

WMP Briefing Paper

Impact Areas and Activities

Ethics Committee (03 Nov 2021)

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 more detail.

Legal opinion has been sought and the Data Protection Impact Assessment (DPIA) approved by the Force Data Protection Officer (DPO).

Tasking

This project was requested by Detective Chief Superintendent Andy Hill, Director of Intelligence in April 2021.

Purpose

The purpose of this project is to assess the effect of police presence and movements on criminal activity within Impact Areas (IA) and how this compares to similar areas which have not been designated as Impact Areas (non-IA).

The output will be two-fold:

1. A Qlik dashboard for Business Insights to enable an assessment of the movements of officers from any department or Neighbourhood Policing Unit (NPU) within a chosen Impact Area and to overlay these movements with data relating to crime, incidents and stop and search.
2. Analysis which evaluates the effectiveness of deploying police resources in an Impact Area compared to police resources active in a similar area which is not designated as an Impact Area.

Specifically the project will answer the following questions:

1. What is the baseline of officer time spent in the IA and non-IA?
2. What resources were in the IA and non-IA?
3. What activities did those resources undertake?
4. Were those resources in cars or on foot?
5. What crimes and incidents occurred (for the same time period) in the IA and non-IA?
6. What stops and searches occurred in both areas?

7. Is there any relationship between police presence; the type of resource and policing activity and the occurrence of key crime types? This should include identifying any displacement of crime.
8. To what degree does the number of calls for service correlate with the quantity of recorded crime?

Context

There is increasing evidence for the benefits of a 'place based' approach to policing founded on the premise that crimes occur repeatedly in a small proportion of places.¹ Thus targeting these hot spot locations with additional interventions can reduce crime. The College of Policing (CoP) 2021 systematic review of the evidence suggests that hot spot policing has reduced crime, in particular when a problem-oriented approach is used. It does not appear to displace crime and can lead to a diffusion of benefits to surrounding areas.²

West Midlands Police (WMP) has been developing its methodology for a place-based approach for 15 years and in 2019 adopted the current **Impact Areas**. These are small geographical areas where there is a disproportionate amount of crime, demand for service, deprivation and harm.

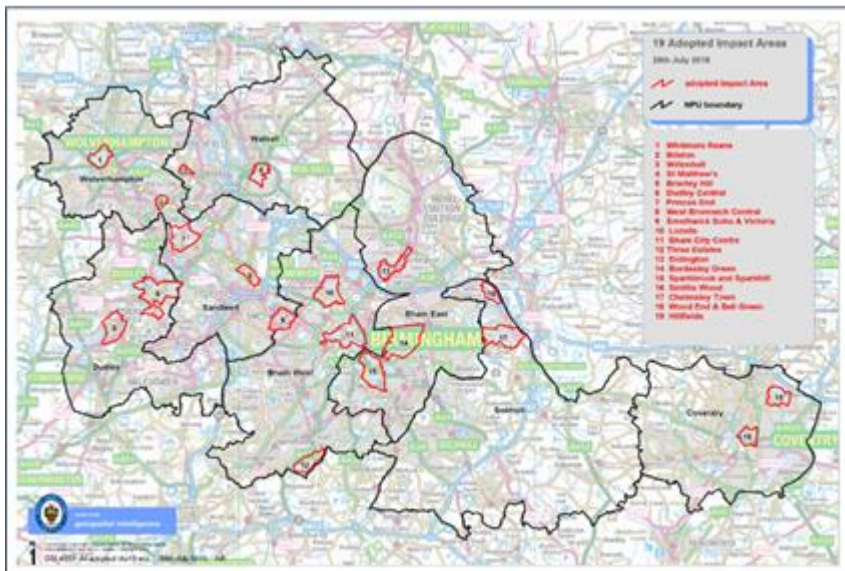


Figure 1: 19 adopted Impact Areas

The methodology identified areas of long term **demand** (including crime and incident data and home addresses of offenders³) and **need** (based on the index of multiple deprivation and areas with higher concentrations of young people aged 10 – 24).

The analysis resulted in 39 Impact Areas being identified across the force area of which 19 were adopted.

This project will use the remaining areas which were not adopted as the comparison areas for the analysis.

