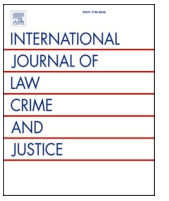
International Journal of Law, Crime and Justice 75 (2023) 100629

Contents lists available at ScienceDirect

International Journal of Law, Crime and Justice

journal homepage: www.elsevier.com/locate/ijlcj



Implementation issues with hot spot policing

Barak Ariel [a,b]

[a] Institute of Criminology, University of Cambridge, Sidgwick Ave, Cambridge, CB3 9DA, UK
[b] Institute of Criminology, Faculty of Law, The Hebrew University of Jerusalem Mt. Scopus, Jerusalem, 9190501, Israel

A B S T R A C T

Although the science behind hot spot policing is robust and grounded in theory, implementation issues prevent it from becoming commonplace in everyday policing. The mounting evidence suggests that "hot spot policing" (Sherman and Weisburd 1995) is rarely applied in police routines. The paper critically discusses three common problems with the implementation of this approach into policy: officers' motivation, organisational resistance, and technological failures. Two competing solutions are proposed to these endemic issues: instituting specialised hot spot policing units or outsourcing the job of 'cooling down' hot spots to alternative non-police entities, partially or wholly.

1. Introduction

The main argument of this paper is that while the theory and research on hot spot policing are equally strong, there are considerable implementation issues with this tactic. The available literature on these considerations is therefore reviewed; however, there are gaps in our understanding of the scope of these problems, and solutions are generally scant. Police scholars should therefore focus their efforts on identifying ways in which hot spot policing will be more sustainable.

With this aim in mind, the paper is structured in the following way: First, the hot spot policing hypothesis is laid out, with an emphasis on the types of tactics available for the police to implement within hot spots of crime – and, importantly, emphasising that they are not ubiquitously practised everywhere. While some forces may argue they are applying this approach, they often under-deliver enough dosage at the hotspots, concentrate their efforts outside the hotspots, and often target locations that are only temporarily afflicted by crime.

I then move on to the main text of this paper by reviewing why hot spot policing is not more commonplace in territorial policing efforts and highlighting three primary concerns: motivational, organisational, and technological issues. Since hot spot policing goes against the ethos of officers as "crime fighters", and since the police praise apprehension of offenders over prevention, it is challenging to get buy-in from constables for this approach. Furthermore, as the police struggle to allocate sufficient resources, along with the core issues with hot spot policing (treatment decay, displacement, and diminished returns), organisational problems ensue. Finally, issues with the accuracy and precision of the data hinder a more stable implementation of hot spot policing.

The paper concludes with two competing proposals for advancing hot spot policing: either institute specialised hot spot policing units or outsource the job, partially or entirely, to third parties.

E-mail address: ba285@cam.ac.uk.

https://doi.org/10.1016/j.ijlcj.2023.100629
Received 4 November 2022; Received in revised form 16 August 2023; Accepted 12 September 2023
Available online 28 September 2023

2. Hot spots policing in practice

2.1. The hot spot policing hypothesis

The concept of hot spots is a fairly robust feature in contemporary criminology. Crime is not randomly distributed across spatial units (e.g., unique addresses, street segments, polygons, or facilities) because there are certain features of the place that increase the propensity for a criminal event to occur (Eck and Weisburd 2015; Lee et al. 2017; Levin et al. 2017; Prieto Curiel et al., 2018; Steenbeek and Weisburd 2016; Weisburd 2015). Subsequently, some of the units experience a disproportionate bulk of crime because there is a juxtaposition of conditions at these units that is not present in other units, including the very features of the space (such as lighting [Welsh et al. 2022], CCTV [Welsh et al., 2020], the layout of the place [Lorenc et al., 2013], the number of people in the streets [Bogomolov et al., 2015]; or alcohol-prone places [Popova et al., 2009]), offenders-targets-guardianship dynamics at the spatio-temporal level (Delpech et al. 2021), or police presence (Dau et al., 2021). This broader ecological theorization of crime and delinquency has been a central feature of criminology since the Chicago School (see Eck and Weisburd 1995), but the focus on the "micro" is a paradigmatic shift that has helped to recalibrate existing theories in criminology, geography, sociology, and adjacent fields.

The existence of hot spots immediately translates into questions of crime control and "what works" to prevent potentially predicable criminal events [i]. If crime repeatedly takes place in a certain location, then criminal events are likely to repeat there, unless structural variations are made to the aforesaid features. Multiple place-based longitudinal studies show that certain places remain 'hot' over extensive periods of time (Andresen et al., 2017; Curman et al., 2015), whereas others are afflicted by crime for relatively shorter periods of time (e.g., Mohler et al., 2015). Thus, the police and their partners can apply an evidence-based approach to predicting the likelihood of crime at certain places and then target these places with preventative initiatives.

This hypothesis was first tested in the seminal experiment by Sherman and Weisburd (1995) on the effectiveness of hot spot policing as a tactic for reducing crime and disorder, which provided the impetus for an impressive scholastic enterprise on this approach. Braga et al. (2019) have unearthed dozens of rigorous quasi-experiments and different variations of randomised controlled trials in their meta-analysis of the available evidence, and the list continuously grows. Overall, there is reliable evidence that supports the overall proposition of effectiveness, which has led the US National Academies of Sciences, Engineering, and Medicine (2018) to conclude that hotpot policing is one of the most robust and evidence-led proactive interventions available to the police.

2.2. The many faces of hot spots policing

Cooling down hot spots of crime and delinquency can take many forms and attempts to deal with a variety of crimes. The way in which hot spot policing is practised depends on its aims, resources, police cultures, style of delivery, and normative customs. However, broadly speaking, the evidence compartmentalises this tactic into two broad approaches (although they are not mutually exclusive, as argued below). Whereas some research has focused on a saturated visible presence of police officers within the designated microplace, other experiments have included problem-oriented policing, neighbourhood policing, or other proactive policing initiatives (Ariel et al. 2016; Braga 2001; Braga and Weisburd 2010; Eck, 2015; Groff et al., 2015; Haberman 2015; Ratcliffe et al., 2011; Santos and Santos 2015a,b; Santos and Santos 2016; Sherman and Weisburd 1995; Taylor et al. 2011; see meta-analysis of the evidence in Braga et al., 2019).

Studies have suggested that some strategies at hot spots have led to larger effects than others because, as Groff et al. (2016:23) show, "what police do at hot spots matters." For example, Braga and Bond (2008) found that situational crime prevention strategies had the greatest impacts, while Taylor et al. (2011) suggested that problem-oriented policing has the largest effect at hot spots of violent crime relative to directed-saturation patrol (although due to statistical power considerations, given an overall sample size of 83 hot spots and interventions tested within a period of 90 days, there are limits to the generalisation of their finding). A similar outcome was recently presented by Itskovich et al. (2023), who found that dosage (i.e., increased visibility alone) is a necessary but insufficient ingredient in effective hot spot policing, with the effect of the intervention largely borne out of problem-oriented policing rather than presence alone.

On the other hand, there are unresolvable epistemological, practical, and methodological issues with "the many faces" of hot spot policing. First, it is not at all clear what problem-oriented policing means, as this term can encompass nearly all policing activities. Eck and Spelman (1987; see also Goldstein 1979) advocated that police should concentrate more on the causes of crime as opposed to simply responding to crime by applying the SARA model (scanning [identification of recurring problems], analysis [researching the problem], response (customised strategy design), and evaluation (evaluation of response effectiveness). However, under this prism, police presence can be construed as a cost-effective problem-solving response to crime in hot spots, at least in the short run, which therefore means that saturated policing is part and parcel of this approach as well. Similarly, problem-oriented policing promotes collaboration with community members, local organisations, and public agencies to resolve broader social problems that contribute to criminal activity, but teleologically speaking, saturation of police presence at the hot spots can nevertheless remain the desired outcome of such community and third-party consultations. Therefore, the two approaches are not mutually exclusive of each other.

A proposed advantage of problem-oriented policing is that it can lead to more sustainable solutions and improved police-community relations. This is logical, if indeed this approach is able to remove the causes of the crime problem. However, the evidence on the long-term effects of hot spots policing that utilises this approach, or at the level of the community, is presently scant, with only one study based on interrupted time series analyses in a small city in the United States (Koper et al., 2021) and another uncontrolled evaluation of the hot spots policing programme in Montevideo (Chainey and Estévez-Soto, 2022; on long-term effects, see

also Sutherland et al., 2017). This implies that problem solving does not "solve" - i.e., stop - crime, but rather may be more effective in unearthing and then managing crime problems; whether this approach is systematically cost-effective, efficient, or extendable as a comprehensive solution to crime in places is presently unknown.

