



BDC |

**Manchester Metropolitan University
Crime & Well-Being Big Data Centre**

Evaluation of the Impact of Alcohol Minimum Unit Pricing (MUP) on Crime and Disorder, Public Safety and Public Nuisance

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1. Introduction

To combat a set of societal harms associated with alcohol, and as part of a public health whole population approach, the Scottish Parliament passed legislation in 2012 to allow for the implementation of MUP. Secondary legislation set the level of MUP at 50 pence per unit (ppu). The Scottish Government implemented MUP on the 1st of May 2018. The legislation requires Ministers to report to Parliament on the impact of the act on a number of outcomes. It is in this context that the proposed study aims to evaluate the impact of MUP on crime and disorder, public safety and public nuisance.

The evaluation is founded on a comprehensive understanding of the aim, objectives, scope and challenges. Specifically:

- It recognises the need to accurately qualify which types of crime and disorder, public safety and public nuisance can be considered alcohol-related. An innovative and piloted method is proposed to undertake this task.
- It appreciates that, in addition to a global impact, MUP might be expected to hold greatest effect in particular settings and time periods and amongst certain social groups. These insights have informed the design of the evaluation framework.
- It understands that a fundamental challenge of the evaluation to be the issue of causality, the capacity to ascribe any observed changes in alcohol related harms to the introduction of MUP. This issue is addressed through the proposed enhancement of the draft theory of change presented in the Invitation to tender (ITT) and in the utilisation of a synthetic dataset as a (counterfactual) control group.

2. Background

Alcohol consumption

Alcohol consumption is moderated by its affordability, availability and acceptability (or culture). Over the last thirty years, alcohol in the UK has become more affordable as disposable income has increased whilst the cost of alcohol has decreased. In 2018, alcohol sold in the UK was 64% more affordable than it was in 1987 (Giles & Robinson, 2019¹). The sale and consumption of alcohol in Scotland rose during the 1990s and early 2000s, peaking in 2007. Thereafter, sales stabilised before commencing to fall. The 2019 Monitoring and Evaluating Scotland's Alcohol Strategy (MESAS) report (Giles & Robinson, 2019¹) identifies that the volume of pure alcohol sold per adult in 2018 was 9.9 litres, the equivalent of 19.0 units of alcohol per adult per week. However, when the increasing prevalence of non-drinkers is factored in, the volume of pure alcohol sold per adult is estimated to be 11.9 litres.

The level of alcohol consumption varies across the population. Scottish Government (2018²) identified that 17% of the population aged 16 and over were non-drinkers (no units per week); 59% were moderate drinkers (>0 units and up to 14 units per week); whereas, 24% were hazardous/harmful drinkers (more than 14 units per week). A third of Scottish men drink more than the 'low risk' weekly drinking guidelines compared with 16% of women. As household income increases the proportion of the population drinking above the weekly guidelines increases. However, and importantly, the mean weekly consumption of the lowest income group is considerably higher (at 40.1 units) than the highest income group (at 28.3 units). Furthermore, the heaviest 10% of drinkers consume 48% of all self-reported consumption in Scotland (Giles & Robinson, 2019: 12¹).

The vast majority of 'cheap' alcohol sales take place via the off-trade (supermarkets, convenience stores, and off-licences) as opposed to the on-trade (pubs, clubs, and restaurants). The latest figures from Nielsen (Giles & Robinson, 2019¹) indicate that in 2017, 47% of all alcohol was sold at under 50ppu. This included 74% of all Blended Whisky and 70% of all Vodka sold. In 2018 (noting the introduction of MUP on 1 May 2018), these figures fell to 23%, 24% and 23% respectively. It is important to note that the price disparity between the more expensive on-trade and cheaper off-trade has been evidenced to inform a pre-loading culture – the consumption of

alcohol at a domestic residence prior to attending licensed premises in the night-time-economy (Foster & Ferguson, 2014:213³).

Drinking alcohol and heavy drinking / drunkenness in particular has been argued to be an integral part of Scottish culture (MacAskill et al, 2008: 47⁴). To an extent, this is reflected in the disparity in the consumption rates of alcohol between Scotland and England and Wales (Giles & Robinson 2019¹). Thus, and in 2017, the mean self-reported weekly alcohol consumption in Scotland was 12.5 units in comparison to 11.8 units recorded in England (noting the slight differences in survey methods used to calculate these figures).

Crime and disorder, public safety and public nuisance

As alcohol consumption increases, so too does the prevalence of a multitude of societal harms (Campbell et al., 2009⁵; Elder et al., 2010⁶; Gilmore et al., 2016⁷). Of key relevance to this evaluation are the crime and disorder, public safety and public nuisance harms inflicted on others and the consequent public money spent on policing them. Alcohol does not cause crime, but its excessive consumption is pervasive amongst offenders. For example, alcohol intoxication is associated with heightened aggression and a feeling of power (Finney, 2004⁸) and, consequently, the risk of being involved in violence increases with drunkenness (Schnitzer et al., 2010⁹). Further, a recent Scottish survey found that that 30% of respondents stated that they had been kept awake at night by drunken noise, 20% had been harassed or bothered by someone who had been drinking on a street or in another public place and 19% had felt unsafe in a public place because of someone else's drinking (Gell et al., 2015¹⁰). In overview, the cost to society of alcohol-related crime and public disorder, (threats to) public safety and public nuisance is vast. In 2007, and therefore quite dated, it was estimated that the cost of alcohol related crime in Scotland amounted to £727 million (Scottish Government, 2010¹¹).

Police Scotland (2017: 23¹²) state that "Alcohol is a prevalent factor in many crimes". The most recent Scottish Crime and Justice Survey (SCJS) in 2017/18 states that of respondents who report being a victim of crime, around two in five (39%) felt that the offender was under the influence of alcohol. However, this varied by crime type, with almost half of victims of violent crime (46%), assaults (48%) and vandalism (50%) feeling that the offender was under the influence of alcohol. Scottish Government

(2019¹³) identified that in 2017-2018 “nearly two-thirds (63%) of serious assault crime records made reference to the consumption of alcohol” whereas “one in ten serious assaults (10%) made reference to drugs”. For Homicides, 81% of offenders were recorded as being under the influence of alcohol at the time of the offence (Giles & Robinson 2019¹) and in 2017, 39% of prisoners reported being under the influence of alcohol at the time of their arrest.

The potential outcomes of MUP

A large international literature has evidenced an inverse relationship between the price of alcohol and its consumption (Wagenaar et al., 2009¹⁴), as price increases there is a reduction in consumption. In a review of the potential of supply and demand reduction strategies to temper alcohol-related harms, Stockwell (2006¹⁵) found that alcohol taxation, to maintain a high price per unit of alcohol, to hold greatest prospect of beneficial effect. Recent systematic reviews and rapid evidence assessments have served to corroborate this finding (Elder et al., 2010⁶; Booth et al., 2011¹⁶; Boniface et al., 2017¹⁷; Stockwell et al., 2016¹⁸). Examining alcohol taxation in Canada, Stockwell et al (2015¹⁹) found that a 10% increase in the minimum unit pricing of alcohol to be associated with a 4 to 5% decrease in consumption, a 9% reduction alcohol related hospital admissions and a 9% reduction in violent crime.

