

WMP Briefing Paper

Project Guardian

Randomised Control Trial of Hot Spot Policing for Serious Violence

Ethics Committee (06 July 2022)

This project is at the proposal stage and is presented to the committee 'in principle' so that any immediate concerns can be raised.

The finer details of the methodology, exact data to be used and mode of communicating the results will not be determined until after the exploratory data analysis (EDA) phase has been undertaken.

Once the analyses have been completed the project will be presented to the Committee again so that the data used, methodology, findings, intention for deployment and communication plans can be examined in detail.

Tasking

This project was requested by Project Guardian in March 2022. The request is to design a randomised control trial (RCT) to optimise and evaluate the impact of 'Targeted Guardian Patrols' on the levels of serious youth violence in specified hot spots. Some of the parameters of the RCT design have been set via recommendations to the Home Office.

The project is sponsored by Assistant Chief Constable (ACC) for Local Policing, Rich Baker and recommended by the Home Office.

Purpose

The purpose of this project is to assist the Senior Leadership Team (SLT) of Project Guardian and the Force Executive Team (FET) to evaluate the effectiveness of hot spot policing approaches used to tackle violent crime involving young people. The intention is that over a three year period the project will enable Project Guardian to refine its approach and that any learning will be fed into the wider organisation.

West Midlands Police (WMP) receives funding from the Home Office to reduce serious youth violence. The specific purpose of the funding is to enable Neighbourhood Policing Units (NPU) to deliver targeted violence patrols into identified hot spots. There is a requirement from the Home Office to measure the impact, duration and presence of these patrols. It is intended that the RCT will facilitate this process.

Context

Serious youth violence has increased in the West Midlands area and is forecasted to remain at elevated levels in the next year (*Figure 1*).¹

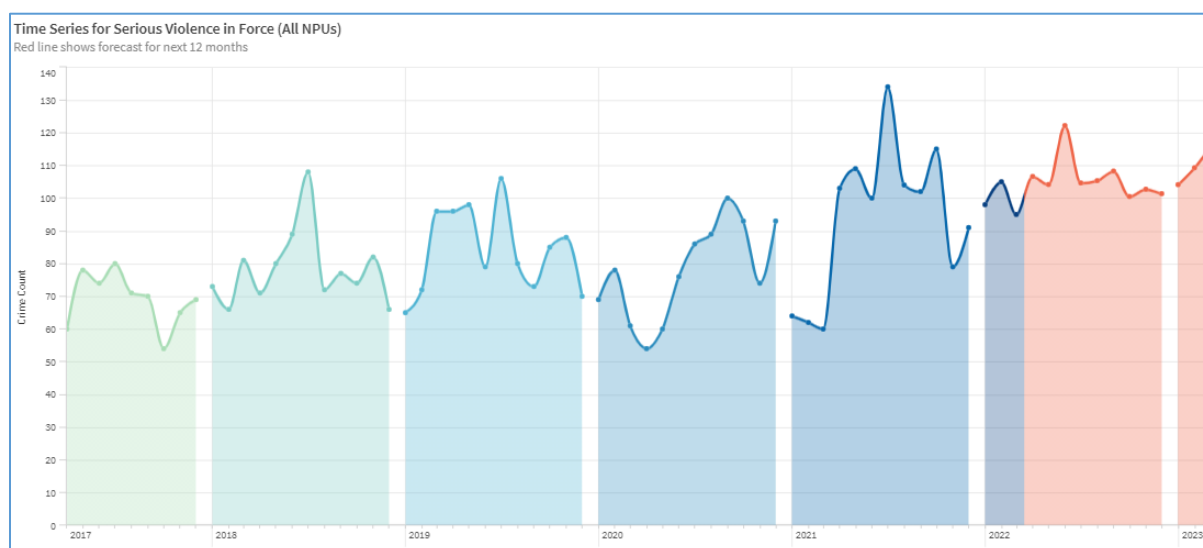


Figure 1: Serious Youth Violence since 2017 and forecasted for 2022/23 (not Domestic Abuse related)

Project Guardian is WMP's response to the government drive to reduce serious youth violence, in particular young people's involvement in knife enabled criminality and injury. It is one element of the wider public health approach being taken by WMP, the Police and Crime Commissioner (PCC) and the Violence Reduction Unit (VRU).

Project Guardian receives funding from the 'GRIP' programme for 'hot spot policing', which involves police forces operating regular, intensive, high-visibility police foot patrols for short periods of time within specific areas where data analysis shows there is a risk of serious violence.²

The confirmation that the next phase of GRIP funding from the Home Office will cover a three year period provides an opportunity for Project Guardian to undertake a more robust evidence based approach to hot spot policing, in order to evaluate whether it is effective and if so improve its effectiveness.

