

**“HOW DO WE KNOW THIS WORKS?”
AN EVALUATION OF TWO BRITISH COLUMBIA GANG VIOLENCE HOTSPOT PROJECTS USING A
KNOWLEDGE-TO-ACTION FRAMEWORK**

by

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Abstract

Academic research is one component of evidence-based policing, but must be paired with knowledge translation, implementation, and evaluation strategies that integrate real word outcomes and frontline feedback into the knowledge cycle. One framework for understanding this knowledge cycle is the Knowledge to Action (KTA) framework adapted by Santos and Santos (2019) from Graham et al. (2006). This paper uses the KTA framework to critically assess one police agency's implementation of directed patrol hotspots policing to target gang-related violence in British Columbia, Canada. Overall, the projects were effective, but real-world operational demands limited the research design, and the analytical team was unable to design a deployment model to maintain test and control conditions that would have enabled more rigorous evaluation methodologies. Post-hoc analysis of gang-related homicides and attempted homicides pre- and post-intervention showed that directed patrol hotspots policing is effective at reducing gang-related violence in British Columbia, but more rigorous evaluation is needed to understand differences between completed homicides and attempted homicides. Furthermore, the agency's use of research, briefings, feedback, and evaluation allowed for an effective feedback loop to inform and progress the KTA cycle.

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Dedication

In this country, education is a privilege born of other privileges. I cannot dedicate this work to my support system without first acknowledging how exceptional it is to have so much support. I am honoured and will strive to use my education to lift others up the way I have been lifted up.

I don't know anyone who works harder than my Dad, and I try my best to emulate his work ethic and integrity in all that I do. My Mom's pursuit of lifelong learning and academic excellence has been inspirational. My siblings, nieces, and nephews have been eternally patient with me doing homework at their birthdays and skipping family outings to write. Thank you all.

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Glossary, or acronyms and symbols

ALPR	Automatic Licence Plate Reader
ANZSEBP	Australia and New Zealand Society of Evidence-Based Policing
ASEBP	American Society of Evidence-Based Policing
CFS	Calls for Service
EGM	Campbell Collaboration's Evidence Gap Maps
CAN-SEBP	Canadian Society of Evidence-Based Policing
CEBCP	Centre for Evidence-Based Crime Policy at George Mason University
CPTED	Crime Prevention Through Environmental Design
CRRP	Crime Reduction Research Program
DTES	Downtown East Side
DV	Dependent Variable
EBP	Evidence-Based Policing
FN	First Nations
GRAH	Gang-Related Attempt Homicide
GRH	Gang-Related Homicide
KTA	Knowledge to Action framework
LMD	Lower Mainland District
MDT	Mobile Data Terminal
MSO	Most Serious Offence
OCRGO	Office of Crime Reduction – Gang Outreach
POP	Problem-Oriented Policing
PPT	Possession for the Purpose of Trafficking
RCT	Randomized Controlled Trials
RTCC	Report to Crown Counsel
SES	Socioeconomic Status
SNA	Social Network Analysis
SEBP	Society of Evidence-Based Policing in the United Kingdom
UCR	Uniform Crime Report

Introduction

This major paper aims to contribute to the translational criminology literature on gang enforcement in three ways: (1) by evaluating an integrated police agency's translation of environmental criminology into a directed patrol¹ hotspot policing² strategy targeting gang violence in the Lower Mainland District (LMD) of British Columbia (BC), Canada; (2) by leveraging Santos and Santos' (2019) adapted Knowledge to Action (KTA) framework to evaluate how the agency implemented and institutionalized the strategy; and (3) by applying principles of translational criminology to this major paper, making it locally relevant and accessible to frontline practitioners. To that end, Appendix A is a brief, plain-language summary of this major paper and Appendix B contains a process map and task descriptions for the project design discussed in this major paper. This is intended to enable police leaders, analysts, and officers to replicate the project in their own agencies. Together, these appendices ensure the literature review, implementation evaluation, and project design are accessible to frontline practitioners regardless of their level of academic exposure.

This major paper is not intended to be a defence of hotspot policing. Multiple systematic reviews and meta-analyses³ have shown this technique to be effective at reducing

¹ Directed patrol uses intelligence to direct police resources into hotspot areas to conduct overt enforcement that may include vehicle stops, curfew checks, and visible patrols (Cohen et al., 2014). This contrasts with "random patrol" that is undirected and left to the officer's discretion.

² Hotspots are small geographic units with high crime rates. Hotspot policing is the use of policing strategies and tactics that focus on those areas (Weisburd & Telep, 2014a, b). This term should not be conflated with the wide array of tactics that can be used *at* hotspots, including stop-and-frisk, drug market crackdowns, problem-oriented policing, directed patrol, foot patrol, and others.

³ According to the Campbell Collaboration, "A systematic review is an academic research paper that uses a method called 'evidence synthesis', which can include meta-analysis, to look for answers to a pre-defined question. The purpose of a systematic review is to sum up the best available research on that specific question. Reviews can also show when there has not been enough research carried out, and where more research is needed" (Campbell Collaboration, n.d.)

crime in targeted areas when used appropriately (Braga, 2001; Braga et al., 2014; Braga et al., 2019). This major paper is also not an endorsement of projects that use hotspots in conjunction with otherwise ineffective policing strategies, such as drug market crackdowns (Dandurand, 2021)⁴. Among other issues, drug market crackdowns can harm police-community relations and may be especially harmful to people who use drugs (Scott, 2004). Hotspot maps are an effective tool to guide deployment, but it also matters what police do at the hotspots (Groff et al., 2014; Taylor et al., 2010). The effectiveness of hotspot policing is also specific to the type of offence it targets. For instance, historical studies found hotspot policing to be effective for reducing violence and firearms offences (Cohen & Ludwig, 2003; Sherman, 1995), and residential burglary (Santos & Santos, 2020), but found less evidence for its effectiveness at preventing less serious crime and disorder (Braga, 2001).

More recently, Braga and Weisburd (2022) revisited previous systematic reviews and meta-analyses of hotspot policing projects to apply a new effect size calculation⁵. Overall, this most recent analysis of hotspot policing effectiveness showed greater effect sizes, found that a diverse range of crime types were reduced through hotspot policing projects, and reaffirmed that the benefits of hotspot policing diffuse into surrounding neighbourhoods, reducing crime beyond the treatment area (Braga & Weisburd, 2022).

⁴ Drawing upon work by Davis and Lurigio (1996) and Sherman (1990), the Center for Problem-Oriented Policing at Arizona State University defines a crackdown as “Sudden and dramatic increases in police officer presence, sanctions, and threats of apprehension either for specific offenses or for all offenses in specific places.” They explained that a “crackdown” can be focused on small spaces or be as large as city- or state-wide, with varying degrees of success depending on the target offence and how they are conducted (Scott, 2004).

⁵ For further discussion on effect size calculation models, the potential problems with using Cohen’s *d* on place-based data, and the rationale the researchers used to choose the log RIRR, please see: Braga & Weisburd, 2022; Farrington et al, 2007; Farrington & Welsh, 2013; Wilson, 2020.

The goal for this major paper is to outline how best to institutionalize a practice in a way that is evidence-based and operationally sustainable in a local context. This is known as “translational criminology” – the process of translating research into operational policies, programs, and practices (Laub, 2012; Lum & Koper, 2017; Santos & Santos, 2019). Ideally, the reader will take away not only the building blocks for this model, but also the theoretical foundations upon which it is based. Theory is typically the purview of academics and is rarely discussed in police departments in the context of deployment models; however, theory matters because it is effectively the core belief system upon which policies and practices are based. The assumptions inherent to a particular theory frame the way victims, offenders, criminal events, and the role of police are viewed (Heidt & Wheeldon, 2015; Williams & McShane, 2014). It is also the reason to expect to see certain results following from certain actions, as theory helps to explain why and how people act and phenomena occur. If we want to understand what works, we need to understand the theory that guides the practice.

In terms of the structure of this major paper, it will begin with a discussion of the adoption and proliferation of Evidence-Based Policing (EBP). This will be followed by an overview of Translational Criminology, and the four-phase KTA model for evaluating and implementing evidence-based practices in a police agency (Santos & Santos, 2019) that will serve as the organizing framework for the latter half of the major paper. The first phase of the model will take the reader through the relevant research in two key areas. The first is Environmental Criminology with an emphasis on the theories that inform hotspots policing. This will also include a focus on gangs with particular attention paid to the literature from the

United Kingdom (UK), Western Europe, and British Columbia⁶. The second phase will address the synthesis and dissemination of research discussed in phase one, and the tools available to policing professionals to access that research. Phase three will describe one agency's effort to implement and evaluate a directed patrol hotspot policing project targeting gang violence in British Columbia, including the data assets used, the implementation process, performance metrics gathered during the project, and the project outcomes. The fourth phase will speak to the steps that agency has taken to institutionalize the model both within their own agency and through skill-sharing with partner agencies across the Lower Mainland District (LMD). The major paper will conclude with a discussion of the successes, challenges, and next steps in the translation process to ensure continued success and sustainability of this model across the province.

Evidence-Based Policing

While early criminology focused heavily on theory development and explanatory research (Shaw & McKay, 1942; Sutherland, 1942; Thrasher, 1936), many of today's criminologists have shifted their attention to practical applications that focus on crime prevention (Cohen et al., 2022a; Jeffrey, 1971), enforcement strategies (Braga et al., 2019; Clarke & Weisburd, 1994; Cohen et al., 2014; Cohen et al., 2021; Koper, 1995; Koper & Mayo-Wilson, 2012; Lee et al., 2017; Weisburd et al., 2012) or offender management and behaviour (Cohen et al., 2022b; McCuish et al., 2015; McCuish et al., 2018; Millar & Dandurand, 2017).

While theoretical and explanatory work remains relevant and vital to the field, it is only by

⁶ Gangs in the Lower Mainland of British Columbia are distinct from gangs in other parts of Canada and in the United States of America (CFSEU-BC, n.d.; McConnell, 2015).

operationalizing and testing these theories in frontline justice settings that we can complete the loop between academia and the criminal justice system. This is important to ensure that public resources are invested in practices that are grounded in sound theory, supported by science, and garner and maintain the confidence of the public.

The currently accepted practice for achieving these goals in policing is referred to as evidence-based policing (EBP), which is a method of combining the best available scientific evidence with real world policing experience to inform policy and practice decisions in ways that are translatable and accessible to frontline police staff (Lum & Koper, 2017; Mitchell & Huey, 2019; Sherman, 2013; Sherman, 2015; Telep & Lum, 2014). The research questions that are tested should seek to solve real problems through practical recommendations, and the methods used to test these questions, along with their findings, should be free to access and written in plain language that all frontline justice employees can quickly and easily digest and integrate into their work.

EBP has become topical in recent years, with various societies emerging to promote uptake and discourse on the subject, such as Australia, Canada, New Zealand, the UK, and the United States of America (USA). However, the concept of evidence-based practice is not new, nor is it unique to the field of criminal justice. In the 1940s, psychologists began openly questioning the evidence base for commonly used techniques in psychotherapy (Hertz, 1941), emphasizing the importance of teaching scientific literacy to students of clinical psychology (Anastasi, 1947). Beginning in the 1970s, epidemiologist Archie Cochrane began to advocate for better synthesis of medical research by subspecialty and developed a methodology for evaluating and summarizing the results of randomized controlled trials (RCTs) in medicine

(Robinson, 1995). This effort would eventually become the Cochrane Collaboration, established in 1993 (Robinson, 1995), which is an international open-source repository of systematic reviews and meta-analyses pertaining to the medical field. This resource is intended to make medical research freely accessible in support of evidence-based medicine.

Similar efforts to refine and standardize rules for the scientific method were unfolding within the social sciences. Key texts emerged setting out acceptable methods for teaching experimental and quasi-experimental research (Campbell & Stanley, 1963) and conducting quasi-experimental field research (Cook & Campbell, 1979) in the social sciences. Throughout the 1990's, Sherman and many of his colleagues began to push for this same emphasis on using the best available scientific evidence from police research to improve feedback loops and support learning and advancements in police practices (Lum & Koper, 2017; Sherman, 1998). By 1996, the United States Attorney General was required to present independent evaluations to Congress on the effectiveness of publicly funded crime prevention programs (Sherman, 1998). More recently, Lum and Koper (2017, p.3) noted that the concept of EBP "...has become an anchoring concept for government funding for research and technical assistance in policing."

This shift in focus prompted the Maryland Report (Sherman et al., 1997) in which the authors evaluated the effectiveness of popular crime prevention programs. They organized their results into four categories – what works, what does not work, what may be promising but requires more research, and a "don't know" category, meaning there was insufficient

information to draw any conclusion. Sherman's 1998 address to the Police Foundation⁷

summarized some key findings from the report and provided a definition for EBP:

Evidence-based policing is the use of the best available research on the outcomes of police work to implement guidelines and evaluate agencies, units, and officers. Put more simply, evidence-based policing uses research to guide practice and evaluate practitioners (Sherman, 1998, p.3-4).

Sherman et al. (1998) also noted that it was just as important to identify programs that did not work as it was to identify those that did. Well-funded and popular programs since found entirely ineffective included gun buybacks, Drug Abuse Resistance Education (D.A.R.E.), drug market crackdowns, Scared Straight, and storefront police offices, among others (Sherman et al., 1998). A few examples of programs that were found empirically to be effective included early childhood public health interventions, nuisance abatement in rental housing, hotspots policing, and intensive monitoring of high-risk repeat offenders (Sherman et al., 1998). The authors underscored the need for a central registry of crime prevention evaluations similar to the Cochrane Collaboration (1998). This effort led to the formation of the Campbell Collaboration in 2000 for evaluating RCTs in the social sciences (Lum & Koper, 2017).

The Campbell Collaboration has now been operating for over 20 years. It publishes four open access journals per year, where each issue contains anywhere from 12 to 35 peer-reviewed articles per issue (Campbell Collaboration, 2020). In addition to systematic reviews, the Campbell Collaboration publishes policy briefs and Evidence and Gap Maps (EGM). EGMs are visual maps of the available rigorous evidence on a subject, designed as an at-a-glance reference showing where research evidence is strong, weak, or missing. They also provide

⁷ Referring in this instance to the Police Foundation based in Washington, DC, as opposed to the UK Police Foundation.

training, open access software and online tools for conducting systematic reviews, Coordinating Groups, research grants, and links to external funding streams (Campbell Collaboration, 2020).

A keyword query in EBSCO⁸ for “evidence-based practice” today returns over six million items from a broad range of fields, including medicine, nursing, social work, policy, psychology, policing, and education. Given the surge of evidence-based research, in 1996, Sackett and colleagues noted the need for a unifying definition of evidence-based medicine to clarify its purpose and to dispel myths concerning the intentions of evidence-based proponents. They defined evidence-based medicine as:

...the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence-based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research (Sackett et al., 1996, p.71).

Similarly, EBP emerged from important questions around which strategies worked to reduce crime in communities, and which strategies either did not work or made things worse (Lum & Koper, 2017; Sherman, 2013). Mitchell (2019) provided an excellent overview of the current definitions of EBP and defined the role of data, the meaning of “evidence”, and the scope implied by an evidence “base”. Mitchell pointed out that data itself was not evidence but formed part of the analysis that contributed to evidence. Furthermore, evidence from a single study does not form an “evidence-base”. The totality and quality of available evidence should be considered the base upon which to make decisions (Mitchell, 2019). In effect, this point of view made systematic reviews and meta-analyses extremely important to EBP. However, in medicine, as well as policing, it is also important to incorporate frontline experience and

⁸ EBSCO is a search engine used for locating academic publications and other materials in research databases.

professional judgement into these decisions. As cited by Mitchell (2019), “evidence alone is never sufficient to make a clinical decision” (Guyatt et al., 2002, p.8). Similarly, academic research alone does not form a complete and reliable evidence base in policing. It must draw from and be integrated with professional judgement and the lived experience of frontline police officers, analysts, and police managers in a continuous feedback loop.

As one of the earliest proponents of EBP, Sherman’s work has contributed not only to our understanding of what EBP is and ought to be, but also to the existing literature in applied criminology specific to policing⁹. An academic who has chosen to publish both in peer-reviewed academic journals and in open access policing periodicals, Sherman has shown the value of making research accessible to frontline justice staff. He describes the rise of EBP as a shift in philosophy from a traditional “random patrol, rapid response, reactive investigation” model of policing (what he refers to as the “three Rs” model), to a model where places, offenders, times, and situations are understood and targeted based on empirical evidence of greatest harm. He termed this new model a “three Ts approach” of *targeting* the most harmful problems, *testing* police activities for effectiveness, and *tracking* the results (Sherman, 2013).

Among his efforts to promote EBP, Sherman launched the *Cambridge Journal of Evidence-Based Policing* in 2017, which saw just over 75,000 downloads in the first four years (Springer, n.d.). The journal is now fully open access, meaning the articles are free for anyone to download (Springer, n.d.). The editorial board includes a combination of academics and current or former law enforcement professionals and is associated to the Cambridge Centre for

⁹ See for example Ariel et al., 2018; Farrington et al., 2018; Gibson et al., 2017; McFadzien & Sherman, 2021; Sherman et al., 1995; Sherman, 1998; Sherman et al., 1998; Sherman, 2013; Sherman et al., 2014; Sherman, 2019; Sidhu et al., 2017; Williams et al., 2020.

Evidence-Based Policing. Sherman is also Director of the Cambridge Police Executive Program, and Director of Research at the Jerry Lee Centre of Experimental Criminology at the University of Cambridge (Cambridge University, n.d.). The journal, research centres, and executive training programs provide numerous avenues by which police professionals and agencies can access training, resources, and research. The *Cambridge Journal of Evidence-Based Policing* (n.d.) offers the following definition of EBP:

‘Evidence-Based Policing’ is the systematic practice of applying research to decision-making in policing. It refers to both the body of research that can be applied to policing practice, as well as the body of research about how to apply it (in a wide range of tactical, organizational, financial, and political contexts).

Efforts to promote EBP have also led to the formation of numerous societies, including the Australia and New Zealand Society of Evidence-Based Policing (ANZSEBP), the Canadian Society of Evidence-Based Policing (CAN-SEBP), the Society of Evidence-Based Policing in the United Kingdom (SEBP), and the American Society of Evidence-Based Policing (ASEBP) in the USA. These organizations seek to promote the integration of academic work with professional experience and to make that work accessible through conferences, free online training, and various open access resources for their members.