Two key studies have modelled the elasticity of pricing on alcohol-related harms in Scotland utilising the Sheffield Alcohol Policy Model (SAPM) (Meng et al., 2012²⁰; Angus et al., 2016²¹). Angus et al. (2016: 8²¹²¹) projected that: “implementing a 50p MUP is estimated to reduce alcohol consumption in Scotland by 3.5% or 26.3 units per drinker per year; consumption reductions under a 50p MUP are estimated to be largest among harmful drinkers (7.0%, 246.2 units per drinker per year) and hazardous drinkers (2.5%, 35.5 units), and a 50p MUP is estimated to lead to 2,036 fewer deaths and 38,859 fewer hospitalisations during the first 20 years of the policy”. Meng et al (2012: 6²⁰), admittedly whose consumption and sales estimates are now dated, projected that “as the minimum price threshold increases, alcohol-related crimes are estimated to decrease: ... 4,700 offences per annum for a 50p threshold (with discount ban)...Crime reductions take place across the spectrum of violent crime, criminal damage and acquisitive crimes”.

3. Research aim and questions

The aim of this study is to evaluate the impact of MUP on crime and disorder, public safety and public nuisance in Scotland. The objectives of the study are captured in the following research questions:

- RQ1: What impact has MUP had on alcohol related crime and disorder, public nuisance and public safety?
- RQ2: How have any MUP-related changes in crimes and offences varied by type of crime and offence?
- RQ3: To what extent have any MUP-related impacts on crime and disorder, public safety and public nuisance varied by sex, age group, geographic location and socio-economic position (if feasible)?

However, we strongly feel, informed by our understanding of the potential impacts of MUP that the evaluation of the impact of MUP on crime, disorder, public safety and public nuisance would benefit from the address of two further research questions, namely:

1. What are the spatial and temporal impacts of MUP around alcohol outlets?
2. What are the cost savings to Police Scotland of the introduction of MUP?

We, therefore, incorporate the address of these questions in the research design.

4. Scope and challenges

Interpreting the scope of, and challenges embedded in, this evaluation a number of key observations can be made. Firstly, identifying which types of crime and disorder, public safety and public nuisance are alcohol related is a fundamental requirement of the study. We propose the address of this challenge (in part) through an innovative and piloted method. Using Police Scotland data for Greater Glasgow, we have assessed the prevalence of alcohol markers in crime records. In 2017-2018, for example, we found that 49% of serious assaults and 42% of common assaults were identified as alcohol related. Whilst this undoubtedly underestimates the true extent to which these crimes are shaped by alcohol consumption, as police officers do not always apply alcohol markers, this approach holds real value in that it can help determine, for example, which crimes are likely to be alcohol related and which crimes less so.

Secondly, whilst the introduction of MUP can be expected to hold a global impact, the existing evidence base implies that its greatest impact might be found in particular time periods and settings and amongst particular social groups (qualified according to their age, gender, poverty and drinking behaviour). For example, not only is serious assault time-variant but the role of alcohol in serious assault might be time-variant also. Thus, Scottish Government (2019: 25¹³) state that “in 2017-18, three out of every five (59%) serious assaults (where day and time was known) occurred at the weekend (i.e. between 6pm on Friday night and midnight on Sunday)”, whilst our own analysis on Greater Glasgow found alcohol markers to be present in over 50% of serious assaults occurring between 21.00 and 03.00 but in 70% of such crimes occurring between 0.00 and 03.00. Turning to consider the spatial patterning of alcohol related harms, serious assaults (for example) tend to cluster around settings associated with the night-time-economy. However, and in line with the changing pattern of alcohol sales from on-trade to off-trade (see also the recent assessment of MUP compliance, Dickie et al 2019²²), it is also important to consider the potential dispersal of alcohol related harms to residential settings. Moreover, that the qualities of these settings and their residents also hold an association with the patterning of alcohol related harms.

Thus, for example, Katikireddi et al (2017: 272²³) demonstrate, in their analysis of linked Scottish Health surveys, that "...alcohol-attributable harms are far higher in disadvantaged social groups, even when accounting for differences in consumption and binge drinking and irrespective of which measure of socioeconomic status is used". Collectively, these issues speak to the requirement of the evaluation to address the issue of equity, of the need to move beyond the assessment of the average effect of MUP and pay attention to the variations in its impact*.

Consideration of these issues is given, where feasible, in the evaluation framework (below).

Thirdly, the key challenge embedded in this evaluation is the issue of identifying causality. Our approach to this issue is twofold. Our evaluation will commence through the enhancement of the draft theory of change presented in the ITT. The existing international evidence base and interviews with subject area experts will be used to more closely specify the outputs and outcomes expected (intended and unintended) of the introduction of MUP. Further, and with reference to the Maryland Scientific Methods Scale, we note that the attribution of causality to MUP of any observed outcomes via a time series evaluation (i.e., a before-and-after comparison in Scotland) can be enhanced through comparison with an untreated group (i.e., a polity out with Scotland). To this end, the evaluation will employ a synthetic dataset as a counterfactual control group. In essence, if the changes observed in the alcohol related harms assessed in this study are found to be greater in Scotland than in the synthetic dataset, a higher level of confidence can be held in the role of MUP in driving these changes.

* For details visit the website: www.betterevaluation.org/en/blog/impact_evaluation_1

5. Evaluation framework

5.1 Project overview

The strategy has been designed to ensure a rigorous and robust approach to the collection of data and evaluation of the impact of MUP on crime and disorder, public safety and public nuisance in Scotland.

5.2 Project inception and preparatory work

The first stage of the evaluation will constitute an inception phase, vital for ensuring that the evaluation meets the needs of the commissioners and starts successfully. Investment in this preparatory work provides a firm foundation for both primary and secondary data collection and its subsequent analysis.

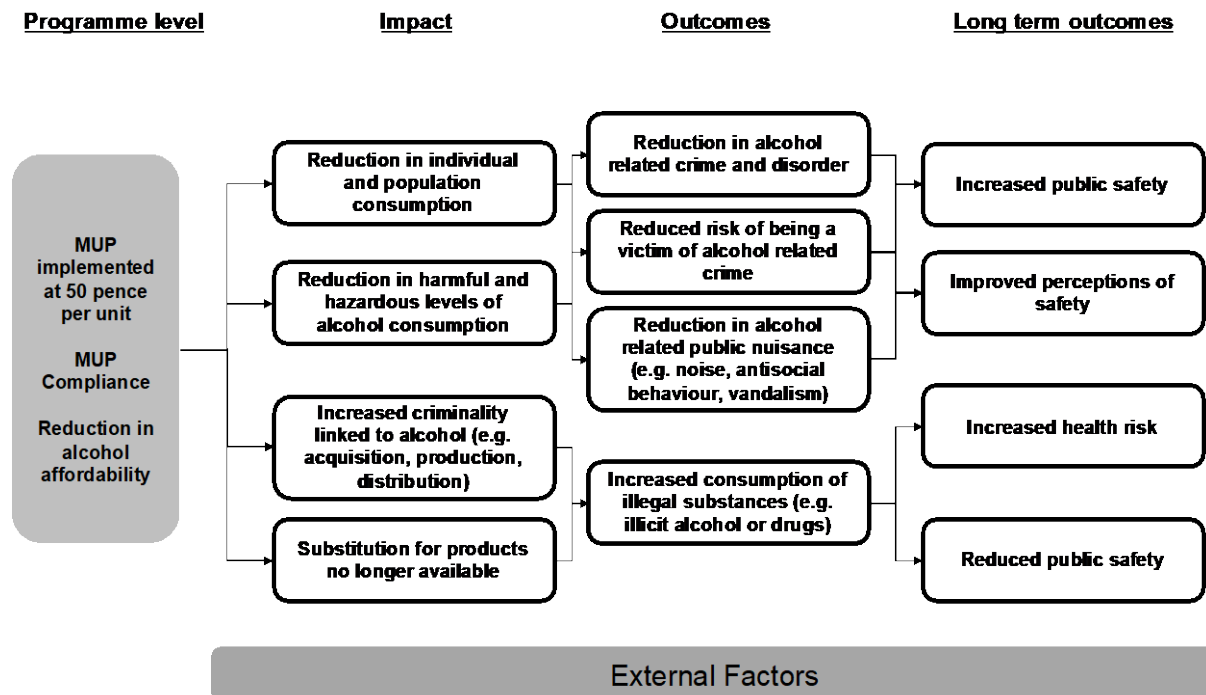
This phase will include:

- An enhancement of the draft theory of change
- Agree research questions (sub-questions)
- Identification of key stakeholders (including links to other MUP evaluation strands)
- Finalise Data Requirements (including Information Sharing Agreements)
- Finalise methods, approach and project plan
- Finalise fieldwork tools
- Commissioner sign-off of overall approach

5.2.1 Theory of change

The draft theory of change (ToC) is presented in Figure 5.1 (below). It provides a high-level overview of the expected impacts, as well as the expected immediate and longer-term outcomes, of the introduction of MUP.

Figure 5.1. Draft Theory of Change (Source: ITT).



As part of the project inception phase, we intend to refine and enhance the draft ToC. A theory-based evaluation is one that starts by unpacking the theoretical or logical sequence by which an intervention is expected to bring about its desired effects (Treasury, 2011).

The key question to ask is:

“What is the conceptual link from an intervention's inputs to the production of its outputs and, subsequently, to its impacts on society in terms of results and outcomes?” †

Carol Weiss (1995²⁴), who is closely associated with the development of the ‘theories of change’ approach, has argued that a key reason why complex programmes are hard to evaluate is because the assumptions that underpin them are sometimes poorly articulated. In order to revise the ToC, we will undertake a number of related tasks, comprising: a review of the international evidence base of the relation between alcohol consumption and crime/disorder, public safety and public nuisance; a review of relevant research on similar projects that involve

† United Kingdom Evaluation Society Glossary of evaluation terms www.evaluation.org.uk/Pub_library/Glossary.htm

taxation/pricing; one to one or small group discussions with a number of key project stakeholders; and, an assessment of the alcohol markers present in crime and incident data. Collectively, we expect that these tasks will serve to support the refinement of the expected immediate and longer-term outcomes of the introduction of MUP in the patterning (intended and unintended) of crime and disorder, public safety and public nuisance captured by the ToC. Thus, the revised ToC will serve to clarify the specific types of these phenomena likely to be influenced by the introduction of MUP as well as the settings (e.g., residential and commercial), time periods (e.g., daily and seasonal) and social groups (e.g., gender and age) in which and among whom, changes in the scale of these phenomena are expected to occur. In these terms, the revised ToC will inform the scope of the research, support the assessment of causality and further guide the refinement of the methodological tools and analytical strategies deployed.

5.3 Secondary Datasets

5.3.1 Overview of data requirements

To undertake this evaluation, it is necessary to deploy proprietary datasets held by Police Scotland, other police forces in the UK, NHS Health Scotland, as well as a number of publicly available datasets. In addition to secondary data, the research will draw on primary data collected from a range of stakeholders. In the following section we list the datasets, their qualities as well as their intended use in the study. The research team currently hold Police Scotland data, as well as data from other police forces across the UK. Knowledge of their qualities, inclusive of structure, strengths and limitations has shaped the design of the evaluation. Further, a project to map the Home Office Counting Rules and Crime Tree structure to the Scottish crime and offence structures has been undertaken.

5.3.2 Police Scotland Datasets

The research will deploy the following Police Scotland datasets: crime event; accused (offender) data; complainant (victim) data; alcohol ghost markers (flags); incident data; and, deployment data. Ideally, the data will span the period 2013 to 2020 (to cover a time period 2 years post MUP implementation). Access to these data requires development of Information Sharing Agreements.

Crime event data

These data include the date and time the offence was committed, reported and recorded, the crime or offence classification code, the x-y coordinates of where the crime occurred and other geographical markers (Police beat, Data Zone, Local Authority etc.). This data will be used to assess crime trends, inclusive of their global and local (space-time) composition.

Crime ghost markers

These data include an alcohol flag. Preliminary analysis (reported above) has been conducted to identify which crimes and offences have a large proportion of alcohol flags. Assessment of this data will inform (at least in part) the selection of specific crimes and offences for which a MUP dividend can reasonably be expected.

Accused data

These data include details of the accused (offender) nominal including the role, date of birth, gender, ethnic origin and the x, y co-ordinates of the home postcode centroid. This allows basic demographic analysis of the accused.

Complainant data

These data include details of the complainant (victim) nominal including the role, date of birth, gender, ethnic origin and the x, y co-ordinates of the home postcode centroid. This allows basic demographic analysis of the complainant.

Incident data

These data comprise calls-for-service data and are collected via the STORM system. When an incident is created, data on the details of the incident are captured including date, time and location (x-y co-ordinates). There is also an opening code and a series of closing codes, which provide details of the type of incident. These data will be used to identify alcohol-related disorder, public safety and public nuisance.

Deployment data

This includes the number of resources deployed and the total time resource committed to an event. This data will be used to determine the overall financial impact upon Police Scotland of the introduction of MUP.

The spatial and temporal referencing of **crime event**, **accused**, **complainant**, **incident** and **deployment** data allows the evaluation to unpick the impact of MUP across different settings (e.g., according to the level of neighbourhood deprivation via Census data) and time periods, addressing a key equity issue. Moreover, the linking **complainant** (victims) and **accused** (offenders) with **crime event** data will allow an understanding of the demographics by crime and offence type.

Innkeeper Dataset – Police Scotland hold a list of all licensed premises. These data includes details of the type of premise, its location and opening hours. These data will be used to understand the numbers and density of particular licensed premises within a geographical location. These data will also be linked with the POI data (see below).

In overview, the research will deploy data spanning 2013 to 2020. This is because:

1. Police Scotland formed and generated a common standard dataset from legacy systems in 2013; and
2. The proportion of alcohol sold at under 50ppu stabilised/plateaued after 2013 at around 50%, following a steep decline from 77% in 2009, 72% in 2010, 66% in 2011 and 60% in 2013.
3. This will enable the evaluation to take account of longer-term crime and incident (disorder, safety and nuisance) trends, whilst also opening prospect of examining the impact of MUP two years post implementation.

We envisage two extracts of the Scotland wide dataset, the first at the commencement of the evaluation (January 2020) and the second in June 2020 (capturing a time period two years post MUP implementation). This will enable the advance of the research, inclusive of methodological piloting, in a timely fashion.

5.3.3 Scottish Criminal Justice Survey (SCJS)

The Scottish Crime and Justice Survey (SCJS) is a representative, typically annual, survey of public experiences and perceptions of crime in Scotland. The survey interviews adults (aged 16 or over) who live in private residential addresses. The SCJS surveys provide a record of peoples' experiences of crime, which is unaffected by variations in reporting behaviour of victims or changes in police practices of recording crime. Assessment of SCJS data will enable the evaluation to probe peoples' 'changing' (i.e., post the implementation of MUP) perceptions of safety and

the extent to which their experiences of certain types of crime are perceived to be part consequence of the offender being under the influence of alcohol. The study will capture insights afforded by this data relevant to the evaluation of MUP. However, these data are not expected to hold sufficient quality and quantity to usefully inform the statistical analyses proposed in this study - they offer limited value in establishing a trend and any observed changes could not be attributed to MUP.