¹ Eck, J.E. and Weisburd. 1995. 'Crime Places in Crime Theory'. In Eck and Weisburd (eds) *Crime and Place* (vol.4, pp.1-33); Joel Hunt, "From Crime Mapping to Crime Forecasting: The Evolution of Place-Based Policing," *NIJ Journal* 281, November 2019, <https://nij.ojp.gov/topics/articles/crime-mapping-crimeforecasting-evolution-place-based-policing>;

Bowers, K.J., Johnson, S.D., Guerette, R.T. et al. Spatial displacement and diffusion of benefits among geographically focused policing initiatives: a meta-analytical review. *J Exp Criminol* 7, 347–374 (2011) <https://doi.org/10.1007/s11292-011-9134-8>;

Garnier S, Caplan JM and Kennedy LW (2018) Predicting Dynamical Crime Distribution From Environmental and Social Influences. *Front. Appl. Math. Stat.* 4:13. <https://www.frontiersin.org/articles/10.3389/fams.2018.00013/full>

² College of Policing What Works Crime Reduction Toolkit – Review of the Evidence for Hot Spots Policing using the EMMIE framework <https://whatworks.college.police.uk/toolkit/Pages/Intervention.aspx?InterventionID=46>

³ 'Offenders' includes those identified as either 'suspects' (around 76%), 'defendants' (around 22%) or 'responsible' (around 2%). Offender home location was one of 11 variables used in the methodology and therefore not dominant in determining the overall 'score'.

The 19 Impact Areas represent 4% of the WMP geographical area yet account for 16% of the region's crime and are home to 14% of offenders.

By focusing on these areas since 2019 the intention has been to have the biggest impact with our resources on the areas where there is greatest call for police services and the greatest need.

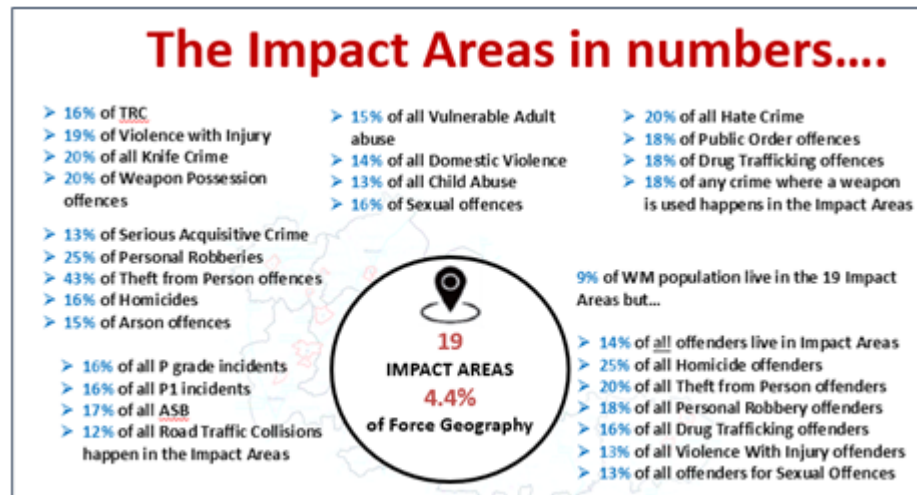


Figure 1: The Impact Areas in Numbers

The aspiration is to make Impact Areas fundamentally better and safer in the long term by:

- reducing crime, demand and harm
- improving the quality of life for those living in these areas
- protecting the most vulnerable

This approach is rooted in working with partner agencies and communities to solve long term problems and is the key focus for Local Policing, supported by all departments.⁴

Intended activity resulting from the project

The Business Insight dashboard and the accompanying analysis have been tasked in support of the Force's *Precision Policing Doctrine*.⁵ This aims to maximise the use of data and evidence based practice by giving decision makers access to the right data and expertise in order to develop a learning culture.

The dashboard will enable decision makers to assess how long officers spend in Impact Areas, whether they were there at the most appropriate times and whether they were the right resource for the current crime and demand issues (for example response officers, neighbourhood officers, offender managers or partnerships teams all offer different types of response). Additionally, the stop and search data will be overlaid with crime data to ensure that the use of this tactic is focused on the right areas at the right times.

Access to this information will support precision policing by enabling decision makers to monitor the effectiveness of operational activity. This learning will inform the monthly Force Tasking and Delivery Board (FTDB), the quarterly Strategic Tasking and Coordination Group (STCG) and a range of other decision making forums. Access to the dashboard will be for appropriate Inspectors and above.

