hot spots of crime (Kochel & Weisburd, 2017).

RESEARCH QUESTIONS

The primary purpose of implementing LVMPD's hotspot policing strategy was to – in combination with other strategies – reduce gang-member involved violence. There are numerous operational and logistical constraints related to adding additional saturation patrols to reduce violence; it was known from the onset that while additional patrols could be added strategically, not all needed areas could be addressed at once. Given that not all areas could receive additional patrols simultaneously, the LVMPD agreed to randomize these locations and engage in a comprehensive, methodologically rigorous study to enhance our collective understanding regarding the impact of hot spot policing strategies on violent crime. Collectively, our review of the evidence above suggests that hot spots policing interventions can be effective in preventing crime, with small, but significant, prevention effects on violent crime specifically. Although these findings are encouraging, several limitations in the available evidence base exist.

First, the long-term crime reduction benefits of hot spots policing interventions have not been established. Collectively, the existing evaluations have focused on the short-term crime prevention impacts of these strategies (Weisburd & Braga, 2019; Weisburd & Majmundar, 2018; Weisburd & Telep, 2014). In addition, it is unknown if a threshold effect exists. Many police agencies currently focus deployment on hot spots identified through crime analysis. Does the addition of supplemental saturation patrols to locations that are already routinely receive police deployment further reduce crime, or are these additional resources better used elsewhere?

Second, the available research provides limited insight on which hot spots policing tactics “work best” in addressing specific crime problems (Braga, 2001, 2005, 2007; Braga et al., 2012; Weisburd & Braga, 2019). Although it is understood that the efficacy of any hot spots policing intervention will depend upon the type of crime and type of place the intervention is designed to address, few evaluations provide insight related to the impact of specific police actions within hot spots. For example, the differential impacts of police activities at the specific locations identified for saturation patrol are unknown.

Finally, evaluations of hot spots policing interventions have not examined the occurrence of crime displacement or diffusion of benefits beyond the areas proximate to hot spots locations (Weisburd & Telep, 2014). Furthermore, there is limited examination of displacement effects beyond *spatial* displacement. These additional research questions are addressed within our evaluation of LVMPD's Hot Spots Policing Experiment.

Specifically, in addition to examining the overall crime reduction impacts of LVMPD's additional saturation patrol, this experiment was designed to address the following three related key research questions:

- 1) **Threshold effect.** What is the impact of hot spots policing on crime within street segments that are bound within chronically persistent high crime areas? While most hot spots experiments have focused on the collective impact on crime in the highest risk segments distributed across an entire city (i.e., the highest risk hot spots distributed citywide), this initiative examines the impact on the highest risk hot spots within bounded

high-risk areas. Within each of its ten command districts, LVMPD officials and researchers designated specific larger-scale geographic areas as worthy of additional police presence (i.e., a violent crime unit officer who designates their time to combatting violence within that geographic area within the command area). Is it possible to have additional hot spots policing impact above and beyond this level of violence reduction commitment? In short, is there a threshold effect for violence reduction with additional saturation patrols when police are already strategically deployed to these areas – are will additional patrols continue to reduce violence.

- 2) **Police activity in hot spots.** What is the impact of different types of police patrol dosage treatments and do different treatment types correlate with differential changes in crime reduction? In short, what is the most effective activity for police to perform during additional patrols? Patrol officers have long used police vehicle lights to reduce speeding (e.g., in work zones), as well as proactive patrols (e.g., walking foot patrols) to reduce crime risk in high-crime areas. By randomly assigning different types of treatment to the different hot spots, we assess whether treatment type corresponds with differential changes in crime outcomes.
- 3) **Displacement.** Does crime remain stable in non-treated (control) areas that were geographically close to treated areas? We examine the potential for crime displacement consistent with prior research by focusing on crime changes in street segments and intersections immediately adjacent to the treatment segments, as well as in similar street segments that were ‘down the street’ within the persistent crime hot spots.

Our study methodology and statistical analyses used to examine these research questions are presented in the remaining sections below.

METHODOLOGY

Project Implementation

In May 2018, researchers from the IACP / UC Center began working with LVMPD data analysts, patrol supervisors, and dispatcher executives to develop a framework to adopt and implement a rigorous hot spots policing experimental design to implement and assess the impact of directed patrol allocation to some of the highest-risk locations within the city. At the onset of the design phase, the research team identified the top street segments within the city that had the largest volume of violent citizen-generated calls for police assistance. The intent at this stage was to randomize half of the segments into treatment and half into control conditions. It was determined that the number of officers needed to commit the standard 15 minutes of dosage (see Koper, 1995), randomly, every two hours across multiple shifts (equating to roughly two hours of total dosage per day) for six months would have overwhelmed the agency's patrol capacity.

Most of the citywide hot spots (i.e., street segments) identified by the research team already fell within the identified larger chronic persistent high crime areas in Las Vegas, which were distributed across the various police command areas. In Las Vegas, the following command areas are geographically distinct: Bolden Area Command (BAC), Convention Center Area Command (CCAC), Downtown Area Command (DTAC), Enterprise Area Command (EAC), Northeast Area Command (NEAC), Northwest Area Command (NWAC), South Central Area Command (SCAC), Southeast Area Command (SEAC), and Spring Valley Area Command (SVAC).⁴

Within each command area, there were pre-existing specialized violent crime squads devoting a majority of their efforts to address emerging problems within these chronically persistent high-crime areas within the command boundaries. To provide context for example, ten chronically persistent high-crime areas comprised 23.6% of all citizen-generated calls for service, and 20.3% of all crime reports in the city in Las Vegas in 2018.

Conditions of Experimental Implementation

The vast majority of hot spots policing experiments rely on clustered randomized trials where a 1:1 ratio of treatment to control conditions are distributed among the highest crime hot spots across the entire city. For the purpose of this experiment, each district command was willing to designate their pre-existing violent crime unit within the chronic persistent high crime areas to provide additional patrol saturation at the identified high-crime hot spots (i.e., street segments). However, given patrol resource constraints it would have been difficult to include patrol officers from outside the chronic persistent high crime areas to cover patrol dosage in hot spots outside of the chronic persistent high crime areas; and, violent crime unit officers were not able to depart

⁴ The McCarran Airport Bureau was excluded at the onset of the study design because of the uniqueness of this setting, which did not lend itself to proactive hot spots patrols in designated segments.

the chronic persistent high crime areas to cover hot spots patrols outside of their predetermined geographic boundaries.