We note the unknown data release date of the SCJS and the geographical boundaries of its reporting. Whilst we would intend to probe the SCJS for insights, we do not envision these materials comprising a significant element of the study. For example, the last data release contained a sample size of only 306 records in which the respondent was asked if they 'perceived' the offender to be under the influence of alcohol (see Table 3.56: ALCOFF: Survey crimes where offender was under the influence of alcohol. BASE: All SCJS crime where respondent can say anything about the offender).

5.3.4 Points of Interest, licensing and census datasets

The Ordnance Survey (OS) Points of Interest (POI) data[‡] is produced quarterly at a national level. Through the BDC's existing research and analysis of the association between alcohol and crime, we have examined the qualities of POI data alongside local authority licensing datasets and the Police Scotland's Innkeeper dataset. From this, we have identified a set of POI/PointX categories as premises which sell alcohol. Census data from Scotland and England/Wales (2011) will be used to qualify the deprivation characteristics of residential settings. These data will be utilised in the analysis of the spatial patterning of alcohol related crimes and offences.

5.3.5 Compliance Data

Statistical compliance data from local areas was not available for the MESAS evaluation of compliance. Therefore, qualitative interviews were undertaken with Licensing Standards Officers (LSOs) and Trading Standards Officers (TSOs) (Dickie et al., 2019²²). The study found that MUP was, in the main, well implemented and compliance among licensed premises was high. The evaluation would be enhanced

[‡] www.ordnancesurvey.co.uk/business-and-government/products/points-of-interest.html

through access to accurate local compliance data. Principally, we are seeking to understand the following question: are there particular areas where compliance is good and other areas in which it is poor? We anticipate that such data might become available during the proposed research project. If so and recognising that currently we do not know the qualities of these data, it may be possible to use this data to contrast the impact of MUP according to geographical variance in the level of compliance. The availability, qualities, strengths and limitations of these data will be assessed during the project inception and preparation stage.

5.3.6 MESAS Datasets

The Monitoring and Evaluating Scotland's Alcohol Strategy (MESAS) monitoring report and associated datasets are published in June each year. We propose to use the data published in the report and associated supplementary data tables, including:

Alcohol Pricing Data

Compiled by Nielsen/CGA Strategy, these data provide a national level assessment of alcohol pricing in Scotland, with England and Wales offered as a comparison. This data is important to understand the proportion of alcohol sold at under 50ppu, expected to be zero in Scotland from 2019, but higher in England and Wales. Additional breakdowns by supermarket/convenience store would be useful, together with any sub-regional or local authority breakdowns if available.

Alcohol sales and consumption data

The MESAS data will be used to understand any changes to consumption.

5.3.7 Comparison datasets

The BDC are currently working with other UK police forces on a range of projects. Through this relationship, the BDC has acquired comparable crime and incident datasets to those proposed for capture in Scotland. As with all the data sources identified here, the BDC is aware of their strengths and limitations.

5.3.8 GIS datasets

We propose to use a range of Ordnance Survey (OS) datasets, including Scottish Data Zones (DZ) and English Lower Layer Super Output Areas (LSOA), for data aggregation, comparison and mapping (visualisation).

5.4 Stakeholder engagement

We will collect primary data through two waves of **stakeholder** engagement. This will take the form of one-to-one or group discussions with professionals/ stakeholders. These data will be used to support the set-up of the project and then qualify the quantitative findings at the end of the project. This is explained in more detail below.

5.5 Methods

5.5.1 Overview of Methodological approach

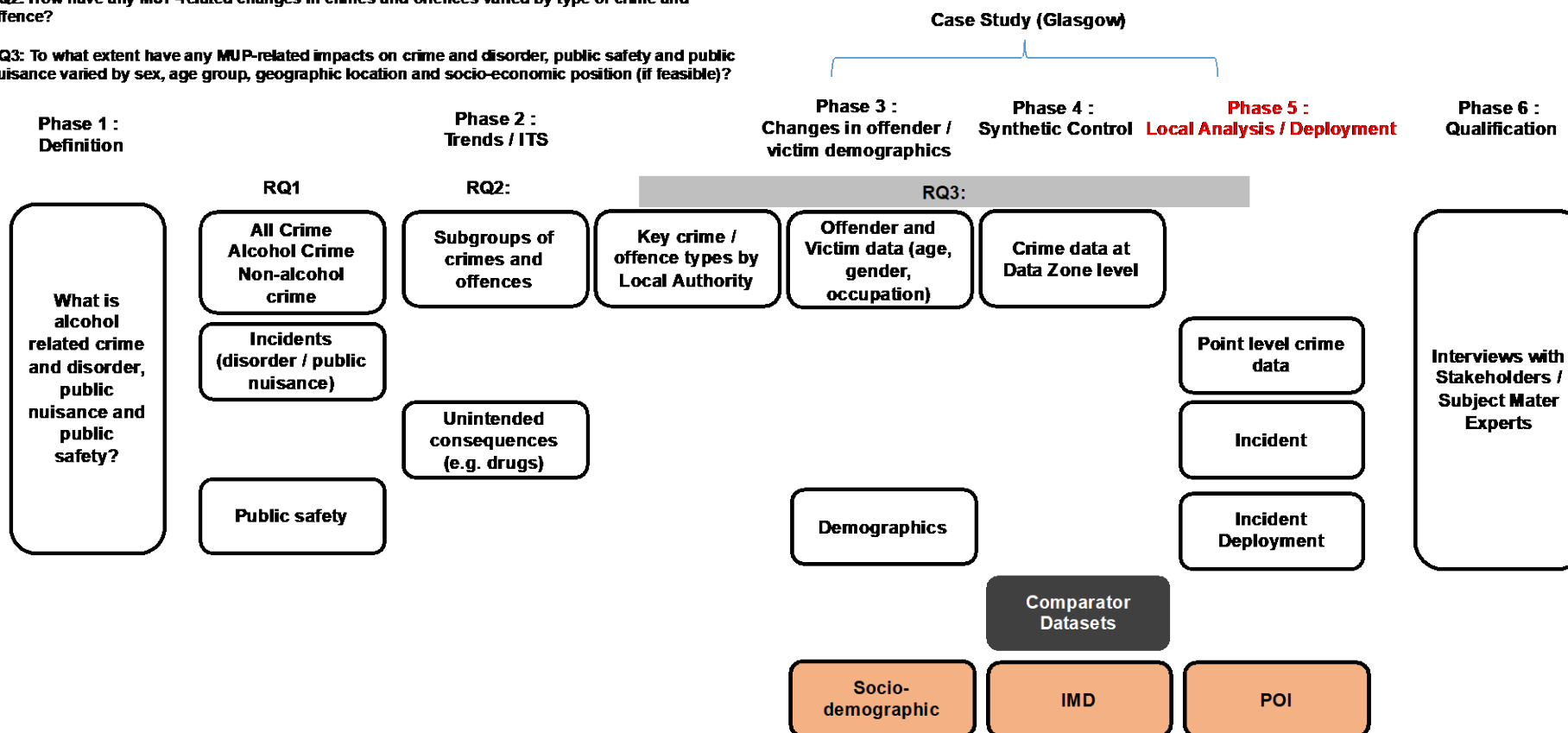
This section details the methodological approach to be utilised in the evaluation. There are a number of phases of work (associated with the individual research questions 1-3), which may overlap and be iterative. These phases are illustrated in Figure 5.2 and then described.

Figure 5.2. Evaluation phases, methods and data

RQ1: What impact has MUP had on alcohol related crime and disorder, public nuisance and public safety?