As researchers and stakeholders built a body of evidence to contribute to the understanding of crime and public safety, it became increasingly apparent that not all evidence is equal – a sentiment echoed across multiple disciplines (Ratcliffe, 2017; Richards, 2003; Zibulewsky, 2001). Furthermore, the quality and scope of research studies may not be readily apparent to non-academic practitioners who are interested in implementing projects or models based on research findings. Consequently, several leading academics sought to rank police research according to the quality of the research, and to make the scope and findings more

tangible to sworn and civilian members of law enforcement agencies (Farrington et al., 2002; Huey, 2021; Ratcliffe, 2019; Sherman et al., 1998). Sherman and colleagues (1998) developed the Maryland Scale for ranking the rigour and quality of research (see also Farrington et al., 2002). The scale scores research based on control of other variables, measurement error, statistical power, and research design, assigning a score of one through five. A level one study draws conclusions from “[c]orrelation between a crime prevention program and a measure of crime or crime risk factors at a single point in time”, whereas a level five study would be based on “[r]andom assignment and analysis of comparable units to program and comparison groups” (Sherman et al., 1998, p.4-5).

Similarly, Ratcliffe offered a scoring hierarchy on a scale of zero to five (Ratcliffe, 2019). Anecdotes, case studies, memoirs, and expert opinions score a zero on this scale, whereas randomized controlled trials, systematic reviews, and meta-analyses score a five. For ease of decision-making, Ratcliffe groups the scores and corresponding examples into four categories. Research scoring a five is labelled as “what works”, levels three and four represent “what’s promising, and definitely worth looking at with more rigorous studies”, levels one and two are “what’s interesting, and maybe worth looking at with better studies”, and level zero is “what’s suspect, if presented as the only source of evidence” (Ratcliffe, 2019, p.194). This is an example of not only an EBP tool, but also a translational tool, which will be discussed in more detail later.

As both scales are primarily applicable to quantitative research, the founder of CAN-SEBP, Laura Huey (2021) introduced an adapted eight-level scale specific to qualitative work. It similarly focuses on methodology, rigour, and quality of research as indicators of how much

weight a study should be given in decision-making. Another useful tool is the Effect Size Calculator offered by the Campbell Collaboration for calculating effect sizes in meta-analyses. The calculator is an adaptation from Lipsey and Wilson's 2001 book on meta-analysis (as cited by Campbell Collaboration, n.d.).

Additionally, the Centre for Evidence-Based Crime Policy (CEBCP) at George Mason University produced a "Playbook" of strategies that have been shown to be effective with information on how to implement and evaluate strategies (Lum & Koper, 2017). Lum, Koper, and Telep developed a ranking system that they named The Evidence Based Policing Matrix (Lum & Koper, 2017). The Matrix combines a scoring rubric similar to the Maryland Scale with a visual model for grouping interventions by type that resembles a 3D variant of the Campbell Collaboration's Evidence Gap Maps (EGMs). The Matrix is unique in two ways. First, it is tailored to the policing context and the visual design enables the reader to quickly identify successes and failures of common crime prevention or enforcement tactics in specific settings (Lum & Koper, 2017). Second, it is the only tool that incorporates elements of policy transfer, such as scalability and target populations. The CEBCP website describes the three dimensions of the Matrix as "the nature of the target, the extent to which the strategy is proactive or reactive, and the specificity or generality of the strategy" (Center for Evidence-Based Crime Policy, n.d.).

Within Canada, applied police research has taken various forms, but has been somewhat scattered and siloed. Some has been the result of academic-practitioner partnerships (see for example Malm et al.'s *30-year analysis of police service delivery and costing*, 2005), while other work has emerged from Canada's numerous Commissions of Inquiry (McKenna, 2018). In 2012, Public Safety Canada held a summit on the economics of policing,

and invited policymakers, civil servants, police leaders, police union representatives, and academics (Huey & Ricciardelli, 2016). An important theme that emerged was the need for a standardized body of Canadian public safety research. Additional summits, research conferences, reports, and a House Standing Committee followed. All emphasized the lack of Canadian research and attributed that to a lack of funding and barriers to accessing police data for research purposes (Huey & Ricciardelli, 2016; Malm et al., 2005; McKenna, 2018).

Huey subsequently established the Canadian Society of Evidence-Based Policing (CAN-SEBP) in 2015, and later went on to create the Journal of Police Practice and Research, of which she is Editor. She has co-authored multiple books on police research, including a forthcoming book on crime data (Huey et al., 2021; Mitchell & Huey, 2019; Huey & Buil-Gil, 2023).

The CAN-SEBP cites the following as their mission: “To empower Canadian police agencies to develop an internal capacity within their agencies to generate, use, and share high quality applied research to help inform evidence-based police practice in Canada” (CAN-SEBP, n.d.). They offer a range of resources, including a library of Canadian research publications, research tutorials, access to scholars and practitioners who readily engage through social media, and Square One reviews that provide a rapid assessment of the body of evidence for a particular program to assist police leaders and policymakers in determining whether the evidence supports the use of that approach. The criteria for Square One reviews (CAN-SEBP, n.d.) are:

1. Is the program based on existing research?
2. Has the program been independently evaluated?
3. Was the program rigorously tested? (4 or 5 on the Ratcliffe or Maryland Scientific Scales?)
4. Has the program evaluation been replicated/reproduced?
5. Was the program tested in Canada?

The final criterion is worthy of emphasis. Canadians are in a unique position whereby proximity to the USA and relative isolation from everywhere else can lead to a disproportionately American diffusion of literature and policy into the Canadian system. However, many aspects of Canada's culture, the Charter of Rights and Freedoms, and justice systems are functionally more similar to those of the UK, the Netherlands, Australia, New Zealand, or Sweden. This proximal diffusion of scholarship poses a significant risk of naïve policy transfer between very dissimilar conditions when more fitting scholarship and policy options may be available elsewhere. By including in their scoring criteria the importance of testing programs in Canada, CAN-SEBP attempts to address this problem and elevate programs and policies that have been proven effective in a Canadian setting.

At a local level, research centres at the University of the Fraser Valley and Simon Fraser University maintain the necessary levels of laboratory security and security-cleared researchers to enable them to conduct applied research in collaboration with local police, corrections, and other entities within the justice system. To further enhance this capacity, the Province of British Columbia operates a Crime Reduction Research Program (CRRP) that connects current research needs from within the Public Safety Branch to qualified Canadian researchers capable of conducting independent research to meet those needs, particularly in circumstances where longer-duration, external project designs are most appropriate. The CRRP also funds the projects approved through the working group, assists in securing the required data assets, facilitates partnerships, and oversees timelines. Through their existing relationships with various agencies, researchers may also be contracted to conduct studies outside the CRRP funding model.

In 2014, researchers from University of the Fraser Valley's Centre for Public Safety and Criminal Justice Research published a book titled *"Eliminating Crime: The 7 Essential Principles of Police-based Crime Reduction"* (Cohen et al., 2014), which is available free of cost on the Centre's website. These seven principles are: be information-led; be intelligence-led; focus on offenders; focus on problems; develop meaningful partnerships; be pre-emptive; and be performance-based. The book is a guide for police leaders on how to implement evidence-based crime reduction strategies in British Columbia. It provides detailed examples of how each of these principles has been implemented by different agencies in the province, demonstrating their effectiveness through well-known projects and investigations. The book is a bridge between EBP (knowing what works) and implementation science (how to make it work in real life), thereby facilitating a process known as Translational Criminology.

Translational Criminology and the Knowledge to Action Model

Translational Criminology followed the move toward EBP and was similarly derived from implementation science in the medical field (Santos & Santos, 2019). Laub (2012) described Translational Criminology as the creation, application, implementation, and dissemination of knowledge on what works and why it works. He defined knowledge creation as a partnership between researchers and practitioners, whereby "[s]cientists discover new tools and ideas for use in the field and evaluate their impact. In turn, practitioners offer novel observations from the field, which stimulate basic scientific investigations" (2012, p.4).

Knowledge application is the process through which evidence-based strategies are made accessible to practitioners and adopted into practice. Implementation considers the extent to which evidence-based programs are designed and operated correctly. Dissemination is the

process of identifying who the end users of the research are, how they access the research, and how research can be made more accessible. Accessibility may include writing in user-appropriate language, creating repositories that are free and available to practitioners, or forming research-practitioner partnerships, among other methods (Laub, 2012).

Through the CEBCP, Lum, Koper, and others have contributed extensively to Translational Criminology. They define the concept as translating what is known in the field of criminology and police research into embedded practices within justice organizations (Lum & Koper, 2017). This includes teaching agencies to seek out and trust the research, to gather data to support continuous evaluation within their own agencies, and to look to the outcomes of those evaluations when developing policy. Part of the Translational Criminology portfolio at the CEBCP includes brief research summaries in plain English, a periodical summarizing current police research, and the EBP Matrix described above, each of which is available through open access on their website.

Ratcliffe has also developed numerous open access tools for police leaders to access quality research and implement it in their agencies, including plain-language research briefs, decision-making models, and a podcast. He authored a book (*Reducing Crime: A Companion for Police Leaders*, 2019) for police leaders on the topic, which is accompanied by an open-access website that summarizes each chapter of the book in brief.

The purpose of these various tools is to equip justice staff, from frontline to senior management, with empirically supported strategies for carrying out their mandates. Criminologists have recognized that the best available research is often hidden behind paywalls and couched in scientific jargon to such an extent that it becomes inaccessible to those who

need it, particularly as many justice agencies do not pay for the level of access to peer-reviewed scientific publications that they would need to stay current on emerging research. The sheer volume of available research, good, bad, and otherwise, also makes the consumption of research literature extremely time consuming.

Furthermore, while the people who apply crime reduction strategies are experts in police tactics, offender management, or other frontline justice roles, they may not necessarily be experts in research methodologies or data analysis. The various tools noted above represent an effort to address these barriers to evidence-based criminal justice work by including only rigorously tested outcomes, in quick-read formats, free of charge.

In addition to these various accessibility tools, there is a need for processes or models to guide sustainable implementation of new practices in police agencies. Santos and Santos addressed this with a four-phase model adapted, again, from the medical field, stating:

...translational criminology involves understanding both how to translate one language (i.e., research results) into another (i.e., policies, procedures, processes, tools, etc.). However, it is also important to recognize the goal of translation is not simply to ensure practitioners understand and consider research findings and evidence-based tools presented to them, but that the results of the research are institutionalized into everyday practice (2019, p. 586).

Santos and Santos presented an adaptation of Graham et al.'s (2006) 'Knowledge to Action (KTA)' model for research implementation. The KTA approach describes two cycles for this process, namely a knowledge creation cycle and a knowledge action cycle, which Santos and Santos broke down into four distinct phases:

- Knowledge Creation Cycle
 - Phase 1: Research and Evaluation
 - Phase 2: Synthesis and Dissemination
- Knowledge Action Cycle
 - Phase 3: Implementation and Evaluation

- Phase 4: Institutionalization and Sustainability

Santos and Santos (2019) noted that most police research activity to date fell within the Knowledge Creation Cycle, while a significant gap remained in the Knowledge Action Cycle. Apart from CEBCP's "Play Book", very little information is available on the topic of implementation, and even less exists on institutionalization and sustainability. Moreover, there is minimal research or information related to the Knowledge Action Cycle, particularly from within Canada. Practices that are sustainable for the duration of a study (particularly one funded through a grant or similar external resource) may not be sustainable as a routine practice funded by taxpayers. Given this, the field of criminology needs to push forward into Phases 3 and 4 to better understand and communicate not only what works in the short term and why it works, but also what is sustainable in the long term, and especially what works and is sustainable within the Canadian context.

Knowledge Creation Cycle: Theory, Research, and Local Context

The remainder of this major paper will focus on applying Santos and Santos' (2019) Four-Phase Research-to-Practice Translation Process to gang-related hotspots policing projects in British Columbia. This section of the major paper will cover the theories and research giving rise to hotspots policing as a technique (Phase 1: Research and Evaluation) and the systematic reviews and meta-analyses that show this technique to be effective (Phase 2: Synthesis and Dissemination). Following this discussion will be the design and implementation of a British Columbia law enforcement agency's first gang-related hotspots project (Phase 3: Implementation and Evaluation). The last section of the major paper will discuss subsequent

projects the agency has undertaken with partner agencies and some recommendations for how to institutionalize this strategy (Phase 4: Institutionalization and Sustainability).

Theoretical Foundations of Place-Based Crime Prevention

Routine Activity Theory

The history of place-based criminology began in the mid-19th century when French statisticians Guerry and Quetelet each created maps to represent the statistical prevalence of certain crime types, education, and poverty (Brantingham & Brantingham, 1981; Kindynis, 2014; Sherman, 1995). In the early 20th century, Burgess proposed his “concentric zone theory”, though this was less about crime mapping and more about the influence of various types of land use on crime (Kindynis, 2014). Several theories emerged through the mid-20th century that considered the influence of neighbourhood or community conditions on individual motivations to commit crime. According to Sherman (1995), these included Shaw and McKay’s ecological perspectives on neighbourhoods and criminality (1942) and Merton’s Anomie Theory (1938; 1968 as cited in Sherman, 1995), which would later influence Agnew’s early and revised General Strain Theories (1980; 1983; 1992) and others. However, as Sherman noted (1995), these theories focused on how place features or social conditions motivated individual offenders. The unit of study was still the person, rather than the event or the place.

In their seminal 1979 paper, Cohen and Felson proposed an approach to crime analysis that focused on the criminal event itself, and how offenders and victims converged in time and space to create opportunities for crime. The theory assumes offenders are motivated to commit crime and makes no attempt to explain what motivates them. This focus on events rather than persons is perhaps the most notable departure from previous theories. Cohen and Felson’s Routine Activity Theory is directed towards what they termed “direct-contact

predatory violations”, such as robbery or interpersonal violence (1979, p.589). They argued that direct-contact predatory violations occurred when motivated offenders encountered suitable targets (a person or object) in the absence of capable guardians¹⁰, and that “the lack of any one of these elements normally is sufficient to prevent such violations from occurring” (p. 590). Further, they suggested that these criminal *opportunities* could have a greater influence over crime rates than the proportion of potential offenders or victims in a community at any given time. Essentially, the authors suggested that guardianship or control of opportunity spaces was what determined whether crimes were likely to occur (Cohen & Felson, 1979). By examining the temporal and spatial organization of motivated offenders and suitable targets, and the presence or absence of guardianship wherever the two converge, it becomes possible to anticipate risky times and places for criminal events and to counter these by adjusting one of the three elements that are required for an offence to occur.

Cohen and Felson (1979) also argued that illegal activities fed upon legal activities. As a result, the structure and routine of legal routine activities become significant determinants of when and where predatory violations will occur. Extending this to explain the convergence of motivated gang members and suitable targets (rival gang members) in the absence of capable guardianship, it follows that the predatory violation (shootings) might feed off other activities in which the offenders and guardians are engaged, whether those activities are legal. An example of a gang-related shooting feeding off legal activity would be a shooting that takes place at a

¹⁰ Cohen and Felson’s original concept of a “guardian” included police, private citizens, or even the victim themselves. A guardian is the protective oversight provided through the routine activities of others, or of the intended victim, that prevent illegal acts. Guardians may supervise offenders, victims, or places (Cohen & Felson, 1979). Felson later modified this to include “handlers”, described as people who know an offender well enough to exert some control over their behaviour and reduce their chance of committing crime (1986). Eck (1994, 1995) added “place managers” as sources of formal or informal crime prevention at places.

gym, bar, or restaurant while the victim is engaged in routine daily activities. A disruption of that opportunity may involve increasing guardianship (cameras, security, etc.) or removing the potential targets, such as banning gang members from some locations through inadmissible patron programs.¹¹ Another example of a gang-related shooting feeding off illegal activity would be a shooting that takes place while a gang member is driving around working a drug line. An effective disruption of this opportunity might include increased guardianship (police) at high-risk locations that could be identified through hotspot analysis. While Cohen and Felson envisioned predatory violations feeding off only legal activities, it is plausible that they also feed off illegal activities if those illegal activities follow a routine that creates opportunities for victimization.

Given that drug dealing is an illegal act, the parties to the transaction routinely and deliberately seek out times and places with low guardianship (Eck, 1994; Felson, 1995; Taniguchi et al., 2011). If one of those parties happens to be an intended target for gang violence, the routine activities inherent to their other gang-related activities (e.g., drug dealing) create the elements required for the motivated offender to carry out targeted gang violence. In the same way Cohen and Felson suggest that other predatory violations feed off the routine activities of the offender and victim (1979), so too should gang-related predatory violations. Although the primary activity of gang victims is not always legal, the primary activity is the reason for the routine, and the predatory violation feeds off that primary routine. The persistent nature of substance use behaviour creates highly clustered and predictable routines in illicit drug market activity; thus, by extension, any activity that “feeds” off those routines,

¹¹ For an example of a local inadmissible patron program, see Gahunia, 2017.

including gang-related violence, is also likely to cluster in time and space, creating predictable hotspots¹² and hot times where violence occurs most frequently.

Rational Choice Theory

In 1983, Clarke proposed Situational Crime Prevention, which he described as measures directed at specific types of crime, involving the “management, design, or manipulation of the immediate environment” to reduce opportunities for crime and increase perceived risks to offenders (p.225). He referred to these measures as target hardening¹³, defensible space architecture¹⁴, community crime prevention initiatives¹⁵, and various other measures targeting specific problems. Situational crime prevention strategies can be seen in numerous programs, including Neighbourhood Watch, Citizens on Patrol, Crime Prevention Through Environmental Design (CPTED), and Crime-Free Housing initiatives.

Clarke’s emphasis on offender decision-making and modifications to the conditions influencing those decisions paved the way for Cornish and Clarke’s Rational Choice Theory (1985, 1986). This theory is based on three main principles. First was the assumption that offenders are reasoning persons and, at least to the extent that it benefits them, make, from their personal perspective, rational decisions. Second, the authors asserted that these decisions varied by crime type. They proposed a crime-specific approach, arguing that different crimes

¹² The nature of dial-a-doping means that transactions happen quickly, the dialers can flee quickly, and the initial “ask” happens by phone rather than on the street corner, making it harder for police to anticipate individual transactions. However, a large portion of drug clients are heavily dependent on their drugs, and that dependence creates cyclical and predictable demand. Therefore, drug trafficking remains predictable overall, even while vehicles and cell phones make it increasingly difficult to anticipate single transactions at a street level.

¹³ Clarke defined target hardening as “making the objects of crime less vulnerable” (1983, p.225).

¹⁴ “[Encouraging] residents in housing projects to exercise territorial surveillance of the public spaces outside their dwellings” (Clarke, 1983, p.225).

¹⁵ Neighbourhood watch, citizen patrol, etc.

met different needs, and that the situational context changed how offenders made decisions about whether they would commit a crime. Some examples the authors provided were burglary (middle-class residences versus wealthy ones) or rape, where different motivations result in difference offender decisions, thereby producing differences in the offence itself. Third, they presented different decision models for involvement in crime and the decisions that formed the event itself (Cornish & Clarke, 1986). Using the example of burglary, they posed an “Initial Involvement Model” of decision-making, whereby background factors related to psychology, upbringing, and social factors, previous experiences, needs, solutions, and opportunities contribute to the offender’s decision to become involved in the burglary. Next, they posed an “Event Model” that outlined the decision-making processes the offender used to select a target residence and proceed with the burglary. Lastly, the “Continuing Involvement Model” outlined the factors that contributed to an offender’s decision to continue being involved in future burglaries, such as experience, peer influence, or family factors. The decisions pertaining to the event itself (“Event Model” decisions) are what situational and/or place-based crime prevention strategies seek to influence, including Routine Activities Theory. By increasing the likelihood of detection, disruption, and punitive outcomes, the goal is to increase perceived risk and discourage the offender from proceeding with the crime.