On behalf of the Home Office and the College of Policing, the Cambridge Centre for Evidence Based Policing has reviewed and offered guidance to WMP regarding its approach to the policing of hot spots of serious violence which draws upon evidence provided by all 18 GRIP funded forces.³

The report makes a number of recommendations using the '6T Framework' based on the themes of 'targeting', 'testing' and 'tracking', which are underpinned by 'tasking', 'technology' and 'training' in order to develop an RCT to direct the time and locations of hot spot violence patrols and to evaluate their impact.

The Data Analytics Lab (DAL) will play an integral part in this evaluative work throughout the three year funding period and will support the Guardian Intelligence Team and wider Force to deliver its

¹ Forecast taken from DAL Seasonality Project to be presented to Ethics Committee 06 July 2022.

² <https://www.gov.uk/government/news/whole-system-approach-to-tackling-violent-crime-is-working>

³ This review is for internal use only, however, for the development of the evidence and theories of hot spot policing by the Cambridge Centre for Evidence Based Policing see this link: Sherman, L.W. (1998). *Evidence-Based Policing*. Washington, DC: Police Foundation. <https://www.policefoundation.org/wp-content/uploads/2015/06/Sherman-1998-Evidence-Based-Policing.pdf>

objective of reducing serious youth violence. The DAL is tasked with designing the RCT rather than engaging an academic institution or business partner.

Intended activity resulting from the project

The DAL will design an RCT to understand the impact of randomised policing activity in hot spots identified as locations of serious violence. The patrols will be funded by Project Guardian, but conducted by neighbourhood police teams.

In line with the 6T Framework, the following outcomes have been agreed for this initial phase:

Targeting

The definition of serious violence for the purposes of the RCT includes the most harmful violent offences where an injury is caused or where there is possession of firearm with the intent to endanger life. All the offences fall within the *Violence with Injury* sub-category as defined by the Home Office Counting Rules (HOCR)⁴. See *Appendix 1 for a detailed breakdown*.

Assaults on police, crimes against the Crown and Domestic Abuse (DA) offences are all excluded, so that the focus is on events where people are injured in a public place, since this is the type of offence that targeted patrols could help to reduce. The data collection will not be restricted to offences involving victims under the age of 25, although the subsequent analysis will be able to focus on 'youth' violence as required.

The DAL and the Geo-Spatial Team will, in conjunction with the Guardian team, identify hot spots which are appropriate for targeted patrols. These areas will be reviewed by local subject matter experts (SMEs) to ensure that the patrol areas identified are those where the greatest harm is caused. It is anticipated that that these areas will be smaller than ward area, likely to be concentrated at street or a few streets level.

A rationale for the selection of the hot spot locations will be provided which will include the type of offending and the times when offending occurs. At this initial stage, the analysis will include offending in the night time economy (NTE) locations and times. Once the drivers for offending in these areas is understood a decision will be taken about whether or not they are to be included in the RCT. The focus of the RCT is not to direct patrols to deal with offending fuelled by licensed premises and alcohol; but where Organised Crime Group (OCG) activity contributes to the hot spot they will be assessed by SMEs for inclusion.

Testing

Testing is an essential part of developing a hot spot patrol strategy, and in determining how to use it with the greatest effectiveness and cost-efficiency. The DAL will develop a methodology for randomised treatment which will test a number of elements of using targeted patrols. The Cambridge review recommends the use of a 'crossover' design, in which each hot spot on each day is randomly assigned a treatment that is unknown to police and community in advance. The DAL will consider this and other approaches in the design phase.

The RCT will test:

- The effect of police presence on serious violent offending in the chosen hotspots

⁴ Home Office Counting Rules (HOCR) can be found at <https://www.gov.uk/government/publications/counting-rules-for-recorded-crime>

- The effect of different time periods for the length of patrol – ranging between 15 minutes and 45 minutes.⁵

Tracking

In order to understand the effectiveness of the targeted patrol strategy the DAL will monitor and track officer movements and activities to ensure that they were in the right place at the right time.

Building on the '*Impact Areas and Activities*' project (presented to the Committee in March 2022) the DAL is developing the capability to use Airwave data to track officer movements. 'Geo-fencing' the Guardian patrol areas using mapping software will allow the DAL to monitor when and for how long officers spend within each treatment and control area. To support this, a mobile app developed by Thames Valley Police is being considered. This will enable officers to log-on when they enter a patrol area, record their activity from a menu and log-off when they leave. This can be cross-referenced with the Airwave data.