RQ2: How have any MUP-related changes in crimes and offences varied by type of crime and offence?

RQ3: To what extent have any MUP-related impacts on crime and disorder, public safety and public nuisance varied by sex, age group, geographic location and socio-economic position (if feasible)?



Phase 1: Define alcohol related crimes and disorder, public nuisance and public safety

The first phase of research (embedded in the inception of the project and linked to the enhancement of the draft ToC) will set out to determine which types of crime/offence and incidents (disorder, public nuisance and public safety) can appropriately be qualified as alcohol related. In addition to the preliminary analysis advanced in preparation for this research, we will base our decision on the international evidence base (exploring the relationship between alcohol and crime) and interviews with subject matter experts.

Phase 2: Trends in crime and disorder, public nuisance and public safety

To address research questions 1 and 2 (and part of research question 3) we will examine trends in the data utilising uncontrolled interrupted time series modelling (ITS). This methodology will be used to compare global trends in:

- A. 1) all crime and incidents, 2) alcohol related crime(s) and incidents, and 3) non-alcohol related crime(s) and incidents.
- B. Sub-groups of crimes and offences that may result from the unintended consequences of MUP.
- C. Key crime/offence types by local authority/neighbourhood deprivation.

We will also utilise the SCJS to identify if there are any changes in the prevalence of residents who have reported being a victim of crime and/or their perceptions of public safety (primarily to qualify our quantitative findings). These tasks will serve to identify if there is a 'global' and/or 'local' step-change in crime and disorder, public nuisance and public safety before, during or after the introduction of MUP.

Phase 3: Changes in offender/victim demographics

The ITT states that Police Scotland will be unable to provide robust national data for demographics. To this end, Police Scotland datasets, relating to the Greater Glasgow local authorities, will be deployed (as a case study) to identify if there are changes to offender and victim characteristics (age, gender, ethnicity) pre and post the introduction of MUP. This analysis will address core aspects of research question 3 and will be undertaken utilising the study crimes and offences identified in phases 1 and 2. This analysis can only be completed on crimes and offences due to data availability. The analysis will be undertaken using uncontrolled and controlled

interrupted time series modelling (ITS). It is important to note that these data are subject to quality issues surrounding detection rates and lags in recording (relevant specifically to the post MUP period captured in the evaluation). We will also utilise the SCJS to identify if there are any significant changes in the demographics of residents who have been a victim of crime and/or their perceptions of public safety. However, due to the sample size captured by the SCJS, we do not expect observed to be statistically significant.

Phase 4: Synthetic control

In this phase, we will use a synthetic control dataset, integrating and advancing the interrupted time series analysis undertaken to date in address of research questions 1, 2 and 3. A synthetic dataset will be created utilising data from a police force area in England. This data will be weighted at a micro-geographical level (LSOAs) to be reflective of the area-based (Data Zone) characteristics (demographics, deprivation and alcohol related points of interest) of Greater Glasgow. Not only will this analysis support the assessment of causality, it will further ensure that the research addresses the equity issues posed in the ITT.

Phase 5: Local analysis and deployment

The evaluation will address of two further research questions, namely:

- (4) What are the spatial and temporal impacts of MUP around alcohol outlets (specifically convenience stores)? And,
- (5) What are the cost savings to Police Scotland of the introduction of MUP?

Research question 4 recognises that both the 'global' and 'local' changes in crime and disorder, public safety and public nuisance assessed in phases 2-4 of the evaluation neglect to consider the impact of MUP in the areas surrounding alcohol outlets (by type). Research question 5 recognises the value of generating a metric to capture the 'overall' impact of MUP on crime, disorder, public safety and public nuisance as a whole. Both these research questions can be advanced, building on the earlier phases of the evaluation, using the data currently held by the BDC.

For research question 4, we will utilise geographical information systems (GIS) and create buffers of varying sizes (200m, 500m and 1,000m) around premises associated with the NTE, convenience stores and other licensed premises identified using the Ordnance Survey Point of Interest (POI) dataset. This analysis will assess

whether the outcomes of MUP vary according to alcohol outlet type. For research question (2), we utilise incident data to assess the cumulative time that the police are deployed to alcohol-related incidents in Greater Glasgow. The synthetic dataset generated in phase 4 of the research can also be utilised to further advance the insights generated under this research question.

Phase 6: Qualification

The final phase will focus on the qualification of the quantitative analytical results. We will hold one-to-one and/or small group discussions with key stakeholders and subject matter experts after phases 1 to 5 are completed. Their input will serve to help interpret the research findings. Data from phases 1 to 6 will then be triangulated and synthesised in preparation of the draft and final evaluation reports.

5.5.2 Stakeholder Engagement

The intention of this component of the study is to probe the views and insights of commissioners, data providers and those engaged in preventing/managing alcohol-related crime and disorder, public nuisance and public safety across diverse settings. The stakeholder engagement will be used to improve the specification of the draft Theory of Change, research questions (sub questions), research design (methodology and data), interpretation of findings and dissemination.

We will collect stakeholder views through two waves of **stakeholder** engagement (either by group and or one to one discussion). A minimum of 12 group/one to one discussions in total will be completed, reflecting the diverse urban and rural geography of Scotland and professional knowledge of alcohol related harms. The first wave will take place during the inception stage of the project, to further develop the theory of change and to understand how MUP has been implemented and is being monitored. The second wave will take place near the conclusion of the evaluation and focus upon the interpretation of the research findings. Stakeholders will include: commissioners (EAG members); data providers/analysts; and, policy/delivery specialists (across diverse geographies in Scotland).

The key stakeholders/subject matter experts will be invited to participate via an email request. An information sheet will be sent to the stakeholder/subject matter expert explaining the purpose of the research, why they have been identified as a stakeholder and subsequently invited to participate in our engagement work, what

this would involve, and how any information they might provide will be stored and used. Before discussions commence the stakeholder/subject matter expert will sign a consent form in duplicate (one for them and one for researcher). The stakeholders/subject matter experts will be able to withdraw from the stakeholder engagement during and for one week after they take part in a discussion. All discussions will be recorded using a secure device (i.e., Olympus digital voice recorder dS-3500). These files will then be transferred to a secure drive and password protected.

5.5.3 GIS and R

Geographical Information Systems (GIS) including ArcGIS/R statistical packages will be used to visual and analyse the data.

6. Project reporting

6.1. Project inception report

A brief project inception report will be produced to clarify the research questions to be advanced in the evaluation, detail the enhanced theory of change, data requirements of the evaluation, performance and reporting requirements, as well as the fieldwork tools and methodological approaches. This report will be signed off by the commissioners prior to the commencement of the substantive part of the project.

6.2. Highlight reports

As part of our project management processes we will produce short highlight reports on a monthly basis. These will briefly detail the overall progress made with the project, key achievements, work completed in the previous month, a review of key issues and risks, and work planned for the following period.

6.3. Draft report

A draft report will be produced in February 2021. The commissioners will provide feedback on this report before the production of the final report.

6.4. Final report

The final evaluation report will be presented in April 2021. The report will adhere to the guidance specified in the ITT and be compliant with NHS Health Scotland's Research Report Style and Content Guidelines (2018):

www.healthscotland.com/documents/2635.aspx

7. Project plan

A draft delivery milestone plan for this project (Figure 7.1, together with a high-level project plan / Gantt chart (Figure 7.2) are presented below.