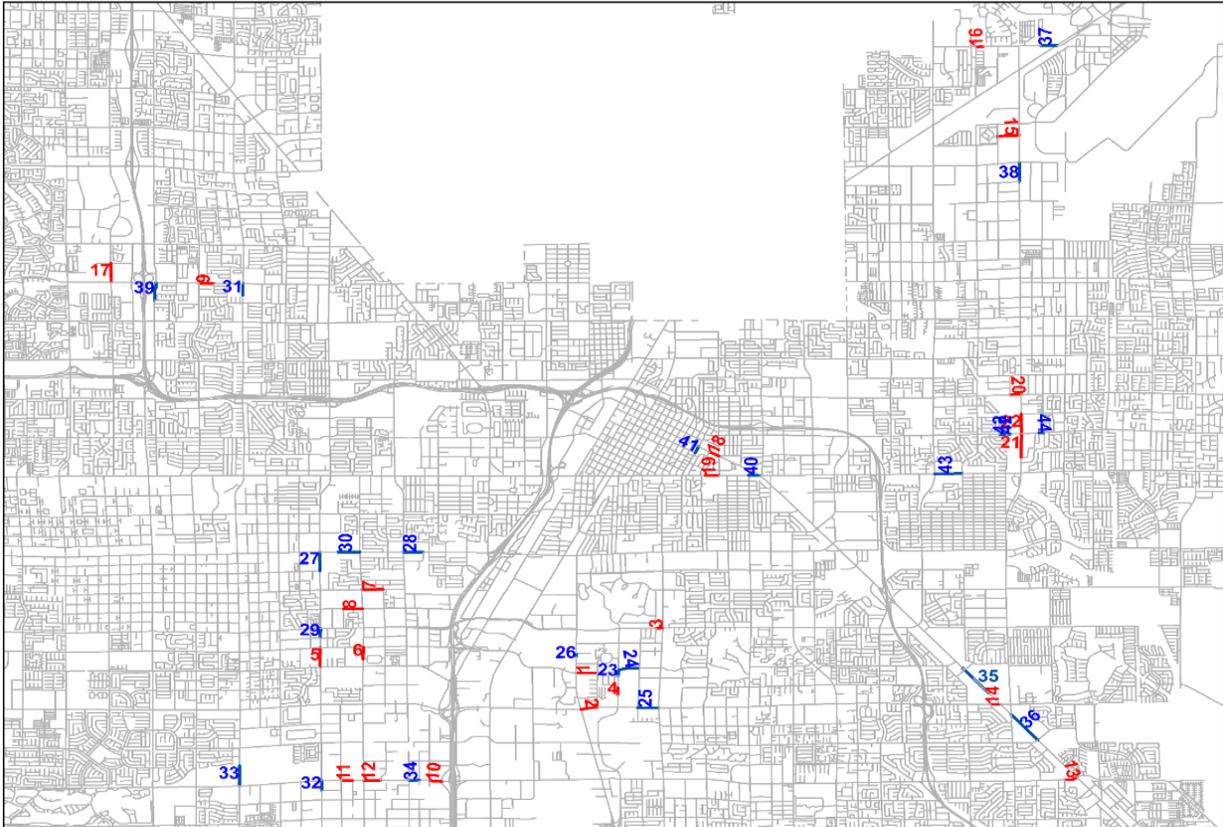
In short, these operational constraints and other parameters materialized to create the following experimental conditions:

- 1) The identified hot spot street segments assigned to both treatment and control conditions had to be located within the pre-determined chronically persistent high-crime areas to ensure sufficient patrol dosage response during the experiment.
- 2) The hot spot street segments within these chronically persistent high crime areas would likely have strong dosage compliance because the violent crime unit officers would devote their energies to fulfilling the requirements of the experimental conditions.
- 3) Within each chronically persistent high-crime area, the same criteria for inclusion was used in this study as prior research (Sherman and Weisburd, 1995). That is, no hot spot was larger than one standard linear street block, did not extend for more than one half block from either side of an intersection, and was not within one standard linear block of another hot spot.⁵
- 4) These parameters resulted in a designation of 44 hot spots (i.e., street segments) that were allocated to treatment (N = 22) and control (N = 22) conditions.⁶ These street segments are visually displayed in Figure 1.

⁵ In circumstances where two standard linear street segments abutted one another we randomly removed one of them from the potential pool prior to randomizing to ensure this criterion was met.

⁶ Of the 44 hot spot segments that comprised the treatment and control conditions, the distribution was as follows: 8 in Bolden; 6 in Downtown; 8 in Northeast; 8 in Southeast; 6 in Spring Valley, and 6 in the remaining command districts.

Figure 1: LVMPD Treatment and Control Segment Allocation



Randomization and Treatment Allocation

A randomized experimental design was deployed, where treatment group street segments received additional patrol allocation (i.e., hot spot policing), and control group street segments received policing as usual. The control street segment locations remained unknown to LVMPD officials until after the experiment ended. Within field-trial settings, randomized experiments seemingly have the highest internal validity, and allow for the strongest causal statements about the effects of strategic interventions on targeted outcomes (Cook & Campbell, 1979; Cook, 1980; Weisburd, 2003). The research team and LVMPD officials paired treatment and control groups so that the treatment and control hot spots were relatively similar, prior to randomization across the various districts. Upon pairing, a computerized random number generator assigned treatment and control allocation.

The treatment delivered follows Koper's (1995) seminal findings that patrol allocation should range between 12-15 minutes of patrol allocation per treatment received at each hot spot, and also follows Sherman and Weisburd's (1995) finding of a total of two hours of patrol allocation

intermittently (i.e., fifteen minutes every two hours over the span of an eight-hour day) for the entire day.⁷

To allocate patrol resources to hot spot treatment locations, the LVMPD utilized radio control dispatchers to produce a police-generated call for service (referred to as code 469-T) to the midpoint of the treatment street segment at designated time periods throughout the day. This deployment method ensured that the number of dispatch requests at each hot spot: 1) had no more than two hours between treatment dispatches, and 2) had two total hours of patrol intended dosage each day calibrated with the highest risk time periods of calls for assistance and criminal offenses.⁸ The daily experimental schedule was between 3:00 pm and 7:00 am, which includes sixteen consecutive hours during the highest risk times for crime and citizen generated calls for service.

This implementation plan provided for 132 monthly treatment units (i.e., 22 treatment areas x 6 months of hot spots intervention). Given the evaluation literature on hot spots initiatives indicates an expected small to moderate impact on crime and calls for service (Braga et al., 2019), we conducted power analyses on our planned experimental design. The results of these analyses indicated that it would be possible to detect a moderate effect on our targeted outcomes during this time period.⁹ Commands of the various LVMPD violent crime teams in these chronically persistent high-crime areas committed to providing six months of additional dosage as directed by the dispatch-generated deployment plan. Given our confidence in the LVMPD's likely compliance with the experimental conditions during the study period, the research team introduced a second dimension to the hot spots experiment: randomization of what activities officers performed during hot spot policing deployments (described in detail below).

Types of Hot Spots Treatment

The research team balanced the desire to conduct the most appropriate known treatment to the randomized segments based on the scholarly literature to maximize the potential for programmatic impact, with an opportunity to assess the potential impact of untested, though

⁷ The Koper Curve, as it has come to be known, has been assessed and supported more directly by Telep et al. (2012) in their Sacramento, CA study.