The type of activity conducted in the patrol areas will be high visibility patrols engaging in normal neighbourhood policing activity, community engagement and reassurance. The data generated will be used for both reporting activity to the Home Office and WMP governance boards as well as feeding into the evaluation of the RCT by the DAL.

Tasking

Once the hot spots and control areas have been identified, the policing activity branded as **Targeted Guardian Patrols (TGP)** and will begin on 01 September 2022. The Corporate Communications Department are supporting Project Guardian in raising internal awareness of the RCT.

A TGP Qlik visualisation tool will be developed in Business Insight to assist with the tasking of resources to the right hot spots at the right times and to deliver performance information.

Technology

Two key pieces of technology are being developed to support the RCT – the use of airwave data to track officer movements and a mobile app where they can log their activity.

In addition, one of the DAL outputs will be a Business Insight Qlik dashboard to support the tasking process as well as providing the required performance metrics.

Training

Knowledge of Evidence Based Practice (EBP) in policing is embedded in WMP and many officers involved will be aware of the use of RCTs. This project will be promoted by Corporate Communications and the Guardian Team and training will be provided as to any associated technologies and processes. Whilst officers will be made aware of the RCT, when they are directed to conduct TGPs they will not know whether they are operating in a treatment or control hot spot.

⁵ Current literature suggests that patrols should be 15 minutes in length, however, some of this evidence comes from areas which are not similar to the policing environment in the West Midlands. For example see Koper, Christopher S. "Just enough police presence: Reducing crime and disorderly behavior by optimizing patrol time in crime hot spots." *Justice quarterly* 12.4 (1995): 649-672.
<https://www.tandfonline.com/doi/abs/10.1080/07418829500096231>

Data

<p>Data to be used:</p> <ul style="list-style-type: none"> • Crimes – violence offences • Stop and Search Records • Intelligence Reports • Organised Crime Groups Data • Airwave Geo-Fencing Data • Mobile App Data (if developed) <p>Level of analysis:</p> <p><input type="checkbox"/> Individual Individuals aggregated?</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input checked="" type="checkbox"/> Specific Area: <input checked="" type="checkbox"/> Other – Targeted Guardian Patrol areas to be determined by DAL. Will be concentrated at street level.</p>
<p>Reliability of data:</p> <p>An extensive exploratory data analysis (EDA) phase will be undertaken to examine the extent of any data quality issues.</p> <p>Sample or entirety: Entirety</p>
<p>Type of analysis:</p> <p><input checked="" type="checkbox"/> Exploratory <input type="checkbox"/> Explanatory <input type="checkbox"/> Predictive <input type="checkbox"/> Optimisation</p> <p>Proposed methodology:</p> <p>The DAL will explore a number of appropriate RCT methodologies and determine the most appropriate.</p>
<p>Will the project eventually be automated:</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>
<p>Means of evaluation:</p> <p>Extensive exploratory spatial data analysis (ESDA) will be undertaken in order to identify potential hotspots utilising a number of methods. Potential areas will then be discussed with Guardian SMEs for final inclusion. Randomisation will then be undertaken which will take into account the number of dimensions to be assessed (e.g. it would make sense to take the opportunity to see if different lengths of time of presence have any effect). Evaluation post the trial will then likely include comparison of means and effect sizes over both counts and harm, etc.</p>

ALGO-CARE considerations

As this project is at the proposal stage and is presented to the committee 'in principle' in order that any immediate concerns can be raised, the finer details of the methodology will not be determined until after the EDA. Once the analyses have been completed the projects will be presented to the Committee again so that findings and methodology can be examined in more detail.

Advisory	
If applicable, are the outputs from the algorithm to be used in an advisory capacity?	<p>In terms of the targeting phase of the RCT, the hot spots to be included will be reviewed by SMEs in Project Guardian and NPU's with local knowledge before a final decision is made.</p> <p>Once agreed, officers who are delivering TGP will be expected to patrol the specified area at a specified time and for the duration as directed by the process developed by the DAL. This may well be an automated process to protect the integrity of the experiment.</p>
Does a human officer retain decision-making discretion?	<p>Operational decisions are always left to officers and their supervisors. If there are other critical operational requirements the decision may be made not to proceed with TGP. Equally, once on patrol, an officer may be faced with a situation which requires different activity to that envisaged by the RCT. Officers will always retain discretion to act as required outside of the parameters of the RCT, in line with the policing purpose.</p>
Lawful	
What is the policing purpose justifying the use of the algorithm (means and ends)?	<p>Reducing serious youth violence is a key priority nationally and locally. Evidence based interventions are recognised and promoted by the Home Office and College of Policing as the best way to ensure policing activity is effective. Development of an RCT to tackle serious youth violence in identified hot spots has been recommended by the Cambridge Centre for Evidence Based Policing.</p>
Is the potential interference with the privacy of individuals necessary and proportionate for legitimate policing purposes?	<p>Whilst data regarding individuals will be processed from a number of systems, this would be to produce aggregated data (counts of events over certain time periods and in various locations) to understand where the violence hot spots are located.</p> <p>It is not possible to evaluate any potential bias within the model without processing ethnicity data at the level of the individual. However, names of individuals are not included in the data set.</p> <p>Therefore there would essentially be no interference with the privacy of individuals.</p>