Figure 7.1. Delivery milestone plan

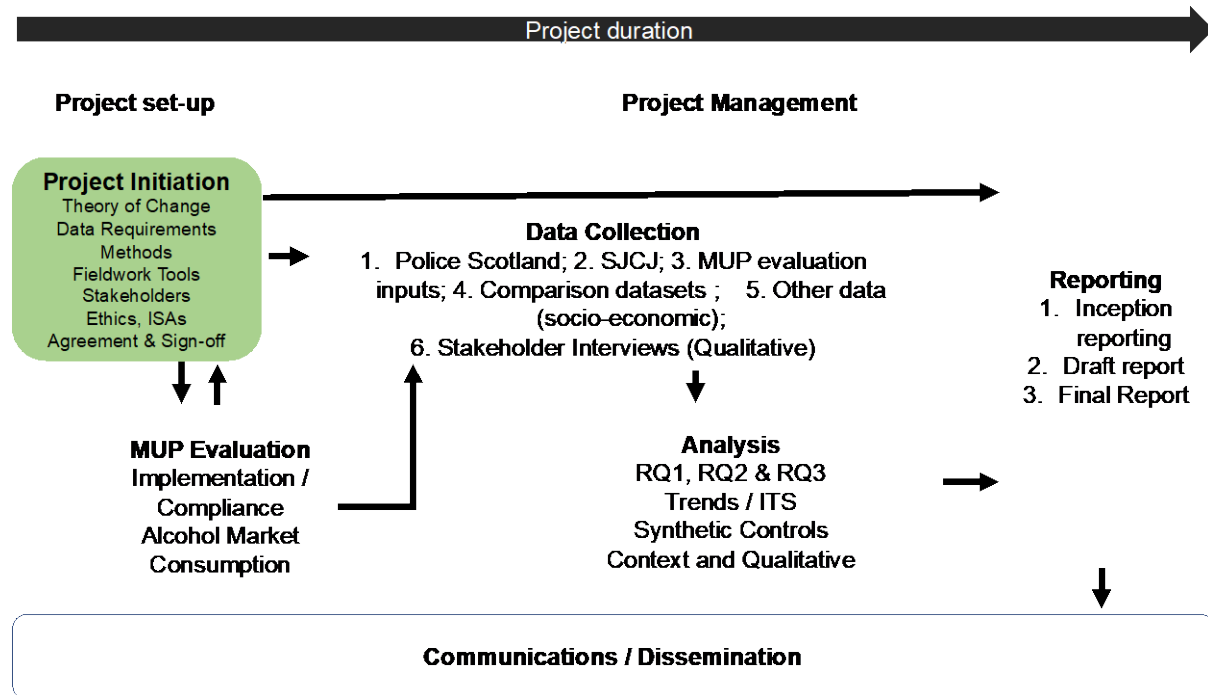
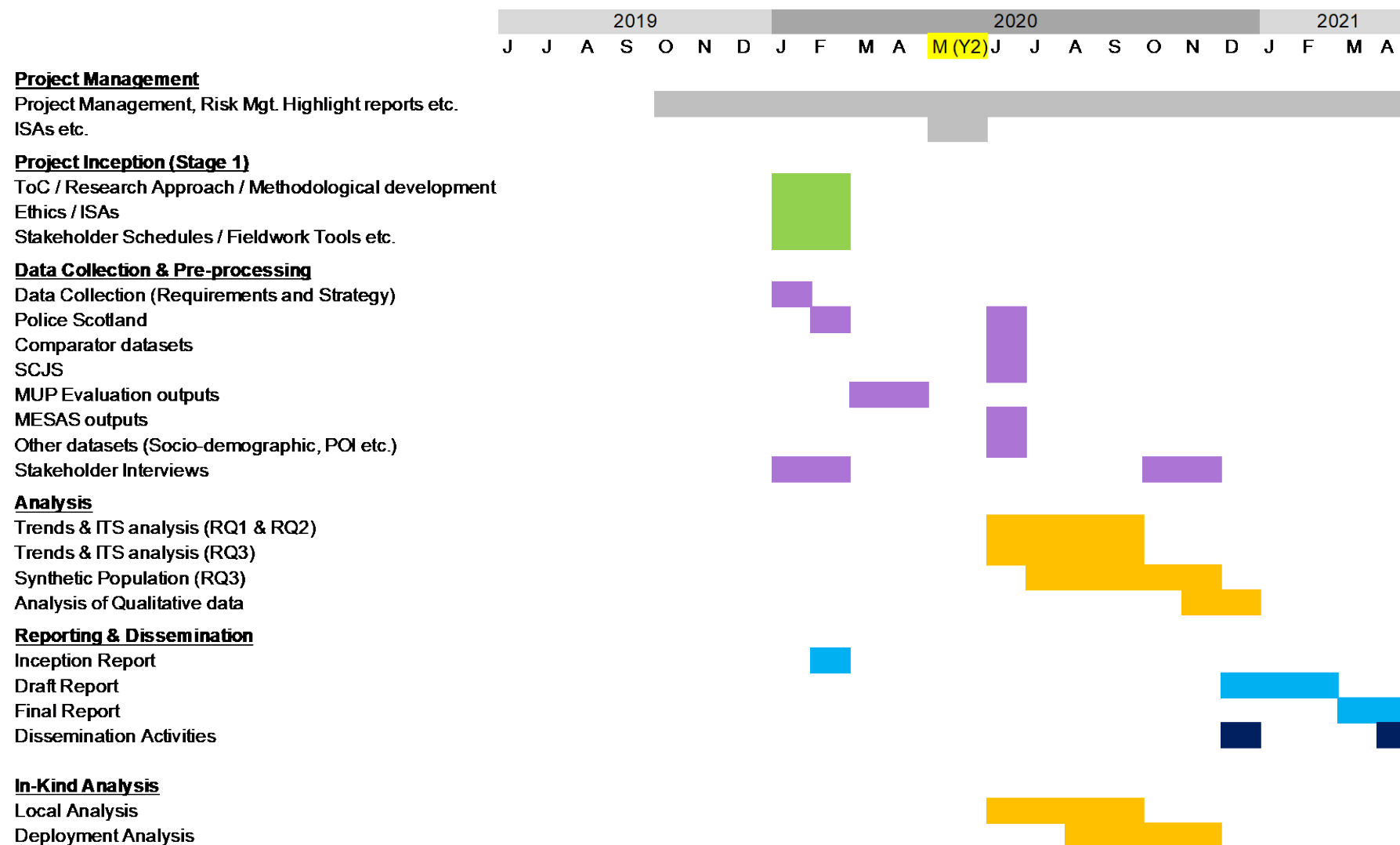


Figure 7.2. High-level project plan/Gantt chart



8. Project team

Professor Bannister will provide strategic direction and delivery roles throughout the duration, and across each aspect, of the project. Similarly, Mark Ellison will fulfil data and project management duties. From experience, we have found significant and consistent senior staff engagement to hold close association with successful project outcomes. Other senior staff will be drawn in to the project to fulfil specific roles, as determined in the project inception phase (e.g., Computing and Data Science, Advance Quantitative Analysis, Evaluation). The BDC possesses a large pool of analysts with expertise in advanced quantitative and data science methodologies, geo-computation and GIS etc. The project team (as described) has worked together on multiple projects. Analysts will be drawn into the project based on the specific requirements of individual research tasks.