⁸ For dispatched 'calls to hot spots' that went unanswered, the dispatchers maintained the call as open until it was answered, or dropped by the beginning of the 7am shift the next day.

⁹ The combined calls for service average in the treatment segments was 5.5 total calls for service per unit per month, with a standard deviation of 2.2 calls per month. Using a power calculator (one-tailed test, and a desired power of .70), we found that a 33% reduction in calls for service would be detectable with this design (from 5.5 calls per month to 4.1 per month). While more units of hot spots observation were desirable for a more precise test, a reliable design was possible under these conditions.

popular approaches of police activity during hot spot policing deployment. This resulted in the test of two approaches to treatment:

- 1) Walking patrols at the hot spots – to promote proactive engagement between the assigned officer and residents, business owners/patrons, and others at the designated hot spot locations
- 2) Stationary patrol cars with flashing lights – to enhance citizen awareness of the additional patrols that were taking place

Prior scholarly literature clearly indicates that problem-solving policing approaches hold the most promise to reduce crime and calls for service among hot spots policing approaches (Braga, Papachristos, and Hureau, 2014). However, a recent experiment conducted in Philadelphia showed that foot patrols generated the greatest reductions in crime within the city (Ratcliffe, J., Taniguchi, T., Groff, E.R., & Wood, J.D., 2011).

We combined the results from both sets of studies to suggest two types of hot spots policing activities. Specifically, it was hypothesized that walking police officers in the hot spots should engage community stakeholders and business officials, and that such an approach would be well grounded with the evidence-based literature of hot spots policing effectiveness.

The second approach, the use of illuminated police lights during the treatment period, is based on a widely adopted risk-reduction practice in construction work zones – the use of police presence with lights on to deter traffic speed violations in order to reduce accident risk. Richards, Wunderlich, and Dudek (1985) found that visible police presence via flashing lights reduced speeds by roughly 18% in work zones. The use of police presence via flashing lights has been widely adopted as evidence-based practice in construction zones for the past thirty years; however, the adaptability of flashing lights to criminal justice initiatives (i.e., crime prevention as opposed to accident risk reduction) is unclear because there are no published evaluations of which we are aware examining the impact in high-crime patrol hot spots.

Of the 22 treatment segments, we used computer randomization to assign one of two treatment types (walking or stationary with lights) to each hot spot. This assignment lasted one month and then re-randomization occurred. The second randomization was based on the proportion of total hot spots that would equate to a 1:1 treatment type match over a two-month period. This iterative approach ensured that the 132 monthly treatment units in the intervention period had an even distribution of 66 treatments of walking patrols and 66 treatments of stationary with lights. During the transmission of the 469-T call for police presence at the hot spots, dispatchers would communicate to the officer the random assignment of the action to be taken at the hot spots.

Study Methodology Compliance

An examination of dosage compliance, based on cleared calls to the dispatch center, indicates that 100% of the hot spots experienced at least 1.25 hours of patrol dosage per day over the 6-month intervention period. Indeed, over 90% of the hot spots (n = 19) experienced an average of

1.5 hours or greater of patrol dosage per day over the 6-month intervention period. And, roughly 55% (n = 12) of the hot spots averaged the intended 2 hours of patrol dosage per day over 6 months.

The high level of compliance observed can be attributed primarily to the collaborative implementation design between the research team and the feedback from the various area commanders prior to programmatic onset (to ensure compliance was feasible). In addition, the violent crime units committed – and responded to – deployment for multiple dosages per day to the hot spot locations. Finally, dedicated and immediate oversight by the area commanders, including prompt response to initial reports from the research team of low compliance, served to convey to officers the importance of meeting the study requirements and proper dosage in the hot spots.

Data

To evaluate the impact of hot spots patrols, we collected primary outcome measures from the LVMPD official reported data. Specifically, we were provided access to LVMPD calls for service data, which included all citizen-generated calls to 911 and patrol dispatch. In addition, we examined LVMPD reported crime incidents, which included all Part I crime incidents based on the UCR classification of serious crimes (i.e., homicide, robbery, burglary, auto theft, and aggravated assault, and larceny), and Part II crimes (less serious criminal incidents that are usually related to disorder – e.g. public drunkenness, trespassing, and vandalism) as well as misdemeanor assault. Reported crime incidents were further divided into violent and property crime categories for analysis.

In sum, the following dependent variables were examined:

- Total crime incidents
- Total calls for service
- Violent crime incidents
- Violent crime calls for service
- Property crime incidents
- Property crime calls for service

As described in the results section below, the primary outcome of interest was the change between the experimental period (Nov 1, 2018 – Apr 30, 2019) and the same time period in the treatment versus the control hot spots the year prior (Nov 1, 2017 – Apr 30, 2018).

FINDINGS

Each of the various outcomes are examined in the treatment and comparison hot spots, and within treatment hot spots the differential changes in outcomes correlate with the various treatments that were randomly assigned to the officers (i.e., officers walking or illuminated and flashing patrol car lights) are also considered.

First, the percentage change estimates comparing the experimental (treatment) areas to the control hot spots during the 6-month intervention period in 2018–2019, relative to the same period in 2017–2018 are presented. This analysis is consistent with a difference-in-difference as the primary counterfactual analysis. As a follow-up step, these bivariate analyses are extended by examining mean-differences via paired sample t-test statistics. Finally, supplemental regression-based analyses are used to provide further context regarding the change in the various outcomes in the targeted hot spots.

Table 1 below indicates that the total crime counts in the target area hot spots were roughly 10.8% lower in the intervention period compared to same 6-month time period in the prior year; conversely, the control area hot spots experienced a 15.6% increase over this same period.

Table 1: Total Crime Incident Changes during the Intervention Period (Nov 1, 2018 - Apr 30, 2019) Relative to the Prior Years Counts (Nov 1, 2017 - Apr 30, 2018)

Area	Total Crime Count 2017-2018	Total Crime Count 2018-2019	Percentage Change
Treatments	666	594	-10.8%
Controls	746	863	15.6%

Table 2 below indicates that the total calls for service (CFS) counts in the target area hot spots declined by 14.5% during the experimental period relative to the prior year’s counts. Comparatively, the control area hot spots experienced an 18.7% increase during this same experimental period.

Table 2: Total Calls for Service Changes during the Intervention Period (Nov 1, 2018 –Apr 30, 2019) Relative to the Prior Years Counts (Nov 1, 2017 – Apr 30, 2018)

Area	Total CFS Count 2017- 2018	Total CFS Count 2018- 2019	Percentage Change
Treatments	661	565	-14.5%
Controls	671	797	18.7%

Table 3 shows that the violent crime counts in the target area hot spots were roughly 4.6% lower in the intervention period than the prior year during the same period. However, the control area hot spots experienced a sizable 20.8% increase over this same period.