In what way will the tool improve the current system and is this demonstrable?	In the past, RCTs have been undertaken by academic institutions on behalf of WMP. The DAL has the tools and expertise to undertake an RCT enabling the project to be managed internally.
Are the data processed by the algorithm lawfully obtained, processed and retained, according to a genuine necessity with a rational connection to a policing aim?	The data are from WMP systems and collected to enable their normal day-to-day operations.
Is the operation of the tool compliant with national guidance?	The analyses proposed would accord with the Government Digital Service Data Ethics Framework 2020. ⁶
Granularity	
Does the algorithm make suggestions at a sufficient level of detail given its purpose and the nature of the data processed?	The aim of the project is to identify violent crime hot spots for treatment and control policing activity. The analysis will provide information at a level which enables these hot spots to be determined.
Are data categorised to avoid broad-brush grouping and results and therefore issues of potential bias?	Using aggregated counts would best suit the aims of the project, but would not involve any other form of categorisation (other than an assessment of harm)
Do the potential benefits outweigh any data quality uncertainties or gaps?	The project will include an extensive EDA element and this should highlight areas of heightened uncertainty in the data or where particular gaps exist. Should any such issues be identified, these would be addressed as a part of the project. Given the benefits of reducing violent crime it is not expected that any data quality issues would be of such a magnitude as to warrant not undertaking the project.
Is the provenance and quality of the data sufficiently sound?	The data will be those that are gathered during the day-to-day work of WMP and will enable analyses of the type envisioned for this project.
If applicable, how often are the data to be refreshed?	To be determined with Project Guardian.

⁶ <https://www.gov.uk/government/publications/data-ethics-framework>

If the tool takes a precautionary approach in setting trade-offs, what are the justifications for the approach taken?	Not applicable, this is not a predictive model.
Ownership	
Who owns the algorithm and the data analysed?	WMP would own the analyses and data.
Does WMP need rights to access, use and amend the source code and data?	No
Are there any contractual or other restrictions which might limit accountability or evaluation?	No
How is the operation of the algorithm kept secure?	The analyses developed would be kept wholly within the secure WMP computing environment.
Challenge	
What are the post-implementation oversight and audit mechanisms, e.g. to identify any bias?	The analyses should highlight any biases, etc. (which should be avoided in order to enable a 'clean' trial approach.
If the algorithm is to inform criminal justice disposals, how are individuals notified of its use?	Not applicable.
Accuracy	
Does the specification of the algorithm match the policing aim and decision policy?	The model would aim to produce information to aid decision making within WMP which would be in line with the strategic intent of Project Guardian and the force to reduce youth violence.

Can the accuracy of the algorithm be validated periodically?	Not applicable – this is not a predictive model.
Can the percentage of false positives / negatives be justified?	Not applicable - this is not a predictive model.
How was the method chosen as opposed to other available methods?	The use of an RCT has been advised by the Cambridge Centre for Evidence Based Policing on behalf of the Home Office and the College of Policing, after their review of Project Guardian. This approach has been endorsed by the Assistant Chief Constable (ACC) for Local Policing. Currently the broad approach for the RCT has been identified due to the nature of the business question and the data available.
What are the (potential) consequences of inaccurate forecasts?	Not applicable - this is not a predictive model.
Does this represent an acceptable risk?	Not applicable - this is not a predictive model.
How are the results checked for accuracy and how is historic accuracy fed back into the algorithm for the future?	Not applicable - this is not a predictive model.
How would inaccurate or out-of-date data affect the result?	Not applicable - this is not a predictive model. (Although every effort will be undertaken to ensure that data gathered will be as accurate as possible).
Responsible	
Would the operation of the algorithm be considered fair?	During the development of any analyses, the presence of any biases in the underlying data to produce biases would be fully examined and mitigated if the potential was present. As with previous projects, the impact of including Stop and Search data will be evaluated.
Is the use of the algorithm transparent (taking account of the context of its use), accountable and placed under review?	The details of any analyses arising from this project would be provided.
Would it be considered to be used in the public interest and to be ethical?	Enabling the reduction of youth related violent crime would be the aim of the project and given the cost to society of violence, enabling more effective means of its reduction would likely be seen as positive.