In 1989, Sherman et al. argued that a place itself has routine activities that are expected and normal, much like people who move through space in their routine activity patterns (1989). They noted that the characteristics of a place that led to higher crime rates were non-random. The purpose of a place adds context, and creates the heterogeneity of places, the collectives who are part of that place, and the expectations of that place (Sherman et al., 1989). A place

may be commercial, private, social, sacred, or public, which consequently creates unique behavioural and organizational norms. For example, a transit stop is a public place that has the purpose of facilitating the movement of people. As such, this location draws highly transient and diverse groups of people and has predictable cycles of guardianship. Conversely, a temple is a sacred place that draws a relatively homogenous group of people who tend to know one another, and has natural guardianship provided by both leadership and membership. Each of these characteristics changes the place from simply a visually bounded space to something more definitive, and those unique characteristics may attract or discourage various types of crime.

To test the theory, Sherman et al. analyzed spatial data from over 300,000 calls for service (CFS) in the city of Minneapolis over a one-year period (1989), with the goal of refining the understanding of “places” where crime concentrated. They offered the definition of a “place” as “...a fixed physical environment that can be seen completely and simultaneously, at least on its surface, by one’s naked eyes” (p.31). The study outcomes supported the theory that crime is concentrated at places and is non-random (Sherman et al., 1989). Specifically, they found that 50.4% of crime in Minneapolis was concentrated at only 3.3% of places in the city. This finding has been replicated numerous times¹⁶ in both urban and suburban settings, prompting Weisburd to reference it as the “Law of Crime Concentration at Place” (2015).

¹⁶ See for example, Amemiya & Ohyama, 2019; Andreson & Malleson, 2011; Andreson et al., 2017; Beavon et al., 1994; Chainey, et al., 2019; Crow & Bull, 1975; Curman et al., 2015; Gill et al., 2017; Haberman et al., 2017; Hillier 2004; Jaitman et al., 2015; Johnson 2010; Johnson & Bowers, 2010; Kautt & Roncek, 2007; Mazeika & Kumar, 2016; Pierce et al., 1988; Weisburd & Amram, 2014; Weisburd & Green, 1995; Weisburd et al., 2004, 2009, 2012; Wheeler et al., 2015.

In 2011, Andreson and Malleson studied a range of crime types (assault, burglary¹⁷, robbery, sexual assault, theft, theft of vehicle, and theft from vehicle), and found that half of these crimes in the City of Vancouver occurred at between 1% to 8% of street segments. They also examined the rate of concentration for each crime type separately and noted that each of the crime types concentrated at slightly different rates. Similarly, in 2015, Curman et al. analyzed crime data spanning 1991 to 2006 and found that 40% of street segments in Vancouver had no crime of any type reported. In a later study, Andreson et al. (2017) analyzed four property crime types and found that 65% of street segments and intersections in Vancouver were free from all four crime types in 2003, and that this increased to 75% in 2013. They again examined crime concentration in Vancouver by crime type and found that approximately 1.2% of all places (intersections or street segments) accounted for 50% of commercial burglaries in 2013, and 2.9% of all places accounted for 50% of all theft from vehicles that year. When places with zero events were excluded from the analysis, they found that 23.2% of places with any crime accounted for 50% of commercial burglary events in 2013, and 15.4% of places with any crime accounted for 50% of theft from vehicles that year. In aggregate, 11% to 14% of places accounted for 50% of crimes overall from 2003-2013 (Andreson et al., 2017). This study did not explore the effects of land use on crime concentration, other than to note that commercial land use was limited, which may contribute to the stability of crime concentrations for commercial burglary. The authors also pointed out that a drop in overall crime rates may create the appearance that crimes were further

¹⁷ As “burglary” is not an offence in the Canadian Criminal Code, this is presumed to refer to Breaking and Entering (BNE). It is possible the authors chose this language to avoid confusion for an international audience.

concentrated; however, when analyzing only places with non-zero values, crime became less concentrated for most crime types (Andreson et al., 2017).

In a study based in Philadelphia, PA, Haberman et al. (2016) found that crime not only concentrated at places, but also at times, underscoring the importance of spatiotemporal analyses of hotspots. While most crime concentration research is based out of the United States, there have been a few Canadian studies, and they have validated the finding of concentration in a Canadian context (Boivin & de Melo, 2019; Wuschke et al., 2021).

Questions have been raised over the most appropriate method of calculating crime concentration. Early methods failed to control for bias in areas with fewer crimes than places. Bernasco and Steenbeek (2016) noted that when using generalized methods of analysis that assumed an even distribution of incidents, where there were fewer incidents than places, the analysis would always be biased toward confirming the Law of Crime Concentration, even if incidents were randomly distributed. There was a need for standardization of methods, and a means to address this bias. More refined methods have confirmed the concentration effect, albeit more modestly than first thought (Bernasco & Steenbeek, 2016; Chalfin et al., 2021; Wuschke et al., 2021). However, the goal of standardization may be elusive, as the range of proposed solutions to the bias problem keeps growing (Bernasco & Steenbeek, 2016; Chalfin et al., 2021; Curiel, 2019; Lee & Eck, 2019; Mohler et al., 2019; Wuschke et al., 2021). The conversation around standardization and the most appropriate methods is relatively new, therefore it remains to be seen which methods will be adopted and how widely.

Sherman et al. (1989) analyzed 323,979 calls to police in Minneapolis for one year and found that different crime types produced varying degrees of concentration. It should be noted

that this effect could also result from varied reporting rates for different crime types (e.g., property crime, which may not be reported unless a police record is required for insurance purposes compared to murder that tends to be reported most of the time. The authors identified several limitations of CFS data, including risks of underreporting, over-reporting, or duplicate reports for single events, and the difficulties with documenting the correct address for the event itself, as opposed to the location of the caller, the victim, or the suspect when police are dispatched (Sherman et al., 1989). McCormick et al. (2012) noted similar crime data challenges in British Columbia with implications for clearance rates and official crime statistics.

An important distinction raised by Sherman et al. (1989) is the difference between a place that *hosts* or *receives* a lot of crime and a place that *attracts* or *generates* crime. He proposed that “crimes arising out of intimate or market relationships may be much less dependent on place than predatory stranger crimes” (1989, p.47). For example, a building may be a hotspot for domestic violence calls because of who chooses to live there, or the likelihood of victims or witnesses to report domestic violence in those locations, but the building itself did not increase the likelihood of violence. The crime would have occurred regardless of where the occupants lived, meaning the overall rate of this crime type would remain the same, even if occurrences concentrate at hotspots. The characteristics of the location may explain why those offences concentrate there but did not cause the offence to take place. This type of hotspot is a *receptor* or *host* to crime but is not a crime generator. The crime is less dependent on place, and, therefore, changing the characteristics of the place will have little effect on the crime (Sherman et al., 1989).

However, if a place is truly a crime *generator*, changing or disrupting the routine activities inherent to that place should reduce the occurrence of crime without displacing it (Sherman et al., 1989). Using convenience store robberies as an example, Sherman et al. (1989) noted that crime was facilitated by these businesses being open at night and having cash on the premises. By altering the places, it is possible to reduce the number of convenience store robberies that occur, even while there are still motivated offenders. Given this, Sherman et al. (1989) noted that the potential for displacement should vary by crime type. In their own words, “[if] routine activities of places are criminogenic, they appear to be more powerfully so for some kinds of offences than others” (Sherman et al., 1989, p.47).

Sherman later found that crime concentration at places was six times greater than concentration among individuals and introduced the concept of “criminal careers” of places (Sherman, 1995, p.36-37). He suggested that places, like offenders, had onset dates, recurrence, frequency, and duration or “desistance” of their criminal careers. Offenders also had intermittency that could be explained by the routine activities that characterized the place, and that high-crime places had varying degrees of crime “specialization”.

Lee and colleagues (2017) conducted a systematic review of crime concentration studies between 1970 and 2015. Overall, the review found that crime was highly concentrated, but they stopped short of affirming it as a “law” of crime concentration. They found that crime was more concentrated at addresses than at other units of analysis, that CFS were more concentrated than reported incidents, and that crime was more concentrated before the historic crime “drop” in the late 1990’s. However, they were unable to reach a conclusion on

the concentration of violent versus property crime¹⁸. Crime concentration at places by crime type should be more thoroughly explored to better address this important question.

Lee et al. (2017) argued that social efficacy¹⁹ could influence the rate at which residents in some neighbourhoods sought police assistance, while other victims resolved the issues themselves or ignore problems altogether – a factor that could influence the appearance of crime concentration for some crime types. This problem was first suggested by Black (1970) as a possible by-product of weak policing and was echoed by Sherman et al. (1989) as a limitation of their data. In summary, it could be argued that fear of crime, police legitimacy, or even police policies about which calls to attend could influence CFS data and could create inconsistencies or gaps in documentation of address data with varied effects across places.

Environmental Criminology

Brantingham and Brantingham (1993) noted that criminologists throughout the 1970s and 1980s were beginning to view crime in the context of the offender's knowledge of the space, their underlying motivations for engaging in crime, and the presence of opportunities. They reiterated Cohen and Felson's theory and added that offenders sought not only places that lacked capable guardians, but also places that offered familiarity and comfort. Furthermore, they blended elements of Routine Activity Theory with Rational Choice and Situational Crime Prevention by suggesting that environmental design, including urban planning and transportation planning, could shape criminal opportunity spaces, such as by reducing the

¹⁸ There is what appears to be an editing error in their paper, whereby they claimed in the abstract that violent crime was more concentrated than property crime, but in the conclusion to the paper they stated the reverse. More than anything else, this oversight is likely an indication of the challenges they encountered in analyzing this variable. Given their description of those challenges (p.10), and the fit of the logarithmic curves (p.11, Table 7), this portion of the analysis is unreliable. To quote the authors, it is "a puzzle we cannot solve with these data" (p.10).

¹⁹ Lee et al. (2017, p.6) define "social efficacy" as "the ability to deal with problems yourself".

presence of crime attractors and generators or increasing forms of capable guardianship.

Perhaps most importantly, Brantingham and Brantingham stated that crime was complex and could not be explained by any one single factor or cause. Both victims and offenders are dynamic and active, changing the opportunity spaces but also responding to changes in the opportunity space.

Criminal events were described by Brantingham and Brantingham (1993) as transactional, meaning the offender was both influenced by and influenced the environment where crime occurred. They introduced the term “environmental backcloth” and defined it as “...the uncountable elements that surround and are part of an individual and that may be influenced by or influence his or her criminal behavior” (1993, p.6). To the extent that an offender can blend in and act comfortably in a given environment without being perceived as an outsider, their motivations and opportunities are influenced by and influence the backcloth. Brantingham and Brantingham (1993) suggested that mathematical modeling could reveal patterns in backcloths that would provide visual models of crime patterns, the practice of which has now emerged not only in the form of hotspot mapping, but also Risk Terrain Modeling (Caplan & Kennedy, 2016; Kennedy et al., 2018) and predictive policing projects, like PredPol/Geolitica (Mohler et al., 2015). These techniques are not relevant to the current evaluation; however, they will be discussed in the final section of this major paper as considerations for future projects.

Brantingham and Brantingham (1993) placed a strong emphasis on an offender’s active and deliberate selection of a crime site and target consistent with Cornish and Clarke’s theory. They placed greater importance on urban planning and environmental design than did Cohen

and Felson (1979); however, in many ways, their work is quite similar and a natural extension of Cohen and Felson's earlier work. By translating routine activity spaces into the language of geography, with activity nodes, pathways, and edges, Brantingham and Brantingham (1993) provided a tangible framework through which to categorize crime places by offence types and allowed for some insight into the opportunity structures that made that type of crime likely to occur in that type of space. With reference to nodes, according to Lynch:

Nodes are strategic foci, into which the observer can enter, typically either junctions of paths, or concentrations of some characteristic. But although conceptually they are small points, in the city image, they may in reality be large squares, or somewhat extended linear shapes, or even entire central districts, when the city is being considered at a large enough scale. (Lynch, 1959, as cited in Desai, 2018, p.2).

An activity node in criminology is defined by Brantingham and Brantingham as a high activity location that allowed for clustering of criminal opportunities, sometimes called "crime generators" or "hotspots" (1993, p.16). By either definition, a node could be, for example, an intersection, a strip mall parking lot, or a transit station.

A pathway is the primary route of travel between nodes, such as main streets, collectors, or even the most familiar route of travel for an offender in a given area.

Brantingham and Brantingham (1993) argued that violent offences were more concentrated at the nodes or endpoints of these pathways, while property crime was distributed along the pathways between nodes and at the nodes. For instance, an assault may occur at the victim's residence, the offender's residence, or a bar they both frequent. However, a burglary may occur at a residence along the offender's daily route to work or some other non-criminal activity (Brantingham & Brantingham, 1993).

Edges are loosely defined as anything that represents a physical or cognitive barrier, real or perceived, or a potential barrier to an outsider or between groups of people (Brantingham & Brantingham, 1993). These could be created by differences in land use designations, perceptions around “territory”, or different socioeconomic environments (e.g., bridges, jurisdictional boundaries, railroad tracks, or transitions between high- and low-income neighbourhoods). These definitions form a cognitive map through which researchers can begin to identify variables unrelated to the criminal event itself that may aid in our understanding of crime places.

Together, these theoretical frameworks help to create a foundation upon which to develop crime prevention strategies and experimental designs to test those strategies. This may include hotspots policing, problem-oriented policing, installation of CCTV systems, or environmental design features intended to deter criminals. In summary, crime is not evenly distributed across a city. It concentrates at a small number of places within the city. Crime concentrations, especially crimes against persons, tend to occur at places known in urban planning geography as “nodes”. There are specific characteristics of that space that either host or attract crime, and that cause them to be part of the routine activities of both offenders and victims. Strategies that increase guardianship or alter the encounters between willing offenders and suitable victims may help to prevent crimes from occurring. Through experimentation, researchers can measure the effect of the strategy and determine whether crime prevention was successful.

Existing Research and the Local Context

The Evidence Base for Hotspots Policing

Hotspots policing is a place-based crime analysis tool that operationalizes the theories discussed in the previous section. Early forms of hotspot analysis date from the early 19th century, where hand-drawn maps depicted crime frequencies alongside other demographic information. Modern hotspot analysis uses mapping software to plot crime data and identify locations where crime concentrates (hotspots). The idea of a crime hotspot draws from several elements of environmental criminology, including the Brantingham's (1993) concepts of "nodes" and "pathways" and Sherman's (1989) definition of a "place". The Brantinghams defined nodes as locations where people may cluster, such as intersections or transit stops – a definition that focuses on land use; whereas Sherman and colleagues define a place by line of sight (see full definition on p.31 of this major paper).

When operationalized, those hotspots are communicated to frontline police officers for proactive policing. For instance, a crime analyst may plot all incidents of auto theft for the past six months onto a map of a particular neighbourhood. This may be accompanied by intelligence products regarding prolific auto crime offenders in the area. The map and any accompanying analyses would then be distributed to police officers to target auto theft in areas where it is most prevalent. This avoids flawed prioritization resulting from word-of-mouth or "recency effect", and instead uses the data to ensure events from all shifts and across an appropriate timeframe are accounted for in the map. Furthermore, it is highly specific and provides a quick visual reference that is easily operationalized by frontline officers. Police strategies, such as

directed patrol and problem-oriented policing,²⁰ can enhance the crime prevention effects of the police well beyond the effect of random and reactive strategies by focusing resources on the highest risk places, times, and people (Braga, 2001; Sherman, 1997).

There have been a number of systematic reviews and meta-analyses conducted on hotspot policing projects. Braga published the first of these in 2001 and included nine hotspot projects. Eight studies were conducted in the United States and one in Australia. According to Braga (2001), the findings of this first systematic review collectively supported the principles of rational choice theory (Cornish & Clarke, 1986), routine activities theory (Cohen & Felson, 1979), and environmental criminology (Brantingham & Brantingham, 1991; Braga, 2001). By 2014, Braga, Papachristos, and Hureau found 19 studies that met inclusion criteria for the systematic review, of which 17 were from the United States, one from Australia, and one from Argentina. By 2019, Braga et al. found 65 qualifying studies²¹, 51 of which were from the United States, four from the United Kingdom, four from Sweden, and one in each of Argentina, Australia, Colombia, Denmark, India, and Trinidad and Tobago. Braga et al. (2019) noted that this represented a 242% increase in eligible studies since the previous review in 2014. The rate of increase is indicative not only of greater buy-in to the hotspots strategy across agencies and jurisdictions, but also, and perhaps more importantly, of a substantial increase in the number and quality of project evaluations being conducted on such projects that can provide insight and guide policy development in this area.

²⁰ "Problem-oriented policing is an approach to policing in which discrete pieces of police business (each consisting of a cluster of similar incidents...) are subject to microscopic examination...in hopes that what is freshly learned about each problem will lead to discovering a new and more effective strategy for dealing with it" (Goldstein, as cited by the Centre for Problem-Oriented Policing at Arizona State University).

²¹ Inclusive of the original studies, such that the nine studies from 2001 were re-analyzed along with 11 new studies in 2014, and all 20 from 2014 were analyzed with 45 new studies in 2019.

Weisburd et al. (2004, 2012) analyzed crime concentration data using trajectory analysis to determine the stability of crime at hotspots. Their analysis looked at 14 years of crime data from Seattle, WA and noted five important findings. First, crime was tightly concentrated at hotspots. Second, hotspots had strong stability over time. Their third and fourth points underscored the importance of micro-level analysis of places to avoid overlooking geographic variability at a micro-level and to understand social and contextual differences between places. Lastly, they noted that crime at places was predictable, and this made it a useful tool for developing crime prevention strategies (Weisburd et al., 2012). Moreover, they found that certain hotspots had steeper changes in crime trajectories over time indicating that just a small number of hotspots were responsible for overall changes in crime rates city-wide (Weisburd et al., 2004). Collectively, these findings lend support to Sherman's (1995) argument that crime places have criminal careers.

A fear regarding hotspot policing is that targeted enforcement in one area will displace crime into adjacent areas; however, to the extent that it has been tested, this does not appear to be a common outcome. Braga's series of systematic reviews and meta-analyses demonstrated some important findings about displacement and diffusion. Braga cites Reppetto (1976), saying that displacement can mean crime moves elsewhere, is committed in another way, or is manifested as another crime type. However, all studies that tested for displacement appeared to test only for geographic displacement rather than method or crime-type displacement. Braga (2001) referenced Clarke and Weisburd's (1994) finding that crime control benefits were observed to "spill over" into places beyond the target areas, rather than crimes being displaced.