Finally, it becomes intellectually and practically challenging to identify the ingredients of the "problems" and the "solutions" that are linked to successful problem-oriented hot spot policing initiatives (see also Braga 2010). Consider the recent contribution by Hasisi et al. (2022) on an integrative approach that has led to a reduction in stone-throwing in East Jerusalem by teenage boys. The treatment was "derived from the principles of problem-oriented policing, which involves identifying and analysing a crime and disorder problem to develop an appropriate response […] by incorporating four major policing strategies under proactive policing: problem-oriented policing, place-based policing, person-focused policing, and community-oriented policing" (p. 387). Indeed, effective crime control solutions require multiple interventions to deal with complex issues, but what problem did the aforementioned integrative "wall of treatments" encounter? What is the relative effect of each stimulus on a reduction in stone-throwing? Would a similar effect be detected through only one of the four proactive policing initiatives? Can this multiagency and systemic intervention be replicated across other hot spots with sufficient mimicry to maintain its internal consistency and be considered the same treatment? It is close to impossible to answer these quantitative queries, even though they are pertinent for cost-effective solutions in policing. While the end result of this smorgasbord of treatments is effective and provides crucial insight on "what works" to deal with political offences, the underlying efficacy of it is unclear (espcially if the hot spot has multiple crime problems).

To clarify, proponents of problem-oriented policing contend that the SARA model, along with other similar models, is commonly employed. These models are considered to be relatively uncomplicated and can be easily taught to individuals tasked with their execution. Law enforcement officers are trained in the identification of highly specific issues, conducting thorough analyses to uncover root causes, and conducting comprehensive searches for response options that effectively address these causes. However, it is important to note that these response options extend beyond traditional law enforcement measures. Problem Oriented Policing in hot spots lies in its ability to elicit a diverse range of responses and involve various stakeholders, contributing to the pursuit of an optimal solution for achieving sustainable crime reduction—but implementation of SARA, strategically and in certain places,can pose challenges due to cultural, organisational, and various other barriers within the police system.

3. Hot spot policing is not a commonplace feature of contemporary policing: why?

Hot spot policing is not quite a ubiquitous tactic in policing. Territorial policing—the placement of police officers on the streets—has, of course, been a fundamental feature of policing for nearly 200 years since the invention of the modern police department by Sir Robert Peele in London (Reiner 2010). When officers are on duty, they are either responding to calls for service or proactively engaging with members of the public (activities that can be categorised as "on-view", "self-initiated activity", "command directed", and "investigative or intelligence bulletin/broadcast", etc.). These engagements all have a spatial attribute, and officers are routinely assigned patrol duties to either designated macrobeats, microbeats, or specific addresses that have been, or are likely to be, afflicted by crime or criminals. They may prioritise certain places over others or follow recent data trends in the places they attend.

However, these functions are not exactly 'hot spot policing' in the form that was originally prescribed (Sherman and Weisburd 1995), and these are not the common features of virtually all hot spot policing experiments. Broadly speaking, across all hot spot policing approaches, there are three fundamental implementation features: (a) spatiotemporal identification of small areas afflicted by a disproportionate amount of crime; (b) application of policing resources in public places with the aim of preventing crime or solving crime problems; and (c) rotation of officers between identified hot spots to maximise efficiency. Yet there are at least three distinctions between these ingredients of the scientific approach to hot spot policing and broader territorial policing tactics which are far more common.

3.1. *Under-delivery of sufficient dosage*

Officers rarely stay within 'proper' hot spots long enough for their presence to be deemed 'hot spot policing'. As police officers in Trinidad and Tobago termed it (Port of Spain Police Station, n.d.), hot spot routines are 'woosh woosh policing': driving or walking

Table 1
Northern Ireland hot spots experiment: Assigned versus delivered patrols, based on GPS trackers (in minutes).

Hot Spot Location	Assigned Patrol Targets	Delivered Patrols			
		Friday Night 1	Saturday Night 2	Friday Night 3	Saturday Night 4
Malone Road	225	5.25	6.57	10.17	1.38
Blackstaff Square	75	7.28	16.29	21.16	64.16
The Odyssey Complex	75	0.00	0.00	0.00	3.03
Botanic Avenue	225	87.09	67.43	39.43	14.50
Donegall Place	225	122.22	16.50	11.53	84.08
Tomb Street	75	2.31	0.47	1.16	0.34
Patterson's Place	75	8.05	88.24	85.48	68.49
Skipper Street	225	11.41	9.47	33.17	6.00
Ann Street	75	35.57	4.55	6.34	5.05
Dublin Road	225	6.49	9.07	14.23	10.42

quickly through hot spots of crime for very brief moments, which are much shorter than the common recommended practise of 15-min patrols (Koper 1995; Telep et al. 2014). Outside experimental settings, officers do not spend sufficient time for a deterrence effect to materialise (Hutt et al., 2018: Fig. 2; Sorg et al., 2014).

In one experiment on the effect of a police presence in night-time economy hot spots in Northern Ireland (Goddard and Ariel 2014), police officers were equipped with GPS trackers and tasked with doing nothing but staying within a high-crime hot spot during the hottest hours of crime for that hot spot. These were clearly demarcated places: nightclubs, pubs, and large congregations outside these facilities. The first three weeks of the implementation are shown in Table 1 below, where it can be noted that the officers rarely spent time within the hot spots as prescribed. Similarly, the Bedfordshire Police assigned patrols to crime hot spots (Bland et al., 2021); however, GPS trackers on the officers showed that they were only able to deliver 50% of the allocated patrol time. This under delivery appears to be a common story (e.g., Barnes et al., 2020).

3.2. Hot spot policing delivered outside hot spots

Several studies have shown that what police officers identify as hot spots are, in fact, not places disproportionally affected by crime for extended periods of time (e.g., Chainey et al., 2021; Ilijazi et al., 2019; Macbeth and Ariel 2019; McLaughlin et al., 2007; Porter et al., 2020; Ratcliffe and McCullagh 2001; Sutherland and Mueller-Johnson 2019). Officers asked to draw hot spot maps are often wrong with respect to their location based on aggregated crime data (cf. Bichler and Gaines, 2005). Importantly, officers are unwilling to rely on the geographic information system (GIS) department for guidance (Telep et al., 2014; Telep 2017) and prefer to use their own professional discretion (e.g., Jonathan-Zamir et al., 2022).

Furthermore, whereas Weisburd et al. (2012) and others view hot spots as street segments or city blocks, the hot spot polygons GIS units prepare for proactive patrols or that are actively chosen by frontline officers are much larger, often covering dozens of streets or entire roads (see the recent study by Wheeler and Reuter 2021). While the evidence generally goes against it (Eck and Maguire 2005; Weisburd 2021), police officers prefer random patrol tactics. They may assume they are patrolling hot spots, as some sections of a neighbourhood are deemed more criminogenic than others; however, this approach misses the point, as crime is concentrated in much smaller spatial units, and while some of the time might be spent in 'real' hot spots, cool spots are patrolled as well, thus reducing the efficiency offered by proper hot spot policing.

3.3. Moving targets

A genuine hot spot is stable, often for many years. Although some literature has described the 'dynamic', 'fluid," or "temporary" nature of some hot spots (Johnson and Bowers 2008) or 'temporary' nature of some hot spots (Gorr et al., 2017), I prefer to focus on the stable hot spots. The theoretical mechanism of a hot spot is the 'coupling' of crime and the socioecological features of the place: social disorganisation, design attributes, increased opportunities with limited capable guardianship, etc. (Weisburd 2018). These characteristics are consistent, if not constant, as offending is causally linked to places due to these features rather than pure opportunity (Nagin et al. 2015). However, dynamic hot spots do not maintain these special characteristics (Leigh et al., 2019), which is why some the locations are 'hot' for a relatively short period of time—up to a few days—and then evaporate only to appear elsewhere, thus making them difficult to track and subsequently cool down (Haberman and Ratcliffe 2012; Mohler et al., 2015; Short et al., 2010; Zipkin et al., 2014). Furthermore, when police departments look at short periods of time, what they consider 'hot spots' lack statistical power with low base rates, and therefore when creating hot spots for the purpose of evaluation, the designated areas are drawn too large (see Bland et al., 2021). Policing initiatives against these appearing-disappearing-reappearing trends, for example, identifying and then targeting the active offenders responsible for the recent trend or placing a continuous police presence throughout the crime wave, are different from hot spot policing. Thus, while Weisburd et al. (2004) have found in Seattle stability in crime hot spots over an extended period of time, the police do not commonly patrol these areas (see for example Macbeth and Ariel 2019).

Identification of stable hot spots also helps police deal with the recency bias—the constant chase after the most recent trends in crime data, such as a spree of robberies or a fresh wave of violence (including political violence). We are not contesting police intervention in crime waves, as the public expects the police to deal with these scenarios diligently (Huey 2010). However, the most recent crime is often not spatially grounded (as the waves tend to eventually regress to the mean), whereas accrued harm in hot spots has inherent fundamental spatial and long-term attributes; therefore, the two require different policing approaches.