The accompanying analysis will provide a baseline for evaluating the effectiveness of activities within the Impact Areas at a strategic level. This will provide senior leaders with evidence of how effective the Impact Area strategy is and inform decisions about the resourcing of these areas in the future.

⁴ West Midlands Police and Crime Commissioner Strategic Policing and Crime Board paper 15/10/2019 'Neighbourhood Policing' <https://www.westmidlands-pcc.gov.uk/wp-content/uploads/2019/07/151019-SPCB-Agenda-Item-9a-Final-Neighbourhood-Policing-Report.pdf>

⁵ WMP Force Strategy *This Work Matters* https://www.west-midlands.police.uk/flysystem/public-sync/inline-files/This_work_matters_0.pdf and Dave Thompson QPM, Oct 2020. 'A Force for Change: policing after the pandemic', Reform UK <https://reform.uk/sites/default/files/2020-10/A%20force%20for%20change%20%20%281%29.pdf>

Data

Data to be used:

- Radio affiliation data (Airwave)
- Crimes (from CONNECT post April 2020)
- Incidents (Oasis and ControlWorks)
- Stop and Search

Level of analysis:
 Individual

Individuals aggregated?

 No

Data will be aggregated for the analysis, but will be viewed at an individual level on the dashboard.

 Specific Area:

 West Midlands

 Other (type of crime)

The geographic areas will be Impact Areas and similar areas which are not designated as Impact Areas. See map on p.2 for the 19 Impact Areas under review

Reliability of data:

The data are sourced from WMP systems which are used as part of daily business. All have been used in previous DAL projects and are routinely used in existing dashboards to provide the Force with performance management information.

However, an extensive exploratory data analysis (EDA) phase will be undertaken to examine the extent of any data quality issues.

Sample or entirety: Entirety

Type of analysis:
 Exploratory

 Explanatory

 Predictive

 Optimisation

Proposed methodology:

The analysis will use radio affiliation data to observe the movements of officers in and out of the Impact Areas and comparison areas as well as the time spent in each over the day. This will be overlaid with crimes, incidents and stop and search data. Further detail about the methodology is not yet known.

Will the project eventually be automated:
 Yes

 No

The dashboard will be refreshed daily.

Means of evaluation:

Manual checking of the dashboard will be conducted during the beta phase to compare information held on current systems. Any issues will be investigated and corrected by the DAL.

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?	The outputs of both the dashboard and the strategic analysis will be advisory for decision makers at various levels within the organisation. The outputs will describe what has happened in the past to inform future resourcing decisions, whether at an operational, tactical or strategic level.
Does a human officer retain decision-making discretion?	Yes, the outputs are for information only.
Lawful	
What is the policing purpose justifying the use of the algorithm (means and ends)?	This project supports the Force Strategy and the <i>Precision Policing Doctrine</i> by ensuring that resourcing decisions are based on data and evidence. The intention is to ensure the most effective use of police resources in the areas where there is the greatest demand and need for policing services.
Is the potential interference with the privacy of individuals necessary and proportionate for legitimate policing purposes?	<p>Data from key WMP systems (both legacy and CONNECT) relating to crimes; incidents and stop and search will be used. Personal information referring to members of the public involved in these events will not be used in the analysis.</p> <p>However, WMP officer and (deployable) staff collar numbers will be required as unique reference numbers to understand which officers, from which departments were present in the chosen areas and at what time. No further personal data held by the organisation about officers will be used in the analysis.</p> <p>It is proportionate to use the officer collar number as a URN for this purpose in order to understand whether deployments have an effect on levels of crime. This will provide insights into how we can use our resources more effectively. The collection of data relating to individual officers' collar numbers to determine their location at a particular time whilst they are on duty, is business as usual.</p>