Table 3: Violent Crime Count Changes during the Intervention Period (Nov 1, 2018 –Apr 30, 2019) Relative to the Prior Years Counts (Nov 1, 2017 – Apr 30, 2018)

Area	Violent Crime Count 2017-2018	Violent Crime Count 2018-2019	Percentage Change
Treatments	304	290	-4.6%
Controls	413	499	20.8%

Table 4 similarly shows that the violent crime calls for service in the target area hot spots were 28.3% lower in the intervention period relative to the prior year. The control area hot spots experienced a 13.0% increase over the same comparative period.

Table 4: Violent Crime Calls for Service Changes during the Intervention Period (Nov 1, 2018 – Apr 30, 2019) Relative to the Prior Years Counts (Nov 1, 2017 – Apr 2018)

Area	Violent Crime Calls for Service 2017-2018	Violent Crime Calls for Service 2018-2019	Percentage Change
Treatments	417	299	-28.3%
Controls	445	503	13.0%

Table 5 illustrates that property crime counts in the target area hot spots reduced from 362 total offenses to 304 total offenses, or a 16.0% in the intervention period relative to the prior year during the same period. The control area hot spots experienced a rise from 333 to 364 total calls for assistance, or a 9.3% increase over this same period.

Table 5: Property Crime Count Changes during the Intervention Period (Nov 1, 2018 –Apr 30, 2019) Relative to the Prior Years Counts (Nov 1, 2017 – Apr 30, 2018)

Area	Property Crime Count 2017-2018	Property Crime Count 2018-2019	Percentage Change
Treatments	362	304	-16.0%
Controls	333	364	9.3%

Table 6 below shows that property crime calls for service increased in both treatment and control areas during the intervention period relative to the same time the prior year. In the treatment areas, property crime calls for service rose from 244 to 266 (9.0% increase) while in the control areas calls for service increased from 226 to 294 (30.0% increase).

Table 6: Property Crime Calls for Service Changes during the Intervention Period (Nov 1, 2018 –Apr 30, 2019) Relative to the Prior Years Counts (Nov 1, 2017 – Apr 30, 2018)

Area	Property Crime Calls for Service 2017-2018	Property Crime Calls for Service 2018-2019	Percentage Change
Treatments	244	266	9.0%
Controls	226	294	30.0%

Mean Difference Tests

A potential concern about a simple bivariate count comparison is that a small number of street segments could yield sizable differences observed in the overall percentage change estimation. Therefore, paired sample t-test analysis (difference tests) and count regression (difference-in-difference tests) via Poisson and Negative Binomial Estimation are also provided to explore whether the changes in the treatment and control areas were beyond random chance. These significance-threshold analyses account for sample size and sample variability patterns over time.

First, following Telep et al. (2012), treatment to control hot spot counts are compared for each of the outcomes during the 6-month intervention period (Nov 1, 2018 – Apr 1, 2019) to ensure there are no differences in means across the outcomes prior to a difference-in-difference comparison. The results indicated that there are no statistically significant differences between the treatment and control area counts during the intervention period for property crime calls for service ($t = .350$), property crime offenses ($t = .544$), violent crime calls for service ($t = 1.90$), and violent crime offenses ($t = 1.58$). Thus, any divergences that emerge from the differences-in-differences estimation are not likely to be attributed to significantly different rates of offending or citizen calls for service during the period of experimentation.

Next, the 2018-2019 outcomes are compared to the same six-month period in 2017-2018. The results indicate the potential for a treatment effect across the majority of outcomes modeled. In terms of the total number of criminal offenses, there is a modest reduction in criminal offenses within the target area, while the control area hot spots experienced a statistically significant increase ($T = -2.13$, $p = .045$) during the same period. The results are presented in Table 7 below.

Table 7: Total Crime Incident Changes during the Intervention Period (Nov 1, 2018 - Apr 30, 2019) Relative to the Prior Years Counts (Nov 1, 2017 – Apr 30, 2018)

Treatment Hot Spots				Control Hot Spots			
Pre-Mean	Post-Mean	T	P	Pre-Mean	Post-Mean	T	P
30.27	27.0	1.51	.147	33.9	39.2	-2.13	.045

A similar pattern was observed in Table 8 where the total calls for service are moderately lower in the treatment area hot spots when compared to the prior year’s counts; however, the control area hot spots calls for service experienced a modest and marginally significant rise in calls for service during the same period of comparison ($T = -1.98$, $p = .06$).

Table 8: Total Calls for Service Changes during the Intervention Period (Nov 1, 2018 – Apr 1, 2019) Relative to the Prior Years Counts (Nov 1, 2017 – Apr 30, 2018)

Treatment Hot Spots				Control Hot Spots			
Pre-Mean	Post-Mean	T	P	Pre-Mean	Post-Mean	T	P
30.04	25.68	1.480	.154	30.5	36.2	-1.98	.061

Violent criminal offenses did not yield any significant divergences in the treatment and control hot spots over time. Table 9 below shows that violent crime offenses did not change in the pre- and intervention periods in either hot spots treatment areas ($T = .406$, $p = .689$) or in the control areas ($T = -1.29$, $p = .204$).

Table 9: Pre and Post Violent Crimes, T-Statistics, and P-Values (two-tailed test)

Treatment Hot Spots				Control Hot Spots			
Pre-Mean	Post-Mean	T	P	Pre-Mean	Post-Mean	T	P
13.81	13.18	.406	.689	16.29	17.93	-1.29	.204

Table 10 illustrates that violent crime calls for service experienced a significant decline in the treatment hot spots ($T = 2.57$, $p = .018$) in the experimental period relative to the same six-months the year prior to the intervention. Conversely, the control hot spots did not experience any differences in the mean number of violent crime calls for service ($T = -1.12$, $p = .272$) during the same period of comparison.

Table 10: Pre and Post Violent Crime Calls for Service, T-Statistics, and P-Values (two-tailed test)

Treatment Hot Spots				Control Hot Spots			
Pre-Mean	Post-Mean	T	P	Pre-Mean	Post-Mean	T	P
18.95	13.59	2.57	.018	20.22	22.86	-1.12	.272

Table 11 below indicates that property crime offenses experienced a significant decline in the treatment hot spots ($T = 2.05$, $p = .050$) in the experimental period relative to the same six-months the year prior to the intervention. Conversely, the control hot spots did not experience any differences in the mean number of property crimes ($T = -1.14$, $p = .265$) during the same period.

Table 11: Pre and Post Property Offenses, T-Statistics, and P-Values (two-tailed test)

Treatment Hot Spots				Control Hot Spots			
Pre-Mean	Post-Mean	T	P	Pre-Mean	Post-Mean	T	P
16.45	13.81	2.05	.050	15.1	16.5	-1.14	.265

Table 12 shows that property crime calls for service experienced a significant increase ($T = -2.71$, $p = .013$) in the control hot spots in the intervention period relative to the baseline period of comparison the prior year. The treatment area hot spots did not experience any significant change in property crime calls for service during this same period of comparison.