4. What prevents hot spots policing from becoming more common?

There are at least three primary concerns that place strains on hot spot policing and prevent the concept from materialising more generally, and they are centred on implementation problems: motivational, organisational, and technological. The concern with police implementation is not new (see Butler 1984), although the body of empirical research that focuses on fidelity in policing is relatively limited (Sherman, 2013). The literature is largely based on case studies rather than systematic assessments of programme implementation, let alone explicit contexts in which the implementation of hot spot policing is more probable. We call for more research in this space.

4.1. Motivational issues

From the little evidence that does exist, it seems that police officers who are assigned to conduct hot spot policing simply do not like

it (Ariel et al., 2020a,b; Wain et al., 2017; see review in Granholm Valmari et al., 2022). In the United Kingdom, officers were found to hold a cynical view of hot spot policing (Wain and Ariel 2014), as they do regarding new initiatives (Tankebe and Ariel 2016). In the United States, there have been mixed findings on the 'popularity' or application of hot spot policing, but some have shown negativity towards this approach. Telep (2017, Table 1) reported that more than half of police officers do not think hot spot policing is an effective strategy (73% had never heard of 'evidence-based policing'), and Telep and Lum (2014, Table 4) showed that officers will generally not use (or plan to use) materials produced by crime analysts, which is the most fundamental step in hot spot policing (i.e., identifying the hot spots). Several sources for this lack of motivation to conduct hot spot policing can be considered.

4.1.1. Hot spot policing goes against officers' mentality as crime fighters

Hot spot policing is largely a preventative approach. Police officers tasked with 'cooling down' hot spots of crime and disorder are strategically positioned in hot spots to prevent offending rather than to pursue offenders in an active manner. While there is likely consensus that prevention is the most cost-effective and 'right' thing to do about crime, a preventative approach undermines the fundamental ethos held by many police officers: "I am a crime fighter'. As effective as it may be in deterring offenders, being stripped of the power of discretion (see Miller 2014) and instead standing idle or sitting still inside a parked police vehicle in the hot spot does not sit squarely with this mentality.

4.1.2. Successful prevention goes unrecognised

As far as I am aware, police departments rarely celebrate successful prevention,[1] whereas praise for successful arrests, unusual seizures, or bravery in the line of fire is a cultural institution within law enforcement (e.g., Porter 2018). The success of hot spot policing is measured not by the number of criminals brought to justice but rather by the number of incidents prevented. Yet promotion boards, decision-makers, and the public are interested in police officers who 'do their job' by bringing people to justice (Karp and Stenmark 2011; Kiely and Peek 2002). Being a sentinel, rather than Rambo, is not part of this code, and prevention often goes un-celebrated. Therefore, the culture of policing (including the executive team's willingness to direct prevention) may be resistant to a paradigmatic shift in which outcomes are not measured by more criminals behind bars but by fewer crimes in hot spots (Sherman 2011). In such circumstances, it is not surprising that officers would resist hot spot policing (Goddard and Ariel 2014). They are not rewarded at the institutional or social level for crime prevention.

Just as importantly, officers may lack a perception of the benefits of prevention because they cannot see or feel them. An officer conducting a stop-and-search that leads to the discovery of an illegal firearm and the arrest of a wanted violent offender is likely to feel pride and satisfaction. Stopping a robbery in progress is a high-intensity event. Yet if the same officer stands in a hot spot long enough for a potential offender to take notice, they may be deterred from carrying an illegal firearm or committing a robbery in the first place. The latter consequences are more desirable; however, the officer will not have experiential evidence of this success and therefore will not have a certain level or type of feeling, let alone the 'rush' that comes from interacting with dangerous criminals (see Hickman et al., 2011).

Directly linked to the lack of 'action' that would demotivate an officer from spending the full 15 'Koper minutes' within the hot spot is the level of 'heat' generated by the hot spot. Consider some of the experiments conducted and the threshold used as an inclusion criterion: 36, 20, or even two crimes per year (see Ariel et al. 2020). Even in a relatively hot spot with 50 crimes per year—approximately one crime per week—the likelihood of an officer encountering criminal elements in the 15 min they are tasked to be present in the hot spot is very low. In such circumstances, when there is very little crime to detect and possibly no other humans to interact with at all during the tour of the hot spot, it is unsurprising why officers may find the task boring and unsatisfying.

4.2. Organisational issues

There are institutional problems that prevent frontline officers from performing their hot spot policing tours of duty, all of which create a genuine strain on the organisation: downsized resources, treatment decay, displacement, and diminished returns.

4.2.1. Reduced resources

The main issue is a lack of resources to do anything proactive, which limits policing to reacting to emergency calls for service. Some studies have considered the use of 'unallocated time' for hot spot policing (Weisburd 2018:5); however, such unallocated time rarely exists in policing today, at least in major metropolises (Winchester 2020). Unallocated time for prevention initiatives is seen as a luxury many departments cannot afford, especially given the recent austerity measures undertaken by contemporary law enforcement agencies (Pearson-Goff and Herrington 2014), the recent wave of police resignations, and the difficulty of recruiting enough officers to fill vacancies (see Morrow et al., 2019).

Of course, the absolute number of officers itself is not as crucial as what the police do with their resources (Eck and MaGuire 2005). However, police cannot 'do more with less' (Bell 2015), and local and strategic commanders have frequently mentioned the strain they experience because of limited resources. The sheer increase in call volume is overwhelming (www.bbc.co.uk/news/uk-wales-58491004) without an equivalent increase in officers (www.statista.com/statistics/864928/officer-numbers-of-the-metropolitan-police/). With the number of incidents on the rise and counterterrorism, civil protests, VIP protection, and once extraordinary but

[1] Academics do acknowledge this type of contribution when practitioners collaborate with researchers, such as in the CEBCP hall of fame, the Policing Division of the American Society of Criminology, and the Cambridge Evidence-Based Policing Annual Conference.

now standard 'jobs' taking up officers' time, proactive prevention measures, such as hot spot policing, represent the first type of police work to be removed.

Directly related to resourcing is the fact that while fewer than 5% of places may account for about half the crime in any city (Weisburd 2015) and fewer than 5% of the most harmful 'harm spots' may account for as much as 80% of the reported harm (Norton et al., 2018; Weinborn et al., 2017), in mid-to large-size police departments, these ratios can accumulate into many hundreds of microspots that require police intervention. Considering the time it takes to travel between these hundreds of polygons and the requirement to visit each hot spot at least once every shift for an optimal number of minutes of police presence (Basford et al., 2021), a policy of reasonable attention to all hot spots is clearly challenging (Santos and Santos, 2015a,b).

4.2.2. Decay

Regardless of how effective hot spot policing may be, it has not been shown to be a panacea for crime (saturated police presence or problem-oriented policing). Soon after the officers leave the hot spot, in a matter of hours or days, the criminogenic attributes preside again, and crime reverts to the same level as the baseline. This 'deterrence decay' (Sherman 1990) is a concern because it suggests that the police cannot 'solve' the crime problem through hot spot policing operations unless the socio-physical attributes of the place that attracted crime in the first place are changed or they keep on going at it without end.

4.2.3. Displacement

A known issue is the possibility of crime 'moving around the corner' or to more distant areas once police officers target the hot spot. This criticism is logical, and we should not expect that proactive activities at the hot spot would make hardened offenders change their criminal lifestyle entirely. When it is too risky to commit a crime in a public place, offenders are likely to seek alternatives. However, and quite interestingly, we identify the diffusion of the benefits of social control (Clarke and Weisburd, 2004) in lieu of the displacement of crime to adjacent special units. Much of the evidence thus far has shown that, while this special displacement can take place, it is often limited and does not amount to a full spatial transition of all the crime that existed within the hot spot to other locations. A drug dealer whose business is interrupted by a police presence may have to limit their commerce by a non-negligible degree after moving the business elsewhere; violence may be curtailed, as not all fights that would ordinarily take place in the hot spot (e.g., in the vicinity of a night-time economy facility) will occur elsewhere.

However, the literature acknowledges other, non-spatial types of displacement. Twenty years ago, Bowers and Johnson (2003) taxonomized six types of crime displacement: temporal displacement, tactical displacement, target displacement, crime type displacement, spatial displacement, and perpetrator displacement (see also Eck 1993). In practise, these displacement types suggest that offenders may be quick to learn when the officers are and are not present in the hot spot, what precisely they do in these places, and who they are after, and recalculate the risk of apprehension accordingly (Ariel and Partridge 2017). Subsequently, they adjust their behaviour to dodge apprehension and continue committing crimes. Seasoned offenders collect countersurveillance intelligence just as well (if not better) than law enforcement agents, and they are likely to calibrate their operations accordingly.