	Whilst it will be possible to track officer journeys whilst on duty on the dashboard, this will not be used to assess the impact (or lack of) of individual officers. It will be used to assess the impact of deployments at a macro level. This data will not be used to track the movements of an individual officer for performance management purposes.
In what way will the tool improve the current system and is this demonstrable?	Currently, there is limited capability to track officer journeys and to overlay this with the crimes, incidents and the use of stop and search tactics. The dashboard will provide visibility of where officers have been and how this relates to events requiring a police presence. The strategic analysis will be the first comprehensive review of the effectiveness of deployments within Impact Areas.
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 as part of WMP's duty to investigate crimes, respond to incidents and record stop and search interactions. As such they are collected in the appropriate manner and for the appropriate purposes.
Is the operation of the tool compliant with national guidance?	The analyses proposed would accord with the DCMS Data Ethics Framework 2018. ⁶
Granularity	
Does the algorithm make suggestions at a sufficient level of detail given its purpose and the nature of the data processed?	The dashboard will show officer journeys and crime, incident and stop and search events at the level of the individual occurrence. The radio affiliation data is refreshed every few minutes which will provide sufficient detail to assess officer presence against events occurring at a specific place and time.
Are data categorised to avoid broad-brush grouping and results and therefore issues of potential bias?	There will not be any categorisation of individuals other than understanding which operational unit officers belong to.
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. The benefits of the analysis is to evaluate the effectiveness of the resources we deploy to the communities who most require our services.

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

Is the provenance and quality of the data sufficiently sound?	The data have been 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?	The dashboard will be updated daily. The strategic analysis will be updated as deemed necessary by the Force Executive Team.
If the tool takes a precautionary approach in setting trade-offs, what are the justifications for the approach taken?	There is no predictive element to this project.
Ownership	
Who owns the algorithm and the data analysed?	WMP owns the underlying data and any resulting analyses.
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 data and the analyses are contained wholly within the WMP Hadoop system and the security measures employed therein.
Challenge:	
What are the post-implementation oversight and audit mechanisms, e.g. to identify any bias?	Where end users find errors in the dashboard these will be investigated and any underlying errors corrected by the DAL.
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 research question matches the policing aim and is aimed at supporting the Precision Policing Doctrine. The nature of the analyses used will be determined to be the best means of addressing the research question.
Can the accuracy of the algorithm be validated periodically?	The accuracy of the output of the dashboard will be monitored and amended where issues are identified. However, the dashboard will simply report on past events, rather than being predictive.
Can the percentage of false positives / negatives be justified?	Not applicable
How was the method chosen as opposed to other available methods?	The method will be chosen once discussions have taken place with Subject Matter Experts (SMEs) and the EDA has been undertaken.
What are the (potential) consequences of inaccurate forecasts?	Not applicable
Does this represent an acceptable risk?	Not applicable
How are the results checked for accuracy and how is historic accuracy fed back into the algorithm for the future?	Not applicable
How would inaccurate or out-of-date data affect the result?	If data were to be wholly or partially inaccurate then the analyses would essentially provide inapplicable findings. The Lab will seek to minimise this potential through a thorough analysis of the data in an extended EDA phase including their pitfalls, issues and overall nature. Discussions with SMEs should also highlight effects that may arise due to erroneous data.
Responsible	
Would the operation of the algorithm be considered fair?	The analyses will be fair in that each data point will be considered on its own merits.
Is the use of the algorithm transparent (taking account of the context of its use),	The output of the dashboard can be checked against source systems to check it is an accurate reflection of an officer's movements. It is anticipated that supervisors would make regular use of the dashboard and any issues

accountable and placed under review?	they identify will be investigated.
Would it be considered to be used in the public interest and to be ethical?	It would be considered to be in the public interest for WMP to be able to demonstrate how effective or otherwise resourcing decisions are, particularly for the areas where there is the greatest need for our services.
Explainable	
Is information available about the algorithm / decision-making rules and the impact of each feature?	<p>The front page of the dashboard will provide an explanation of the data and methodology used.</p> <p>A technical report will be produced for the strategic analysis, which will include information about the methods used.</p>

Appendix 1:

WMP / Law Enforcement Terminology	
COP	College of Policing
DAL	Data Analytics Lab
EMMIE	The EMMIE framework developed by University College London used to rate the best available evidence on crime reduction interventions by evaluating their Effect; Mechanism; Moderators; Implementation and Economic cost. Used by the College of Policing in their systematic reviews of research papers.
FTDB	Force Tasking and Delivery Board
IA	Impact Area
IMD	Index of Multiple Deprivation
NPU	Neighbourhood Policing Unit
SME	Subject Matter Expert
STCG	Strategic Tasking and Coordination Group
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
DCMS	Department for Digital, Culture, Media and Sport – developed the Data Science Ethical Framework.
EDA	Exploratory Data Analysis