Few research designs collected data on displacement or diffusion, and those that did focused only on geographic displacement. Out of the nine studies included in the 2001 systematic review, only five were able to test for displacement and diffusion. Of those five, none could be analyzed beyond immediate spatial displacement. Still, none showed substantial displacement by that measure, while four of the five showed at least modest diffusion. By the 2014 systematic review and meta-analysis, Braga et al. found 17 studies that measured displacement and diffusion but were only able to calculate effect sizes for 13. Of those, nine showed diffusion, three showed non-significant displacement, and one showed significant displacement but net crime reduction overall. Again, these were only tested for immediate spatial displacement.

In the 2019 systematic review and meta-analysis, 46 of the 78 studies could be assessed for displacement and diffusion (Braga et al., 2019). The meta-analysis showed a small but significant overall diffusion effect (.086; $p < .001$). There remains a significant gap in the literature regarding displacement, particularly displacement beyond immediately adjacent areas, and what Weisburd and Telep (2014) referred to as “non-areal” displacement, or displacement to other crime types or methods. Weisburd and Telep commented on the challenges of isolating displacement at a jurisdiction level given the way treatment areas had been randomized across those jurisdictions. For instance, the features of a place that cause it to become a hotspot may not be present in adjacent streets or neighbourhoods, so measuring for displacement into immediately surrounding areas may be misleading. Monitoring for displacement should be done across larger areas and should consider place features and

emerging hot spots. However, randomization of treatment areas in most hotspot studies makes it difficult to measure displacement beyond a few city blocks.

Hotspot policing is an attractive model to use for research purposes because it allows for measurement of outcome metrics in treatment areas, such as patrol dosage, effects on the target offence, effects on other crime types in the same location, public perceptions of police, and resource allocation. It also allows for comparative analysis of occurrences, calls for service, seizures, and other police activities in treatment versus control areas. Hotspot analysis is a tool that is most effective when paired with one or more evidence-based enforcement strategies, such as directed patrol or problem-oriented policing. For instance, pairing hotspot analysis with problem-oriented policing to target violence (Braga et al., 1999), or directed patrol to target gun crimes (Sherman et al., 1995) has been more effective than pairing hotspot analysis with crack house raids (Braga, 2001; Sherman & Rogan, 1995) or drug crackdowns (Braga, 2001; Dandurand, 2021). In summary, once the hotspots have been identified, police can employ a range of strategies at those locations, including evidence-based effective strategies, such as problem-oriented policing and directed patrol, or ineffective strategies, such as drug market crackdowns.²² Hotspot policing is a tool intended to be used in conjunction with other effective strategies and is not a strategy on its own.

The optimal length of a patrol during a project has been proposed by Koper (1995), Telep et al. (2012), and Williams and Coupe (2017), among others. In a 1990 paper on police crackdown projects, Sherman recommended random, unpredictable deployments to raise the

²² For a more in-depth discussion on the importance of what police do at hotspots, see Dandurand (2021), Gibson et al. (2017), Groff et al. (2014), Taylor et al. (2011), and Weisburd et al. (2015).

risk perception of potential offenders. He referred to this as “systematic uncertainty” (1990, p.44). Koper (1995) built on this at a micro-level, recommending a patrol duration of 11-15 minutes per hotspot, and random, unpredictable movement between hotspots. This technique has since been referred to as the “Koper Curve”. It was tested and found to be effective by Telep et al. (2012) who assigned officers to rotate randomly between hotspots spending 15 minutes in each one. However, a question less frequently addressed in the literature relates to effect decay, or how long the crime reduction benefit of a hotspot project lasts in an area before crime levels return to pre-treatment levels (see Sherman et al., 1995 for an exception).

This gap in this body of knowledge on hotspot policing has enormous implications for policy development, project implementation, budget allocation, and planning in police agencies seeking to optimize their deployment models for crime reduction. In many jurisdictions, austerity and competing operational priorities prevent implementation of focused crime reduction strategies in all districts on a continuous basis. Borrowing from the concept of the Koper Curve for optimal length and duration of patrols, local research should explore the optimal duration of projects to maintain crime reduction benefits in hotspots in British Columbia. This would enable agencies to plan for projects throughout the year targeting all hotspots at once or to set up roving hotspot patrol projects in different districts at different times on a schedule that maintains the ideal project frequency and duration in each zone.

Defining Gangs and Gang Responses

In addition to understanding hotspots policing as a targeting strategy, police agencies should also have a solid understanding of the specific crime types occurring at those hotspots. In the current study, the focus is on gang-related violence. Therefore, an understanding of

gangs is critical to implementing an effective response. This section will discuss gang definitions, the challenges of leveraging gang literature from other jurisdictions, and what is known about the local gang landscape in British Columbia.

Academic literature is saturated with gang definitions, some so vague that nearly any collection of people could be loosely defined as a gang, while other definitions are so prescriptive that they are not useful outside the specific context for which they were written. For gang scholarship to be useful in policing practice, as well as for comparative study, some consensus is needed on what defines a gang. However, there is also a very real risk of paralyzing gang research around the quest for a perfect definition at the expense of more valuable explorations into policy options and targeting strategies (Spergel, 2002).

It is also important to appreciate the cultural and regional differences between gangs in different countries. According to Klein (2001), “most American gangs are Black or Hispanic, and unmixed” (p.8). Curry et al. (2014) placed a strong emphasis on graffiti, claiming of gang status by members, and symbols as indicia of gang membership. Organized crime groups, such as the Triads and Yakuza, are longstanding and powerful in their respective countries, and the Triads are noted to be recruiting poor, rural youth into street gangs in Chinese cities (Decker et al., 2022). Gangs in the United Kingdom have developed a “county lines” model of drug trafficking, whereby the gangs recruit or exploit vulnerable adults and youth to work in rural communities for drug lines based out of larger cities (James, 2018). This blurs the line between a member versus an employee of the gang, or even a victim of the gang (James, 2018). Decker, Pyrooz, and Densley (2022) summarized gang literature from Canada, which is primarily from Ontario and Quebec, emphasizing First Nations gangs and immigrant youth as key focus areas.

McConnell (2015) noted that gang members in British Columbia tend to be multiethnic and often come from affluent households, though his work focused on the Lower Mainland region of the province. Proper consideration of these differences may require a pluralistic approach to gang scholarship, rather than the current quest for unifying theories and definitions (Wegerhoff et al., 2021). Moreover, the dearth of scholarship on gangs in many jurisdictions will limit the application of highly prescriptive definitions because there is insufficient evidence to determine whether those definitions apply at the local level.

The definition itself should not introduce arbitrary limitations on the scope of research. For example, it is not helpful in a British Columbian context to limit scholarship to “youth”, as this could exclude many of British Columbia’s active gang members. For instance, Osterberg (2020) noted that the average age of a gang victim between 2006-2015 was 28 years old, and that many gang victims were gang-involved themselves. More recently, a province-wide warning was issued to the public about 11 high-risk gang members. The ages of those gang members ranged from 21 to 40 years old, with an average age of 29 years old (Judd, 2021). Gangs in the American scholarship also tend to be ethnically homogenous whereas, in British Columbia, gang membership is multicultural and socioeconomically diverse (McConnell, 2015; Osterberg, 2020). Whether a unifying or pluralistic approach is adopted, a gang definition should provide researchers and readers with a clear understanding of which individuals, groups, and behaviours are being studied. Given this, a brief overview of some available gang definitions is presented below and concludes with a definition that is suitable for this major paper.

In one of the earliest definitions of a gang, Thrasher stated that a gang was “an interstitial group formed spontaneously and then integrated through conflict” (Thrasher, 1936, p.57). This definition is simple, clear, and concise. It is foundational in that it could be applied to any enduring violent group without being influenced or limited by typologies, thus making it a useful choice for theory development. However, in practice, typologies and specificity become necessary to allow for hypothesis testing, program or policy development, and evaluation. Klein (1971), Short (1996), and others proposed subsequent definitions that focused largely on youthful membership, delinquency, and continuity in various forms, though these definitions have not been widely adopted (as cited in Curry, 2015).

Curry et al. (2014) proposed a set of defining elements that qualify an offending group as a gang. To qualify as a gang, they suggested that the gang should be a group, should use symbols and unique communication, should have permanence, be involved in crime, and *may* include street orientation or “turf”. Currey and Decker (2014) also list “claiming” as a criterion for defining a member of a gang. According to Currey and Decker (2014), an individual who claims to be a gang member should be defined as being in a gang, while one who denies being a gang member should not be defined as one. They contended that gang members’ own definitions of a gang were generally grouped into two categories, namely “criminal involvement” and the various aspects of friendship, culture, and affiliation that led members to view the gang as a family (Curry et al., 2014; Decker et al., 2022). This final point is broad enough to differentiate between gangs and other types of groups in most contexts, and, in some ways, echoed Klein’s observation that gang members tended to adopt a “master identity”

centred on their gang, whereas other groups retained their individuality outside of group activities (Klein, 2001).

While well-supported in American studies, these criteria have not been validated on a British Columbian sample and, therefore, must be approached cautiously in this context. For example, the extent to which British Columbian gang members use “unique communication” should be studied to determine whether certain expressions are unique to specific groups as opposed to simply being the common vernacular of the drug trafficking subculture in British Columbia²³. Moreover, claiming may be disincentivized in Canada due to legislation that applies sentencing enhancements to offences committed on behalf of a criminal group (*Criminal Code*, s.467.1-467.14). Tendencies toward claiming could potentially be discouraged by legal counsel or one’s experience in the legal system over time, effectively limiting that behaviour to younger gang members who have had less contact with the criminal justice system. Further study by non-police researchers should be undertaken to clarify whether the jeopardy of charge enhancement affects claiming behaviour, and whether it is more likely to manifest through proxies, such as bragging about weapons carrying, gunshot wounds, or living the gang lifestyle.

Tattoos are another unresolved question. Many gang members in British Columbia are heavily tattooed, and several British Columbian gangs have distinctive gang-related tattoos (Bolan, 2018). However, this does not appear to be a requirement of gang membership. Where present, a gang tattoo in British Columbia seems more of an outward demonstration of the gangs as family (Decker et al., 2022) or master identity (Klein, 2001) concepts referred to above.

²³ For a review of case law dealing with drug trafficking expressions, see Cohen et al., 2021. These unique expressions are universal within the drug subculture but not specific to any one gang.

Curry and colleagues ultimately endorsed the Eurogang Consensus Nominal Definition of Street Gangs (Curry et al., 2014; Esbensen & Maxson, 2012; Klein et al., 2001). The process that led to the Eurogang Definition represents a commendable effort to consolidate international perspectives. A series of workshops was held that engaged gang researchers from around the world (Esbensen & Maxson, 2012). To arrive at a universal definition, Klein led a group of gang scholars who debated definitional issues over three years before drafting the Eurogang Definition. A consensus was reached on a list of criteria for defining European gangs. The final list of criteria were:

1. Beyond-normal engagement in criminal (delinquent) activity;
2. A level of social organization greater than the usual informal youth group;
3. A degree of temporal stability;
4. Indicia of group identity (name, rituals, clothes, signals, etc.);
5. Opportunities in space to come together with some regularity;
6. Perceived blocks to social opportunities; and
7. A tradition as a group that can be passed on to new members. Connection with a specific territory may be common (Klein et al., 2001, p.334).

From this list of criteria, the Eurogang Consensus Definition was drafted. This definition states that: “[a] street gang is any durable, street-oriented youth group whose involvement in illegal activity is part of its group identity” (Esbensen & Maxson, 2012, p.5). While it is not explicitly clear why emphasis was placed on youth in this definition, Klein (2001) noted that their objective was to differentiate youth gangs from other youth groups suggesting that the focus on the younger age bracket may have been presumptive.

While the Eurogang Definition has developed a following among many gang scholars, it is not necessarily applicable to gangs in all jurisdictions (Aldridge et al., 2012; Jingfors et al., 2015; Osterberg, 2020; Rodriguez et al., 2017; Wegerhoff et al., 2021). Densley commented that some British scholars avoid using of the term gang entirely because the label is “so

dangerously leveraged by American ideology and policy prescription that it can neither be translated nor meaningfully used in the British context” (2012, p.43). The same concerns arise in the Canadian context, where culture, legal systems, socioeconomic variables, and political values are more similar to Europe or the UK than to the US. Klein noted many of these problems in the context of gang research more broadly, noting that most American gangs would also not fit the typical understanding of an American gang. He termed this the “Eurogang Paradox” with the Eurogang Definition intended as a solution to the problem. Yet, Spergel (2002) noted that the Eurogang workshops were premised on what he described as an “arrogant presumption” that American gang researchers had a wealth of knowledge to impart upon European gang researchers. The overwhelming influence of American scholarship leaves the Eurogang Definition, ironically, most applicable to a limited subset of American or American-style gangs.

There are several key assumptions in the Eurogang Definition that are problematic for the local context. First, the definition contains an age-limiter that excludes large proportions of gang-involved individuals by assuming gangs are made up solely of youth. This is perhaps most concerning because it risks excluding gang leaders and more experienced and entrenched life course gang members from the reference group. This could bias research sampling toward less experienced, less organized, less affluent, and less established groups. Second, the age limiter introduces the need to define youth to apply the definition, and youth are not defined the same way in every context nor in every country (Juhasz, 2019). Third, as noted by Aldridge et al. (2012), the definition assumes that gangs are always street entrenched. In British Columbia, gang experts have said that many gang members reside with their families in middle- or upper-

middle class homes (Jingfors et al., 2015). Others, such as outlaw motorcycle gang members, lead seemingly normal lives to the casual observer, maintaining a certain amount of insulation from the street-level activities of the criminal enterprises they oversee. Lastly, most American gang scholarship has taken for granted that gang members come from a backdrop of poverty and disadvantage (Curry et al., 2014). Yet, gang members in British Columbia come from all socioeconomic and cultural backgrounds, including many from affluent two-parent homes (Jingfors et al., 2015; Juhasz, 2019; McCuish et al., 2015; Osterberg, 2020).

To address the issues with the Eurogang Definition, Jingfors et al. (2015, p.2) proposed Miller's definition as a better fit for British Columbia. This definition contended that a gang was:

...a self-formed association of peers, bound together by mutual interests, with identifiable leadership, well-developed lines of authority, and other organizational features, who act in concert to achieve a specific purpose or purposes which generally include the conduct of illegal activity and control over a particular territory, facility, or type of enterprise (Egley et al., 2006, p.7, as cited in Jingfors et al., 2015).

Although originally intended to define youth gangs, Miller's definition avoids age-limiters, allows for the inclusion of all levels of membership, and recognizes that "turf" may be the enterprise itself rather than a physical street corner. However, this definition is perhaps overly prescriptive in the context of clearly defined leadership, which varies from one gang to the next, and, as Densley (2012) noted, may become more consolidated with time and maturation.

Issues with the Eurogang Definition arise in many jurisdictions outside the United States, yet some scholars have opted to use it anyway, while noting its limitations (see Densley, 2012 for example). Perhaps more important than the definition itself are the underlying assumptions about gangs and organized crime groups. Some scholars adhere to a view that gangs are highly organized and structured, whereas others view them as a fluid and dynamic network of people

that evolves along a spectrum over time (Densley, 2012). Densley describes a sequential evolution of gangs in which they emerge as neighbourhood-based youth groups but grow and expand their organizations over time in response to threats, financial commitments, and opportunities with successful groups eventually maturing into high functioning organized criminal enterprises (Densley, 2012). Early in this evolution, gangs will actively recruit members, while reaping minimal financial rewards since most profit must be reinvested. As the gang matures, new members will seek out the gang. As the individual members mature, their focus shifts from seeking reputation and street credit to seeking financial stability facilitating the group's evolution into a more profitable criminal enterprise (Densley, 2012).

Gang definitions within Canadian public service agencies can be similarly problematic and inconsistent. Public Safety Canada published a research brief on the topic of gang definitions. They cited Wortley, who recommended the following definition:

A gang is a group of three or more individuals that has existed for at least one month and engages in criminal activity on a regular basis. Gang-related crime can be conducted within the group context or by individual gang members in isolation – as long as such criminal activity, directly or indirectly, benefits the gang (Wortley (2010), as cited in Public Safety Canada, 2011).

This definition avoids age-limiters and is aligned with the language and criteria used in the *Canadian Criminal Code* in reference to various enterprise offences. It is also aligned with the definition of a gang-related homicide that is used by police agencies in British Columbia, and by Statistics Canada. It requires that the criminal activity be committed for the benefit of the gang, which effectively excludes “other youth groups” from the definition, thereby addressing some of the concerns raised in the Eurogang discussions. However, this definition also has some drawbacks. While this definition states that crimes must be committed for the benefit of the gang, in practice, it may be difficult to ascertain which crimes benefit a gang. These must be

investigated on a case-by-case basis, as even identical criminal offences can be committed for a variety of different reasons. For instance, a drive-by-shooting may be for the benefit of a gang, such as to intimidate a witness, or for the benefit of an individual, such as the intimidation of an ex-girlfriend. Overall, this definition may not be as helpful for international comparative research because it allows for the inclusion of organized crime groups in the definition; however, in Canada, and particularly in Western Canada, this definition is accurate and fits the local context very well.

Gangs in British Columbia are often what McConnell describes as hybrids between street gangs and organized crime. This conceptualization is consistent with Densley's description of the evolution of gangs as they grow and mature (Densley, 2014; McConnell, 2015) and captured in Wortley's concept of a spectrum from street gangs to organized crime (Osterberg, 2020; Wortley, 2010). It may be useful in the future to apply an organizational psychology lens to our understanding of gangs in British Columbia with specific attention focussed on the relative power distance within gang hierarchies in British Columbia compared to elsewhere in Canada and to American gangs. The seemingly rapid progression of British Columbia street gangs toward an organized crime typology may be related to less local competition and higher cooperation, particularly in smaller markets (Cohen et al., 2022b). Moreover, British Columbia may offer geographic opportunities related to illicit commodities and transportation infrastructure, such as ports, that allow groups to quickly grow their illicit enterprises.

The underlying assumptions reflected in many gang definitions are the result of a persistent overreliance on American data and scholarship, which is not necessarily

generalizable outside of the United States (Osterberg, 2020). With vastly different population profiles, social and political values, socioeconomic structures, and legal systems, it is hard to imagine a scenario where American scholarship would be directly applicable to British Columbia without significant limitations. Against that backdrop, the lack of robust Canadian gang research presents a concerning barrier to evidence-based policing, gang intervention programming, and policy development that requires urgent attention from Canadian criminologists.

Collectively, the research synthesis on place-based policing and gangs draws on an enormous body of literature. To summarize the relevant work presented above, research has shown that crime concentrates at places, such that a large proportion of crime occurs at a small number of places within a city (Weisburd et al., 2004). Crime concentrations vary slightly by city or crime type, but the proportions are relatively similar across jurisdictions (Lee et al., 2017), and are relatively stable over time (Weisburd et al., 2012). The most effective unit of measure of crime places is a hotspot. By mapping hotspots and integrating hotspots policing with other strategies that are grounded in research, significant crime reduction benefits can be realized, not only in the hotspots but potentially in the hotspot's surrounding areas (Braga, 2001; Braga et al., 2014; Braga et al., 2019; Clarke & Weisburd, 1994; Ratcliffe, 2019), although researchers should monitor for non-areal displacement (Weisburd & Telep, 2014).