The key strengths of the project team are:

- Extensive knowledge of the subject area
- Excellent Track record of delivering criminal justice evaluation / policy change projects
- Established relationships with Police Scotland
- Extensive experience of the application of advanced quantitative and data science methods
- Extensive experience of managing and analysing police datasets, inclusive of their integration with other proprietary and open-access datasets
- Extensive experience of working with stakeholders (qualitative, collaborative and co-production techniques)
- Transfer research findings into policy formulation and operational delivery

8.1. Team roles

Director and Principal Investigator: Professor Jon Bannister

Project Manager and Principal Researcher: Mark Ellison

Researchers:

- Dr. Muhammad Salman Haleem
- Dr. Karolina Krzemieniewska-Nandwani

- Dr. Kitty Lympelopoulou
- Dr. Stephanie Wallace
- Dr. Monsuru Adepeju

The research team possess strong skills and experience, meeting the following criteria:

- Experience of undertaking evaluations of an intervention, programme or policy change with a track record of completing to high quality, on time and within budget;
- Experience of working with and accessing data held by public bodies (for example, Police Scotland);
- Skilled in statistical analysis, including analysis of time series data;
- Experience of designing data collection tools appropriate to the preferred study design; and
- Experience of the collection, synthesis and interpretation of the types of data associated with the preferred study design; and,
- Experience of working with stakeholders to deliver effective and efficient evaluations (via collaboration and co-production techniques).

8.2. Principal investigator and project manager profiles

Jon Bannister FAcSS FRSA is Professor of Criminology in the Department of Sociology at Manchester Metropolitan University, where he founded and directs the Manchester Metropolitan Crime and Well-Being Big Data Centre, and the Crime and Policing Network. He is Editor-in-Chief of Urban Studies, as well as holding visiting professorial positions at the Chinese Academy of Science and Wuhan University. He is currently engaged, amongst other research activities, in the Economic and Social Research Council funded (£2.5m) Understanding Inequalities research programme, having recently completed work on the Economic and Social Research Council funded (£4m) Applied Quantitative Methods Network research programme.

Jon holds research expertise in criminology, urban studies, big data, policing, evidence-based policy, advanced quantitative methods and knowledge mobilisation (inclusive of co-production). His research examines the interplay of urban processes and behaviours (urban transformations) upon the exposure to inequalities. He has

generated a research portfolio in excess of £10m, inclusive of grants made available by the Economic and Social Research Council, the Scottish Funding Council, Scottish Government, the Joseph Rowntree Foundation, the Home Office. He has published over 80 international peer reviewed journal articles, research monographs and reports. He has undertaken extensive public engagement and knowledge mobilisation activities to support urban studies, policing and community safety activities, nationally and internationally. He has delivered national and international crime and policing training, and undertaken advisory roles, on behalf of: Police Scotland; the National Violence Reduction Unit; the Scottish Community Safety Network; the Scottish Parliament Justice Committee; the Ministry of Justice of the Dutch Government; the Ministry of the Interior of the State of Qatar; and, the Parliamentary Office of Science and Technology.

Mark Ellison is deputy director at the Manchester Metropolitan University Crime and Well-Being Big Data Centre (BDC) leading on data collection/analysis and developing relationships with external partners. He is a specialist in managing and analysing large data sets. Mark is currently working with a number of police forces and councils on a range of Big Data Projects. Mark is the project manager for the Greater Manchester Police (GMP) Operational Analytics/Data Science project, understanding demand across GMP, including the areas of Domestic Abuse, Missing Persons, Mental Ill Health and Knife Crime. Mark is leading on work to understand the relationship between crime and alcohol outlets in the West Midlands working with West Midlands Police (WMP) and a number of local 'licensing' authorities. Mark is also supporting the ESRC Understanding Inequalities project and developing research with Police Scotland. Mark previously worked as a research fellow for the Policy Evaluation and Research Unit (PERU), managing a range of projects. Mark has supported Interserve/Purple Futures (Community Rehabilitation Companies) with demand, business and outcomes modelling. Mark has also worked on a Troubled Families data-mining project with Manchester City Council. Mark has previously worked on a range of Criminal Justice projects and evaluations including; Greater Manchester ICO evaluation, Manchester College/Novus impact of education on re-offending, GM Transforming Justice Project, London Criminal Justice Partnership Reducing Reoffending evaluation, HMP Preston impact evaluation, Wigan DAAT Payment by Results Pilot and London Probation Trust evaluations.

Mark previously worked on the European FP7 MYPLACE project (contemporary views of young people), managing the UK survey (fieldwork/data collection) and analysing the consortium dataset of 17,000 records.

9. Ethics, data security and equality

9.1. Ethics

This research protocol has been developed in accord with the ethical guidelines of MMU, from whom formal ethical approval for the project will be sought. Evidence of approval, as well as any actions recommended in order to receive approval, will be shared with NHS Health Scotland. The mixed methods study design entails both stakeholder engagement and quantitative research. The stakeholder engagement encompasses one to one and group discussions with professionals (key stakeholders and subject matter experts) working in case study settings. We will ensure that the safety and well-being of these stakeholders is assured and take account of any ethical issues that may arise during the research. Preserving stakeholder safety, confidentiality and anonymity (as appropriate) will be paramount to our research process. In recruiting stakeholders we will work under the doctrine of valid consent. We will develop clear and accessible consent forms and information sheets. The consent process will apply to discussions in person, by telephone or via any other media. Consent and Information sheets will be provided to the stakeholder/ subject matter expert in advance of the discussion. Stakeholders will be told that they have the right to withdraw from the study at any time. All stakeholder engagement will be conducted in public settings and the researchers engaged in this component of the research will receive safety training and abide by safety protocols in accord with Social Research Association (SRA) guidelines. Accessible versions of the findings will be distributed to stakeholders who participate.

The MMU ethics procedure is consistent with the guidance of the United Kingdom Research Integrity Office. The MMU ethics process requires an application for research approval to be made to the Faculty Ethics Committee. Ethics approval usually takes one month to secure. The BDC holds an overarching ethics agreement that spans its various research activities using police data. In these terms, this aspect of the project will require an amendment to this existing agreement – saving time. The MMU institutional ethics procedure recognises that the BDC ethics framework exists 'beyond compliance', physically and legally.