The immediate implication is the need to acknowledge that treatment estimates of hot spot policing are exaggerating the potency of hot spot policing interventions as the spatial, geographical, and operational boundaries of this approach go beyond the imaginary spatiotemporal lines we draw around hot spots (Guerette and Bowers, 2009; Rosenbaum 2006). As crime is like any business that adapts in the face of adversity, drug dealers, gang members, robbers, and thieves are likely to modify the ways in which they commit crimes rather than simply 'moving it around the corner' (Weisburd et al., 2006). Open street drug dealing and prostitution are clear examples. These crime types are transitioning from the public domain to the 'dark web' and 'home delivery' services or parlours rather than the risky out-in-the-open public space (Middleton 2020; Leukfeldt and Roks 2021).

The challenge is that much of our academic enterprise on hot spot policing does not consider the human condition and makes assumptions about the effect of the intervention rather than gathering evidence on what the offenders themselves think or do. We assume that offenders are affected by hot spot policing, but we do not know the extent to which the impact has reduced crime or whether it has simply made it more difficult to observe with our spatial instruments. Spatial displacement is one of multiple ways in which offenders adapt to the new environment once police attempt to disrupt their business, and police data ar unlikely to reflect that.

4.2.4. Diminished returns

As far as we can tell, hot spot policing leads to a modest reduction in crime relative to control conditions (Braga et al., 2019). Although this finding is statistically significant, i.e., it is not the result of chance alone, the magnitude of the difference may limit the willingness of the police organisation to apply hot spot policing as a business-as-usual model. Notwithstanding recent advances in agent-based modelling (Weisburd et al., 2017), let us assume that the police would be willing to engage with the hot spots that produce 50% of the crime, or about 5% of all street segments with at least one crime in a period of 12 months (Sherman et al., 1989). Should that department succeed in reducing crime to the levels suggested in the synthesised meta-analysis (Braga et al., 2019), it should expect to reduce crime by approximately 13% (or only robbery at 11.7%; see Weisburd et al., 2017). However, this reduction is only attributable to crimes affected by the presence of the police, and any indoor offence, computer-enabled crime, fraud, rape, white-collar offence, domestic abuse, breaches of orders, neighbour disputes, and other crime types that are unlikely to be reduced through visible hot spot policing. Therefore, the total effect of hot spot policing is more conservative than 13%.

These individual studies mirror what Braga et al. (2019) found in their review of the evidence: Problem-solving strategies at hot spots had the largest impacts, which leads to the conclusion that if police want to maximise the benefits of hot spot policing, they should prioritise certain tactics rather than simply increasing patrol in small, high-crime areas (or even larger areas, as a recent re-analysis of the Kansas City Preventative Patrol Experiment has shown (Weisburd et al., 2023). However, the implementation of

more cost-effective interventions like problem-oriented policing within hot spots requires consideration and organisational commitment.

5. Technological issues

5.1. Crime location accuracy

Another family of issues concerns the lack of precision and accuracy of police GIS systems in terms of both the recorded crime as well as the location of patrolling officers. Sherman (2022) referred to both as elements of 'tracking', and they are equally crucial. Insofar as crime addresses are concerned, police records are often inaccurate when it comes to the location of crimes taking place in the public domain. Victims whose wallets or purses are stolen on a mass transit system will seldom know the precise location or time of the incident, and the police are likely to record the station where the victim disembarked, the end-of-line station, or the victim's home address. Victims of violence may report their incident from a recognisable address, such as a fast-food restaurant, whereas the assault may have occurred on a less identifiable city block. These inaccuracies may not matter much for police practise because the exact spatiotemporal coordinates of the criminal event are not an essential requirement for a 'successful' case. The dispatched unit will be able to conduct an initial investigation, gather testimonies or CIS evidence, or make arrests, even if the recorded incident is not precise. However, unless the coordinates are subsequently corrected, which is often not the case, they create misleading spatial estimates of the hot spots (see Koper 2014). The result would be the drawing of inaccurate historical maps and the inefficient utilisation of police resources.

5.2. Precision of measurements of police outputs

Moreover, and possibly more concerning, is the fact that the historical spatiotemporal reading of police officers' whereabouts is often unrecorded, inaccurate or imprecise. In terms of hot spots policing, these devices can be used to geofence the hot spot and count the number of pings generated from within and outside the hot spot (e.g., Ariel, Weinborn and Sherman 2017), thus providing a relatively robust and accurate output measure of dosage. However, these are not available in most contemporary police departments (e.g., see de Brito and Ariel 2017). Although police vehicles are equipped with sophisticated AVLS tracking systems, foot patrols are often untracked, and when such devices are available, they are often set to ping every several minutes, rather than more frequently (to save on the battery life of the GPS tracker), which could lead to an undercount of the patrol in the hot spot. This is one reason we do not have valid causal estimates on the dose–response relationship (however, cf. Koper 1995; Williams and Coupe 2017; see also an alternative using calls for service data in Wu and Lum 2017).

Therefore, I concur with Sherman et al. (2014) that a necessary step in implementing interventions that 'work' is to track the ways in which the police 'police'. Until we have sufficiently valid dosage measures (not to mention how exactly policing is delivered), the mechanisms of practical hot spots policing will be akin to a 'black box' (Haberman 2016; Rosenbaum 2007). Pending these measures which are deemed critical to law enforcement, we will not be able to estimate the application of hot spots policing. To stress, however, a 'better' investment in tracking technologies – both in data acquisition, collation and analysis is not enough. We need algorithms to understand GPS tracking data, and proper dashboards to parse them to street commanders (Bland 2020).

In part, officers are not tracked because there is no operational reason for recording officers' movements in space, other than for immediate tactical deployment (i.e. dispatching the police patrol closest to a crime that has just occurred/been reported) and for health and safety considerations (i.e. to account for all officers out in the field). However, there is every reason to collate this information for strategic and long-term purposes (see Sherman 2022). Are police supervisors directing over- or under-policing to certain risky facilities (see Famega et al., 2005)? Do hot spots require more visits or more time spent by the officers within the hot spot (see Mitchell 2017; Williams and Coupe 2017)? Did officers spend any time at all in the hot spot? What spatial and temporal residual deterrence exists after officers have left the hot spot (see Koper, Taylor and Woods 2013)? These pertinent questions are fundamental (Haberman 2016), and we have yet to obtain direct, let alone, experimental evidence, on these patterns. Therefore, future research should invest in collecting valid and reliable output measures as a priority.

6. Discussion

This paper does not aim to debunk the hot spots policing approach; in fact, its purpose is quite the opposite. Hot spot policing remains one of the most robust approaches to crime prevention we have (Weisburd et al., 2019), supported by a large body of rich and diverse evidence. The rationale for cooling down places disproportionally afflicted by harm entirely justifies the investment, and police departments are encouraged to consider implementing hot spot policing as much as possible in a consistent and continuous manner.

At the same time, the implementation of hot spot policing with a 'system-level' impact (Nagin and Sampson, 2019) is challenging. The motivational, organisational, and institutional barriers require further attention. If police officers are unable to deliver hot spot policing reliably and with a sufficient dosage or are unwilling to accept prevention as a primary objective, they will continue to underdeliver. A data-driven operation needs accurate, reliable, and precise data, or else the end-user, i.e., the very constables tasked with preventing crime problems, will be frustrated and eventually disinterested (Wain et al., 2017). If the agency cannot commit to the continuous deployment of officers to the hot spots, regardless of the type of intervention applied, the theory will not materialise, no matter how vigorous the research evidence is.

How can we overcome the implementation barriers in order to maximise the potential benefits of hot spot policing? I offer two

conflicting solutions: institutionalisation of a hot spot policing division or outsourcing hot spot policing to third-party agencies.

6.1. *Ring-fence hot spots policing teams instead of a "hot spot policing operation"*

The studies reviewed above have usually been tied to a research project and, by implication, to a special operation within the participating police department ("Operation Savvy," "Operation Beck," "Operation Rowan," etc.). By definition, police operations are constrained in time, and the transition into business as usual is challenging (see more broadly, Grover et al., 1995). On the other hand, the creation of a dedicated hot spot policing unit within the police force signifies an official commitment to the strategy, thereby enhancing its stability.

The debate over specialised versus generalised policing units is not new, and scholars have raised convincing arguments in favour of the niche expertise rather than an all-in-one approach in policing (e.g., Greene et al., 1994; Moore and Trojanowicz, 1988; Namgung 2018). In contrast to policies that are largely at the mercy of changing command personnel and shifting political winds, a division that has been formally established has inherent continuity. It is a component of the department's structure that is difficult to eliminate or disregard. This structural change may also improve the professional stability and morale of officers assigned to this division, given that their positions are less likely to be eliminated suddenly—for example, when a new chief or commander takes office (Isenberg 2017).

In many police departments, resource allocation is typically determined by a combination of political, social, and managerial factors, which frequently results in inconsistent and ad hoc crime prevention strategies. Establishing a specialised division for hot spot policing is likely to result in a more organised and resilient approach. Independent of fleeting departmental agendas, this division can be designed to support long-term operations. It can invest in extensive research and comprehension of the specific hot spots, their histories, and criminal activity patterns. This increases the likelihood of positive outcomes and community trust by resulting in more informed and targeted interventions.