There is a robust literature on gangs, particularly in the United States; however, findings from that body of work may not be generalizable to the British Columbia gang landscape (Juhasz, 2019; Osterberg, 2020). Gangs in British Columbia lack several of the key features of gangs in the available literature from outside the jurisdiction. In particular, British Columbian

gangs are seldom ethnically homogenous and appear to vary more by age and socioeconomic status than gangs described in the literature. Gang definitions tend to be highly contested, and this may be partly due to substantial gaps in non-American gang research. The Eurogang Definition is widely popular but is heavily directed toward youthful offenders. A more appropriate definition for British Columbia may be Miller's definition, which avoids age-limiters and acknowledges that, for some gangs, enterprise may be the more important territory than physical space.

In addition to defining a gang, it is also helpful to include a note here on responses to gangs. Gang responses by police or community organizations can be organized into three main categories: prevention, intervention, and enforcement/suppression. Gang prevention programs seek to prevent youth from becoming involved in gangs. Gang intervention programs aim to reduce delinquency of gang-involved individuals or to reduce gang-affiliation by providing gang members with pathways out of the gang life. Gang enforcement is targeted enforcement directed at gangs and gang-related harms. For a more fulsome discussion of the gang prevention, intervention, and enforcement programs that have been evaluated in Canada, see Wong et al. (2012).

Against this backdrop, an integrated gang enforcement police agency in British Columbia offers a variety of programs to address gang proliferation, including prevention and education, intervention and exiting, and targeted enforcement initiatives. In 2018, this agency designed and implemented a directed patrol hotspot policing project to address gang violence incidents within the Lower Mainland of British Columbia. This project was exclusively an enforcement-focused project at the outset; however, more recent iterations included intervention strategies

alongside the enforcement initiative. The projects will be discussed in greater detail below; however, more contextual information on the gang landscape in British Columbia is required to understand the context for which these projects were developed.

The British Columbia Gang Landscape

Until recently, very little research had been done on gangs in British Columbia, and what had been done relied heavily on media coverage as a data source. The need for greater collaboration between law enforcement and academia has been acknowledged and existing research funding streams were restructured in 2017 leading to the formation of the Crime Reduction Research Program (CRRP) overseen by the Police Services Branch of British Columbia. However, the gap in gang-specific research persists, particularly as it relates to understanding how local gangs differ from the predominantly American understanding of gangs that permeates the literature and public discourse.

While a small number of publications have touched on the characteristics of British Columbia's gangs as part of a broader research question (i.e., Mayor's Task Force Findings Report, 2018; Jingfors et al., 2015; Juhasz, 2019; Osterberg, 2020), no peer-reviewed studies to date have taken a rigorous, empirical approach to identifying and validating risk factors for gang involvement in British Columbia. The Combined Forces Special Enforcement Unit of British Columbia (CFSEU-BC) has done some preliminary analysis to try and address this gap in the literature (Wilson et al., 2019). They examined a small sample ($n = 18$) of adult gang members enrolled in the agency's Gang Intervention and Exiting program and found that individuals enrolled in the program presented with a wide array of domains affecting their ability to leave gangs. In this study, 100% of the sample presented with moderate-to-high levels of trauma and

victimization. A majority of the sample also presented with problems with education and employment (Moderate = 24%; High = 70%) and/or mental and physical health problems (Moderate = 25%; High = 65%). Other domains that affected individuals to varying degrees included lifestyle and friends, family relationships, living arrangements, and substance use (Wilson et al., 2019).

Furthermore, the focus on South Asian gangs in media, scholarship, and policing discourse in British Columbia has led to programming and strategies primarily directed at the South Asian community. Data collection has focused on gang members who connected with those services, and this reinforced the perception that these gang members were representative of the overall gang landscape. However, this may not be true. Caucasians make up the largest ethnic group among British Columbia's gang violence victims²⁴ (CFSEU-BC, 2015). While South Asians are over-represented among gang victims as a proportion of the entire population of British Columbia (Jingfors et al., 2015; Osterberg, 2020), they tend to be somewhat concentrated within a few cities that have large South Asian populations (Osterberg, 2020). This variation from city to city is important when developing programs, services, and violence reduction strategies at a city level. For example, there are many important differences in motivations, opportunity structures, and pathways in and out of gangs for a FN gang member (Descormiers & Corrado, 2016) compared to a South Asian gang member (Sangha, 2018). Programs that focus on the social spaces of affluent gang members of one race/ethnicity will

²⁴ As a subset of gang membership in British Columbia, gang victim data provides a proxy measure of gang demographics used in several infographics on the CFSEU-BC website (see for example, <https://www.cfseu.bc.ca/wp-content/uploads/2018/10/FUTURE-VICTIM-2018-01-1-1024x797.png>). While victim data is also an imperfect sample of overall gang demographics, it is less prone to selection bias than the available alternatives.

invariably overlook gang members that originate in poor neighbourhoods or come from other racial/ethnic backgrounds, even within the same city. Province-level data is insufficient to capture this nuance. It is important that individual municipalities develop an accurate and nuanced understanding of the specific gang issues in their own jurisdictions and tailor their responses accordingly.

The focus on race/ethnicity to the exclusion of more important variables, such as childhood trauma, substance use, or mental health diagnoses, presents the risk of misrepresenting British Columbia's gang problems in ways that are harmful, while overlooking very real and critical risk factors that cut across racial/ethnic differences and warrant meaningful, evidence-based interventions. For instance, programs that assume race/ethnicity are the key risk factor will inevitably focus on race/ethnicity in their interventions. They may focus on connectedness to community or faith, racism in schools, or personal identity, while neglecting family violence, substance use issues in the home, or childhood trauma. This means resources could be poured into programs that fail to address the underlying causes of gang involvement. Conversely, it is important to understand the role of race/ethnicity in context. If racialized persons are experiencing greater harm than their Caucasian counterparts within gangs, this would also have implications for gang outreach programs and services. While new and creative research opportunities are attractive, the greatest need is for foundational and descriptive work that has yet to be done in British Columbia. Prevention, intervention, and suppression efforts must be designed so that they are relevant and effective for all racial/ethnic identities. Tailoring responses exclusively to South Asian gang members risks reinforcing a narrative that most gang members are South Asian, or worse, that most South Asian young men

are gang members. This weakens our collective response to gangs and risks leaving other racial/ethnic groups underserved and under-policed. Suppression strategies can also be vulnerable to this bias if designed to target selected individuals. One way to avoid this bias is to design suppression strategies that focus on high-risk behaviours, such as weapon-carrying, commodities like firearms or large volumes of controlled substances, and high-risk places for gang violence.

Knowledge Action Cycle: Directed Patrol at Gang Violence Hotspots in British Columbia

This section presents a case study of how a police agency designed, implemented, and evaluated directed patrol hotspot policing projects at gang violence hotspots in British Columbia. The agency's specialized policing capacities are diverse and fluid. Their current mandate includes a range of organized crime groups and street gangs involved in serious violence, illegal gaming, money laundering, firearms trafficking, and domestic and international drug trafficking.

The enforcement unit tasked with actioning the hotspot projects was a uniformed gang enforcement unit. The officers in this unit have specialized training and experience prior to joining and continue to receive specialized training throughout their tenure with the unit. They are typically double-crewed²⁵, operating unmarked but fully equipped police vehicles. They focus almost exclusively on gang-related proactive policing²⁶, and are authorized to operate across all jurisdictions in the province. Their activities include proactive patrols with a focus on

²⁵ "Double-crewed" refers to when police (or paramedics) are deployed two officers to a vehicle.

²⁶ While the unit will occasionally respond to urgent patrol calls, such as officer calls for assistance or calls for service involving serious imminent harm, they are not dispatched to routine calls for service.

violence suppression and weapons seizures, warrant executions, curfew and house arrest checks, and a variety of specialized operational functions.

The agency also has a large and diverse contingent of analytical staff, including Criminal Intelligence Analysts, Open Source Analysts, and Strategic Intelligence Analysts that support investigations and operational teams. Additionally, the analytical unit that developed the projects discussed in this major paper includes Senior Research Officers, Strategic Research Analysts, and a Research Assistant who report to a Manager and Director of Strategic Research. Members of the unit have (or are in the process of completing) Masters or Doctoral degrees in a variety of fields. Current and past members have held degrees in Criminology, Forensic Psychology, Economics, and Business Administration.

The unit's roles are to operationalize research to advance evidence-based programs (EBP) in the agency's operations, liaise with external researchers on program or unit evaluations, oversee the capture and reporting of business analytics to ensure transparency and fiscal accountability to government and the public, and draft strategic plans. Products created by this unit include research products, outcome reports, strategic plans, reports or briefings to various levels of government, infographics and presentations, business cases, specialized analytical products, program evaluations, and specialized briefing notes or in-person briefings to operational units or various levels of police leadership. Methods vary depending on project objectives, but can include trend analysis, social network analysis (SNA), spatiotemporal analysis, risk assessment, environmental scans, interviews, or field observations. Over the past several years, the unit has designed directed-patrol hotspot projects targeting gang-related

violence. These projects have been actioned by the agency's uniformed enforcement unit. Two of these projects are presented here.

In mid-February 2018, a strategic research analyst in the analytical unit conducted a routine review of gang violence data for the preceding decade. The objective was to identify trends and insights that could contribute to future violence reduction initiatives. In doing so, the analyst conducted a time series analysis and noted that the month of March was repeatedly the most active time of year for gang-related homicides and attempt homicides. This finding was conveyed verbally to the Director and then the Chief Officer, who asked whether there was a technique that could be used to address the problem. Given the temporal and geographic concentration of past events, a hotspots policing model was proposed. The Chief Officer allocated resources and tasked the project analysts with developing a violence reduction hotspots project to launch at the beginning of March. With the analysts conducting the research and analysis, and uniformed gang enforcement officers actioning the project, Project #1 went live across three cities on March 3, 2018 for four weeks. Upon conclusion, the project was evaluated for efficacy and cost effectiveness. This first project represents the Implementation and Evaluation phase of the Knowledge Action Cycle. The project was repeated in March 2019 (Project #2) in collaboration with police of jurisdiction in two of the original three cities. The model was refined, expanded, and taught to partner agencies. This represents the Institutionalization and Sustainability phase of the Knowledge Action Cycle.

Project #1: Implementation and Evaluation

Homicide and attempted homicide events in British Columbia are reviewed by analysts to determine whether they are gang-related based on an agreed set of criteria used by all

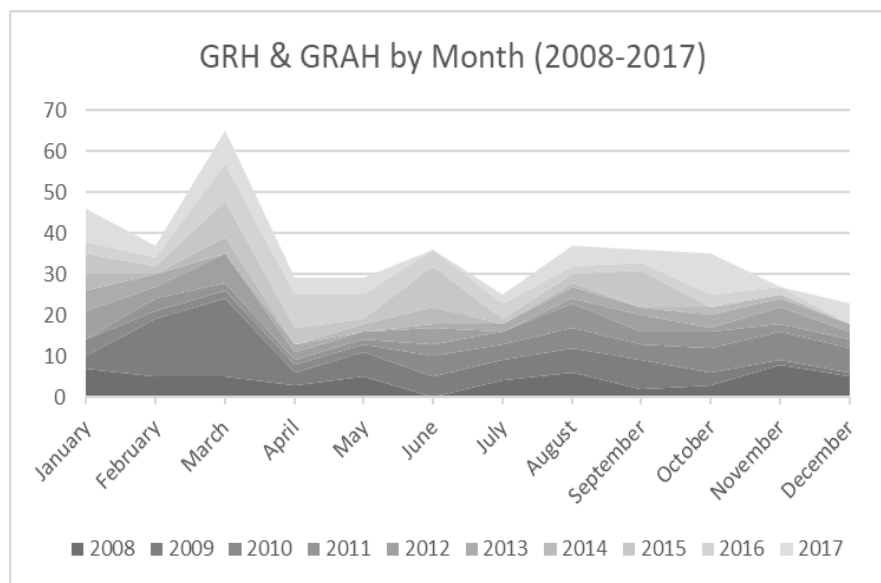
police agencies in the province. “A homicide is considered confirmed gang-related when one person involved in the homicide was a member or associate of an organized crime group and the incident was committed to gain material, financial, and/or power-based benefits for the group. A homicide is suspected to be gang-related when one person involved in the homicide was a member or associate of an organized crime group and it is suspected that the incident was committed to gain material, financial, and/or power-based benefits for the group” (CFSEU-BC, n.d.). Classifications of individual incidents are subject to change as investigations progress and new evidence becomes available. Figures used in this major paper reflect what was current during the projects and, therefore, may differ from current statistics. Events listed as “confirmed” or “suspected” gang-related at the start of the project were included, and, for this major paper, will be referred to collectively as gang-related homicides (GRH) and gang-related attempt homicides (GRAH). Events listed as “not gang-related” or “unknown” were excluded. Data available for Project #1 covered the period of 2008-2017. GRH (n = 193) and GRAH (n = 218) were then merged²⁷ for a combined total of 411 events.

Descriptive statistics were analyzed for the full data set (2008-2017), as well as a subset of the most recent three years (2015-2017) to ensure historical events did not skew the data, and to better understand more current trends. The mean number of combined GRH/GRAH events per month over the full decade from 2008-2017 was 3.43, while the mean number of events per month over the most recent preceding three years (2015-2017) was 3.53. The mean number of events occurring in March from 2008-2017 was 6.5 events (n = 65 over 10 years),

²⁷ The decision to merge these two event types was based on the premise that attempted and successful drive-by shootings are the same behaviour with the same risks to the public, they occur with nearly equal frequency, and factors influencing survival, such as time to treatment, may have little or nothing to do with the offence itself.

and for 2015-2017 was 8.67 events (n = 26 over three years). Furthermore, GRH/GRAH in the month of March was skewed toward the beginning of the month, with 79% of the March events occurring in the first two weeks of March.

Figure 3: GRH & GRAH by Month (2008-2017)



To explain this finding, analysts looked for recurring events that could potentially alter the routine activities of police, gang members, or drug purchasers, such as statutory, cultural, or religious holidays, anniversary dates of high-profile gang incidents, and school breaks. No relationship was identified. Interestingly, this period does coincide with tax season and government fiscal year end; however, there is no obvious link between those activities and lethal gang violence. Supplementary cheques that could increase liquid revenue for drug purchasers are remitted throughout the year, such as clothing allowances, so this should not disproportionately influence drug market activities in the beginning of March. Suggestions for further investigations into the March trend are discussed further in the Recommendations section.

To remove possible confounding variables and gain a more precise understanding of these events within the Lower Mainland, analysts removed all events that occurred in correctional institutions, at unknown locations²⁸, or outside the Lower Mainland. After coding for jurisdiction, analysts noted that lethal gang violence events over the preceding three years were distributed across four jurisdictions (Cities A, B, C, and D). Cities A, B, and C accounted for 93% of all lethal gang violence events in the Lower Mainland during the preceding three years. City A accounted for approximately 19% of the Lower Mainland population²⁹ but had 64% of March's lethal gang violence events between 2015-2017. City B accounted for 22% of the Lower Mainland population, and 21% of lethal gang violence³⁰. Cities C and D represented 5.1% of the Lower Mainland population each, and 7% of lethal gang violence events each, for the same period. Intelligence suggested that City C was central to an ongoing gang conflict at the time and was, therefore, included in the project. City D was geographically "caught in the crossfire" between Cities A and C but did not have a large resident population of gang members at that time. Most victims targeted in that city were residents of either City A or City C. Consequently, City D was excluded from the project to better focus available resources. Finally, for all GRH/GRAH events occurring in the month of March, 76% of victims were targeted while in a vehicle and nearly all were shot. This meant that a directed vehicle patrol model was particularly well-suited to target the problem as opposed to, for example, foot patrol.

²⁸ Unknown locations typically occur when victims use some conveyance other than an ambulance to reach hospital and refuse to disclose the location of the shooting to police. They may also include "found body" incidents where the location of the homicide is unknown.

²⁹ All population estimates are taken from Government of British Columbia. (2020). *British Columbia Development Region and Municipal Population Estimates*. [Excel Spreadsheet]. Retrieved from: <https://www2.gov.bc.ca/gov/content/data/statistics/people-population-community/population/population-estimates>

³⁰ Despite the lower per capita rate of violence, this city was still included in the analyses because it had the second highest number of events overall.

Based on information from previous victim analysis, and a review of the events in the focus cities, the project proposed by the analytical unit aimed to disrupt violence opportunities through directed patrol at hotspots within these key jurisdictions for March 2018. The agency approved an overtime budget for proactive, directed patrols for a four-week period. Project teams were assigned surplus to regular deployment to ensure “policing as usual” was maintained outside of the project areas. The Senior Management Team set an ambitious goal of achieving zero homicides during the project.

The analytical unit anonymized and mapped lethal gang violence events in the three target cities to produce a kernel density map³¹ for each city using the 2018 trial version of ArcGIS Pro. The density maps³² showed the concentration of GRH/GRAH in each city. Victim profiles unique to each city were identified. Time series analysis revealed peak times of day and days of the week for lethal gang violence events in each of the three jurisdictions (see Table 1).

Table 4: Temporal Concentrations of GRH/GRAH by City

Project #1	Peak Day(s) of the Week	Peak Times of Day
City A	Saturday-Monday	1800-2200
City B	Sunday	2200-0400
City C	Monday-Friday	No peak time provided

The map of City A revealed distinct clusters of hotspots within neighbourhoods, meaning that not only did individual occurrences cluster into statistically significant hotspots,

³¹ Based on a definition provided by ESRI (n.d.), kernel density calculates the density of point features (crime events in this case) within a neighbourhood. To visualize this, a smoothly curved surface is fitted over each centre point. The density is highest at the centre point and fades out over a predetermined distance. Only a circular neighborhood is possible, although certain settings allow adjoining or overlapping density circles to be blended, creating non-circular visuals on the map. This differs from a hotspot, which is the centre point of a group of individual events calculated over a predetermined distance. A kernel density highlights entire neighbourhoods, whereas a hotspot highlights a single location, such as an address or intersection.

³² Maps and other materials pertaining to operational deployment incorporate data from multiple sources and cannot be disseminated without permission from each originating agency.

but the hotspots also formed visual clusters within neighbourhoods. These clusters were easily visualized through the density map. Such clustering of hotspots has been noted by other researchers, most notably Gill et al. (2016). In consultation with the officer in charge of the enforcement unit, a “box” was drawn on the map that captured all of the clusters and nearly all of the events. Main roadways were used as the patrol box boundaries, as this was a logical and efficient way to translate the data into practical instructions for the teams. The box was 36 city blocks long (North-South) by 16 blocks wide (East-West). The most active time of day in City A was 18:00-22:00, and the most active days of the week were Saturday through Monday, with more events taking place on a Monday. Victims targeted in City A tended to be residents of that city 79%³³ of the time, 98% of victims were male, and 82% were South Asian (see Table 2). Victims in City A were the youngest, with 33% between the ages of 16 to 20 years old, and 80% were targeted in their vehicle.

