WMP Briefing Paper

Modelling to determine potential benefits of creating a Prisoner Handling Team in FCID

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 Superintendent Darren Walsh in December 2020 on behalf of the Force Criminal Investigations Department (FCID) to support the *Act with Precision* strand of the Force Strategy.[1]

Purpose

The purpose of this project is to provide analysis to enable the FCID Senior Leadership Team (SLT) to determine the most economic deployment of resources in relation to dealing with persons in custody (PICs) or 'prisoners'[2] as part of managing investigations.

Specifically, the analysis is to determine whether it would be beneficial to create a Prisoner Handling Team (PHT) covering the two Birmingham Neighbourhood Policing Units (NPUs) to deal with prisoners who come under the remit of the Volume Violence and Acquisitive (VVA) crime investigation teams.

Volume crime is defined as 'any crime which, through its sheer volume, has a significant impact on the community and the ability of the local police to tackle it. Volume crime often includes priority crimes such as street robbery, burglary and vehicle-related criminality, but can also apply to criminal damage or assaults.'[3]

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[1] Force Strategy *This Work Matters*: https://www.west-midlands.police.uk/_flysystem/public-sync/inline-files/This_work_matters_0.pdf

[2] In WMP PICs are commonly referred to as 'prisoners'

[3] ACPO (2009) Practice Advice on the Management of Priority and Volume Crime (The Volume Crime Management Model) (Second Edition) https://library.college.police.uk/docs/acpo/VCMM-191109.pdf

The intention is to build a data model which predicts the likely volume of prisoners and the size of team and roles that would be required to manage this.

Context

The VVA investigative teams manage the secondary investigations for the bulk of cases relating to geographically based violent and acquisitive crime (which do not meet the threshold for the teams investigating Serious, Complex and High Harm crimes). The greatest volume sits within the central hub, covering the two Birmingham NPUs.

Presently, investigators on the VVA team spend a significant proportion of their time dealing with PICs, which reduces the quality of service offered to victims and the wider community as the time dedicated to the secondary investigation is limited. This includes processes such as interviewing witnesses, interrogating potential sources of further intelligence such as CCTV, telephone or financial records and police and partner intelligence databases.

Since the current operating model was instigated, the environment has changed both in terms of the volume of demand coming into the VVA team and the procedures required by the Crown Prosecution Service (CPS). Additionally, as a result of the recruitment uplift the department now includes a significant number of student officers who have little practical experience of building court files to the required standard for both Pre-Charge Advice (PCA) and Pre-Charge Decisions (PCD). An improvement in current processes would reduce this failure demand, bringing benefits to the management of both FCID and CPS resources and ultimately providing victims (and PICs) with a better standard of service.

Initial scoping undertaken by the department based on a dip sample of prisoner demand in October 2020 suggests that a team of one inspector, six detective sergeants and 30 investigators (officers and police staff) could undertake the PHT function on early and late shifts, seven days a week. The perceived benefit is that the officers who remain on VVA would be less likely to be disrupted by reactive prisoner demand.

This analysis has been tasked in order to understand whether a prisoner handling function would offer better value (economic use of resource) in comparison to the current operating model and predict whether it could accommodate likely future levels of demand.

Intended activity resulting from the project

This analysis will contribute to the information gathered by the FCID SLT in order to make decisions about the best operating model for the VVA investigation team.

Data

Data to be used:
 	
Data relating to the following:
 	
    • Crimes (to identify correct offences dealt with by VVA team)
    • Custody
    • Human Resources data (to identify VVA officers)
    • Docutrak / Connect CASE records (to extract details about the investigation undertaken)
 	
Time frame to be agreed with VVA subject matter expert (SME). Pre-April 2020 data will be from legacy systems; post-April 2020 crimes, custody & CASE will be from CONNECT.
 	
Level of analysis:
 	
☑ Individual
    Individuals aggregated?
    ☑ Yes
☑ Specific Area:
    ☑ Districts – Birmingham NPUs

Reliability of data: The data are sourced from WMP systems which are used as part of daily business. An extensive exploratory data analysis (EDA) phase will be undertaken to examine the extent of any data quality issues, including processes to identify the presences of any bias, to ensure that no bias is built into the model. Discussions with subject matter experts (SMEs) will be undertaken both to capture any extraneous requirements and to sense check the analyses. **Sample or entirety:** Entirety
Type of analysis: ☐ Exploratory ☐ Explanatory ☑ Predictive ☑ Optimisation **Proposed methodology:** Not currently known
Will the project eventually be automated: ☐ Yes ☑ No
Means of evaluation: If the recommendations are accepted, the Force will assess costs and benefits of the changes as part of usual business processes.