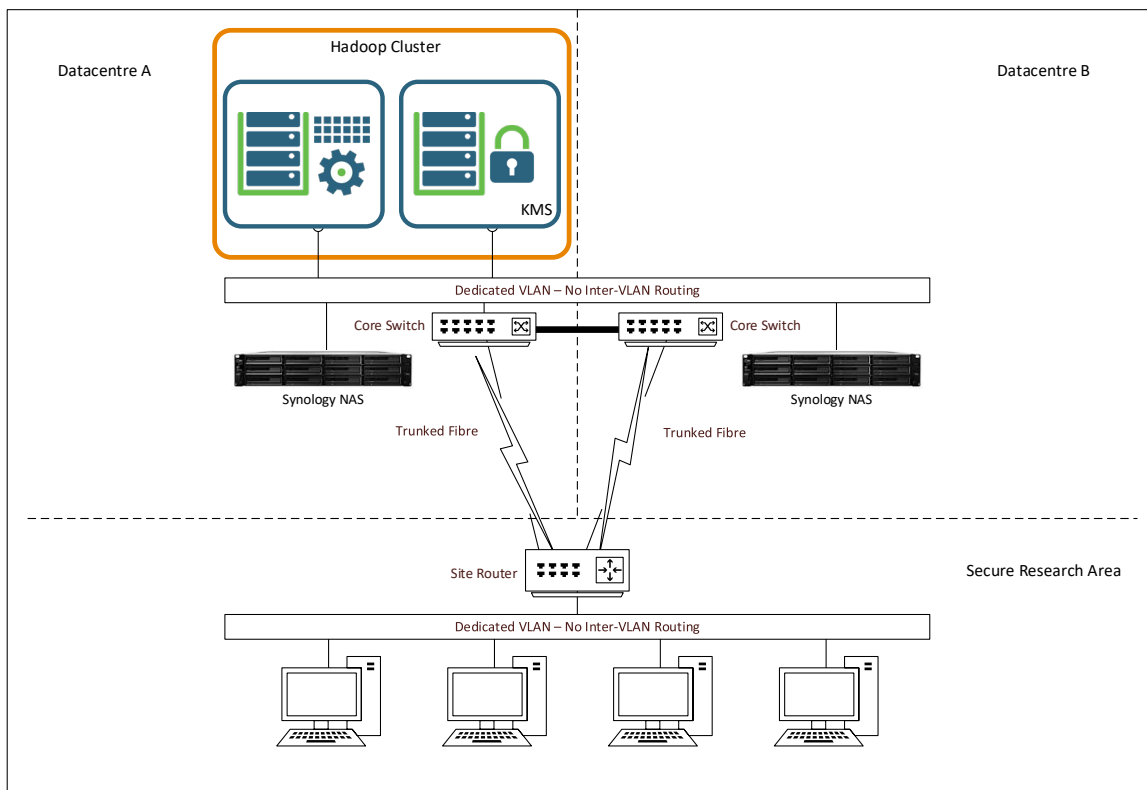
The quantitative research will utilise data generated from both proprietary secondary /administrative and open-access data sets. The research will use longitudinal disaggregated data sets supplied by Police Scotland (e.g., crime, incident, offender and Innkeeper data), Greater Manchester Police (crime, incident and offender data) and (as appropriate) NHS Health Scotland. All use of this data will be subject to the highest ethical standards and legal governance procedures. Because the police data include information pertaining to individuals, all research based on this data will conform to the requirements of the Data Protection Act/General Data Protection Regulation (GDPR) and the English and Scottish Information Commissioners. The research design implies area identification at the city-level (Greater Glasgow, Greater Manchester). However, individual and micro-level area data will be analysed and represented in such a way that both cannot be identified (e.g., through high level clustering or using weighted mapping techniques).

The data will be held, via Information Sharing Agreement (ISA) in the BDC secure data facility. Access to and analysis of these data will be subject to Police vetting (all BDC team members have been vetted to NPPV3) and the physical and procedural protocol of the BDC (see Data security and Data management, below). These measures will ensure that only those researchers that require analysing the data will be named on the ISAs related to the proposal. The problems of absolute data destruction upon completion of research are well known. All efforts will be made, in line with the ISAs, to ensure that datasets are destroyed securely and successfully. Though a range of stakeholders will be involved the research, no personal or secure data will be passed on to these stakeholders.

9.2. Data security

The BDC is a UK Government assured and Police Scotland approved secure data facility. The NCC Group conducted a Cyber Essentials assessment against the environment in July 2019 and awarded certification. An overview of secure data facility is illustrated in Figure 9.1.

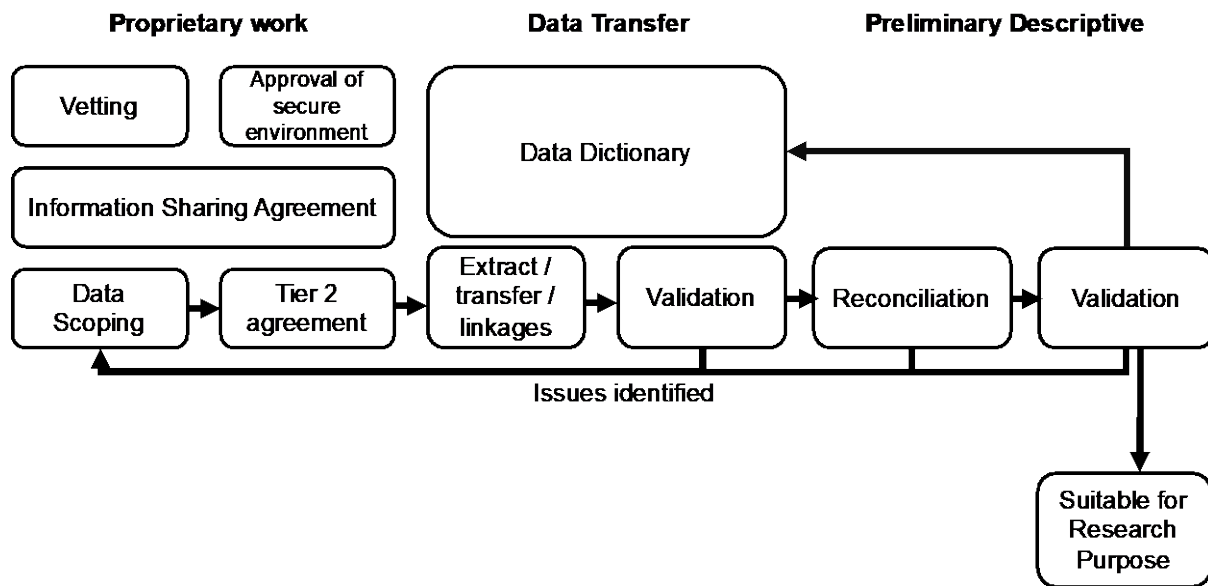
Figure 9.1. Configuration of the BDC secure facility



9.3. Data management

The BDC adopts a three-stage process to understand, transfer and integrate police and other partner agency datasets, assuring their appropriate and accurate integration. These stages are illustrated in Figure 9.2 below. In essence, they encompass preparatory work, data transfer and preliminary descriptive analysis. These stages are essential to developing a suitable and reliable dataset for the requirements of the project. We intend to work closely with the proprietary data partners of this project to ensure these data management stages are completed efficiently and effectively.

Figure 9.2. Data management



With regards to the stakeholder and subject matter expert discussions, these will be recorded using a secure device (password protected). These files will be uploaded to a secure drive in the BDC, at which point the original recording will be deleted. Access to the secure drive is password protected and access to the BDC facility requires security clearance. No personal data is required to be processed. The original data file and the note file will hold two identifiers (name and role). Any processed and reported data will be marked by the role of the stakeholder/subject matter expert. All data files (original and note) will be deleted upon completion (approval) of the final research report or at the request of the stakeholder/subject matter expert. It is duly noted that NHS Health Scotland will be the Data Controller (for stakeholder data).

9.4. Equality

We can confirm that Manchester Metropolitan University comply with all relevant equality legislation (Equality Act 2010) stated in the tender. Information on how MMU treat employees fairly and appropriately with specific reference to the protected characteristics can be found on our website: www2.mmu.ac.uk/about-us/equality-and-diversity/

Manchester Metropolitan University is proud of its diverse community of staff, students and visitors. We are committed to creating a positive environment where everybody is treated with dignity and respect. The University aims to build a culture where:

- Fairness and inclusion are a fundamental part of everything that we do.
- Diversity is valued and celebrated.
- Good relations between diverse members of the University's community are promoted.
- People's diverse abilities and backgrounds are recognised and are treated with respect.
- Students from diverse backgrounds have an equal opportunity to benefit from higher education.
- Students and staff from diverse backgrounds have an equal opportunity to reach their potential.
- Benefits are maximised to the local communities that we serve.

Every year the University reports key information to support monitoring and drive continual improvement, not just to meet our statutory reporting requirements.

MMU are one of the Top 20 Employers for LGBT staff: www2.mmu.ac.uk/news-and-events/news/story/7101/

The primary participants in the evaluation will be professional and stakeholder groups. In working with these groups we will consider how to ensure participants from a diverse range of backgrounds and experiences are included and represented within the research activities, to ensure that community views are captured.

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