Table 5: Profiles of GRH/GRAH Victims by City

Project #1	% Male	Most Prevalent Age Range (%)	Most Prevalent Ethnicity (%)
City A	98%	16-20 (33%)	South Asian (82%)
City B	90%	21-25 (29%)	First Nations (33%)
City C	100%	21-25 (47%)	South Asian (88%)

The map of City B revealed a small density of gang-related violence at a single intersection well known to police, while the remaining events were dispersed along main routes coming into and out from the entertainment district of the city³⁴. The density map for this city was less useful than the physical description of the intersection and the main roads

³³ Certain data have been aggregated and presented as ranges or percentages to maintain confidentiality and information security. Disaggregating these variables further could identify individual investigations.

³⁴ It is likely that these two distribution patterns represent very different groups within the gang landscape of that city, each requiring different approaches.

because the kernel density function in the mapping software was attempting to translate linear concentrations into concentric zones³⁵; however, the map was still provided for reference. In City B, 39% of events occurred between 22:00-04:00, with the most active day and timeframe of the week being Sunday evening. In total, 74% of victims targeted in that city were residents of that city, 90% were male, and age was slightly less concentrated than the other cities with 29% of victims being between the ages of 21 to 25 years old. In City B, 33% of victims were First Nations and 20% were South Asian. This was of particular interest, as media and other narratives project the belief that gangs in British Columbia are overwhelmingly South Asian. It is more likely that gang violence is multifactorial reflecting the ethnic composition of high-risk places, as well as the possibility that riskier jobs are given to certain ethnic groups and age groups within the larger organized crime landscape. Further research should also consider the proportion of victims who reside in or adjacent to high-risk places in City B compared to those who traveled to that area for entertainment purposes from other areas of the city or outside the city. At the current level of analysis, it appears there may be two distinct typologies of gang victims in City B, each with unique history, socioeconomic and cultural considerations, and reasons for being in the city at the time they were targeted (i.e., neighbourhood residents versus patrons of clubs or restaurants). This has multiple implications for enforcement strategies and may indicate a need for a two-pronged approach to lethal gang violence in City B. Furthermore, the vehicle patrol hotspots model proved less efficient in this city due to traffic density and because much of the resident and ambient populations were on foot and/or were

³⁵ For instance, the point data were distributed linearly along several major routes, but the kernel density map is more suited to phenomena that radiate from a centre point. Hotspot maps are a more appropriate tool for the purpose of these projects, and Project #2 used hotspots instead of densities for this layer of data.

targeted in or near entertainment venues. Future hotspots projects in City B would likely benefit from a foot patrol deployment strategy alongside enhanced enforcement of inadmissible patron bylaws.

City C's map was particularly interesting, as it immediately dispelled some myths about specific neighbourhoods in that city. Anecdotally, gang violence in that city was believed to be concentrated within a particular neighbourhood but the map showed that lethal gang violence events had occurred in most areas of the city. Socioeconomic factors did not appear relevant, as there were high- and low-income neighbourhoods in the affected and unaffected areas of the city. Land use was also diverse in affected and unaffected areas, including commercial, industrial, residential, and agricultural districts. Neither vehicular nor pedestrian traffic differed significantly across the affected and unaffected areas; however, gang violence did appear to correlate with certain school catchment boundaries.

A noteworthy obstacle to accurately identifying focus areas in City C emerged upon examining the victim data. Unique to this city was that, although there were fewer gang violence *events* in this jurisdiction, most events involved multiple victims. In fact, 70% of victims in City C were targeted in pairs or groups. Unlike other cities where most victims represented a single shooting event, the multiple-victim trend in City C meant that a single event could create an instant "density" on the map due to the large number of victims. The analysts applied discretion in how the boxes were drawn for City C to ensure these multi-victim events did not skew the focus areas.

The overwhelming majority of events in this city occurred on weekdays, 73% of victims were residents, and 100% were male. In a marked departure from the rest of the district, only

33% of victims in City C were targeted in their vehicle. Like City A, 88% of gang violence victims in City C were South Asian; however, they tended to be slightly older with 47% being between the ages of 21 to 25 years old.

Further research with respect to City C could focus on the origins of offending relationships between gang members in that city. Densley (2012; 2014) described sequential stages of maturation from delinquent youth groups to street gangs to organized crime groups. This process appears especially salient in City C. It is possible that perceived geographic concentrations in this city stem from the gangs' ties to specific schools early in their offending careers, rather than a concentration of their current gang activity, which appears quite mobile and dispersed across the city. Social network analysis could provide helpful insights into gang activity in City C, particularly if paired with qualitative interviews of teachers, school administrators, school liaison officers, and former gang members or their associates.

The density maps, victim profiles, and peak time periods for all three cities were disseminated to the officers as they deployed for the first shift of the project. No briefings were held because of the short timeline leading up to the project start date; however, officers were encouraged to reach out to analysts with questions throughout the month in person or by email, which they did frequently. Most questions were about the project's methodology, while some officers provided feedback about specific areas on the map. Any clarifications that were needed during the project were communicated to the teams by either the analysts, the Staff Sergeant, or the Training NCO. Analysts also participated in ride-alongs during the project to observe how the maps and information sheets were being used, how the deployment model worked, and to try to identify gaps or opportunities to refine the project for future iterations.

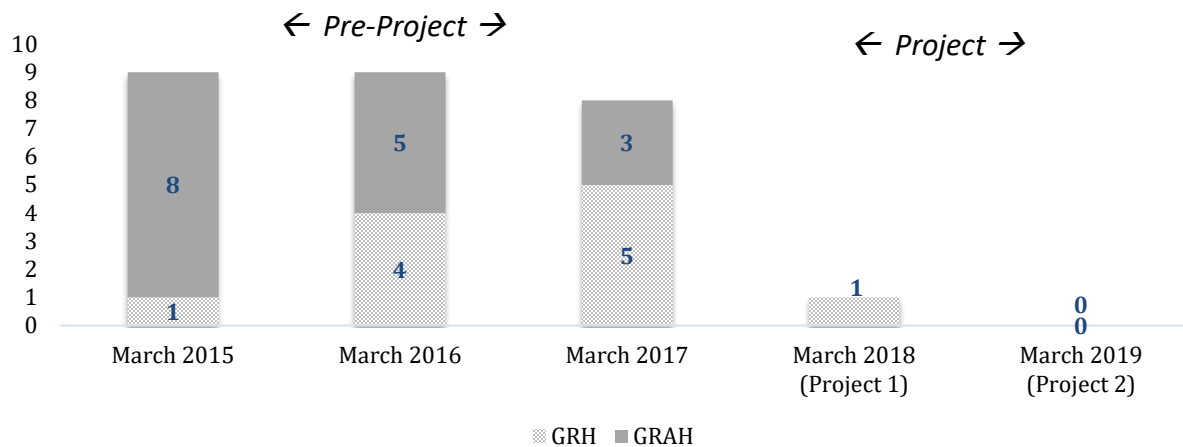
An important benefit of the ride-alongs was the opportunity for officers to ask questions about the methodology and to offer thoughts, critiques, suggestions, and to point out real-time examples of what worked and what could be improved for future projects.

Results

During Project #1, officers conducted 20 shifts surplus to regular deployment within the three target cities. The project teams checked 578 vehicles, interacted with at least 1,145 individuals, and seized 19 weapons. The project resulted in 21 criminal charges and 26 charges under provincial statutes. There was one gang-related homicide in British Columbia during the project. That event occurred in one of the project cities during the first half of the month, during peak hours, and well within the kernel density area on the map but just outside the southeast boundary of the “box”. The victim was a South Asian male in his early 20’s and was known to gang enforcement officers. Project-assigned officers were in the vicinity when the shooting occurred and were first on scene. As the only GRH/GRAH event during the project occurred in one of the project cities, there is no evidence of displacement resulting from the project.

The primary measure of success for the project was GRH/GRAH reduction during the month of March. As noted earlier, the mean number of GRH/GRAH events over the ten years preceding the project was 6.5 each March (see Figure 2). Gang-related violence was on an upward trajectory at the time of the project, and the mean number of GRH/GRAH events in the month of March for the three years preceding the project was 8.67. Based on the recent trend, a reduction from 8.67 events to a single event during Project #1 represents a percentage change of -88.5% with no geographical displacement.

Figure 4: GRH/GRAH Before (March Only, 2015-2017) and During the Hotspot Projects (2018-2019)



A second measure of effectiveness was whether this change resulted in temporal displacement of events to other times of year or whether events simply did not occur. To test this, a Mann-Whitney U test was conducted using GRH and GRAH events from the 12 months prior to the project and 11 months following the conclusion of the project. The Mann-Whitney U test is an ordinal-level nonparametric test that assesses the significance of difference between two independent samples. In this case, the test was used to compare pre- and post-intervention periods for each offence type. The Mann-Whitney U test indicated that the difference in GRH pre-intervention ($n = 29$) and post-intervention ($n = 13$) was statistically significant ($U = 33.50$, $p = .04$). This result suggests that these events were prevented. For GRAH, the Mann-Whitney U test indicated that the difference between the pre-intervention ($n = 22$) and post-intervention ($n = 10$) periods was not statistically significant ($U = 43.50$, $p = .17$). This result suggests that these events may have been temporally displaced to the remainder of the year. However, an important limitation of the data is the extremely low base rates that make it difficult to interpret these results with confidence. Another limitation is that this

analysis does not control for the upward trend that was observed prior to the project. Had the upward trend continued, the expected number of events should have been higher than the pre-intervention period, rather than lower or the same.

Although the design phase of this project occurred on a tight timeline, the analysts were able to draw upon the existing body of research on crime concentration and hotspot policing, and implemented a project that closely resembled those described in the literature. The analytical unit already had established data collection practices in place to monitor GRH/GRAH outcomes, and reported those outcomes alongside traditional policing metrics. Another measure of effectiveness applied by the analytical unit was a Benefit Cost Ratio (BCR) analysis. Analysts have estimated the police-only cost of a GRH in British Columbia to be \$1,083,776.00, and the cost of a GRAH to be \$58,320.00. The observed reduction in GRH/GRAH incidents was estimated to have saved the province between \$447,314.40 (assuming all events would have been GRAH) and \$8,312,561.92 (assuming all events would have been GRH). Based on the ratio of GRH to GRAH in the preceding three years, and the overall costs of the project, the BCR for #1 was estimated to be 33.1, or approximately \$33 saved for every \$1 invested.

Project #2: Steps Toward Institutionalization and Sustainability

In 2019, the agency again funded a hotspots project to target GRH/GRAH in the LMD during the month of March. With more time to plan and prepare for the project, analysts chose to incorporate additional data sources and employ more robust strategies based on lessons learned during Project #1 and further review of the relevant literature. The expanded information included intelligence packages to facilitate focused deterrence, briefings to ensure

consistency between teams, and additional outcome measures. Furthermore, the 2019 project included other gang enforcement units in the target cities.

For Project #2, analysts used the same GRH/GRAH data as in Project #1 updated to include 2018 events. It was decided that City B would be more suited to a different deployment model (e.g., foot patrol) and current intelligence regarding ongoing gang conflicts at the time suggested City B was not as relevant, therefore, the decision was made to omit City B and focus Project #2 on Cities A and C.

New data types were added to the analysis for this project to try and add to the overall strength of the analysis and to gain a more in-depth understanding of the relationship between offence types. Specifically, Possession for the Purpose of Trafficking (PPT) and confirmed³⁶ Shots Fired events were added as new layers in the maps. Furthermore, the maps for Project #2 were hotspot maps rather than density maps, which improved precision and specificity.

The analysts used the Vancouver Police Department's CRIME³⁷ system to extract all police records with a Uniform Crime Report (UCR) code of (4220-xx; Possession for the Purpose of Trafficking) occurring within the LMD between the years of 2008-2017 inclusive. The query found a total of 18,282 files. The Police Records Information and Management Environment (PRIME) records management system used in British Columbia allows for up to four UCR codes to be attached to a file, but scores by the first (most serious) offence as per the hierarchy rule³⁸.

³⁶ Shots Fired calls for service are frequently unfounded, as many are determined to be fireworks, power tools, or other unrelated events. In 2019, the analytical unit had reviewed Shots Fired files for another purpose and coded them to isolate events that were confirmed through the presence of shell casings, bullet holes, or similar tangible evidence. Those confirmed events were mapped for this project.

³⁷ This system allows the user to build a detailed query for large, bulk data pulls from PRIME.

³⁸ According to Statistics Canada, "The UCR Survey classifies incidents according to the most serious offence (MSO) occurring in the incident (generally the offence which carries the longest maximum sentence under the Criminal Code of Canada). In categorizing incidents, violent offences always take precedence over non-violent offences" (Statistics Canada, 2021).

Any file with a PPT UCR code in any of those four positions was captured in the query. The data included all file types ranging from investigative files to calls for service, assists to other agencies, founded and unfounded, and a diverse range of quantities. Also included in the data extraction were file number, date and time of the offence, jurisdiction, zone, atom, location type, geographic coordinates, drug type(s), and various administrative data.

The files were cleaned to remove duplicates, assists to other agencies, unfounded and unsubstantiated files, “intel only” files, such as unverified Crime Stoppers tips, or files that occurred outside the LMD. Analysts also identified and removed project files linked to a master file on large investigations to avoid duplicate counting both within and across jurisdictions. Some files were created for administrative purposes, such as exhibit handling, extradition or deportation files, DNA orders, or entering firearms bans into the system. These were excluded. Furthermore, there were a large number of files in which police attended a postal centre, airport, or prison to take possession of a drug seizure made by another agency (Canadian Border Services Agency – CBSA, Canada Post, or Corrections Service of Canada - CSC). Since the purpose of the project was to create heat maps for uniform gang suppression teams, these files were excluded from the study as these fell outside UGET’s mandate. Marine interdictions were excluded as were “border runners”. The final total after data cleaning was 16,951 PPT files in the LMD for the years 2008-2017 inclusive.

The files were then divided by jurisdiction, and files in the target cities were coded for several variables to try and elicit insights regarding the offenders, the role of women, how PPT files tended to be initiated (i.e., police initiated versus calls for service), and whether any of those characteristics differed between cities. A more in-depth description of the coding

strategy is provided below. Interrater reliability was not assessed; however, portions of the PPT data pertaining to other cities had previously been used for an unrelated project. Given this, the coders, as a group, had a substantial amount of practice prior to coding the Project #2 cities. Any file that was ambiguous or unique was discussed with the group and coded by consensus. The target cities for Project #2 were identified based on highest incidence of GRH/GRAH, and the corresponding PPT data set was coded for inclusion in the heat maps for those cities. The total PPT files for Project #2 were City A (n = 2,924) and City C (n = 979).

Coding involved adding variables for Day of the Week and Day of the Month to facilitate temporal analysis. When files were missing data in one or more categories of interest, coders located the missing data in PRIME and entered it into the master data set. Each file synopsis was read and, in cases where insufficient information was included in the synopsis, coders also referred to other text pages, such as Reports to Crown Counsel (RTCC). The initial coding scheme, developed by the author, included 14 file types; however, some categories were deemed sensitive and/or were not relevant to the project. These were subsequently excluded. The remaining 12 file types are listed in Table 3 for reference. Trends and maps were based on aggregates to preserve information security.

Table 6: PPT File Coding

File Type	Criteria
Vehicle Stops	Traffic stops; stolen vehicles; Motor Vehicle Incidents; roadblocks; bicycle stops, etc.
Observed/Plain View	Hand-to-hand transactions; open drug markets; drugs found in plain view; or offers of sale to a police officer who was in uniform and/or in a marked police vehicle.
“Buy & Bust” Operations	Plainclothes officer makes an evidentiary drug purchase, and either arrests the offender themselves at the time of purchase or calls in the arrest to a uniform team nearby.
UC Purchase	Evidentiary drug purchases excluding buy & bust projects. <i>NOTE: Only concluded and de-privatized files were included for this category to protect operators and ongoing investigations.</i>
Calls for Service	Files created in response to a call for service, which upon investigation resulted in discovery of trafficking quantities of drugs (e.g., domestic disputes, etc.); however, see Fires/Rips/Home Invasions for a subset of files which were coded as a separate group.
Investigations	Large, project-level files.
Fires/Rips/Home Invasions	PPT files secondary to a call for service for a home invasion, grow rip ³⁹ , house fire involving a grow-op or clandestine lab explosion, or shots fired within a dwelling.
Schools	Drug seizures initiated by school staff.
Crime Stoppers	Crime Stoppers or Crime Watch found to be credible.
Theft of Hydro Reporting	Includes the formal reports received by police from BC Hydro regarding theft of hydroelectricity indicative of a grow operation or clandestine drug lab. Also includes fire department or city bylaw programs directed at identifying residential grow operations or labs. This category did not include theft of hydro discovered as a result of a search warrant.
Businesses	Illegal dispensaries, etc.
Other	Includes parent-initiated calls for service where they discovered controlled substances of a trafficking quantity in their child’s bedroom or vehicle. This also included calls from prisons regarding drug trafficking around the outside perimeter of the prison, calls from hospitals, drugs found in motel rooms, and any other unusual files which were infrequent. Examples of unusual occurrences include a subject who brought a trafficking quantity of drugs with him to court; a subject who presented to pre-trial detention with drugs on his person; youth subjects spontaneously surrendering drugs to a bylaw officer; a subject sending a detailed message about his new drug operation to a law enforcement phone number in error.

Once all offence categories were mapped, boxes were drawn around clusters of violence hotspots using main roads as outer boundaries creating clear patrol areas for easy

³⁹ A “grow rip” or “drug rip” refers to theft of illicit commodities, such as marijuana grow operations or drug stashes. These events often come to the police’s attention as “home invasions”, and frequently involve instrumental violence.

reference. These maps were combined with briefing packages describing the boundaries, peak times of day and days of the week, and any other findings of interest for each box. Also included in the package were brief “pull quotes” outlining how long to spend in a hotspot (Koper, 1995; Telep et al., 2012) and defining terms, such as “hotspot” and “directed patrol”. These packages and the maps were presented in print and through in-person briefings allowing for an overview of the evidence base for hotspots policing and Koper’s Curve, a detailed presentation of the deployment strategy, a review of the performance metrics being collected by team leaders, and a round-table discussion where officers could ask questions, voice concerns, or clarify information as needed. Briefings were approximately 45 minutes to 60 minutes in duration.