Table 12: Pre and Post Property Crime Calls for Service, T-Statistics, and P-Values (two-tailed test)

Treatment Hot Spots				Control Hot Spots			
Pre-Mean	Post-Mean	T	P	Pre-Mean	Post-Mean	T	P
11.09	12.09	-.683	.502	10.27	13.36	-2.71	.013

Thus, the mean difference tests for each of the treatment and control hot spots across all outcomes indicate a decrease in violent crime calls for service and property crime offenses in the treatment hot spots, but not the control hot spots during the intervention period when compared to the same time period one year prior. For violent crime offenses, no differences in means were observed in either treatment or control hot spots. In terms of property crime calls for service, the controls experienced a significant rise in event counts that was not experienced in the treatment hot spots. The combined analyses are suggestive of a treatment-to-control difference (or difference-in-difference). We next move to difference-in-difference count regression estimation for each of these outcomes to examine the net differences observed in the treatment hot spots relative to the control hot spots.

Difference-in-Difference Multivariate Regression Estimation

Six count regression analyses are conducted on: 1) total criminal offenses; 2) total calls for service; 3) violent criminal offenses; 4) violent crime calls for service; 5) property crime offenses; and 6) property crime calls for service. These analyses allow for the use of multiple covariates across each outcome and across multiple conditions related to treatment. The count models accounted for 44 street segments (22 treatment and 22 control hot spots) during the pre-intervention period (Nov 1, 2017 – Apr 30, 2018) relative to the intervention period (Nov 1, 2018 – Apr 30, 2019). This yields 528 segment observations (44 segments x 12 months) for the difference-in-difference regression estimation. Ordinary least squares (OLS) regression is not used because of the limited distribution of the data; most hot spots had a few crimes occur and very few had more than twenty crimes or calls for service, potentially violating the normality assumption of OLS regression (Long and Freese, 2006). Rather, all count models were estimated using STATA 12.1 for cross-sectional time series data and use Huber-White robust standard errors to reduce the potential bias of heteroskedastic errors across the multiple units of comparison.

First, a difference-in-difference estimation on all criminal offenses and all calls for service is conducted, which is then partitioned into violent and property related crimes and calls for service. Table 13 indicates that there is evidence of a marginally statistically significant ($Z = 1.62$, $p < .10$) total treatment effect (-22.8%) on all criminal offenses in the treatment hot spots.

Table 13: Difference-in-Difference Poisson Regression (N = 528) on All Crime Incidents

Parameter Estimate	Coefficient	Standard Error	Z-Value
Intercept	1.73	.092	18.80**
Treatment	-.113	.119	-0.95
Intervention Period	.145	.129	1.12
Difference-in-Difference	-.260	.160	-1.62 ⁺

** p < .01, * p < .05; + p < .10

Table 14 shows a similar net-treatment effect on the total number of calls for service requests in the treatment hot spots during the six-month experimental period. The difference-in-difference estimate is statistically significant ($Z = -2.26$, $p < .05$) indicating a 27.9% decline in calls for service during this period of examination. Of additional importance, the treatment and intervention period estimates between treatment and controls are not significantly different from one another, suggesting a relative rate of stability between the treatment and control areas prior to the experimental period. Therefore, the net difference is likely to be attributed to the conditions that the experimental hot spots experienced during the intervention period.

Table 14: Difference-in-Difference Poisson Regression (N = 528) on All Calls for Service Requests

Parameter Estimate	Coefficient	Standard Error	Z-Value
Intercept	1.625	.072	22.40**
Treatment	-.024	.095	-.250
Intervention Period	.172	.113	1.56
Difference-in-Difference	-.328	.145	-2.26**

** p < .01, * p < .05; + p < .10

The treatment hot spots did not experience significant divergence in violent crimes relative to the controls during the experimental period. The difference-in-difference estimate presented in Table 16 below shows that violent crimes decline in the treatment areas relative to the control areas, but that this relative rate of decline did not approach statistical significance when examining violent offenses alone ($Z = -1.22$, $p = .183$).

Table 15: Difference-in-Difference Poisson Regression (N = 528) on Violent Crime Incidents

Parameter Estimate	Coefficient	Standard Error	Z-Value
Intercept	1.14	.108	10.52**
Treatment	-.306	.135	-2.25*
Intervention Period	.189	.152	1.24
Difference-in-Difference	-.236	.193	-1.22

** p < .01, * p < .05; + p < .10

The largest estimated impact of the treatment on the partitioned outcomes is for violent calls for service. Table 16 shows violent calls for service declined by 36.5% (Exp (-.455)) in the treatment areas during the experimental period relative to the controls and relative to prior crime counts in the treatment areas. Again, the treatment and intervention estimates indicate a relative degree of stability over time between the treatment and control areas, thus suggesting the treatment impact for violent calls for service was associated with the experimental treatment conditions.

Table 16: Difference-in-Difference Poisson Regression (N = 528) on Violent Calls for Service Requests

Parameter Estimate	Coefficient	Standard Error	Z-Value
Intercept	1.21	.079	15.36**
Treatment	-.064	.103	-.63
Intervention Period	.122	.122	1.00
Difference-in-Difference	-.455	.158	-2.87**

** p < .01, * p < .05; + p < .10

Similar to the change in violent criminal offenses, treatment hot spots did not experience significant divergence in property crimes relative to the controls during the experimental period. The difference-in-difference estimate presented in Table 17 below shows that although property crimes declined in the treatment areas relative to the control areas, this relative rate of decline did not approach statistical significance when examining violent offenses alone ($Z = -1.26$, $p = .179$).¹⁰

¹⁰ It is important to note that the marginally significant difference-in-difference estimate on the total number of offenses presented earlier had similar point estimates (-.263, and -.236 respectively) across both violent and property offenses; however, neither offense category alone was responsible for the net overall reduction – but rather the combined effects on all offenses was likely attributable to declines in both violent and property offenses.

Table 17: Difference-in-Difference Poisson Regression (N = 528) on Property Crime Incidents

Parameter Estimate	Coefficient	Standard Error	Z-Value
Intercept	.925	.108	8.55**
Treatment	.083	.146	.57
Intervention Period	.089	.152	.58
Difference-in-Difference	-.263	.209	-1.26

** p < .01, * p < .05; + p < .10

Finally, as shown in Table 18, there was no attributable change in property crime calls for service in the treatment areas relative to the control areas via the difference-in-difference estimate. Indeed, there was a marginally significant increase in property crime calls for service ($Z = 1.81$, $p < .10$) during the experimental period in both treatment and control areas.