6.1.1. *Concentration on successful strategies and officer buy-in*

A specialised hot spot unit enables more concentrated and effective training on tested strategies for reducing crime in hot spots. This includes strategies for targeted deterrence, problem-oriented policing, and community engagement. Officers in this division may develop a stronger belief in the efficacy of hot spot policing if they receive consistent, specialised training and a clear mandate. By seeing the tangible results of their efforts, officers are more likely to feel invested and committed to the division's objectives, boosting officer morale and the unit's overall effectiveness (see more broadly in Bradford and Quinton 2014; Ratcliffe and McCullagh 2001).

A dedicated hot spot unit can result in a more efficient allocation of police resources to the most successful interventions than a generalised territorial policing unit can make. Rather than diverting officers with general patrol responsibilities to hot spots that may be outside their normal area of operations or expertise, a specialised unit can streamline operations for which they were routinely trained to perform. This allows the remainder of the police force to continue performing their normal duties without interruption.

In this respect—and given the aforementioned "Rambo" mentality that many police officers share—there is a pressing requirement to recruit officers who possess distinct mindsets and skillsets, particularly for the purpose of conducting hot spots policing. This is principally crucial if there is an intention to prioritise community relations and effectively address the identification, analysis, and resolution of problems. In addition to recognising the necessity for modifications or expansions in police academy training to encompass skills beyond protocol and officer safety, it is also probable that salary increments will be required to attract applicants with higher levels of education and skill who aspire to be proactive problem solvers rather than adopting a "crime fighter" mentality. Finally, with regards to organisational aspects, it is suggested that agencies should place greater emphasis on acknowledging and advancing officers who demonstrate exceptional abilities in problem-solving, community relations, and other endeavours aimed at mitigating perceptions that these activities are not integral to authentic police work.

6.1.2. *Improved access to technological advancements*

The specialised hot spot unit provides a platform for utilising technological innovations more effectively than standard police forces. This is due to the specialised nature of their duties, their specialised training, and the unique challenges and opportunities posed by hot spot policing.

First, a specialised hot spot unit can be trained to use cutting-edge technology for crime prevention and investigation. As managing hot spots is their primary responsibility, they are more likely to become experts in the relevant technology. This includes surveillance technologies such as CCTV and drones, as well as analytics software that can predict crime patterns and identify suspects. With a broader range of responsibilities, general police forces may not have the time or resources to develop the same level of expertise.

Due to their specialised focus, a hot spot unit may also be able to adapt to technological changes more quickly. If a new tool or technique that can aid in hot spot policing becomes available, such a unit could potentially learn, adapt, and deploy it more effectively than a general police force that must juggle multiple responsibilities and training needs. In a similar way, the unit can employ emerging big data and analytics to identify crime patterns and anticipate future hot spots. A specialised unit would therefore be optimally positioned to utilise these technologies because they can collaborate closely with bespoke data analysts, contribute their field knowledge to data interpretation, and use the resulting insights to inform their strategies and tactics (on police functional adaptations, see Johnson et al., 2020).

Finally, with a clear mandate and dedicated resources, a hot spot unit could be better positioned to invest in innovative solutions to the problems they face. This may involve collaborating with technology companies to develop or tailor technology to their specific requirements, participating in pilot projects for new technology solutions, or conducting their own research and development. The specialised nature of a hot spot unit enables it to integrate multiple technologies into a coherent system more effectively. They may use

predictive analytics to identify potential hot spots, surveillance technology to monitor these areas, and communication technology to coordinate rapid responses to incidents much more aggressively than if these capabilities were routinely shared with the general patrol department.

6.1.3. Community engagement and trust

A specialised hot spot unit can work to strengthen its relationships with the communities it serves. The consistent presence of the same unit fosters familiarity, which can lead to increased community cooperation and trust. This, in turn, may aid in the prevention of crimes before they occur and the collection of useful information for the resolution of ongoing cases (Bottoms and Tankebe 2012).

6.1.4. Development of expertise and accountability

A specialised hot spot unit permits the development of in-depth expertise in managing hot spots and comprehending the complex factors that contribute to the high crime rates in these areas. Furthermore, having a specific unit accountable for the outcomes of hot spot policing could also lead to increased transparency and a culture of continuous improvement, as the unit's performance could be measured and strategies could be refined based on data and feedback.

6.2. Partial or wholesale outsourcing of the delivery of hot spots policing

The idea of using 'third party' capable guardians such as private security in lieu of constables is not new and is now supplemented through the use of 'technical' capable guardians such as CCTV and signage, as a way to bring even further efficiencies. Therefore, at least one system-level change would involve the consideration of alternatives to police officers to cool down hot spots. Evidence exists that other institutions can complement the police, at least in terms of a highly visible and saturated presence of capable guardians, for example, security guards (Ariel et al. 2017), police community support officers (PCSOs; see Ariel et al. 2016), or 'special constables' (Badesha, 2022) with limited powers of arrest. In some public areas, such as shopping centres, large event arenas, public transportation, and residential estates, security personnel are therefore a promising alternative.

6.2.1. Partial outsourcing

Assigning more responsibility for crime prevention in high-crime areas to other agencies has been extensively studied and shows, overall, supportive evidence. Situated largely in situational crime prevention efforts, place managers in hot spots are particularly promising (see Eck et al., 2023). The police can have a primary role in facilitating these efforts through police-community partnerships, collaboration with other local agencies to improve surveillance and security on public property, etc. One clear example is the use of police data to drive third-party efforts to the appropriate locations, as police records are likely to be the most valid and reliable national database of crime locations (Ariel and Bland 2019).

This proposal is not just practical; it is motivated by the leading theory behind hot spot policing: deterrence. If offenders are sensitive to environmental cues when deciding to commit an offence, then a highly visible security guard could serve as a threat (see review in Ariel 2023). Security guards are relatively cheap(er), well trained, and work within the concept of an idle or semi-idle presence. They are tasked with doing specifically what police officers seem to dislike or find ineffective: standing guard in police-defined hot spots of crime and disorder. On the other hand, these are precisely the qualities of security guards: to remain alert and present, with limited engagement powers but a non-negligible deterrent effect. Although they clearly cannot perform all the duties of a police officer, they are involved in crime prevention, counterterrorism efforts, public events, and maintaining order.

Thus, the police remain accountable and dictate the necessary approach for cooling down the hot spots, but the routine delivery will be assigned to third-party entities. With the deployment of third-party security forces under this model, the police must maintain oversight and ensure the observance of standards, ethical practises, and regulations by these third-party entities (see different models in White 2015). The police continue to play a vital role in directing, supervising, and coordinating the activities of these third parties, despite their diminished roles.

6.2.2. Wholesale outsourcing

More radical yet potentially effective is the idea of completely outsourcing hot spot policing. This suggestion is primarily motivated by traditional policing's implementation difficulties and police officers' lack of buy-in for hot spot policing. By outsourcing place-based prevention to private entities, the police force can refocus its efforts on improving services for victims, offenders, and the community as a whole. This is not an attempt to avoid responsibility; rather, it is a reorganisation that allows each entity to play to its strengths. By delegating the management of crime hot spots entirely to third-party entities, police forces could concentrate on duties requiring their specialised training and authority, such as investigating serious crimes, maintaining public order, and responding to emergencies (Spitzer and Scull 1977; Shearing and Stenning 1987). This model could therefore result in a more efficient allocation of public resources, allowing for an improvement in the delivery of police services and possibly boosting public satisfaction and confidence in the police.

Typically, specialised private security firms have a high level of expertise in place-based crime prevention and surveillance. By entrusting them with the responsibility of managing hot spots, community safety could benefit from their expertise. For instance, these companies frequently possess a comprehensive understanding of how to conduct effective surveillance, manage crowd behaviour, and deter potential criminals (Ariel 2023). We may see a decrease in crime rates, a more proactive approach to crime prevention, and an overall safer environment if we permit them to apply this knowledge in identified hot spots.

In addition, in today's rapidly evolving technological landscape, private entities are frequently in the vanguard of implementing

innovative security solutions. From surveillance systems powered by artificial intelligence that can detect suspicious behaviour to predictive analytics tools that can predict crime hot spots, these technologies can significantly improve the efficacy of crime prevention efforts. Private entities may have greater freedom to innovate and deploy advanced security solutions than traditional police departments, which frequently face bureaucratic obstacles or budgetary constraints when adopting new technologies.

If correctly structured, outsourcing agreements can result in a more accountable and transparent approach to managing hot spots. Contractual obligations that specify performance standards, reporting requirements, and procedures for handling misconduct are binding on private security firms. Regular audits and evaluations of performance can ensure that these organisations are held accountable for their performance. This approach can foster a model of hot spot policing that is more results-oriented, where success is measured against clearly defined benchmarks.