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?	This analysis is intended to inform FCID SLT decision in respect of the department's operating model. The output will be advisory.
Does a human officer retain decision-making discretion?	FCID SLT and the ACC Crime will use this information in conjunction with other considerations to make a decision about the future operating model.
Lawful	
What is the policing purpose justifying the use of the algorithm (means and ends)?	This project supports the Force Strategy and the *Precision Policing Doctrine* by ensuring that resourcing decisions are based on data and evidence. The intention is to ensure that officer time is used efficiently, thus reducing the time spent by prisoners in custody and increasing officer availability to pursue investigative lines of enquiry.
Is the potential interference with the privacy of individuals necessary and proportionate for legitimate policing purposes?	The data relating to individual prisoners will be used to assess the volume of arrests and to calculate average time spent in custody rather than focusing on the details relating to individual detainees. Data relating to officers is simply to identify officers and staff associated with the VVA team over time. Therefore there would essentially be no interference with the privacy of individuals.
In what way will the tool improve the current system and is this demonstrable?	The output of this analysis is not intended to provide a tool for ongoing use. If the recommendations are accepted, the Force will assess costs and benefits of the changes as part of usual business processes.
Are the data processed by the algorithm lawfully obtained, processed and retained, according to a genuine	The data are from WMP systems and collected as part of WMP's duty to investigate crimes and as

necessity with a rational connection to a policing aim?	such 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.[4]
Granularity	
Does the algorithm make suggestions at a sufficient level of detail given its purpose and the nature of the data processed?	The resulting analyses will provide information about the likely volume of investigations and prisoners to be managed by the VVA team and calculate the required number of officers to staff this function. This will be at an appropriate level of detail to inform decision making at a strategic departmental level.
Are data categorised to avoid broad-brush grouping and results and therefore issues of potential bias?	Some categorisation may take place in forming the features of the modelling, however, the details will become apparent during the analyses which will check for any potential bias.
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 determine the most efficient use of investigative resources in order to improve the service we offer to victims of crime.
Is the provenance and quality of the data sufficiently sound?	The data have been gathered during the day-to-day custodial and investigative work of WMP and will enable analyses of the type envisioned for this project.
If applicable, how often are the data to be refreshed?	Not applicable
If the tool takes a precautionary approach in setting trade-offs, what are the justifications for the approach taken?	The accuracy of the predictive model would be tested on separate data which had not been used in building and training the predictions. This can be done using historic data – where we know what happened and would tell us if the model would have predicted events or not. If the model is not deemed to be accurate enough, then the project would not be pursued. Ultimately any model developed would aim to minimise estimation errors. This approach would mean that we could best allocate WMP resources whilst ensuring a minimisation of false positives / over or under-estimation.

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[4] https://www.gov.uk/government/publications/data-ethics-framework/data-ethics-framework

Ownership	
Who owns the algorithm and the data analysed?	WMP owns the underlying data and any models resulting from the 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?	Not applicable as this analysis is not intended to be productionised for use on an on-going basis.
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?	Not applicable as this analysis is not intended to be productionised for use on an on-going basis.
Can the percentage of false positives / negatives be justified?	Not yet known, however any model developed would aim to minimise estimation errors.
How was the method chosen as opposed to other available methods?	The method will be chosen once discussions have taken place with SMEs and the EDA has been undertaken.
What are the (potential) consequences of inaccurate forecasts?	An inaccurate forecast of the level of demand into the VVA team could lead to the analyses recommending either too small or too large a team. Too small a team would mean that the proposed change of creating a PHT would not resolve the current issues being experienced. Too

	large a team would result in a waste of valuable resource.
Does this represent an acceptable risk?	Yes, this will be the first time the department has had any analyses of this depth conducted to answer this type of question.
How are the results checked for accuracy and how is historic accuracy fed back into the algorithm for the future?	Not applicable as this analysis is not intended to be productionised for use on an on-going basis.
How would inaccurate or out-of-date data affect the result?	If data were to be wholly 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), accountable and placed under review?	The nature of the intended method(s) is such that the end-use is to provide information rather than predictions that feed into a process on an on-going basis.
Would it be considered to be used in the public interest and to be ethical?	In the face of increasing demand in this area it would be in the interest of victims if those elements that could improve the efficacy of investigations could be identified.
Explainable	
Is information available about the algorithm / decision-making rules and the impact of each feature?	A technical report will be produced which will include information about the methods used, the features and their respective impact.

Appendix 1: Glossary of Terms

WMP / Law Enforcement Terminology	
ACC	Assistant Chief Constable
CCTV	Closed Circuit Television
CPS	Crown Prosecution Service
COP	College of Policing
DAL	Data Analytics Lab
DPIA	Data Protection Impact Assessment
DPO	Data Protection Officer
FCID	Force Criminal Investigations Department
NPU	Neighbourhood Policing Unit
PCA	Pre-charge advice
PCD	Pre-charge decision
PHT	Prisoner Handling Team
PIC	Person in Custody
SLT	Senior Leadership Team
SME	Subject Matter Expert
VVA	Volume Violence and Acquisitive Crime
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
Productionise	To 'productionise' means that once we are satisfied that the model works well, we would automate the process of providing predictions every 4 weeks.
Sensitivity	Refers to the ability of the model to identify the 'true positives' as a rate. It measures the proportion of actual positives that are correctly identified as such. The greater the sensitivity of a model, the less the specificity will be.
Specificity	Refers to the ability of the model to identify the 'true negatives' as a rate. It measures the proportion of actual negatives that are correctly identified as such. The greater the specificity of a model, the less the sensitivity will be.