Table 18: Difference-in-Difference Poisson Regression (N = 528) on Property Calls for Service Requests

Parameter Estimate	Coefficient	Standard Error	Z-Value
Intercept	.537	.104	5.13**
Treatment	.051	.143	.36
Intervention Period	.263	.145	1.81+
Difference-in-Difference	-.170	.201	-.85

** p < .01, * p < .05; + p < .10

In summary, the most powerful statistical analyses – difference-in-difference count regression estimates – highlight that the treatment hot spots experienced a marginally significant decline in all criminal offenses, and a statistically significant decline in the total calls for service. When we disaggregate the impact of the experimental condition on specific outcomes, it is apparent that for criminal offenses, the treatment effects of hot spots patrol were equally likely to impact property and violent crimes, but neither alone. For citizen generated calls for service, the sweeping and statistically significant impact of the additional patrol saturation in the hot spots was observed for violent crime calls for service, with a 36.5% decline that is likely attributable to the experimental conditions.

Analyses on Outcomes by Hot Spots Treatment Type

To assess the relative impacts of the randomly generated treatment assignment within the hot spots (i.e., patrol car lights and officers’ walking), we conducted bivariate paired sample t-test mean comparisons between the pre-hot spot outcomes and the hot spot outcomes during the experimental period. This equates to a treatment-to-treatment comparison. In short, this is a

difference-in-difference estimation between treatment types across the different outcomes examined.¹¹

When comparing the 2018 – 2019 outcomes to the same six-month period in 2017 –2018, the results indicate the potential for an overall criminal offense impact associated with officers’ walking (T = 1.82, p = .082), and no evidence of a combined effect of the lights intervention on total crime counts (T = .874, p = .392). The results are presented in Table 19 below.

Table 19: Total Crime Offense Changes during the Intervention Period (Nov 1, 2018 –Apr 30, 2019) Relative to the Prior Years Counts (Nov 1, 2017 – Apr 30, 2018)

Walking Hot Spots				Lights Hot Spots			
Pre-Mean	Post-Mean	T	P	Pre-Mean	Post-Mean	T	P
14.72	12.90	1.82	.082	15.54	14.09	.874	.392

A slightly different pattern emerges when examining the impact of walking versus patrol car lighting on citizen generated calls for service observed in Table 20 below. The reduction calls for service in the hot spots where police lighting was used approached marginal statistical significance (T = 1.71, p = .102) while the walking hot spots did not experience a combined calls for service change over time.

Table 20: Total Calls for Service Changes during the Intervention Period (Nov 1, 2018 – Apr 30, 2019) Relative to the Prior Years Counts (Nov 1, 2017 – April 30, 2018)

Walking Hot Spots				Lights Hot Spots			
Pre-Mean	Post-Mean	T	P	Pre-Mean	Post-Mean	T	P
13.50	12.50	.720	.479	16.54	13.18	1.71	.102

There was no evidence of a differential impact of walking versus lights when examining violent criminal offenses. Table 21 below shows that neither walking hot spots nor hot spots that relied on patrol car lighting alone experienced any significant change when disaggregating the different approaches on total violent offenses.

Table 21: Pre and Post Violent Crimes, T-Statistics, and P-Values (two-tailed test)

Walking Hot Spots				Lights Hot Spots			
Pre-Mean	Post-Mean	T	P	Pre-Mean	Post-Mean	T	P
6.59	6.63	-.056	.956	7.22	6.54	.618	.543

¹¹ Within this analysis the non-treatment (control) hot spots are not included in the modeling. The difference-in-difference-in-difference (DDD) analyses presented later will consider the relative changes in controls.

Table 22 shows that violent crime calls for service experienced significant changes in the hot spots that experienced patrol lighting ($T = 2.78$, $p = .01$) in the experimental period relative to the same six-months the year prior to the intervention. While the hot spots that received walking also experienced a decline during this period, these reductions did not approach statistical significance ($T = 1.51$, $p = .146$) during the same period of comparison.

Table 22: Pre and Post Violent Crime Calls for Service, T-Statistics, and P-Values (two-tailed test)

Walking Hot Spots				Lights Hot Spots			
Pre-Mean	Post-Mean	T	P	Pre-Mean	Post-Mean	T	P
8.50	7.00	1.51	.146	10.45	6.59	2.78	.01

Table 23 below shows that property offenses experienced statistically significant declines in the hot spots where walking was the type of treatment ($T = 2.53$, $p = .019$) in the experimental period relative to the same six-months the year prior to the intervention. However, the hot spots that received patrol car lighting did not experience any significant differences in the mean number of property crimes ($T = .926$, $p = .365$) during the same period.

Table 23: Pre and Post Property Offenses, T-Statistics, and P-Values (two-tailed test)

Walking Hot Spots				Lights Hot Spots			
Pre-Mean	Post-Mean	T	P	Pre-Mean	Post-Mean	T	P
8.13	6.27	2.53	.019	8.31	7.54	.926	.365

Table 24 shows that the changes in property crime calls for service were similarly impacted in both the walking and lighting hot spots. Neither set of analyses indicated that either approach corresponded with any meaningful difference in property crime related calls for service.

Table 24: Pre and Post Property Crime Calls for Service, T-Statistics, and P-Values (two-tailed test)

Walking Hot Spots				Lights Hot Spots			
Pre-Mean	Post-Mean	T	P	Pre-Mean	Post-Mean	T	P
5.00	5.55	-.609	.549	6.09	6.59	-.484	.634

In summary, the bivariate analyses used to assess whether or not the different types of randomly assigned treatment used at the various treatment hot spots during the six-month intervention period (relative to the prior year's baseline count) showed differential impacts depending on the type of outcome: criminal offenses and calls for service.

Supplemental Difference-in-Difference-in-Difference Regressions on Treatment Type

As noted in the overall treatment effect analysis, the most rigorous assessment of treatment effects would be to compare the rate of change in one experimental condition to the changes in

the other condition, and to control for trends that may have likewise impacted the control areas during the period of examination. This equates to a difference-in-difference-in-difference modeling strategy. We conducted 12 separate count regression analyses using type of treatment as the difference-in-difference (DDD) estimator; and then calculated the difference-in-difference estimate across all six outcomes. While the point estimates clearly favored walking for property related calls for service and criminal offenses, and lights for violent criminal offenses and violent calls for service, none of the DDD estimates approached statistical significance. However, it should be noted that our experimental methodology is almost certainly underpowered to detect differential types of treatment effects on the outcomes modeled from a multivariate framework. The combined direction of the DDD estimates across these outcomes in combination with a similar set of findings seen in the bivariate t-tests suggests the potential for differential impact of patrol treatment on the outcomes modeled here (see Table 25).