Additionally, analysts spent a considerable amount of time before, during, and after Project #2 liaising with analysts and team leaders from the participating partner agencies for deconfliction⁴⁰ purposes and to provide background, education, and clarification on hotspots policing in general, on the project design, and on the performance metrics being collected. An in-person briefing was provided to all participating officers in City A, and a telephone briefing was provided to the sergeant in charge of the gang unit and an analyst from City C. Project analysts went on ride-alongs to gather additional metrics and to ensure ongoing, real-time communication with frontline officers about project implementation and areas for improvement.

⁴⁰ Deconfliction is a process of ensuring all police units working on a particular target or in a particular area are aware of what one another is doing to ensure the various units are not interfering with one another’s operations. This ensures the safety of all officers involved, prevents one team’s enforcement from disrupting another team’s surveillance or undercover operations, and helps to ensure resource allocation is efficient and collaborative.

Results

During Project #2, officers were deployed across two cities for four weeks, in collaboration with local police of jurisdiction in both cities. Collectively, the participating teams checked 1,101 vehicles, interacted with at least 2,147 individuals, and seized 42 weapons and four firearms. The project resulted in 45 criminal charges and 111 charges under provincial statutes. There were no GRH/GRAH during Project #2 in any of the target cities; however, there was one gang-related shooting outside the LMD. There was no BCR calculation reported for this project because the contributions of police of jurisdiction would have skewed this metric and made it useless for comparison to the previous project.

Pre- and post-intervention non-parametric testing for the 11 months before and after the project did not show significant reductions in either GRH or GRAH for this project. A Mann-Whitney U test resulted in non-significant results for GRH ($U = 57$, $p = .797$), and GRAH ($U = 87$, $p = .088$); however, the pre-intervention period for this project was also the post-intervention period for the previous project, meaning that the effect decay from Project #1 would alter the baseline (pre-intervention) period for Project #2. To avoid this problem, another Mann-Whitney U test was run using the 12 months prior to Project #1 and the 11 months following Project #2. The Mann-Whitney U test indicated that the difference in GRH pre-intervention ($n = 29$) and post-intervention ($n = 12$) was statistically significant ($U = 32$, $p = .04$). This result suggests that these events were prevented. For GRAH, the Mann-Whitney U test indicated that the difference between the pre-intervention ($n = 22$) and post-intervention ($n = 23$) periods was not statistically significant ($U = 60$, $p = .74$) again suggesting temporal displacement.

This project contributed to improved public safety and led to meaningful intelligence and enforcement outcomes in British Columbia. Management has expressed an interest in transitioning from using the approach in isolated projects to implementing this strategy as a standard operating procedure going forward. The model is being tested in additional cities across the province and could be used alongside other techniques in the future. This will complete the Institutionalization step of the Knowledge Action Cycle.

Discussion

This place-based hotspots policing strategy was associated with an 88% reduction in GRH/GRAH in the first year, and 100% reduction in GRH/GRAH the second year using a revised version of the project. The projects were received favourably by frontline officers and senior managers, and have been reported on favourably by mainstream media. Consistent with research findings from other jurisdictions, hotspots policing was shown to be an effective crime reduction strategy in British Columbia.

Using Santos and Santos' (2019) adapted KTA model as an evaluation framework, there were four phases to evaluating the agency's implementation of directed patrol hotspot policing to address gang violence in British Columbia. The four phases, as discussed above, are Research and Evaluation, Synthesis and Dissemination, Implementation and Evaluation, and Institutionalization and Sustainability. These phases could be viewed as cyclical, in that the implementation, evaluation, and institutionalization of a strategy should also contribute to further knowledge creation beginning the cycle over again.

Through that lens, the project analysts stepped into this cycle as recipients of knowledge dissemination effectively beginning their contribution at the Implementation and Evaluation phase. They leveraged existing research and evaluations of similar projects, including systematic reviews and meta-analyses. They designed a project that was similar to those shown effective in the literature with modifications for the local context. They have since implemented and evaluated multiple projects and have begun to share their project design with other agencies through briefing packages, in-person analyst briefings, project collaboration, and outcome reporting. This represents a shift toward Institutionalization of the strategy. The agency has also introduced a recurring budget for these projects signalling that they are sustainable and viewed as a sound investment by senior management and the Board of Governance.

To “close the loop” and contribute to the Knowledge Creation cycle (Phases One and Two) of the KTA framework, the project analysts should publish original research evaluating these projects and should ensure that the project design, results, and outcomes are made freely available to partner agencies in an accessible reading format (e.g., two-page research briefs in plain language). The Appendices to this major paper aim to contribute to that phase in a small way. Additionally, agencies responsible for gang enforcement across the province should look to expand this model within their own communities. This may involve adapting the model to suit rural and/or remote locations, different patterns of criminal behaviour by their targets, or different policing capacities within smaller partner agencies. This will require the analytical unit to refer to existing literature on hotspots policing looking specifically at projects implemented in rural or smaller city environments, and reassessing which offences are most

appropriate as a targeting tool for those jurisdictions. They should continue to evaluate their outcomes, disseminate the results to partner agencies, and seek to institutionalize the strategy in a sustainable way across the province. This can include conducting projects in other districts themselves but should also include skill-sharing and empowering police of jurisdiction to implement their own projects and to institutionalize the practice in ways that are scalable and sustainable within their own communities.

Moreover, additional techniques may prove useful in future iterations of these projects, within and outside the LMD. There is potential to incorporate more advanced analyses (e.g., social network analysis, dose-response monitoring, drive-time isochrone maps, or micro-time hotspots analysis), new stakeholder partnerships (e.g., highway patrol, compartment specialists, pipeline experts, non-police enforcement agencies), or new technology (e.g., live-time hotspot dashboards, automatic license plate recognition (ALPR), or future technology aimed at reducing flight-from-police). Additionally, analysts should consider how to integrate this type of project with other proven crime reduction techniques. Hotspot policing can and should be used alongside other gang suppression/enforcement approaches, including targeted enforcement that focuses on high-risk individuals. It should also be used alongside problem-oriented policing strategies that seek to address underlying problems at key locations. For example, if a particular business or residence is a consistent and strong crime attractor, that location can be targeted in other ways, perhaps by other teams besides the uniformed officers (e.g., bylaw enforcement officers, investigators, transit police, etc.) to neutralize the hotspot itself. Overall, hotspot policing is one tool that can be used alongside many other tools to reduce harms to the community. It is readily adaptable to different environments, but

adaptations should be done thoughtfully and cautiously, with adequate testing to ensure continued effectiveness.

By leveraging techniques shown elsewhere to be evidence-based, validating the outcome of those techniques in the local context, and continuing to adjust and reanalyze the outcomes, the agency has demonstrated a commitment to implementing and institutionalizing evidence-based practice in their approach to preventing gang-related violence. Overall, the analytical unit involved in the original projects should continue to evaluate, adapt, and progress the design of their projects with each repetition, and should make any useful or important findings available to partner agencies through internal and external publications to facilitate the collective advancement of directed patrol hotspot policing in the province of British Columbia.

Limitations

There were a number of important limitations to these hotspot projects. To begin, the projects were not randomized controlled trials (RCT). To conduct a hotspot policing RCT, hotspots would be mapped and then a random control group of hotspots would be removed from the maps provided to the enforcement teams. Only the test hotspots remaining on the maps would receive the treatment of enhanced police presence. Then the test hotspots would be compared to the controls to determine if there were any differences in levels of gang violence. Given the low base rates, high mobility of gangsters and enforcement teams throughout a shift, and the geography of the target cities, it was not feasible to design the projects this way. Time and resource constraints contributed to this problem, along with skill limitations within the analytical team. The first project was implemented under extreme time pressure, and the approach was simply to saturate the problem areas and see if it had any

effect. It did, which led to a more careful and planned implementation the next time. However, the analysts were – and still are – unsure how to preserve “control” conditions of a randomized group of hotspots given the high mobility and constant flux of dial-a-dope drug trafficking, the large and multi-jurisdictional territories covered by local drug lines, and the speed and agility of both the drug dealers and the uniformed teams who target them. The officers cover large swathes of territory in very short amounts of time while on patrol, often in a way that is reactive to drug dealing behaviour. The analysts were unable to develop a model that would ensure control hotspots were not patrolled in the same way as their adjacent test hotspots. Subsequent projects have also led to briefing and disseminating maps and project materials to police of jurisdiction, which could further impede any chance of maintaining control conditions.

Another option is a quasi-experimental design. The team considered a matched-pairs analysis, whereby they would compare cities of similar population sizes within the same district. However, this also presented several challenges. First, GRH/GRAH is not equally distributed across all cities. The analysts may have found reasonable matches in terms of independent variables, such as population, socioeconomic status, general duty police resourcing, and other variables, but this would not mean the dependent variable (DV) is equal between the two cities in the first instance. In fact, most potential “match” cities had DV baselines that were simply too low for comparison. Second, characteristics of GRH/GRAH victims and events were not evenly distributed across all cities. Age, race, and offence characteristics varied from one city to the next complicating any attempt at identifying “matched” pairs.

Ultimately, the team determined that a pre-post analysis was the most suitable approach, and this is what they aimed to achieve. Even that approach had limitations though,

as the project was repeated each March from the first project onward. There has not been a true “post” period. There is a pre-treatment period and, from the first deployment onward, each March has been a “treatment” month. This remains an ongoing limitation to the quality of the evaluation, and likely requires that the analysts reach out and work with an external expert in hotspot policing to develop a quasi-experimental design that is realistic and can be sustained and adhered to in this dynamic gang landscape.

Another limitation to the evaluation was the coding method used by the analysts. Discrepancies in coding of variables for the mapping data were simply resolved by consensus within the team. The extent to which certain operational information must be safeguarded by the agency is also a limitation. Data has been aggregated by the agency to preserve confidentiality and operational security, and to protect tradecraft. This limited how that secondary data could be analyzed and presented in this evaluation. There are nuances related to staffing and deployment, competing operational priorities, and corollary benefits of the project that cannot be published in this evaluation. This is a recurring challenge in law enforcement research that limits the depth and breadth of all project and program evaluations. In a perfect world, there would be a “protected-level” peer-reviewed publication process that would enable agencies to share these nuances within the policing community without risk to operational security or officer safety. However, such a model would risk becoming an echo chamber of biased peer review lacking in the type of critical analysis that ensures transparency, accountability, and growth. This major paper attempts to tread the line between transparency and security but falls far short of being a candid conversation.

Another limitation of the evaluation is also a limitation of the agency's projects overall. There is room to integrate this hotspot policing model with multiple other gang suppression or enforcement techniques (e.g., SNA, ALPR, POP), but this has not yet happened. Moreover, while there were elements of focused deterrence throughout the projects, such as curfew checks and other types of compliance checks that are a routine part of these officers' duties, that activity was not measured or evaluated. It was simply treated as "policing as usual".

Lastly, monitoring of fidelity to the project design was weak and inadequate for dose-response testing. The analysts did go on several ride-alongs with different officers to see how they were using the maps and operationalizing the information provided. Officers were asked to record how much time they spent in the "boxes", which they did; however, this was simply an estimate made by the team NCO at the end of each shift based on estimates from each of their officers. Monitoring through the mobile data terminals (MDT) in the police vehicles is possible, but was not done for two reasons. First, it monitors where the vehicle is, but not what the officers are doing. The MDT cannot tell us whether the officer was stopped to conduct a traffic stop with a gang member, stopped to assist at a minor collision, stepped into a coffee shop for a refreshment, or pulled over to write up a report.

Second, the analysts felt that officer buy-in was more important than minute-by-minute monitoring, and that pulling the data from the MDTs may be perceived by officers as an unnecessary and unwelcome form of compliance monitoring. Consequently, the data available to evaluate dose-response was inadequate. The agency should consider incorporating some form of dose-response testing in future iterations; however, the MDT likely remains a blunt

instrument for this purpose and could skew results. This will likely need to be done by analysts on the road, similar to the Surrey RCMP Ride-Along Study (Pleacas et al., 2011).

Recommendations

Several recommendations for future research emerged from this evaluation. The most important is that British Columbia needs published research on the nature and scope of gang activity in each area of the province. This should include basic descriptive work, such as race/ethnicity by region, as well as specific risk and protective factors for each typology. This information should be used to address issues, such as whether gang members in northern British Columbia are significantly different from gang members in the Fraser Valley or the Downtown Eastside (DTES) of Vancouver, how British Columbia gangs differ from gangs in the Prairies, Ontario, and Quebec, or the Maritimes and why do they differ, what are the implications for transferability of leading gang research to British Columbia school- and community-based gang prevention programming, do current gang outreach programs reach all typologies in all areas of the province, and where are the gaps in service?

Another topic for future research is the seasonality of gang violence. It remains unclear why there is a springtime peak in gang violence in British Columbia, and whether that peak also occurs elsewhere. It could also be helpful to know whether temporal trends apply to all levels of gang membership or only to certain ranks or groups within the gang landscape. Past efforts to explore this phenomenon have included examining weather patterns, shipping schedules, or annual fluctuations in illicit financial flows on the supply side of the drug market. Harvest patterns of illicit crops may also be a useful avenue of inquiry; however, the March trend appears to be amplified in recent years, even as the drug market becomes increasingly

saturated with synthetic products. A greater understanding of illicit markets and the economic geography of organized crime is imperative to understanding the group behaviours of gangs in British Columbia and should be a focus of future research. Moreover, it is likely that quantitative analysis alone is insufficient to explain this trend. Qualitative work directed at understanding seasonal and behavioural economics of drug trafficking networks could elicit much-needed insights to guide and contextualize future research.

Lastly, there has been no quantitative measurement of corollary benefits of directed patrol hotspots policing in the project cities. Enforcement teams have been involved in a wide range of police files unrelated to the project mandates, such as providing lifesaving care to individuals in medical distress, apprehending suspects involved in non-gang related violence including intimate partner violence, and intervening in property crimes, sex trafficking, and missing persons. Diffusion of benefits is typically understood to mean geographic diffusion to nearby places; however, it is possible these projects affect other crime types unrelated to gangs – a sort of diffusion of benefits across crime types. Further research should determine whether that is the case, and if so, what the general cost avoidance ratio is for these projects when accounting for all crime types.

To advance EBP in Canada, and particularly in British Columbia, police and researchers need to work together to build a robust collection of local, peer-reviewed, and accessible police research. This includes a need for gang research that either validates or refutes research from other jurisdictions around the world. Moreover, all crime prevention programs, policies, and enforcement strategies should be viewed through the lens of local, peer-reviewed research to determine whether they are appropriate given the findings of the research.

Conclusion

Criminologists have suggested that implementation science is the next area of development for the field of criminology (Nichols et al., 2019; Santos & Santos, 2019). Theory development is important and contributes to our understanding of the origins of criminal behaviour, allows for the development of testable hypotheses, and provides a framework through which to interpret outcomes. However, the demand for applied criminology that moves beyond theory and into translation, testing, and interpretation is increasing and requires urgent attention. In Canada, this includes a pressing need to validate international research in a local setting (Huey & Ricciardelli, 2016). Canadian police agencies and academics must find ways to work together toward a robust library of local, peer-reviewed, applied police research that will inform police decision-making, move agencies toward a culture of evidence-based policies and practices, and drive innovation in public safety.

As research-practitioner partnerships become more commonplace with funding schemes and data access agreements to facilitate the work, it is important that the products of those partnerships are not lost in internal memos or other forms of inaccessible reporting. Canadian police agencies need to share the burden of applied research and knowledge translation by working in collaboration with one another and with academia. Researchers tasked or contracted to do work for internal police audiences should seek ways to publish that work whenever possible. If the work is not peer-reviewed, published, and made readily accessible, it tends to only live in the unit that commissioned it. Furthermore, if not published, it may not be given the weight it deserves. Unpublished reports emerge from many sources in government – some derive from contracts with academics, but others are simply a task

assigned to an employee who may not have the requisite skills to produce high quality work. Still others are written by senior officers based on their personal experiences and convictions related to a particular topic. High quality, credible work needs to be submitted for publication, not only to increase its reach to a broader audience, but also to set it apart from the various other forms of unpublished work that circulate within government agencies.

This major paper has reviewed one police agency's attempt to apply theory and research to a current public safety problem in British Columbia, Canada. The agency had modest but statistically significant success with a directed patrol hotspot policing project targeting gang violence, and has been able to implement, evaluate, and institutionalize the project model in a way that is both effective and sustainable. By continuing to evaluate the projects annually, they will be able to further refine it in ways that increase effectiveness and should continue to share those findings with partner agencies. In this way, they can complete the cycle of knowledge creation, knowledge action, and back again to knowledge creation. This requires analysts to stay abreast of current and upcoming research in this area. It requires enforcement teams and analysts to be strategic and attentive to data collection not only to satisfy current needs, but also to anticipate future needs. And it requires police leaders within the agency to continue supporting these projects, including the relationship between officers and analysts, and the dissemination of outcomes beyond traditional reporting lines.

Appendix A: Plain-Language Summary

What is this major paper about?

This major paper evaluates how a British Columbia police agency designed and implemented two hotspots policing projects. The major paper has three goals. The first goal is to understand how effective the projects were at reducing gang-related homicides and attempted homicides in the target areas. The second goal is to determine whether the agency did a good job of translating academic research into real-world police operations. The third goal is to make this research accessible to everyone by providing this short, plain-language version of the longer major paper⁴¹, and by laying out all the steps and timelines needed to design similar hotspots policing projects in any British Columbia police agency (Appendix B).

What is evidence-based policing?

Evidence-based policing (EBP) means taking research about policing and turning it into an operational strategy, collecting data on how well it worked in that context, getting feedback from frontline officers, and using the data and feedback together to improve the strategy.⁴² It is a feedback loop that makes sure police agencies use the best available research and data to design our operational strategies, and the best available feedback from boots-on-the-ground to make sure the strategy is working as intended in that specific context. Some strategies or policies will not transfer well from one setting to another, so it is important to consider the differences and confirm that it works at the local level. EBP does not work without the input of

⁴¹ This summary uses footnotes rather than in-text citations to minimize interruptions in the reading of the text, but otherwise follows APA style. All sources can be found in the Reference list for the main paper.

⁴² Lum & Koper, 2017; Mitchell & Huey, 2019; Telep & Lum, 2014; Sherman, 2013; Sherman, 2015.

experienced police officers and analysts. And, if a strategy has not been evaluated in context, it cannot be called evidence-based.

What is Translational Criminology?

Translational criminology means taking research on crime and policing and translating it into something that can be easily understood and applied in real-world settings. This concept comes from the medical field, where medical researchers needed to find a way to make their research more accessible to doctors and nurses who were treating patients.⁴³ Doctors did not have time to read lengthy, technical articles on the latest treatments for heart failure or diabetes. They needed something short and to-the-point that told them what the research found and how it affects treatment. The same applies in policing. Frontline officers seldom have time to read an 80-page thesis or even a 35-page research article full of technical terms. If the findings on a particular topic can be condensed into a one- or two-page document in conversational language, it becomes useful to frontline officers. That is the goal of translational criminology.⁴⁴

EBP and Translational Criminology work together

There are several free resources available that translate EBP findings into quick-read products on police strategies and techniques. Organizations, such as the Canadian Society of Evidence-Based Policing⁴⁵ (CAN-SEBP), the American Society of Evidence Based Policing⁴⁶ (ASEBP), Australia-New Zealand Society of Evidence Based Policing⁴⁷ (ANZSEBP), and UK Society

⁴³ Sackett et al, 1996

⁴⁴ Laub, 2012; Lum & Koper, 2017; Santos & Santos, 2019.