Finally, the inherent adaptability of private entities permits a more malleable response to crime trends (Melitski et al., 2010). As crime patterns change, private security companies can swiftly adapt their strategies, personnel, and technologies in response. They can expand their operations in response to crime spikes or shift their attention to emerging crime hot spots, or reduce it accordingly - a virtue that does not exist in the public sector. This adaptability can help ensure that policing efforts continue to be effective and responsive to the needs of the community.

Despite these potential advantages, it is crucial to keep in mind that a shift towards extensive outsourcing requires strong regulatory oversight to uphold moral standards, prevent abuses, and maintain public confidence. Under this model, the police would not directly manage hot spots, but a ministroy of internal security to which they are held accountable would continue to play a vital role in broader law enforcement as well as oversight and coordination with private security entities. This state actor would be responsible for ensuring that these entities serve the public interest, respect the rights of citizens, and uphold a high standard of professional conduct.

References

Andresen, M.A., Curman, A.S., Linning, S.J., 2017. The trajectories of crime at places: understanding the patterns of disaggregated crime types. J. Quant. Criminol. 33, 427–449.

Ariel, B., 2023. The substitutability and complementarity of private security with public police: the case 0f violence against women and girls in the rail network of the United Kingdom. In: Meehan, B., Hakim, S., Blackstone, E.A. (Eds.), Handbook on Public and Private Security. Springer-Nature.

Ariel, B., Bland, M., 2019. Is crime rising or falling? A comparison of police-recorded crime and victimization surveys. In: Deflem, M., MD Silva, D. (Eds.), Methods of Criminology and Criminal Justice Research Sociology of Crime, Law and Deviance, vol. 24. Emerald Publishing, 7-3.

Ariel, B., Partridge, H., 2017. Predictable policing: measuring the crime control benefits of hot spots policing at bus stops. J. Quant. Criminol. 33 (4), 809–833.

Ariel, B., Bland, M., Sutherland, A., 2017. 'Lowering the threshold of effective deterrence'—testing the effect of private security agents in public spaces on crime: a randomized controlled trial in a mass transit system. PLoS One 12 (12), e0187392.

Ariel, B., Mitchell, R.J., Firpo, M.E., Fraiman, R., Hyatt, J.M., Harinam, V., 2020a. Does surveillance of officers lead to de-policing?: a block randomized crossover controlled trial on body-worn cameras in Uruguay. In: Police on Camera. Routledge, pp. 95–121.

Ariel, B., Sherman, L.W., Newton, M., 2020b. Testing hot-spots police patrols against no-treatment controls: temporal and spatial deterrence effects in the London Underground experiment. Criminology 58 (1), 101–128.

Ariel, B., Weinborn, C., Sherman, L.W., 2016. "Soft" policing at hot spots—do police community support officers work? A randomized controlled trial. J. Exp. Criminol. 12 (3), 277–317.

Barnes, G.C., Williams, S., Sherman, L.W., Parmar, J., House, P., Brown, S.A., 2020. Sweet Spots of Residual Deterrence: A Randomized Crossover Experiment in Minimalist Police Patrol. Available at: https://osf.io/preprints/socarxiv/kwf98/download.

Basford, L., Sims, C., Agar, I., Harinam, V., Strang, H., 2021. Effects of one-a-day foot patrols on hot spots of serious violence and crime harm: a randomised crossover trial. Camb. J. Evid. Base Polic. 5 (3), 119–133.

Bell, B., 2015. Fighting Crime: Can the Police Do More with Less? Centre for Economic Performance Paper Number CEPEA031. Available at: http://cep.lse.ac.uk/pubs/download/ea031.pdf.

Bichler, G., Gaines, L., 2005. An examination of police officers' insights into problem identification and problem solving. Crime Delinquen. 51 (1), 53–74.

Bland, M., 2020. Algorithms can predict domestic abuse, but should we let them?. In: Policing in the Era of AI and Smart Societies. Springer, Cham, pp. 139–155.

Bland, M., Leggetter, M., Cestaro, D., Sebire, J., 2021. Fifteen minutes per day keeps the violence away: a crossover randomised controlled trial on the impact of foot patrols on serious violence in large hot spot areas. Camb. J. Evid. Base Polic. 5 (3), 93–118.

Bogomolov, A., Lepri, B., Staiano, J., Letouzé, E., Oliver, N., Pianesi, F., Pentland, A., 2015. Moves on the street: classifying crime hot spots using aggregated anonymized data on people dynamics. Big Data 3 (3), 148–158.

Bottoms, A., Tankebe, J., 2012. Beyond procedural justice: a dialogic approach to legitimacy in criminal justice. J. Crim. l. & Criminol. 102, 119.

Bowers, K.J., Johnson, S.D., 2003. Measuring the geographical displacement and diffusion of benefit effects of crime prevention activity. J. Quant. Criminol. 19, 275–301.

Bradford, B., Quinton, P., 2014. Self-legitimacy, police culture and support for democratic policing in an English constabulary. Br. J. Criminol. 54 (6), 1023–1046.

Braga, A.A., 2001. The effects of hot spots policing on crime. Ann. Am. Acad. Polit. Soc. Sci. 578 (1), 104–125.

Braga, A.A., 2010. Setting a higher standard for the evaluation of problem-oriented policing initiatives. Criminol.; Pub. Pol. 9, 173.

Braga, A.A., Weisburd, D., 2010. Policing Problem Places: Crime Hot Spots and Effective Prevention. Oxford University Press on Demand.

Braga, A.A., Bond, B.J., 2008. Policing crime and disorder hot spots: A randomized controlled trial. Criminology 46 (3), 577–607.

Braga, A.A., Turchan, B.S., Papachristos, A.V., Hureau, D.M., 2019. Hot spots policing and crime reduction: an update of an ongoing systematic review and meta-analysis. J. Exp. Criminol. 15 (3), 289–311.

Butler, A.J., 1984. Police Management. Gower, Aldershot.

Chainey, S.P., Matias, J.A., Nunes Junior, F.C.F., Coelho da Silva, T.L., de Macêdo, J.A.F., Magalhães, R.P., Silva, W.C., 2021. Improving the creation of hot spot policing patrol routes: comparing cognitive heuristic performance to an automated spatial computation approach. ISPRS Int. J. Geo-Inf. 10 (8), 560.

Chainey, S., Estévez-Soto, P.R., 2022. When the Law Changes: the Impact of a Change in Criminal Justice Policy on a Long-Term Hot Spot Policing Program. https://doi.org/10.31235/osf.io/b6w5s.

Clarke, R.V., Weisburd, D., 1994. Diffusion of crime control benefits: Observations on the reverse of displacement. Crime Prev. Stud. 2 (1), 165–184.

Curman, A.S., Andresen, M.A., Brantingham, P.J., 2015. Crime and place: a longitudinal examination of street segment patterns in Vancouver, BC. J. Quant. Criminol. 31, 127–147.

Dau, P.M., Vandeviver, C., Dewinter, M., Witlox, F., Vander Beken, T., 2021. Policing directions: a systematic review on the effectiveness of police presence. Eur. J. Crim. Pol. Res. 1–35.

De Brito, C., Ariel, B., 2017. Does tracking and feedback boost patrol time in hot spots? Two tests. Camb. J. Evid. Base Polic. 1 (4), 244–262.

Delpech, D., Borrion, H., Johnson, S., 2021. Systematic review of situational prevention methods for crime against species. Crime science 10 (1), 1–20.

Eck, J.E., 1993. The threat of crime displacement. Crim. Justice Abstr. 25 (3), 527–546.