Table 25: Difference-in-Difference-in-Difference Count Regression Models

Outcome	Walking		Lights		Diff-in-Diff-in-Diff
	Coefficient	St. Error	Coefficient	St. Error	Z-Score
Total Offenses	-.306	.134	-.222	.127	-.456
Total CFS	-.280	.121	-.217	.121	-.366
Violent Offenses	-.367	.151	-.417	.148	.238
Violent CFS	-.322	.130	-.429	.133	.571
Property Offenses	-.237	.180	-.016	.167	-.951
Property CFS	-.221	.172	.049	.157	-1.15

Sensitivity Tests

A series of sensitivity analyses are conducted to assess potential external influences on the outcomes examined across the treatment and control areas to provide an assessment of confidence in the results.

First, general trend analyses for total calls for service and total criminal offenses (and similarly disaggregated the outcomes for additional review) are conducted. There is evidence of a general increase in all calls for service across the entire city, driven primarily (if not exclusively) by an increase in property crime generated calls for service. Comparing the six-month experimental period with the same six-months of the prior year, the entire City of Las Vegas had roughly 4.6% more citizen-generated calls for service during this period. The remaining outcomes were relatively stable in pre/post analyses (within a 1-2% margin in each direction).

Second, given that the experimental condition assignment (i.e., assignment to treatment or control conditions) were affixed within the broader chronically high-crime areas, the experimental conditions were not entirely independent of one-another. The vast majority of previous hot spots initiatives and evaluations have relied on citywide segment analyses, and then the segments are randomly assigned across large geographic spaces to treatment or control conditions. While displacement analyses typically indicate that immediately adjacent streets and intersections fail to experience sudden shifts in crime or calls for service (Braga et al., 2019), the

Las Vegas experiment provided an opportunity for crime to be potentially displaced to control areas (i.e., similar high-risk areas not immediately adjacent to, but in relatively close proximity to the treatment segments).

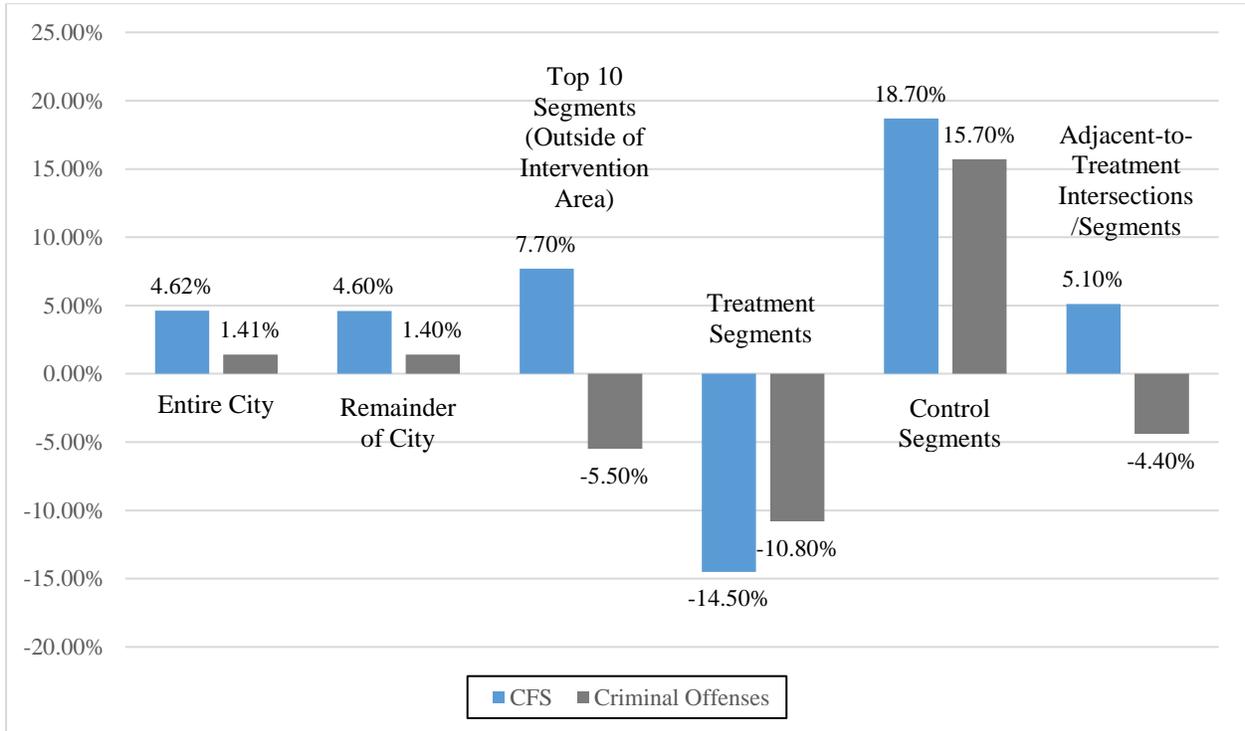
To enhance our counterfactual framework, we selected the ten highest street segments for all calls for service in 2018 that were outside of the chronically persistent high-crime areas. A series of paired sample t-tests on all outcomes indicated that calls for service increased by roughly 10% during our period of comparison; comparatively, the total crime counts in these areas declined by roughly 5%. None of the results were statistically significant, but the margins in these high-crime segments were worth noting.

Two key findings emerged from this set of analyses: 1) total crime and violent crime calls for service in the treatment hot spots declined above and beyond any of the changes experienced in the top-10 hot spots outside of the experimental areas; 2) only the control hot spots experienced any sort of increase in criminal offenses when compared to the rest of the city. Thus, there may be some lingering and very modest evidence of potential crime displacement (but not calls for service) to the control areas. We conclude that future police initiatives that focus heavily in specific crime hot spots should also examine displacement more broadly than simply examining crime changes in segments and intersections immediately adjacent to the treatment-segments. While the net effects of this study clearly demonstrate support for a moderate and significant treatment effect in the treatment areas, it is important to examine whether there are any measurable lingering changes to similar nearby segments that go untreated.

Third, following prior research on displacement and diffusion of crime control benefits, pre/post comparisons of the immediately adjacent street segments and immediate intersections that abut the treatment segments in each direction are conducted. Our findings illustrate crime did not displace around the corner – because there were non-significant changes in each of the outcomes in the immediately adjacent street segments to the treatment segments.

These combined sensitivity findings and the main results of the current study findings are graphically displayed in Figure 2 below.

Figure 2: Bivariate Percentage Change in Criminal Offenses and Calls for Service Comparing 11/17-04/18 Counts to 11/18-04/19 Counts across Different Geographic Units



DISCUSSION

The LVMPD hot spot policing experiment was designed specifically to be used in combination with other strategies to reduce violent crime, particularly gun- and gang-related violence. Specifically, the LVMPD engaged in a 6-month (Nov 1, 2018 to Apr 30, 2019) cluster randomized controlled trial of street segments receiving additional hot spots deployment (saturation patrols) and streets receiving patrol as usual. All potential street segments were identified from an analysis of persistent violent crime hot spots (where intensive police focus is paid by the violent crime unit officers since January of 2018). Researchers stratified highest risk and independent segments within chronic and persistent hot spot locations resulting in 22 treatment segments and 22 control segments selected to form the evaluation. No treatment-to-control selection was within a block or intersection of one another to reduce potential contamination of findings.