Explainable	
Is information available about the algorithm / decision-making rules and the impact of each feature?	A technical report will be provided detailing the analyses developed.

Appendix 1: Serious Violence definition

The table shows the offences that will be included in the definition of Serious Violence for the purposes of the RCT. All these offences fall within the Violence with Injury sub-category within HOCR. Offences which are DA related will not be included in the analyses. Offences against the Crown and assaults against police officers are also excluded from the data.

Offence Title	Counting Rules Codes
Attempted murder	002/00
Attempted - Intentional Destruction of a Viable Unborn Child	004/03
Attempted - s.18 - Assault with Intent to cause Serious Harm - Wounding with intent to do grievous bodily harm	005/01
s.18 - Assault with Intent to cause Serious Harm - Wounding with intent to do grievous bodily harm	005/01
Endangering Life - Using chloroform etc to commit indictable offence	005/05
Assault with Intent to cause Serious Harm - Causing bodily injury by explosion	005/06
Endangering Life - Causing explosions, sending explosive substance or throwing corrosive fluids with intent to do grievous bodily harm	005/07
Endangering Life - Administering poison so as to endanger life	005/10
Attempted - Possession of firearm with intent to endanger life	005/14
Possession of firearm with intent to endanger life	005/14
Possession of shotgun with intent to endanger life	005/15
Possession of air weapon with intent to endanger life	005/16
Endangering Life - Use of noxious substances or things to cause harm and intimidate	005/24
Assault with Intent to cause Serious Harm - Torture	005/27
Assault with Injury - s.20 - Malicious wounding: wounding or inflicting grievous bodily harm	008/01
Attempted - Assault with Injury - s.20 - Malicious wounding: wounding or inflicting grievous bodily harm	008/01

Assault with Injury - Administering poison with intent to injure or annoy	008/02
Attempted - Assault with Injury - Administering poison with intent to injure or annoy	008/02
Assault with Injury - Drivers injuring persons by furious driving	008/04
Attempted - Assault with Injury - Drivers injuring persons by furious driving	008/04
Assault with Injury - s.47 - Assault occasioning actual bodily harm	008/06
Attempted - Assault with Injury - s.47 - Assault occasioning actual bodily harm	008/06
Assault with Injury - Assault with intent to resist apprehension	008/20
Attempted - Racially or religiously aggravated wounding or grievous bodily harm	008/59
Racially or religiously aggravated wounding or grievous bodily harm	008/59
Attempted - Racially or religiously aggravated assault or assault occasioning actual bodily harm	008/60
Racially or religiously aggravated assault or assault occasioning actual bodily harm	008/60
Care worker ill-treat /wilfully neglect an individual	008/69
Care provider breach duty of care resulting in ill-treatment/neglect of individual	008/70
Inflicting GBH Without Intent	008/81
Attempt Malicious Wounding	008/91
Malicious Wounding	008/91

Appendix 2: Glossary of Terms

WMP / Law Enforcement Terminology	
6T Framework	Cambridge Centre for Evidence Based Policing – recommended framework for developing a violence hot spot patrol RCT
ACC	Assistant Chief Constable
DA	Domestic Abuse
DAL	Data Analytics Lab
EBP	Evidence Based Practice
FET	Force Executive Team
GRIP	The GRIP programme, or ‘hot spot policing’, involves police forces operating regular, intensive, high-visibility police foot patrols for short periods of time within specific areas where data analysis shows there is a risk of serious violence. https://www.gov.uk/government/news/whole-system-approach-to-tackling-violent-crime-is-working
HOCR	Home Office Counting Rules
NPU	Neighbourhood Police Unit
NTE	Night Time Economy
OCG	Organised Crime Group
PCC	Police and Crime Commissioner
RCT	Randomised Control Trial
SME	Subject Matter Expert
SLT	Senior Leadership Team
SYV	Serious Youth Violence
TGP	Targeted Guardian Patrols
VRU	Violence Reduction Unit
WMP	West Midlands Police

Data Science Terminology	
ALGO-CARE	All projects have used the ALGO-CARE to consider ethical implications: Advisory, Lawful, Granularity, Ownership, Challenge, Accuracy, Responsible, Explainable
EDA	Exploratory Data Analysis
ESDA	Extensive exploratory spatial data analysis