Eck, J.E., Maguire, E.R., 2005. Have changes in policing reduced violent crime?: an assessment of the evidence. In: The Crime Drop in America. Cambridge University Press, pp. 207–265.
Eck, J.E., Weisburd, D. (Eds.), 1995. Crime and Place, vol. 4. Criminal Justice Press, Monsey, NY, pp. 1–34.
Eck, J.E., Linning, S.J., Herold, T.D., 2023. Place management. In: Place Management and Crime. Springer, Cham, pp. 23–32.
Eck, J.E., Spelman, W., 1987. Problem-solving: Problem-Oriented Policing in Newport News. US Department of Justice, National Institute of Justice.
Eck, J., Weisburd, D.L., 2015. Crime places in crime theory. Crime and place: Crime prevention studies 4.
Eck, J.E., 2015. Who should prevent crime at places? The advantages of regulating place managers and challenges to police services. Policing: A J. Policy Pract. 9 (3), 223–233.
Famega, C.N., Frank, J., Mazerolle, L., 2005. Managing police patrol time: the role of supervisor directives. Justice Q. JQ 22 (4), 540–559.
Goddard, N., Ariel, B., 2014. How Much Time Should Officers Spend in Nighttime Economy Hot Spots? Lessons from a "Randomized Controlled Trial in Northern Ireland. Presented at the Annual American Society of Criminology, San Francisco, CA. November 18-20, 2014).
Goldstein, H., 1979. Improving policing: a problem-oriented approach. Crime Delinquen. 25 (2), 236–258.
Gorr, W., Lee, Y., Weisburd, D., Eck, J., 2017. Chronic and temporary crime hot spots. Unraveling the crime-place connection: New directions in theory and policy—Advances in criminological theory 41–63.
Granholm Valmari, E., Ghazinour, M., Nygren, U., Gilenstam, K., 2022. Exploring the life contexts of patrolling police officers in the European Union–A scoping review. Scand. J. Occup. Ther. 1–19.
Greene, J.R., Bergman, W.T., McLaughlin, E.J., 1994. The challenge of community policing. In: Rosenbaum, D.P. (Ed.), The challenge of community policing, pp. 92–109. Sage.
Groff, E.R., Ratcliffe, J.H., Haberman, C.P., Sorg, E.T., Joyce, N.M., Taylor, R.B., 2015. Does what police do at hot spots matter? The Philadelphia policing tactics experiment. Criminology 53 (1), 23–53.
Grover, V., Jeong, S.R., Kettinger, W.J., Teng, J.T., 1995. The implementation of business process reengineering. J. Manag. Inf. Syst. 12 (1), 109–144.
Guerette, R.T., Bowers, K.J., 2017. Assessing the extent of crime displacement and diffusion of benefits: A review of situational crime prevention evaluations. Crime Opportunity Theories, pp. 529–566.
Haberman, C.P., 2015. Cops on Dots Doing what? the Differential Effects of Police Enforcement Actions in Hot Spots. Temple University.
Haberman, C.P., 2016. A view inside the "black box" of hot spots policing from a sample of police commanders. Police Q. 19 (4), 488–517.
Haberman, C.P., Ratcliffe, J.H., 2012. The predictive policing challenges of near repeat armed street robberies. Policing: J. Pol. Pract. 6 (2), 151–166.
Hasisi, B., Itskovich, E., Khoury-Kassabri, M., 2022. A Wall of Treatments: an Integrative Problem-solving Approach to the Prevention of Stone-throwing in East Jerusalem. Criminology & Public Policy.
Hickman, M.J., Fricas, J., Strom, K.J., Pope, M.W., 2011. Mapping police stress. Police Q. 14 (3), 227–250.
Huey, L., 2010. 'I've seen this on CSI': criminal investigat'rs' perceptions about the management of public expectations in the field. Crime Media Cult. 6 (1), 49–68.
Hutt, O., Bowers, K., Johnson, S., Davies, T., 2018. Data and evidence challenges facing place-based policing. Policing: An. Int. J. 41 (3), 339–351.
Ilijazi, V., Milic, N., Milidragovic, D., Popovic, B., 2019. An assessment of police officers' perception of hot spots: what can be done to improve officer's situational awareness? ISPRS Int. J. Geo-Inf. 8 (6), 260.
Isenberg, J., 2017. Police Leadership in a Democracy: Conversations with America's Police Chiefs. CRC Press.
Itskovich, E., Buchnik, E., Ariel, B., Wain, N., Weinborn, C., 2023. The impractical treatment-as-assigned assumption in field experiments in criminology and the mysterious case of police patrol dosage: lessons learned from the Birmingham South saturated problem-oriented policing hot spot experiment. In: Presented at the Experimental Criminology: Lessons for Theory, Research and Poli–Y - an International Symposium (17 January 2023. Hebrew University, Jerusalem, Israel).
Johnson, D., Faulkner, E., Meredith, G., Wilson, T.J., 2020. Police functional adaptation to the digital or post digital age: discussions with cybercrime experts. J. Crim. Law 84 (5), 427–450.
Johnson, S.D., Bowers, K.J., 2008. Stable and fluid hot spots of crime: differentiation and identification. Built. Environ. 34 (1), 32–45.
Jonathan-Zamir, T., Weisburd, D., Dayan, M., Zisso, M., 2022. The proclivity to rely on professional experience and evidence-based policing: findings from a survey of high-ranking officers in the Israel police. In: Translational Criminology in Policing. Routledge, pp. 181–198.
Karp, S., Stenmark, H., 2011. Learning to be a police officer. Tradition and change in the training and professional lives of police officers. Police Pract. Res.: Int. J. 12 (1), 4–15.
Kiely, J.A., Peek, G.S., 2002. The culture of the British police: views of police officers. Serv. Ind. J. 22 (1), 167–183.
Koper, C.S., 1995. Just enough police presence: reducing crime and disorderly behavior by optimizing patrol time in crime hot spots. Justice Q. JQ 12 (4), 649–672.
Koper, C.S., 2014. Assessing the practice of hot spots policing: survey results from a national convenience sample of local police agencies. J. Contemp. Crim. Justice 30 (2), 123–146.
Koper, C.S., Lum, C., Wu, X., Hegarty, T., 2021. The long-term and system-level impacts of institutionalizing hot spot policing in a small city. Policing: J. Pol. Pract. 15 (2), 1110–1128.
Lee, Y., Eck, J.E., O, S., Martinez, N.N., 2017. How concentrated is crime at places? A systematic review from 1970 to 2015. Crime Science 6, 1–16.
Leigh, J., Dunnett, S., Jackson, L., 2019. Predictive police patrolling to target hot spots and cover response demand. Ann. Oper. Res. 283 (1), 395–410.
Leukfeldt, E.R., Roks, R.A., 2021. Cybercrimes on the streets of The Netherlands? An exploration of the intersection of cybercrimes and street crimes. Deviant Behav. 42 (11), 1458–1469.
Levin, A., Rosenfeld, R., Deckard, M., 2017. The law of crime concentration: an application and recommendations for future research. J. Quant. Criminol. 33, 635–647.
Lorenc, T., Petticrew, M., Whitehead, M., Neary, D., Clayton, S., Wright, K., Renton, A., 2013. Environmental interventions to reduce fear of crime: systematic review of effectiveness. Syst. Rev. 2, 1–10.
Macbeth, E., Ariel, B., 2019. Place-based statistical versus clinical predictions of crime hot spots and harm locations in Northern Ireland. Justice Q. JQ 36 (1), 93–126.
McLaughlin, L.M., Johnson, S.D., Bowers, K.J., Birks, D.J., Pease, K., 2007. Police perceptions of the long-and short-term spatial distribution of residential burglary. Int. J. Police Sci. Manag. 9 (2), 99–111.
Melitski, J., Gavin, D., Gavin, J., 2010. Technology adoption and organizational culture in public organizations. Int. J. Organ. Theor. Behav. 13 (4), 546–568.
Middleton, J., 2020. From the street corner to the digital world: how the digital age impacts sex trafficking detection and data collection. The Palgrave International Handbook of Human Trafficking 467–480.
Miller, E.J., 2014. Challenging police discretion. Howard LJ 58, 521.
Mitchell, R.J., 2017. Frequency versus duration of police patrol visits for reducing crime in hot spots: non-experimental findings from the Sacramento hot spots experiment. Camb. J. Evid. Base Polic. 1 (1), 22–37.
Mohler, G.O., Short, M.B., Malinowski, S., Johnson, M., Tita, G.E., Bertozzi, A.L., Brantingham, P.J., 2015. Randomized controlled field trials of predictive policing. J. Am. Stat. Assoc. 110 (512), 1399–1411.
Moore, M.H., Trojanowicz, R.C., 1988. *Corporate Strategies for Policing* (No. 6). US Department of Justice, Office of Justice Programs, National Institute of Justice.
Morrow, W.J., Vickovic, S.G., Dario, L.M., Shjarback, J.A., 2019. Examining a Ferguson effect on college students' motivation to become police officers. J. Crim. Justice Educ. JCJE 30 (4), 585–605.
Nagin, D.S., Sampson, R.J., 2019. The real gold standard: Measuring counterfactual worlds that matter most to social science and policy. Ann. Rev. Criminol. 2, 123–145.
Nagin, D.S., Solow, R.M., Lum, C., 2015. Deterrence, criminal opportunities, and police. Criminology 53 (1), 74–100.
Namgung, H., 2018. How can police agencies implement community policing? Create specialized units. Int. J. Law, Crime and Justice 52, 144–154.
National Academies of Sciences, Engineering, and Medicine, 2018. Proactive Policing: Effects on Crime and Communities. The National Academies Press, Washington, DC. https://doi.org/10.17226/24928.