⁴⁵ <https://www.can-sebp.net/>

⁴⁶ <https://www.americansebp.org/>

⁴⁷ <https://www.anzsebp.com/>

of Evidence-Based Policing⁴⁸ (SEBP) all have free EBP and translational resources on their websites. They hold conferences each year where police leaders and researchers can meet and share their work. There is also a website run by the Centre for Evidence-Based Crime Policy (CEBCP).⁴⁹ Under the “Resources” tab on their website are several free resources on policing, including Translational Criminology magazine, a police technology web portal, a video library, and a collection of one-page research briefs on various crime and policing topics. Additionally, several police researchers have written books for police leaders on EBP.⁵⁰

What is hotspots policing, and does it work?

Hotspots policing uses mapping software to plot the locations of all occurrences of a particular crime type over a specified period of time, and then calculates which occurrences are clustered within a set distance. Places with higher-than-expected rates of crime occurrences are “hotspots”. This technique is based on the Law of Crime Concentration, which says that approximately half of crimes in a city will occur at roughly 5% of locations in a city.⁵¹ The maps used for the projects in this major paper removed statistically random events and “cold” spots (places with lower-than-expected rates of crime), so that only the hotspots were visible. This

⁴⁸ <https://www.sebp.police.uk/>

⁴⁹ <https://cebcp.org/>

⁵⁰ See books by former London Metropolitan Police officer Dr. Jerry Ratcliffe, as well as a recent book by Dr. Laura Huey and retired Sacramento Police officer Dr. Renee Mitchell, and a locally authored book by Cohen et al., available for free online at <https://www.ufv.ca/media/assets/criminal-justice-research/Eliminating-Crime---The-Seven-Essential-Principles-of-Police-based-Crime-Reduction.pdf>

⁵¹ Amemiya & Ohyama, 2019; Andreson & Malleson, 2011; Andreson et al., 2017; Beavon et al., 1994; Bernasco & Steenbeek, 2016; Boivin & de Melo, 2019; Chainey et al., 2019; Chalfin et al., 2021; Crow & Bull, 1975; Curman et al., 2015; Gill et al., 2017; Haberman et al., 2017; Hillier, 2004; Jaitman et al., 2015; Johnson, 2010; Johnson & Bowers, 2010; Kautt & Roncek, 2007; Lee et al., 2017; Mazeika & Kumar, 2016; Pierce et al., 1988; Sherman, 1989; Weisburd, 2015; Weisburd & Amram, 2014; Weisburd & Green, 1995; Weisburd et al., 2004, 2009, 2012; Wheeler et al., 2015; Wuschke et al., 2021.

was paired with directed patrol policing for the duration of each project. Directed patrol means asking officers to focus on patrolling hotspots instead of random patrol.

Researchers have collected studies on hotspots policing from around the world and analyzed how effective the whole collection of studies were overall.^{52,53} This showed that hotspots policing works reasonably well overall at reducing crime, works better for some crimes than others, and is better when paired with other effective strategies, like directed patrol or problem-oriented policing.⁵⁴ It is not at all useful when paired with ineffective strategies, like drug market “crackdowns”.⁵⁵ It is not very helpful when used to target street-level prostitution in countries that still criminalize sex work. It works quite well on firearms offences, street-level violence, and various property crimes.⁵⁶ Street-level violence involving firearms is an ideal application of directed patrol hotspots policing.

Did the projects in this study work?

Data showed that gang-related homicide and attempt homicide events in British Columbia occurred more frequently in March than the rest of the year.⁵⁷ Specifically, they occurred at a rate of between eight and nine events every March for three years before the first project, and between six and seven events per March overall between 2008 and 2017. The hotspots projects were deployed for the month of March in 2018 and 2019 in the cities with the

⁵² Braga, 2001; Braga et al., 2014; Braga et al., 2019; Braga & Weisburd, 2022.

⁵³ This method of evaluating multiple studies on a topic together in one paper is called a “systematic review”. There are systematic reviews on a vast range of public safety topics available on the Campbell Collaboration website. They also provide Evidence Gap Maps (EGM) that show where more research is needed on a particular subject before a decision can be made on effectiveness. See <https://www.campbellcollaboration.org/> for more information.

⁵⁴ *ibid*

⁵⁵ Dandurand, 2021.

⁵⁶ Braga, 2001; Braga et al., 2014; Braga et al., 2019; Braga & Weisburd, 2022.

⁵⁷ Stewart, 2023.

most gang violence to try and reduce gang-related homicides and attempts. During the first project, British Columbia had one gang-related homicide and no gang-related attempt homicides. There were no gang-related homicides or attempt homicides in British Columbia during the second project. To be sure that the incidents were not just “displaced” to a different time of year, statistical analysis was done to test for increases spread over the remainder of the year. The analysis showed that the homicides were not displaced to another time of year. Attempt homicides were slightly lower following the first project, but not enough to be statistically significant. They were about the same before the first project and after the second project suggesting the projects had no affect on attempt homicides. One of the limitations of the data is that gang-related homicides and attempts were on an upward trend leading into the first project, but the statistical analysis assumes that the rate is a flat line. This means the projects may have been more effective than we were able to show with this data.⁵⁸

How well did the agency use EBP and Translational Criminology in these projects?

To evaluate how well the agency used EBP and Translational Criminology, a framework was borrowed from the medical field called the Knowledge to Action (KTA) framework.⁵⁹ This assesses how well the agency used research and evaluation methods to design the projects, synthesized the research and disseminated it to enforcement teams, implemented the projects and evaluated the project outcomes, and institutionalized the projects in a sustainable way. The finding of this major paper is that the analysts used evidence-based methods to design the projects and shared the research and objectives with the enforcement team through briefings,

⁵⁸ Stewart, 2023.

⁵⁹ Santos & Santos, 2019, adapted from Graham et al., 2006.

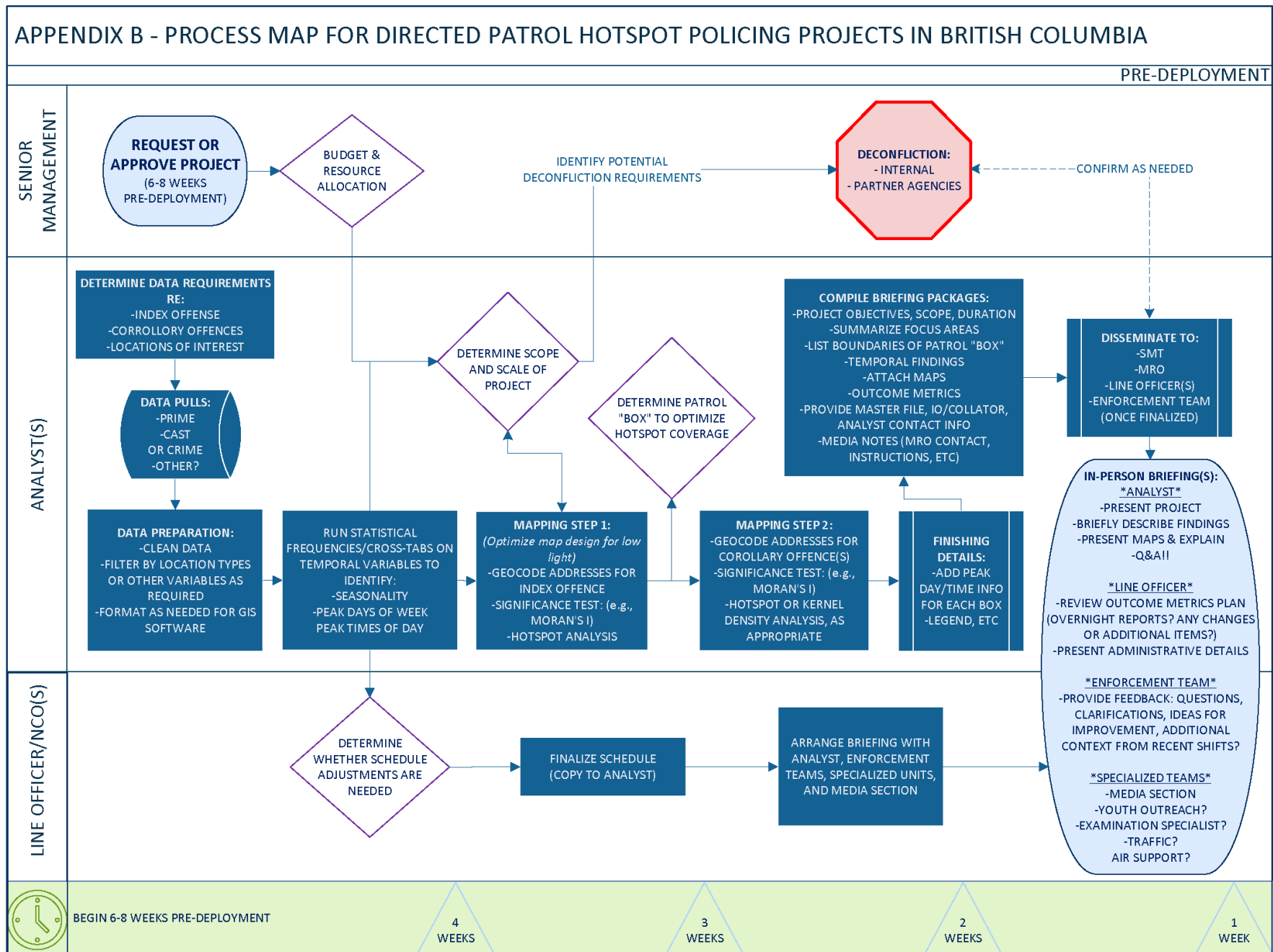
maps, and ride-alongs. The projects were carried out as intended and data was collected to evaluate outcomes. This satisfies the first three criteria of the KTA framework. The agency is in the process of testing these projects in other jurisdictions, such as rural areas, has standardized processes for project design and deployment, and the agency's senior management team has stated that this model should become part of the unit's regular operations. The agency is beginning to share the model with partner agencies through briefings, briefing packages, and on-the-road collaboration between enforcement teams. This means the agency is in the process of meeting the fourth criteria of the KTA framework, known as Institutionalization and Sustainability.⁶⁰

Conclusion

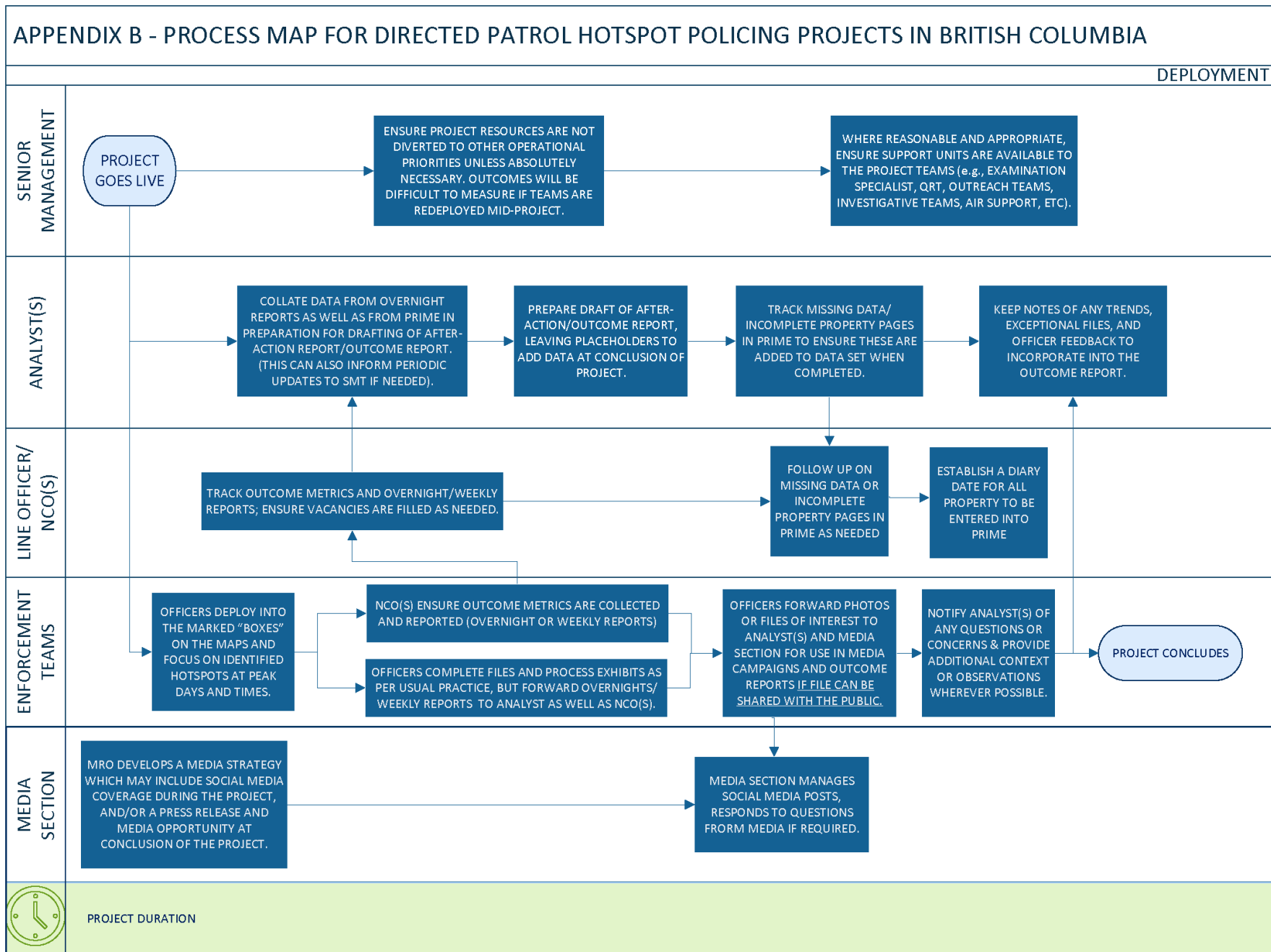
A British Columbia police agency designed and implemented directed patrol hotspots policing projects to reduce gang-related homicides and attempted homicides in key jurisdictions. The projects were effective at reducing gang-related homicides that were previously on an upward trajectory and stabilized but did not reduce gang-related attempted homicides. The agency used evidence-based methods and relied upon outcome data and officer feedback to refine the strategy. They are now institutionalizing it as a standard model and sharing it with partner agencies. This demonstrates effective use of the available research on hotspots policing, EBP, and translational criminology. It is a step toward showing that research from other jurisdictions works in British Columbia for this type of deployment; however, it is important for local researchers to publish their work and make it accessible to other agencies. This major paper attempts a modest first step toward that goal.

⁶⁰ Stewart, 2023.

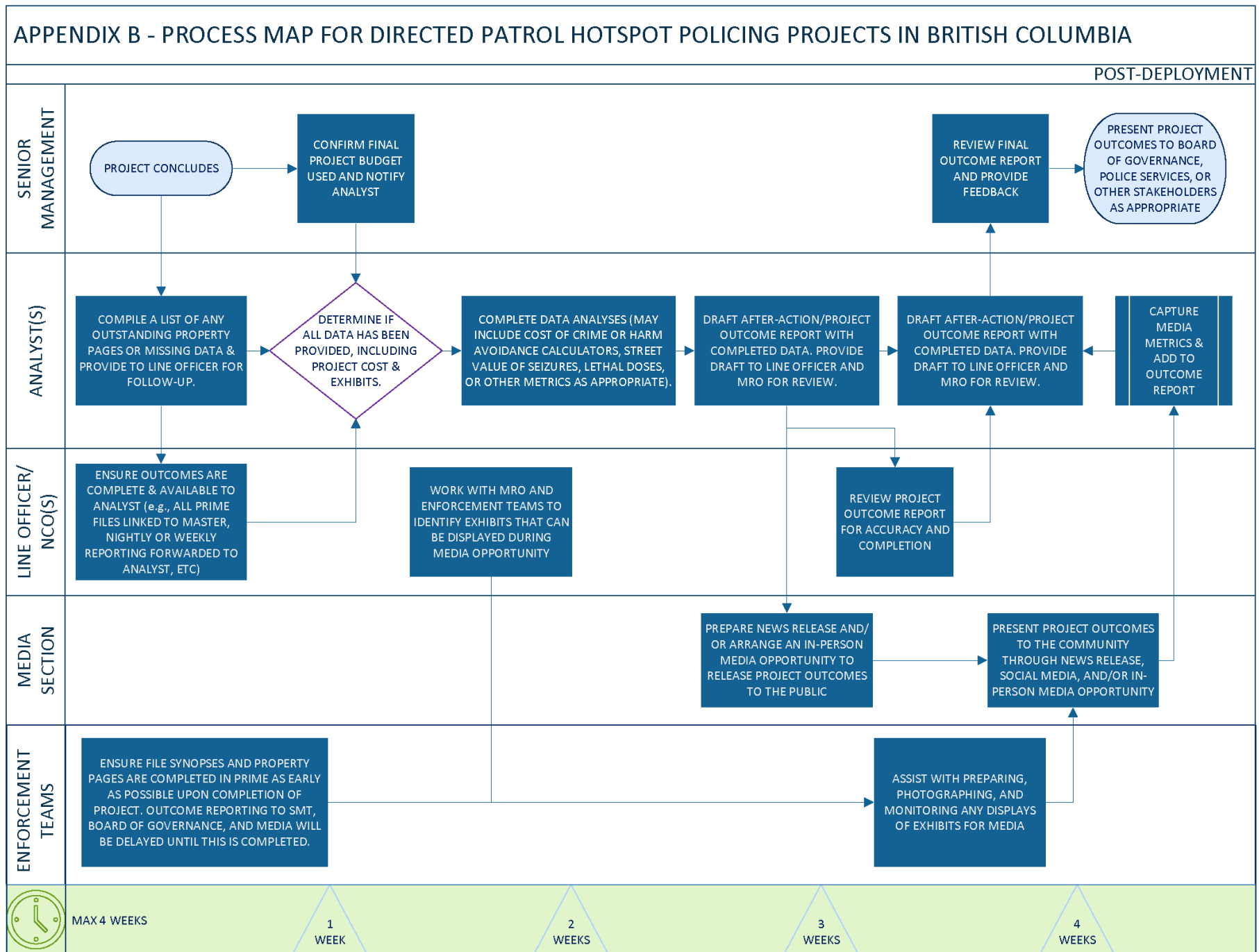
APPENDIX B: PROCESS MAPS



APPENDIX B: PROCESS MAPS



APPENDIX B: PROCESS MAPS



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