To deploy officers to the treatment hot spots, officers were deployed at random via calls for service every day, for a total of two hours of exposure at each hot spot. Officers were instructed to remain at the hot spot for a total of 15 minutes, which is the optimum time for deployment to achieve effects as identified by researchers (Koper, 1995). When reaching each hot spot, officers were also randomly instructed to either stay in their vehicle with the lights on or patrol the area on foot. The research design called for a total of 2 hours of saturation patrol (in randomly deployed 15-minute increments) each day.

Our interpretation of the findings of this study can best be summarized as follows:

- 1) LVMPD was highly compliant and committed to the desired dosage levels of intensive hot spots policing across the city. Roughly 55% of all units received 2 hours of dosage per day, on average, while over 90% of the hot spots received 1.5 hours of dosage per day, on average. The LVMPD district commanders and officers assigned to the hot spots worked diligently to achieve their desired level of patrol commitment.
- 2) We are confident that the treatment hot spots experienced statistically significant reductions in total crimes and calls for service during the experimental period. The most consistent reductions are seen in violence, and in particular violent crime calls for police service as well as suggestive evidence of a reduction in violent criminal offenses. There was also a more moderate and marginal reduction in property crimes during the intervention period.
- 3) We are moderately confident that crime did not displace in the immediate, abutting segments or intersections. Rather, the crime patterns and calls for service in these areas mirrored (to a lesser degree) the changes witnessed in the treatment areas. Combined the results suggest crime went down in the treatment areas, as well as (though less in terms of magnitude), in the areas immediately adjacent to the treatment areas.
- 4) There is some, though less clear and limited, evidence of minor displacement of crime and calls for service into the control street segments, which under the conditions of this

experiment were geographically proximate to the treatment areas. The treatment and control segments here were both bound to the broader chronically persistent high-crime areas (where specialized officers were tactically placed to address persistent crime problems as they emerge). It is possible that geographically close and similar street segments may experience some modest increases in crime during intense saturation periods since; in this case, the treatment-to-control assignment was not completely spatially independent. Thus, when additional saturation patrol is bound to very specific street segments, it is worth examining whether any changes in crime occur in very similar segments that are close (but not necessarily are immediately adjacent) to the treatment segments.

- 5) The types of treatment randomly assigned to the different treatment hot spots indicated a more sizable reduction in violence (in particular violent calls for service) for stationary patrol lights. There was also evidence of a more sizable reduction in property offenses where officers proactively walked the hot spot segments. While these findings about treatment type on specific outcomes is suggestive of some impact, low statistical power inhibits conclusive interpretation of these results. A more comprehensive conclusion to the treatment type findings requires more units of treatment (either over multiple ways of experimentation or across more diverse settings). However, the bivariate patterns seen in this study – showing stationary lights had greater reductions of violent crime, while walking patrol had greater reductions of property crime offenses – suggest further implementation and additional research in this area is indeed warranted.

Policy Implications

The results of this study were presented by members of the research team to the LVMPD command staff in November 2019. Several research and policy implications were discussed at this meeting. These issues are relevant for both LVMPD officials and the larger law enforcement field.

First, LVMPD officials sought to better understand the actual number of crimes reduced through additional saturation patrols. The underlying question is regarding return on investment: Are the resources needed to sustain additional patrols worth the amount of crime reduced? To answer this question, we examined the raw counts of both reported crimes and calls for service. First, examining the total number of combined offenses (violent and property offenses), a marginally statistically significant decline from 5.74 total offenses per hot spot, per month, to 4.43 total offenses per month, per hot spot was observed, or 188 fewer reported offenses in the treatment areas relative to the control areas over a six-month period (1.31 offenses x 24 hot spots x 6 months).

Likewise, examining the total number of combined calls for service (violent and property) showed a significant decline from 5.47 total calls for service to 3.93 total calls for service per hot spot, per month. This equates to 221 fewer calls for service in the treatment areas relative to the control areas during the 6-month experimental period (1.54 calls for service x 24 hot spots x 6 months). Within calls for service, the greatest impact was a reduction in violent crime calls for

service. The difference-in-difference estimate of the treatment hot spots relative to the controls equated to a decline from 3.47 violent calls for service to 2.20 violent calls for service, per hot spot, per month over the study period. On average this equated to roughly 186 fewer violent calls for service in the treatment hot spots (1.29×24 hot spots \times 6 months) relative to the control hot spots during the six-month period.

Given this information, LVMPD officials can begin to determine whether the return on investment demonstrated in reductions in reported crimes and calls for service are appropriate to engage in future hot spot policing interventions. While the personnel costs associated with hot spot policing interventions vary across agencies based on their deployment patterns (e.g., overtime versus straight-time deployment), the LVMPD redeployed pre-existing violent crime unit officers (who were already freed from answering calls for service) to conduct saturation patrols, therefore incurring no additional personnel costs. Rather the cost for LVMPD's implementation of hot spots policing is relative to the time officers deployed to hot spots were unavailable to do alternative work. It may be possible to conduct a rudimentary cost-benefit analysis that is based on a comparison to alternative deployment allocations for these violent crime unit officers. Without this additional information, it is a judgment call whether the 188 fewer criminal offenses and 221 fewer calls for service experienced during a 6-month period is worth the investment of approximately 8,400 hours of scheduled patrol.

Second, police officials questioned the long-term impact of saturation patrols. How long will the observed crime reductions continue once the additional deployment end? This is an important question – and one that can be answered – but additional time is needed before the research team can directly assess. Pending the availability of additional funding, a follow-up examination of crime patterns in Las Vegas will be conducted by the research team in May 2020, once a full year has passed since the conclusion of the experiment.

Third, there was a robust discussion regarding the possible reasons for the differential findings regarding the impact of the type of police deployment. Why did deployment of stationary vehicles with emergency lighting have a stronger impact on calls for service and reported violent crime incidents, while foot patrol had a larger impact on reported property crime? Police officials speculated on the possible reasons, but ultimately it remains unknown. Additional research would be especially valuable to determine if this finding is unique to these circumstances and context, or can be replicated again in Las Vegas, and also in other jurisdictions.

While these and other questions remain, some policy implications are clear. Deploying additional hot spot policing patrols at street segments identified through crime analysis as high risk for violent crime can have at least a short-term, significant reduction in: 1) calls for service for violent crime, 2) reported violent offenses, and 3) reported property offenses. Further, a threshold effect has not been found – indicating that additional patrols, above and beyond deployment already focused in hot spot areas, can result in additional reductions in crime. However, hot spots policing should be combined with other moderate and long-term violence reduction interventions to have the largest overall impact.

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