Norton, S., Ariel, B., Weinborn, C., O'Dwyer, E., 2018. Spatiotemporal patterns and distributions of harm within street segments: The story of the "harmspot". *Policing*. An International Journal 41 (3), 352–371.
Pearson-Goff, M., Herrington, V., 2014. Police leadership: a systematic review of the literature. Policing: J. Pol. Pract. 8 (1), 14–26.
Popova, S., Giesbrecht, N., Bekmuradov, D., Patra, J., 2009. Hours and days of sale and density of alcohol outlets: impacts on alcohol consumption and damage: a systematic review. Alcohol Alcohol 44 (5), 500–516.
Porter, J., 2018. WA police officer wins inaugural national police bravery award. Police Association (Victoria) Journal 85 (5), 26–32.
Porter, L.C., Curtis, A., Jefferis, E., Mitchell, S., 2020. Where's the crime? Exploring divergences between call data and perceptions of local crime. Br. J. Criminol. 60 (2), 444–467.
Prieto Curiel, R., Collignon Delmar, S., Bishop, S.R., 2018. Measuring the distribution of crime and its concentration. J. Quant. Criminol. 34, 775–803.
Ratcliffe, J.H., McCullagh, M.J., 2001. Chasing ghosts? Police perception of high crime areas. Br. J. Criminol. 41 (2), 330–341.
Ratcliffe, J.H., Taniguchi, T., Groff, E.R., Wood, J.D., 2011. The Philadelphia foot patrol experiment: a randomized controlled trial of police patrol effectiveness in violent crime hot spots. Criminology 49 (3), 795–831.
Reiner, R., 2010. The Politics of the Police. Oxford University Press.
Rosenbaum, D., 2007. Police Innovation Post 1980: Assessing Effectiveness and Equity Concerns in the Information Technology Era, vol. 1. Institute for the Prevention of Crime Review, pp. 11–44.
Rosenbaum, D.P., 2006. The limits of hot spots policing. In: Weisburd, D., Braga, A.A. (Eds.), Police Innovation: Contrasting Perspectives. Cambridge University Press, pp. 245–263.
Santos, R.B., Santos, R.G., 2015a. Examination of police dosage in residential burglary and residential theft from vehicle micro-time hot spots. Crime Science 4 (1), 1–12.
Santos, R.B., Santos, R.G., 2016. Offender-focused police intervention in residential burglary and theft from vehicle hot spots: a partially blocked randomized control trial. J. Exp. Criminol. 12 (3), 373–402.
Santos, R.G., Santos, R.B., 2015b. An ex post facto evaluation of tactical police response in residential theft from vehicle micro-time hot spots. J. Quant. Criminol. 31 (4), 679–698.
Shearing, C.D., Stenning, P.C., 1987. Private Policing. Sage publications, Newbury Park, p. 317.
Sherman, L.W., 2011. Al capone, the sword of damocles, and the police–corrections budget ratio. Criminol. Publ. Pol. 1 (10), 195–206.
Sherman, L.W., 2013. The rise of evidence-based policing: Targeting, testing, and tracking. Crime Justice 42 (1), 377–451.
Sherman, L.W., 2022. Goldilocks and the three "Ts": targeting, testing, and tracking for "just right" democratic policing. Criminol. Publ. Pol. 21 (1), 175–196.
Sherman, L.W., Gartin, P.R., Buerger, M.E., 1989. Hot spots of predatory crime: Routine activities and the criminology of place. Criminology 27 (1), 27–56.
Sherman, L.W., Weisburd, D., 1995. General deterrent effects of police patrol in crime "hot spots": a randomized, controlled trial. Justice Q. JQ 12 (4), 625–648.
Sherman, L.W., Williams, S., Ariel, B., Strang, L.R., Wain, N., Slothower, M., Norton, A., 2014. An integrated theory of hot spots patrol strategy: implementing prevention by scaling up and feeding back. J. Contemp. Crim. Justice 30 (2), 95–122.
Short, M.B., Brantingham, P.J., Bertozzi, A.L., Tita, G.E., 2010. Dissipation and displacement of hot spots in reaction-diffusion models of crime. Proc. Natl. Acad. Sci. USA 107 (9), 3961–3965.
Sorg, E.T., Wood, J.D., Groff, E.R., Ratcliffe, J.H., 2014. Boundary adherence during place-based policing evaluations: a research note. J. Res. Crime Delinquen. 51 (3), 377–393.
Spitzer, S., Scull, A.T., 1977. Privatization and capitalist development: the case of the private police. Soc. Probl. 25 (1), 18–29.
Steenbeek, W., Weisburd, D., 2016. Where the action is in crime? An examination of variability of crime across different spatial units in The Hague, 2001–2009. J. Quant. Criminol. 32, 449–469.
Sutherland, A., Ariel, B., Farrar, W., De Anda, R., 2017. Post-experimental follow-ups—fade-out versus persistence effects: the Rialto police body-worn camera experiment four years on. J. Crim. Justice 53, 110–116.
Sutherland, J., Mueller-Johnson, K., 2019. Evidence vs. professional judgment in ranking "power few" crime targets: a comparative analysis. Camb. J. Evid. Base Polic. 3 (1), 54–72.
Tankebe, J., Ariel, B., 2016. Cynicism towards Change: the Case of Body-Worn Cameras Among Police Officers. Hebrew University of Jerusalem legal research paper, pp. 16–42.
Taylor, B., Koper, C.S., Woods, D.J., 2011. A randomized controlled trial of different policing strategies at hot spots of violent crime. J. Exp. Criminol. 7 (2), 149–181.
Telep, C.W., 2017. Police officer receptivity to research and evidence-based policing: examining variability within and across agencies. Crime Delinquen. 63 (8), 976–999.
Telep, C.W., Lum, C., 2014. The receptivity of officers to empirical research and evidence-based policing: An examination of survey data from three agencies. Police Q. 17 (4), 359–385.
Telep, C.W., Mitchell, R.J., Weisburd, D., 2014. How much time should the police spend at crime hot spots? Answers from a police agency directed randomized field trial in Sacramento, California. Justice Q. JQ 31 (5), 905–933.
Wain, N., Ariel, B., 2014. Tracking of police patrol. Policing: J. Pol. Pract. 8 (3), 274–283.
Wain, N., Ariel, B., Tankebe, J., 2017. The collateral consequences of GPS-LED supervision in hot spots policing. Police Pract. Res. 18 (4), 376–390.
Weinborn, C., Ariel, B., Sherman, L.W., O'Dwyer, E., 2017. Hot spots vs. harmspots: shifting the focus from counts to harm in the criminology of place. Appl. Geogr. 86, 226–244.
Weisburd, D., 2015. The law of crime concentration and the criminology of place. Criminology 53 (2), 133–157.
Weisburd, D., 2018. Hot spots of crime and place-based prevention. Criminol. Publ. Pol. 17 (1), 5–25.
Weisburd, D., Braga, A.A., Groff, E.R., Wooditch, A., 2017. Can hot spots policing reduce crime in urban areas? An agent-based simulation. Criminology 55 (1), 137–173.
Weisburd, D., Bushway, S., Lum, C., Yang, S.M., 2004. Trajectories of crime at places: a longitudinal study of street segments in the city of Seattle. Criminology 42 (2), 283–322.
Weisburd, D., Groff, E.R., Yang, S.M., 2012. The Criminology of Place: Street Segments and Our Understanding of the Crime Problem. Oxford University Press.
Weisburd, D., Majmundar, M.K., Aden, H., Braga, A., Bueermann, J., Cook, P.J., et al., 2019. Proactive policing: a summary of the report of the national Academies of sciences, engineering, and medicine. As. J. Criminol. 14 (2), 145–177.
Weisburd, D., Wilson, D.B., Petersen, K., Telep, C.W., 2023. Does Police Patrol in Large Areas Prevent Crime? Revisiting the Kansas City Preventive Patrol Experiment. Criminology & Public Policy.
Weisburd, D., Wyckoff, L.A., Ready, J., Eck, J.E., Hinkle, J.C., Gajewski, F., 2006. Does crime just move around the corner? A controlled study of spatial displacement and diffusion of crime control benefits. Criminology 44 (3), 549–592.
Weisburd, S., 2021. Police presence, rapid response rates, and crime prevention. Rev. Econ. Stat. 103 (2), 280–293.
Welsh, B.C., Farrington, D.P., Douglas, S., 2022. The impact and policy relevance of street lighting for crime prevention: a systematic review based on a half-century of evaluation research. Criminol. Publ. Pol. 21 (3), 739–765.
Welsh, B.C., Piza, E.L., Thomas, A.L., Farrington, D.P., 2020. Private security and Closed-Circuit Television (CCTV) surveillance: a systematic review of function and performance. J. Contemp. Crim. Justice 36 (1), 56–69.
Wheeler, A.P., Reuter, S., 2021. Redrawing hot spots of crime in Dallas, Texas. Police Q. 24 (2), 159–184.
White, A., 2015. The politics of police 'privatization': a multiple streams approach. Criminol. Crim. Justice 15 (3), 283–299.
Williams, S., Coupe, T., 2017. Frequency vs. length of hot spots patrols: a randomised controlled trial. Camb. J. Evid. Base Polic. 1 (1), 5–21.
Winchester, N., 2020. Covid-19 and the police: new powers but more pressure? United Kingdom Parliament. Available. https://lordslibrary.parliament.uk/covid-19-and-the-police-new-powers-but-more-pressure/.
Wu, X., Lum, C., 2017. Measuring the spatial and temporal patterns of police proactivity. J. Quant. Criminol. 33 (4), 915–934.